U.S. Department of Transportation

BUDGET ESTIMATES

FISCAL YEAR 2015

FEDERAL AVIATION ADMINISTRATION

**SUBMITTED FOR USE OF
THE COMMITTEE ON APPROPRIATIONS**

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SECTION 1: OVERVIEW

OVERVIEW

Introduction

The Federal Aviation Administration (FAA) remains the principal federal agency responsible for providing the safest and most efficient aerospace system in the world. Since 1958, FAA has regulated and overseen all aspects of civil aviation in the United States, proudly running the largest and safest air traffic control system in the world, and ensuring the safety of the traveling public.

The FAA is laying the foundation for the aerospace system of the future. As an agency, FAA has a tremendous opportunity to make a difference for stakeholders, while addressing the challenges that the changing industry presents. Our vision is to transform the aviation system to reflect the highest standards of safety and efficiency and be a model for the world. The FAA will bring about this transformation by fostering innovation in our workforce and in how we serve our stakeholders and the American people. This vision is brought to life in our strategic priorities for the agency:

- **Make aviation safer and smarter -** The aerospace industry is growing more complex, and is not the same industry we regulated in decades past. At the same time, there is more safety data than ever before. This provides FAA with the opportunity to be more proactive about safety and use safety management principles to make smarter, risk-based decisions throughout the agency and with industry and global stakeholders. This will make our aviation system safer and smarter and raise the bar on safety.

- **Deliver benefits through technology and infrastructure -** The nation's air traffic system is based on infrastructure that was largely built 50 years ago and is out of balance with our stakeholders' changing needs. NextGen is redefining the NAS and is delivering benefits to system users, such as reduced fuel costs, reduced delays, and reduced environmental impact. Great technological advancements require FAA to safely integrate new types of user technologies, such as unmanned aircraft systems and commercial space vehicles, into the airspace. As we accommodate new services, FAA must rationalize and rebalance existing services while modernizing our existing infrastructure in order to reduce costs and become more efficient in the long run.

- **Enhance global leadership -** Aviation is a global industry and millions of Americans travel overseas every year. The FAA must continue America's heritage as world leaders in aviation and set the standard for others to measure against. Aviation was invented in America, but other nations have seen their aviation systems grow dramatically and have become significantly more influential on the international stage. The FAA needs to be at the table to shape international standards to improve aviation safety and efficiency around the world.

- **Empower and innovate with FAA's people -** Meeting this strategic challenge requires that FAA harness the collective strength of the agency's employees. The FAA's people are the ultimate drivers of success, which means that FAA must attract and develop the best and the brightest talent with the appropriate leadership and technical skills to undertake this transformation. The FAA's workforce is changing and is in the midst of a retirement wave, which presents both challenges and opportunities. There is significant work to do to set the foundation to empower and innovate with FAA's people.

This is a bold aspiration for FAA, and will span beyond the next four years. However, we are committed to seeing measurable and steadfast progress toward this vision by 2018, including significant steps forward in FY 2015. The rapidly changing industry, the technological opportunities, the uncertain fiscal environment, an evolving workforce, and the global backdrop comprise a compelling case for transformational change, and that is what FAA expects to achieve.

Our FY 2015 Budget request of $15.4 billion will support this transformation, while continuing to focus on our ongoing mission. It strikes a balance between maintaining current infrastructure while deploying key NextGen benefits to our stakeholders, upholding our critical safety programs, and modernizing our aviation infrastructure. We have streamlined our organization and processes to gain the benefits of a shared services business model while carefully prioritizing those technologies and programs that will most improve safety and efficiency today. The FAA remains deeply committed to providing the safest, most advanced and efficient aviation system in the world, and to ensuring air transportation remains safe and efficient wherever U.S. citizens travel.

Overview by Appropriation Account

Operations

The FY 2015 request of $9.75 billion represents an increase of 1.0 percent above the FY 2014 enacted funding levels. The requested funding provides for pay increases consistent with government-wide inflationary factors ($55 million) along with the prescribed agency contribution increases into the Federal Employees Retirement System (FERS) for both Air Traffic Controllers and non-controller employees ($129 million). Although this budget requests a net increase of 454 full time equivalents, the FAA has included a $49 million reduction in projected pay-related savings due to the anticipated need to slow down hiring during FY 2015 because of the estimated number of new hires in FY 2014. To manage within existing fiscal constraints, the FAA has further projected over $54 million in contract reductions, all within the Air Traffic Organization.

Included in the budget request are two sets of program adjustments, $17.7 million in the Air Traffic Organization for Transition to Operations and Maintenance (TOM) and a net increase of $606 thousand across the Operations organizations for the Department of Transportation projected Working Capital Fund obligation.

The TOM funds are required for in-service management in FY 2015 for both the En Route Automation and Modernization ($12.7 million) and Terminal Automation Modernization and Replacement ($5 million) programs. En Route Automation and Modernization (ERAM) is replacing Host at 20 en route centers as the computer system that processes flight radar data, provides communications, and generates display data for air traffic controllers. The requested funding will provide second level engineering and software and hardware modification support at Albuquerque, Chicago, Denver, Minneapolis, Houston, Kansas City, Oakland, and Indianapolis. Terminal Automation Modernization and Replacement (TAMR) provides direct mission support to the FAA by ensuring the efficient flow of traffic through the National Airspace System (NAS), principally in the terminal airspace domain. FY 2015 funding will support second level engineering and telecommunications costs associated with three TAMR Phase 1 systems (Philadelphia, Northeast Operating Support Facility, and Traverse City) and 6 TAMR Phase 3 Segment 1 systems (DFW TRACON, two operational support systems at DFW, one training support system at DFW and support systems at Mike Monroney Aeronautical Center and the William J. Hughes Technical Center).

Finally, the budget request identifies three base transfers that would better realign resources within FAA's lines of business and staff offices. The FAA requests 1 FTE transfer from the Air Traffic Organization (ATO) to the Office of Chief Counsel for staff support; $316 thousand from ATO to NextGen (ANG) to support additional costs associated with security guard services at the William J. Hughes Technical Center; and $1.56 million and 6 FTEs from the Office of Human Resources (AHR) to ATO to provide resources to support the Occupational Safety and Health (OSH) workplace inspections program.

Facilities & Equipment (F&E)

The FY 2015 Budget Request allows FAA to meet the challenge of both maintaining the capacity and safety of the current National Airspace System (NAS) while keeping our comprehensive modernization and transformation efforts moving forward. The FY 2015 request of $2.6 billion represents a steady level of continued funding when compared with the FY 2014 Enacted Budget. This funding continues to advance our NextGen modernization efforts that will help maintain American leadership in the skies.

The F&E NextGen portfolio is $774 million in FY 2015, a 6.5 percent decrease below the FY 2014 enacted budget. This funding provides FAA with the resources needed to continue our ongoing NextGen modernization activities, including nation-wide Automatic Dependent Surveillance – Broadcast (ADS-B) deployment, and adding ADS-B service to the Gulf of Mexico and the Oceanic environments. Funding is requested for follow-on ERAM System and Sector Enhancements which will provide additional future NextGen capabilities. In addition, funding is requested for publication and development of Performance

Based Navigation (PBN) procedures that will provide greater flexibility in the NAS and to facilitate more dynamic management of air traffic.

The remainder of our investment – representing over $1.8 billion – will be in legacy areas, including aging infrastructure, power systems, information technology, navigational aids, and weather systems. To support NextGen's mid-term goals, the Terminal Automation Modernization/Replacement (TAMR Phase 3) program will continue full scale deployment of Standard Terminal Automation Replacement System (STARS) hardware and software to continue the convergence to a single Terminal Automation platform. The ERAM program will achieve Operational Readiness (ORD) at all twenty Air Route Traffic Control Centers during the first half of FY 2015.

Of the $1.8 billion in non-NextGen funding, $370 million is requested to advance the state of good repair for FAA infrastructure facilities. This undertaking will target funding toward FAA Air Route Traffic Control Centers (ARTCCs), Airport Traffic Control Towers (ATCTs), Terminal Radar Approach Control Facilities (TRACONs), Power Systems, Unmanned Infrastructure Sustainment (UIS) Facilities, Employee Protection, Environmental Cleanup Programs at FAA facilities, and Mobile facilities used for responses to emergency and heavy air traffic situations. This infrastructure funding, under the NAS Sustainment Strategy Portfolio of Programs, will improve and maintain the Facility Condition Index (FCI) ratings at FAA facilities that provide the backbone for the National Airspace Systems (NAS) and functionality.

Research, Engineering & Development (RE&D)

The FY 2015 Budget Request of $156.75 million is a $2.0 million (1.3 percent) decrease from the FY 2014 enacted level. This supports FAA's continued work in both NextGen and other research areas such as fire safety, propulsion systems, advanced materials, aircraft icing, and continued airworthiness.

The RE&D NextGen portfolio is $47.5 million, a reduction of $10.8 million from the FY 2014 enacted level, and supports NextGen-specific research in wake turbulence, human factors, and clean aircraft technologies.

The FAA has an integrated, performance-based plan to ensure that research and development (R&D) investments are well managed, deliver results, and address national aviation priorities. This plan integrates FAA R&D programs into a portfolio that addresses the near-, mid-, and far-term research needs of the aviation community. The plan is based on three central FAA R&D principles (Improve Aviation Safety, Improve Efficiency, and Reduce Environmental Impact) that align with the National Science and Technology Council (NSTC) National Aeronautics Research and Development Plan.

The Research, Engineering and Development Advisory Committee (REDAC) also reviews and evaluates all programs in the FAA R&D portfolio, including this line item, on an annual basis. Established by Congress in 1989, the REDAC reports to the FAA Administrator on R&D issues and provides a link between FAA's programs and similar efforts in industry, academia, and government. The REDAC specifically looks at the FAA research programs in terms of the relevance and appropriateness of the program to the National Airspace System and works to ensure that FAA's program goals and priorities properly link to national needs. The committee also examines the quality and performance of the research and development programs (for this program, through the Subcommittee on Aircraft Safety, or SAS).

The FAA's System Safety Management Program will provide an infrastructure that enables the free sharing and analysis of safety information provided by government and industry sources. This program offers methodologies, research studies, and guidance material to systematically assess potential safety risks and apply proactive solutions to reduce aviation accidents and incidents. The program also conducts operational research and analysis to maintain or improve safety and to improve terminal area efficiency.

The FAA must meet our nation's growing need for UAS. Our RE&D request continues to support this critical area, providing $9 million to conduct research on UAS technologies which directly impact the safety of the NAS. The program is focused on sense and avoid and command and control requirements that will support the safe integration of UAS in the NAS within the 14 Code of Federal Regulations regulatory framework.

The NextGen Alternative Fuels for General Aviation program is funded at $5.7 million to support the transition from the current aviation 100 low lead fuel to an unleaded replacement fuel that will have the least impact on the general aviation fleet. The Environment and Energy program (including NextGen) is funded at $34.4 million. This program supports a range of activities, including research to mature certifiable clean and quiet aircraft technologies, and develop sustainable fuels. The program also supports enhanced NextGen environmental research via the Continuous Low Energy, Emission and Noise (CLEEN) program and other vehicles.

Grants-in-Aid for Airports

Airports remain a critical part of the aviation system infrastructure. The FAA's FY 2015 request provides the funding needed to ensure safety, capacity, and efficiency at our nation's airports through a combination of grant funding and an increase in Passenger Facility Charges (PFCs). Our $2.9 billion request supports our continued focus on safety-related development projects, including runway safety area improvements, runway incursion reduction, aviation safety management, and improving infrastructure conditions.

The FY 2015 Budget Request proposes to lower AIP to $2.9 billion, offset in part by eliminating passenger and cargo entitlement funding for large hub airports. The Budget would also allow all commercial service airports to increase revenue through an increased PFC that provides them greater flexibility to generate their own revenue. The Budget provides FAA sufficient AIP resources to focus federal grants to support projects of high priority and aviation benefits in smaller commercial and general aviation airports that do not have access to additional revenue or other outside sources of capital.

The FAA requests $107.1 million for Personnel & Related Expenses, an increase of $0.5 million over the FY 2014 enacted level. This request incorporates a $1.7 million reduction from the one-time investment for SOAR in FY 2014, as well as a $750K increase for contracts to complete analysis to reduce runway incursions and improve safety. The remaining changes are attributed to inflation and annualization of FTE enacted in FY 2014.

The budget also provides $29.75 million for Airport Technology Research to support enhanced safety and pavement research efforts and conduct noise studies, and $15 million for Airport Cooperative Research.

NextGen

NextGen is not a single program. It encompasses many programs, systems, and procedures, at different levels of maturity. Some are being deployed now, some are in development and nearing deployment, and still more are being defined as the technology necessary for them becomes available. NextGen is a transformative change in the management and operation of how we fly. NextGen enhances safety, reduces delays, expands air traffic capacity, saves fuel and mitigates aviation's impact on the environment while ensuring the highest levels of safety.

This comprehensive initiative, which is already providing benefits, integrates new and existing technologies, including satellite navigation and advanced digital communications. Airports and aircraft in the NAS will be connected to NextGen's advanced infrastructure and will continually share real-time information to provide a better and safer travel experience. FAA estimates that NextGen will reduce total flight delays about 41 percent by 2020, while providing $38 billion in cumulative benefits to the traveling public, aircraft operators, and the FAA.

This budget supports continued progress on our NextGen efforts. The entire FY 2015 NextGen portfolio totals $836 million distributed among F&E programs ($774 million), Research, Engineering & Development programs ($47.5 million), and Operations activities ($14.1 million). This investment portfolio reflects a decrease of $65.4 million, or approximately 7.3 percent, below the FY 2014 enacted level. This funding will be used to support the delivery of NextGen services and capabilities which will ensure aircraft operators accrue the economic, environmental, and efficiency gains of NextGen as soon as possible.

While the thrust of NextGen work focuses on U.S. airports, airspace and aircraft, the FAA actively engages with global aviation partners to ensure operators receive benefits anywhere in the world.

One immediate benefit to the public is the NextGen Metroplex initiative. The FAA is working to improve the efficiency of airspace above congested metropolitan areas by designing precise GPS routes that will accelerate benefits while reducing bottlenecks and congestion. These routes will enhance safety and efficiency, and foster the flow of commerce. We are already making great progress in Houston, Atlanta, Charlotte, California, North Texas and in metropolitan Washington, D.C. Satellite-based navigation is expected to cut a total of seven million nautical miles from flight plans around these cities each year. These shorter routes, together with gradual descents that cut back on engine power, are projected to save at least 22 million gallons of fuel. For these cities, this represents total reduction in carbon emissions of 220,000 metric tons. That is the equivalent of removing more than 43,000 cars from the streets. We are accelerating these significant changes to our airspace, to complete in three years what would normally take five to ten years to complete.

FY 2015 will see the completion of NAS-Wide deployment of the Automatic Dependent Surveillance–Broadcast (ADS-B), the cornerstone of our transformation to satellite enabled, GPS-based navigation. We expect the total complement of over 630 radio stations to be in place and operating. FY 2015 funding is also included for the development of ADS-B software requirements for the Advanced Technologies and Oceanic Procedures (ATOP) automation platform and for additional stations to provide complete coverage for the Gulf of Mexico.

The FAA continues to analyze fuel quality control procedures, conduct engine durability tests with alternative fuels and perform key testing to support qualification and certification of jet biofuels from alcohols, organic matter and other renewable materials. We expect these activities to support the next round of fuel approvals that began in 2014.

The business case for our NextGen investment has become a reality. Performance-based navigation offers better routes, added capacity, improved on-time performance, and lower fuel bills. NextGen will ultimately yield vast savings and efficiencies for both our nation and aviation industry. The FY 2015 budget request reflects FAA's unwavering commitment to delivering on the promise of NextGen. Our investment in NextGen is already yielding benefits, as demonstrated in the following examples:

- In the Gulf of Mexico, ADS-B-equipped helicopters cut 5-10 minutes off flight time, saving about 100 pounds of fuel per flight.
- JetBlue Airways has partnered with us to equip some of its aircraft with ADS-B so we can collect data from real world use of this technology. Its A320s will fly more direct routes from Boston and New York to Florida and the Caribbean.
- The sharing of airport surface surveillance information with the community through System Wide Information Management increases the efficiency of airlines' airport operations and the ability to collaborate with the FAA to mitigate delays during heavy congestion.
- Airlines flying across the Pacific will be able to use a combination of improved capabilities to save an estimated 200 to 300 gallons of fuel per flight.

NextGen's contribution to our nation's economic recovery and future leadership is critical. We recognize the fiscal challenges our nation faces. America's future demands that we continue to invest in modern technologies that pave the way for tomorrow's capabilities. We continue to work in full partnership with industry, other agencies and departments, and with our labor groups to achieve a shared vision, leveraging powerful technologies and setting new standards for the future of global aviation.

Opportunity, Growth, and Security Initiative

Three months ago, through the Bipartisan Budget Act of 2013 (BBA), Congress came together on a bipartisan basis and took an important first step toward replacing the damaging cuts caused by sequestration with longer-term reforms. Recognizing the importance of the two-year budget agreement Congress reached in December, the President's Budget adheres to the BBA's discretionary funding levels for 2015, giving Congress a roadmap for how to write a budget at those levels that promotes growth and opportunity, enhances national security, and makes important reforms.

However, the BBA levels are not sufficient to expand opportunity to all Americans or to drive the growth our economy needs. The BBA replaced half the sequestration cut for 2014 but just one-fifth of the scheduled cut in the discretionary funding level for 2015. As a result, taking into account unavoidable growth in programs such as veterans' medical care and other factors, the BBA non-defense discretionary funding levels for 2015 are below the levels Congress provided in the bipartisan Consolidated Appropriations Act of 2014. They are also below the 2007 funding levels adjusted for inflation, even though the need for pro-growth investments in infrastructure, education, and innovation has only increased due to the Great Recession and its aftermath.

For that reason, the President's Budget also includes a separate, fully paid for $56 billion Opportunity, Growth, and Security Initiative. The Opportunity, Growth, and Security Initiative, which will be split evenly between defense and non-defense funding, shows how additional discretionary investments in 2015 can spur economic progress, promote opportunity, and strengthen national security. Moreover, the Initiative is fully paid for with a balanced package of spending cuts and tax loophole closers, showing that additional pro-growth investments are easily affordable without increasing the deficit if Congress will enact common-sense spending and tax reforms.

At the Department of Transportation the Opportunity, Growth, and Security Initiative will go directly to the Federal Aviation Administration to augment base funding requests for NextGen. In addition to the $836 million NextGen base request, $186 million from the Opportunity, Growth, and Security Initiative funding would accelerate FAA's progress on existing initiatives related to the core operational benefits of NextGen. This includes additional funds to accelerate:

- Deploy Data Communications – accelerate the transition from voice-based air traffic controller communications with pilots to data-centric, text-based communication. This transition will improve controller productivity, reduce controller workload by automating delivery of routine clearances, enhance safety by reducing operational errors associated with voice communications, and enable many of the NextGen operational improvements that require exchange of information that cannot be efficiently delivered via voice communications.

- Reduce separation standards to allow aircraft to utilize NextGen technologies to increase capacity in the airspace while maintaining FAA's high level of safety.

- In parallel with reducing separation standards, update the Traffic Collision Avoidance Systems (TCAS) developed in the 1990's to take advantage of new computer programming technology that will more accurately predict and identify potential collisions. This new system will also accommodate the more closely spaced traffic made possible with other NextGen efforts to increase capacity and integrates new entrants like UAS.

- Development of a back-up to GPS, which is funded through the Alternative Position and Timing.

- Increase interagency collaboration and utilization of multi-phased radars to take advantage of new technologies and existing DOD assets to improve weather information available to decision makers and decrease maintenance costs.

Conclusion

The overall health of the U.S economy is highly dependent on the aviation industry. Civil aviation contributes roughly $1.3 trillion annually to the national economy and constitutes 5.2 percent of the gross domestic product. Aviation generated more than 10 million jobs, with earnings of $394 billion.

Aviation enables the economic benefits of tourism, shipping and travel for business or pleasure. Through our airports, it delivers economic impact to large and small communities across our Nation. The ongoing implementation of NextGen technologies, policies and procedures, will support the continued economic growth in the aviation industry and our country. The FAA's FY 2015 budget request will enable us to continue to protect and expand this vital economic engine, while moving forward with our transformation and fulfilling our mission of providing the safest and most efficient aerospace system in the world.

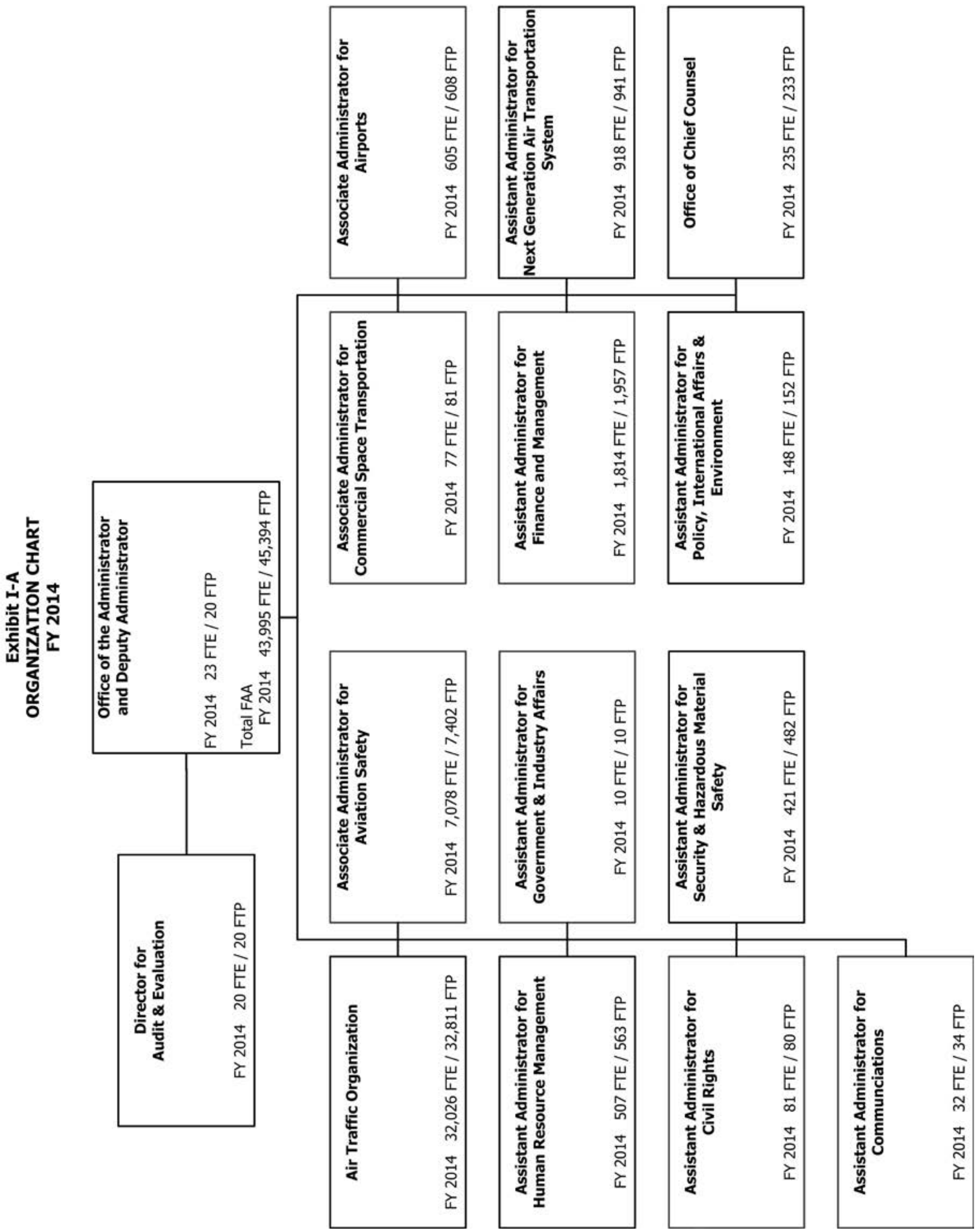
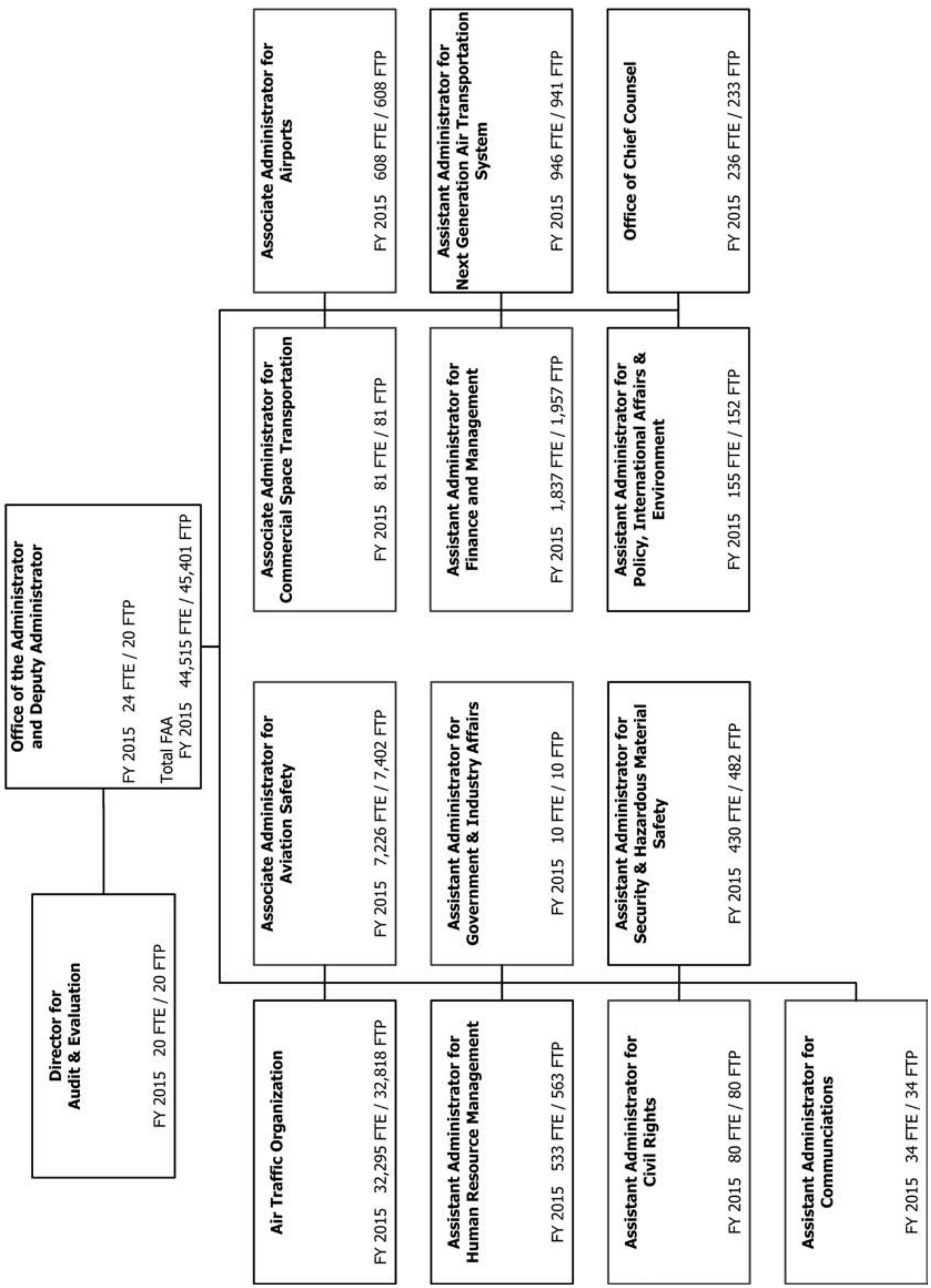


Exhibit I-A
ORGANIZATION CHART
FY 2014
Office of the Administrator and Deputy Administrator
FY 2014 23 FTE / 20 FTP
Total FAA FY 2014 43,995 FTE / 45,394 FTP
Director for Audit & Evaluation
FY 2014 20 FTE / 20 FTP
Associate Administrator for Airports
FY 2014 605 FTE / 608 FTP
Assistant Administrator for Next Generation Air Transportation System
FY 2014 918 FTE / 941 FTP
Office of Chief Counsel
FY 2014 235 FTE / 233 FTP
Associate Administrator for Commercial Space Transportation
FY 2014 77 FTE / 81 FTP
Assistant Administrator for Finance and Management
FY 2014 1,814 FTE / 1,957 FTP
Assistant Administrator for Policy, International Affairs & Environment
FY 2014 148 FTE / 152 FTP
Associate Administrator for Aviation Safety
FY 2014 7,078 FTE / 7,402 FTP
Assistant Administrator for Government & Industry Affairs
FY 2014 10 FTE / 10 FTP
Assistant Administrator for Security & Hazardous Material Safety
FY 2014 421 FTE / 482 FTP
Air Traffic Organization
FY 2014 32,026 FTE / 32,811 FTP
Assistant Administrator for Human Resource Management
FY 2014 507 FTE / 563 FTP
Assistant Administrator for Civil Rights
FY 2014 81 FTE / 80 FTP
Assistant Administrator for Communciations
FY 2014 32 FTE / 34 FTP

Exhibit I-B
ORGANIZATION CHART
FY 2015



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SECTION 2: BUDGET SUMMARY TABLES

EXHIBIT II-1

FY 2015 COMPARATIVE STATEMENT OF NEW BUDGET AUTHORITY
FEDERAL AVIATION ADMINISTRATION
($000)

ACCOUNT NAME	FY 2013 ACTUAL*	FY 2014 ENACTED	FY 2015 REQUEST
Operations	$9,653,395	$9,651,422	$9,750,000
Rescission	($19,307)		
Sequester	($485,623)		
Subtotal	**$9,148,465**	**$9,651,422**	**$9,750,000**
Facilities and Equipment	$2,730,731	$2,600,000	$2,603,700
Hurricane Sandy Emergency Supplemental	$30,000		
Rescission	($5,461)		
Sequester	($141,643)		
Subtotal	**$2,613,627**	**$2,600,000**	**$2,603,700**
Research, Engineering and Development	$167,556	$158,792	$156,750
Rescission	($335)	($26,184)	
Sequester	($8,429)		
Subtotal	**$158,792**	**$132,608**	**$156,750**
Grants-in-Aid for Airports			
Contract Authority (AATF)	$3,350,000	$3,350,000	$3,350,000
Pop Up Contract Authority (49 USC 48112)		$130,000	$126,000
Rescission	($6,700)		($256,000)
Cancellation			($450,000)
Subtotal	**$3,343,300**	**$3,480,000**	**$2,770,000**
Obligation Limitation [Non-Add]	[$3,343,300]	[$3,350,000]	[$2,900,000]
Overflight Fees	$103,000	$130,000	$106,000
Overflight Fees (Transfer to EAS)	($103,000)	($130,000)	($106,000)
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TOTAL	**$15,264,184**	**$15,864,030**	**$15,280,450**
Appropriations	$15,901,682	$15,760,214	$15,860,450
Rescissions	($31,803)	($26,184)	($256,000)
Sequester	($635,695)	$0	$0
Cancellations	$0	$0	($450,000)

* FY 2013 Actual does not reflect the $253 million expediture transfer from Grants-In-Aid for Airports to Operations and Facilities & Equipment, pursuant to the Reducing Flight Delays Act (P.L. 113-9).

EXHIBIT II-2

FY 2015 TOTAL BUDGETARY RESOURCES BY APPROPRIATION ACCOUNT
FEDERAL AVIATION ADMINISTRATION
Appropriations, Obligation Limitations, and Exempt Obligations
($000)

ACCOUNT NAME	FY 2013 ACTUAL*	FY 2014 ENACTED**	FY 2015 REQUEST
Operations	**$9,148,465**	**9,651,422**	**9,750,000**
Air Traffic Organization (ATO)	7,053,438	7,311,790	7,396,654
Aviation Safety (AVS)	1,187,452	1,204,777	1,215,458
Commercial Space Transportation (AST)	15,420	16,331	16,605
Finance & Management (AFN)	551,669	762,462	765,047
NextGen (ANG)	56,989	59,696	60,089
Staff Offices	283,497	296,366	296,147
Facilities & Equipment	**$2,616,397**	**$2,600,000**	**$2,603,700**
Engineering, Development, Test and Evaluation	412,815	347,196	170,937
Air Traffic Control Facilities and Equipment	1,338,150	1,437,390	1,585,683
Non-Air Traffic Control Facilities and Equipment	159,046	146,800	158,280
Facilities and Equipment Mission Support	227,731	218,365	225,800
Personnel and Related Expenses*	450,155	450,250	463,000
Hurricane Sandy Emergency Supplemental	28,500	0	0
Research, Engineering & Development	**$158,792**	**$158,792**	**$156,750**
Improve Aviation Safety	84,642	87,244	94,484
Improve Efficiency	32,387	24,329	22,286
Reduce Environmental Impacts	36,556	41,579	34,435
Mission Support	5,207	5,640	5,545
Grants-in-Aid for Airports	**$3,343,300**	**$3,350,000**	**$2,900,000**
Grants-in-Aid for Airports	3,192,353	3,193,900	2,748,150
Personnel & Related Expenses	100,798	106,600	107,100
Airport Technology Research	29,192	29,500	29,750
Small Community Air Service	5,988	5,000	
Airport Cooperative Research Program	14,970	15,000	15,000
TOTAL:	**$15,266,954**	**$15,760,214**	**$15,410,450**

* FY 2013 Actual does not reflect the $253 million expediture transfer from Grants-In-Aid for Airports to Operations and Facilities & Equipment, pursuant to the Reducing Flight Delays Act (P.L. 113-9). F&E amounts reflect a $5 million transfer from Activity 3 to Activity 2.
** Funding levels reflect internal transfers in the Operations account.

EXHIBIT II-3
FY 2015 BUDGET REQUEST BY STRATEGIC GOAL AND PERFORMANCE GOAL
Appropriations, Obligation Limitations, & Exempt Obligations
($000)

	FY 2013 ACTUAL*	FY 2014 ENACTED	FY 2015 REQUEST
STRATEGIC GOALS AND OBJECTIVES			
1. SAFETY			
a. Improve Safety of System	7,289,849	7,597,940	7,499,490
Total – Safety Strategic Goal	**7,289,849**	**7,597,940**	**7,499,490**
2. STATE OF GOOD REPAIR			
a. Maintain Operating Conditions	1,061,038	1,063,015	922,345
Total – State of Good Repair	**1,061,038**	**1,063,015**	**922,345**
3. ECONOMIC COMPETITIVENESS			
a. Enhance Productivity and Growth	4,743,844	4,876,657	4,760,435
Total – Economic Competitiveness	**4,743,844**	**4,876,657**	**4,760,435**
4. ENVIRONMENTAL SUSTAINABILITY			
a. Promote Energy Efficiency	9,148	9,651	9,750
b. Mitigate Environmental Impacts	443,608	452,142	403,669
Total – Environmental Sustainability	**452,756**	**461,793**	**413,419**
5. ORGANIZATIONAL EXCELLENCE			
a. Develop Human Capital	455,700	450,250	463,000
b. Improve Information Systems and Financial Management	1,235,266	1,310,558	1,351,761
Total – Organizational Excellence	**1,690,967**	**1,760,808**	**1,814,761**
6. OTHER (NON-ALIGNED)			
a. Ensure Effective Response	28,500	0	0
Total – Other (Non-Aligned)	**28,500**	**0**	**0**
GRAND TOTAL	**15,266,953**	**15,760,214**	**15,410,450**

*FY 2013 Actual does not reflect the $253 million expenditure transfer from Grants-In-Aid for Airports to Operations and Facilities & Equipment, pursuant to the Reducing Flight Delays Act (P.L. 113-9).

EXHIBIT II-4

FY 2015 BUDGET AUTHORITY
FEDERAL AVIATION ADMINISTRATION
($000)

ACCOUNT NAME	Mandatory/ Discretionary	FY 2013 ACTUAL*	FY 2014 ENACTED	FY 2015 REQUEST
Operations	**D**	**$9,148,465**	**$9,651,422**	**$9,750,000**
General		$4,352,475	$3,156,214	$709,150
AATF		$4,795,989	$6,495,208	$9,040,850
Facilities & Equipment (AATF)	**D**	**$2,613,627**	**$2,600,000**	**$2,603,700**
Research, Engineering & Development (AAT	**D**	**$158,792**	**$132,608**	**$156,750**
Grants in Aid for Airports (AATF)	**M**	**$3,343,300**	**$3,480,000**	**$2,770,000**
Contract Authority (AATF)	**M**	$3,350,000	$3,350,000	$3,350,000
Pop Up Contract Authority (49 USC 48112)	**D/M**		$130,000	$126,000
Rescission	**D/M**	($6,700)		($256,000)
Cancellation - CHIMPS	**D/M**			($450,000)
Aviation User Fees	**M**	**$103,000**	**$130,000**	**$106,000**
Aviation User Fees (transfer to EAS)	**M**	**($103,000)**	**($130,000)**	**($106,000)**
		---------------	---------------	---------------
TOTAL:		**$15,264,184**	**$15,864,030**	**$15,280,450**
[Mandatory]		$3,343,300	$3,480,000	$2,900,000
[Discretionary]		$11,920,883	$12,384,030	$12,380,450
		---------------	---------------	---------------
[General]		$4,352,475	$3,156,214	$709,150
[AATF]		$10,911,708	$12,707,816	$14,571,300

Note: Totals may not add due to rounding.
* FY 2013 Actual does not reflect the $253 million expediture transfer from Grants-In-Aid for Airports to Operations and Facilities & Equipment, pursuant to the Reducing Flight Delays Act (P.L. 113-9).

EXHIBIT II-5

FY 2015 OUTLAYS
FEDERAL AVIATION ADMINISTRATION
($000)

ACCOUNT NAME	FY 2013 ACTUAL	FY 2014 ENACTED	FY 2015 REQUEST
Operations	**$9,125,783**	**$9,819,028**	**$9,884,791**
General	$4,329,793	$3,323,820	$843,941
AATF	$4,795,989	$6,495,208	$9,040,850
Facilities & Equipment	**$2,754,105**	**$2,715,543**	**$2,692,187**
General	**$1,250**		
-Discretionary	$1,250		
-Mandatory			
AATF	**$2,752,855**	**$2,715,543**	**$2,692,187**
-Discretionary	$2,749,899	$2,715,543	$2,692,187
-Mandatory	$2,955		
Aviation Insurance Revolving Account (M)	**($176,948)**	**($155,000)**	**($3,000)**
Research, Engineering (TF) & Development	**$152,021**	**$171,571**	**$171,018**
Grants-in-Aid for Airports	**$3,652,700**	**$3,766,625**	**$3,609,099**
General			
-Discretionary	$153		
-Mandatory			
AATF			
-Discretionary	$3,652,547	$3,766,625	$3,609,099
Aviation User Fees (Overflight) (M)		$1,000	
Franchise Fund	**$4,184**	**$30,000**	**$18,106**
TOTAL:	**$15,511,844**	**$16,348,767**	**$16,372,200**
[Mandatory]	($173,993)	($154,000)	($3,000)
[Discretionary]	$15,685,837	$16,502,767	$16,375,200

EXHIBIT II-6
SUMMARY OF REQUESTED FUNDING CHANGES FROM BASE
Federal Aviation Administration
Appropriations, Obligation Limitations, and Exempt Obligations
($000)

OPERATIONS

	2014 Enacted	Annualization of 2014 Pay Raises	Annualization of 2014 FTE	2015 Pay Raises	FERS Increase	Hiring Restrictions	WCF Increase/ Decrease	Inflation/ Deflation	FY 2015 Baseline Estimate	Program Increases/ Decreases	FY 2015 Request
PERSONNEL RESOURCES (FTE)											
Direct FTE	40,471		826			-372			40,925	0	40,925
FINANCIAL RESOURCES											
Salaries and Benefits	$6,771,672	10,446		44,353	128,568	-49,037			6,906,002	0	6,906,002
Travel	$151,611								151,611	1,055	152,666
Transportation	$24,256								24,256	0	24,256
GSA Rent	$133,832								133,832	0	133,832
Rental Payments to Others	$62,309								62,309	0	62,309
Communications, Rent & Utilities	$294,577								294,577	0	294,577
Printing	$5,151								5,151	0	5,151
Other Services:											
-WCF											
-Advisory and Assistance Services	$1,098,793								1,098,793	0	1,098,793
-Other	$906,261						606		906,867	-37,413	869,454
Supplies	$148,704								148,704	0	148,704
Equipment	$46,888								46,888	0	46,888
Lands and Structures	$1,420								1,420	0	1,420
Grants, Claims and Subsidies	$3,239								3,239	0	3,239
Insurance Claims and Indemnities	$2,709								2,709	0	2,709
TOTAL FAA	**$9,651,422**	**$10,446**	**$0**	**$44,353**	**$128,568**	**($49,037)**	**$606**	**$0**	**$9,786,358**	**($36,358)**	**$9,750,000**
Line of Business/Staff Office											
Air Traffic Organization (ATO)	$7,311,790	7,680		34,633	115,895	-38,266	36		7,431,768	-35,114	7,396,654
Aviation Safety (AVS)	$1,204,777	1,918		6,360	8,664	-7,154	893		1,215,458	0	1,215,458
Commercial Space Transportation (AST)	$16,331	21		86	112	-93			16,457	148	16,605
Finance and Management (AFN)	$762,462	424		1,674	2,004	-1,797	280		765,047	0	765,047
NextGen (ANG)	$59,696	50		163	193	-181			59,921	168	60,089
Staff Offices	$296,366	353		1,437	1,700	-1,546	-603		297,707	-1,560	296,147
TOTAL FAA	**$9,651,422**	**$10,446**	**$0**	**$44,353**	**$128,568**	**($49,037)**	**$606**	**$0**	**$9,786,358**	**($36,358)**	**$9,750,000**

EXHIBIT II-6

SUMMARY OF REQUESTED FUNDING CHANGES FROM BASE
FEDERAL AVIATION ADMINISTRATION
Appropriations, Obligation Limitations, and Exempt Obligations
($000)

FACILITIES & EQUIPMENT

		Baseline Changes								
	2014 Enacted	Annualization of 2014 Pay Raises	Annualization of 2014 FTE	2015 Pay Raise	FERS Increase	WCF Increase/ Decrease	Inflation/ Deflation	FY 2015 Baseline Estimate	Program Increases/ Decreases	FY 2015 Request
PERSONNEL RESOURCES (FTE)										
Direct FTE	2,670		63					2,733		2,733
FINANCIAL RESOURCES										
Salaries and Benefits	398,464	1,055	7,382	2,988	3,342			413,231	-	413,231
Travel	40,922							40,922	(1,849)	39,073
Transportation	2,557							2,557	(196)	2,361
GSA Rent	357							357	(355)	2
Rental Payments to Others	29,462							29,462	-	29,462
Communications, Rent & Utilities	26,105							26,105	-	26,105
Printing	30							30	-	30
Other Services:	1,798,595							1,798,595	(36,254)	1,762,341
-WCF	33							33	-	33
Supplies	16,916							16,916	2,002	18,918
Equipment	187,198							187,198	11,105	198,303
Lands and Structures	93,020							93,020	14,480	107,500
Grants, Claims, Subsidies and Interest	6,341							6,341	-	6,341
Object Class Total	**2,600,000**	**1,055**	**7,382**	**2,988**	**3,342**	**0**	**0**	**2,614,767**	**(11,067)**	**2,603,700**
PROGRAMS										
Engineering, Development, Test and Evaluation	347,195							347,195	(176,258)	170,937
Air Traffic Control Facilities and Equipment	1,437,390							1,437,390	148,293	1,585,683
Non-Air Traffic Control Facilities and Equipment	146,800							146,800	11,480	158,280
Facilities and Euipment Mission Support	218,365							218,365	7,435	225,800
Personnel & Related Expenses	450,250	1,055	7,382	2,988	3,342			465,017	(2,017)	463,000
Programs Total	**2,600,000**	**1,055**	**7,382**	**2,988**	**3,342**	**0**	**0**	**2,614,767**	**(11,067)**	**2,603,700**
GRAND TOTAL	**2,600,000**	**1,055**	**7,382**	**2,988**	**3,342**	**0**	**0**	**2,614,767**	**(11,067)**	**2,603,700**

EXHIBIT II-6

SUMMARY OF REQUESTED FUNDING CHANGES FROM BASE
FEDERAL AVIATION ADMINISTRATION
($000)
RESEARCH, ENGINEERING, & DEVELOPMENT

	FY 2014 Enacted	Annualization of 2014 Pay Raise	2015 Pay Raises	GSA Rent	WCF Increase/ Decrease	Inflation/ Deflation	FY 2015 Baseline Estimate	Program Increases/Decreases	FY 2015 Request
PERSONNEL RESOURCES (FTE)	249							0	249
Direct FTE	249							0	249
FINANCIAL RESOURCES									
Salaries and Benefits	34,396	86	258				34,740	0	34,740
Benefits for Former Personnel	0						0		0
Travel	2,190						2,190	0	2,190
Transportation	47						47	0	47
GSA Rent	0						0	0	0
Rental Payments to Others	0						0	0	0
Communications, Rent & Utilities	17						17	0	17
Printing	15						15	0	15
Other Services:	0						0	0	0
-WCF	0						0	0	0
-Advisory and Assistance Services	0						0	0	0
-Other	105,387						105,387	-2,386	103,001
Supplies	2,091						2,091	0	2,091
Equipment	1,470						1,470	0	1,470
Lands and Structures							0	0	0
Grants, Claims & Subsidies	13,178						13,178	0	13,179
Insurance Claims and Indemnities	0						0	0	0
Interest & Dividends	0						0	0	0
Admin Subtotal	**158,792**	**86**	**258**	**0**	**0**	**0**	**159,136**	**-2,386**	**156,750**
PROGRAMS									
Improve Aviation Safety	87,244	70	210				87,525	6,959	94,484
Economic Competitiveness	24,329	3	10				24,342	-2,056	22,286
Environmental Sustainability	41,579	6	17				41,602	-7,167	34,435
Mission Support	5,640	7	21				5,667	-122	5,545
Programs Subtotal	**158,792**	**86**	**258**	**0**	**0**	**0**	**159,136**	**-2,386**	**156,750**
GRAND TOTAL	**158,792**	**86**	**258**	**0**	**0**	**0**	**159,136**	**-2,386**	**156,750**

EXHIBIT II-6

SUMMARY OF REQUESTED FUNDING CHANGES FROM BASE
FEDERAL AVIATION ADMINISTRATION
Appropriations, Obligation Limitations, and Exempt Obligations
($000)

GRANTS-IN-AID FOR AIRPORTS

		Baseline Changes								
	2014 Enacted	Annualization of 2014 Pay Raises	Annualization of 2014 FTE	2015 Pay Raises	GSA Rent	WCF Increase/ Decrease	Inflation/ Deflation	FY 2015 Baseline Estimate	Program Increases/ Decreases	FY 2015 Request
PERSONNEL RESOURCES (FTE)	605		3					608	0	608
Direct FTE	605		3					608		608
FINANCIAL RESOURCES										
Salaries and Benefits	86,514	219	434	657				87,824		87,824
Travel	2,758							2,758		2,758
Transportation	261							261		261
GSA Rent	101							101		101
Rental Payments to Others	872							872		872
Communications, Rent & Utilities	491							491		491
Printing	492							492		492
Other Services:										
-WCF	925							925		925
-Advisory and assistance services	15,479							15,479	9,874	25,353
-Other	36,263							36,263	(6,010)	30,253
Supplies	647							647		647
Equipment	964							964		964
Lands and Structures	994							994		994
Grants	3,198,202							3,198,202	(450,174)	2,748,028
Insurance Claims and Indemnities	1							1		1
Interest & Dividends	36							36		36
Financial Transfers	5,000							5,000	(5,000)	0
Object Class Total	**3,350,000**	**219**	**434**	**657**	**0**	**0**	**0**	**3,351,310**	**(451,310)**	**2,900,000**
PROGRAMS										
Grants-in-aid for Airports	3,193,900							3,193,900	(445,750)	2,748,150
Personnel and Related Expenses	106,600	208	434	623				107,865	(765)	107,100
Airport Technology Research	29,500	9		28				29,537	213	29,750
Airport Cooperative Research	15,000	2		6				15,008	(8)	15,000
SCASDP (transfer to OST)	5,000							5,000	(5,000)	0
Programs Total	**3,350,000**	**219**	**434**	**657**	**0**	**0**	**0**	**3,351,310**	**(451,310)**	**2,900,000**
GRAND TOTAL	**3,350,000**	**219**	**434**	**657**	**0**	**0**	**0**	**3,351,310**	**(451,310)**	**2,900,000**

EXHIBIT II-7
WORKING CAPITAL FUND
FEDERAL AVIATION ADMINISTRATION
($000)

	FY 2013 ACTUAL	FY 2014 ENACTED	FY2015 REQUEST	CHANGE
DIRECT:				
Facilities & Equipment	32	33	33	**-**
Grants-in-Aid for Airports	223	925	925	**-**
Operations	45,919	48,684	49,290	**606**
TOTAL	**$ 46,174**	**$ 49,642**	**$ 50,248**	**$ 606**

Footnote:

F&E, Grants-inAid for Airports funding only support E-gov Inititatives.

Operations funding support WCF projects including E-gov Initiatives.

EXHIBIT II-8
FEDERAL AVIATION ADMINISTRATION
PERSONNEL RESOURCE -- SUMMARY
TOTAL FULL-TIME EQUIVALENTS

	FY 2013 ACTUAL	FY 2014 ENACTED	2015 REQUEST
DIRECT FUNDED BY APPROPRIATION			
Operations	41,055	40,471	40,925
Facilities & Equipment	2,733	2,670	2,733
Research, Engineering & Development	248	249	249
Grants-in-Aid for Airports	555	605	608
SUBTOTAL, DIRECT FUNDED	44,591	43,995	44,515
REIMBURSEMENTS / ALLOCATIONS / OTHER			
Reimbursements and 'Other'			
Operations	216	222	222
Aviation Insurance Revolving Fund	5	5	5
Facilities & Equipment	62	62	62
Grants-in-Aid for Airports	-	1	1
Administrative Services Franchise Fund	1,752	1,779	2,072
Allocations from other Organizations			
SUBTOTAL, REIMBURSE./ALLOC./OTH.	2,035	2,069	2,362
TOTAL FTEs	**46,626**	**46,064**	**46,877**

EXHIBIT II-9
FEDERAL AVIATION ADMINISTRATION
RESOURCE SUMMARY – STAFFING
FULL-TIME PERMANENT POSITIONS

	FY 2013 ACTUAL	FY 2014 ENACTED	FY2015 REQUEST
DIRECT FUNDED BY APPROPRIATION			
Operations	40,234	41,787	41,787
Facilities & Equipment	2,719	2,744	2,751
Research, Engineering & Development	243	255	255
Grants-in-Aid for Airports	550	608	608
SUBTOTAL, DIRECT FUNDED	43,746	45,394	45,401
REIMBURSEMENTS / ALLOCATIONS / OTH.			
Reimbursements and 'Other'			
Operations	110	175	175
Aviation Insurance Revolving Fund	5	6	6
Facilities & Equipment	32	39	39
Grants-in-Aid for Airports	-	2	2
Administrative Services Franchise Fund	1,704	1,670	2,020
Allocations from other Organizations			
SUBTOTAL, REIMBURSE./ALLOC./OTH.	1,851	1,892	2,242
TOTAL POSITIONS	**45,597**	**47,286**	**47,643**

EXHIBIT II-10
FEDERAL AVIATION ADMINISTRATION
USER FEES
($000)

	FY 2013 ACTUAL	FY 2014 ESTIMATE	FY2015 ESTIMATE
USER FEE			
Civil Aviation Registry Fees	409	500	500
Foreign Repair Station/Certification Fees	7,793	8,000	8,000
Aeronautical Charting Fees	9,373	9,400	9,400
Overflight Fees	68,417	81,771	92,376
Total User Fees	**85,991**	**99,671**	**110,276**

INSERT TAB HERE:

SECTION 3: BUDGET BY APPROPRIATIONS ACCOUNT

INSERT TAB HERE:

3A. OPERATIONS

OPERATIONS
(AIRPORT AND AIRWAY TRUST FUND)

For necessary expenses of the Federal Aviation Administration, not otherwise provided for, including operations and research activities related to commercial space transportation, administrative expenses for research and development, establishment of air navigation facilities, the operation (including leasing) and maintenance of aircraft, subsidizing the cost of aeronautical charts and maps sold to the public, lease or purchase of passenger motor vehicles for replacement only, in addition to amounts made available by Public Law 112-95, $9,750,000,000 of which $9,040,850,000 shall be derived from the Airport and Airway Trust Fund: Provided, That not to exceed 2 percent of any budget activity, except for aviation safety budget activity, may be transferred to any budget activity under this heading: Provided further, That no transfer may increase or decrease any appropriation by more than 2 percent: Provided further, That funds may be used to enter into a grant agreement with a nonprofit standard-setting organization to assist in the development of aviation safety standards: Provided further, That none of the funds in this Act shall be available for new applicants for the second career training program: Provided further, That there may be credited to this appropriation as offsetting collections funds received from States, counties, municipalities, foreign authorities, other public authorities, and private sources for expenses incurred in the provision of agency services, including receipts for the maintenance and operation of air navigation facilities, and for issuance, renewal or modification of certificates, including airman, aircraft, and repair station certificates, or for tests related thereto, or for processing major repair or alteration forms.

Program and Financing (in millions of dollars)

Identification code: 69-1301-0-1-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Obligations by program activity:			
0001	Air Traffic Organization (ATO)	7,275	7,336	7,419
0002	NextGen	57	60	60
0003	Finance & Management	552	768	771
0004	Regulation & Certification	1,223	1,213	1,225
0005	Commercial Space	15	16	16
0006	Human Resources	94	......	......
0007	Staff Offices	193	297	298
0100	Direct Program Activities Subtotal	9,409	9,690	9,789
0801	Reimbursable program	159	189	189
0900	Total new obligations	9,568	9,879	9,978
	Budget resources:			
1000	Unobligated balance brought forward, Oct. 1	48	34	52
1011	Unobligated balance transferred from other acct. (72-1037).	4	....	......
1021	Recoveries of prior year unpaid obligations	8	....	....
1050	Unobligated balance (total)	60	34	52
	Budget authority:			
	Appropriations, discretionary:			
1100	Appropriation	4,593	3,156	709
1130	Appropriations permanently reduced	-240	....	......
1160	Appropriation, discretionary (total)	4,353	3,156	709
	Spending authority from offsetting collections:			
	Discretionary:			
1700	Collected	5,148	6,741	9,287
1701	Change in uncollected payments, federal sources	55	....	......
1723	New and/or unobligated balance of spending authority from offsetting collections temporarily reduced	-1	....	......
1750	Spending auth from offsetting collections, disc (total)	5,202	6,741	9,287
1900	Budget authority (total)	9,555	9,897	9,996
1930	Total budgetary resources available	9,615	9,931	10,048
	Memorandum (non-add) entries:			
1940	Unobligated balance expiring	-13	....	......
1941	Unexpired unobligated balance, end of year	34	52	70
	Change in obligated balance:			
	Unpaid obligations:			
3000	Unpaid obligations, brought forward, Oct. 1	1,579	1,520	1,334
3010	Obligations incurred, unexpired accounts	9,568	9,879	9,978
3011	Obligations incurred, expired accounts	54	....	......
3020	Outlays (gross)	-9,585	-10,065	-10,212
3040	Recoveries of prior year unpaid obligations, unexpired	-8	....	......
3041	Recoveries of prior year unpaid obligations, expired	-88	....	......
3050	Unpaid obligations, end of year (gross)	1,520	1,334	1,100
	Uncollected payments:			
3060	Uncollected pymts, Fed sources, brought forward, Oct 1	-236	-174	-174
3070	Change in uncollected pymts, Fed sources, unexpired	-55	....	....
3071	Change in uncollected pymts, Fed sources, expired	117	....	....
3090	Uncollected pymts, Fed sources, end of year	-174	-174	-174
	Memorandum (non-add) entries:			
3100	Obligated balance, start of year	1,343	1,346	1,160
3200	Obligated balance, end of year	1,346	1,160	926
	Budget authority and outlays, net:			
	Discretionary:			
4000	Budget authority, gross	9,555	9,897	9,996
	Outlays, gross:			

Identification code: 69-1301-0-1-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
4010	Outlays from new discretionary authority	8,270	8,739	8,826
4011	Outlays from discretionary balances	1,315	1,326	1,386
4020	Outlays, gross (total)	9,585	10,065	10,212
	Offsets against gross budget authority and outlays:			
	Offsetting collections (collected) from:			
4030	Federal sources	-5,238	-6,696	-9,242
4033	Non-Federal sources	-17	-45	-45
4040	Offsets against gross budget authority and outlays (total)	-5,255	-6,741	-9,287
	Additional offsets against gross budget authority only:			
4050	Change in uncollected pymts, Federal sources, unexpired	-55	....	....
4052	Offsetting collections credited to expired accounts	107	....	....
4060	Additional offsets against budget authority only (total)	52	....	....
4070	Budget authority, net (discretionary)	4,352	3,156	709
4080	Outlays, net (discretionary)	4,330	3,324	925
4180	Budget authority, net (total)	4,352	3,156	709
4190	Outlays, net (total)	4,330	3,324	925

For 2015, the Budget requests $9,750 million for Federal Aviation Administration (FAA) operations. These funds will be used to continue to promote aviation safety and efficiency. The Budget provides funding for the Air Traffic Organization (ATO) which is responsible for managing the air traffic control system. As a performance based organization, the ATO is designed to provide cost-effective, efficient, and, above all, safe air traffic services. The Budget also funds the Aviation Safety Organization which ensures the safe operation of the airlines and certifies new aviation products. In addition, the request also funds regulation of the commercial space transportation industry, as well as FAA policy oversight and overall management functions.

Object Classification (in millions of dollars)

Identification code: 69-1301-0-1-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Direct obligations:			
	Personnel compensation:			
11.1	Full-time permanent	4,579	4,523	4,616
11.3	Other than full-time permanent	34	24	25
11.5	Other personnel compensation	373	379	382
11.9	Total personnel compensation	4,986	4,926	5,023
12.1	Civilian personnel benefits	1,741	1,750	1,878
13.0	Benefits for former personnel	9	5	5
21.0	Travel and transportation of persons	106	152	153
22.0	Transportation of things	26	26	26
23.1	Rental payments to GSA	123	134	134
23.2	Rental payments to others	60	62	62
23.3	Communications, utilities, and miscellaneous charges	306	296	296
24.0	Printing and reproduction	5	6	6
25.1	Advisory and assistance services	466	464	338
25.2	Other services from non-Federal sources	1,407	1,659	1,658
26.0	Supplies and materials	129	156	156
31.0	Equipment	40	47	47
32.0	Land and structures	1	1	1
41.0	Grants, subsidies, and contributions	2	3	3
42.0	Insurance claims and indemnities	2	3	3
99.0	Subtotal, obligations	9,409	9,690	9,789
99.0	Reimbursable obligations	159	189	189
99.9	Total new obligations	9,568	9,879	9,978

Employment Summary

Identification code: 69-1301-0-1-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
1001	Direct civilian full-time equivalent employment	41,055	40,471	40,925
2001	Reimbursable civilian full-time equivalent employment	216	222	222

Exhibit III-1

Operations Appropriation
Summary by Program Activity
Appropriations, Obligation Limitations and Exempt Obligations
($000)

	FY 2013 Actual[1]	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Air Traffic Organization (ATO)	$7,270,538	$7,311,790	$7,396,654	+$84,864
Aviation Safety (AVS)	1,217,552	1,204,777	1,215,458	+10,681
Commercial Space (AST)	15,420	16,331	16,605	+274
Finance & Management (AFN)	551,669	762,462	765,047	+2,585
NextGen (ANG)	56,989	59,696	60,089	+393
Human Resource Management (AHR)	93,687			
Staff Offices	189,810	296,366	296,147	-219
TOTAL	**$9,395,665**	**$9,651,422**	**$9,750,000**	**+$98,578**
FTEs				
Direct Funded	41,055	40,471	40,925	+454
Reimbursable, allocated, other	216	222	222	

Program and Performance Statement

This account provides funds for the operation, maintenance, communications and logistical support of the air traffic control and air navigation systems. It also covers administrative and managerial costs for the FAA's regulatory, international, medical, engineering and development programs as well as policy oversight and overall management functions. The operations appropriation includes the following major activities:

(1) Operation on a 24-hour daily basis of a national air traffic system;
(2) Establishment and maintenance of a national system of aids to navigation;
(3) Establishment and surveillance of civil air regulations to assure safety in aviation;
(4) Development of standards, rules and regulations governing the physical fitness of airmen as well as the administration of an aviation medical research program;
(5) Regulation of the commercial space transportation industry;
(6) Administration of acquisition programs; and
(7) Headquarters, administration and other staff offices.

[1] FY 2013 includes amounts made available under the Reducing Flight Delays Act of 2013.

Exhibit III-1a

OPERATIONS APPROPRIATION
Summary Analysis of Change from FY 2014 to FY 2015
Appropriations, Obligation Limitation, and Exempt Obligations
($000)

	Change from FY 2014 to FY 2015	
	$	**FTE**
FY 2014 Enacted	**$9,651,422**	**40,471**
Adjustments to Base	**+$134,936**	**+454**
Annualized FY 2014 Pay Raise	+10,446	
Annualization of FY 2014 Hiring		+826
FY 2015 Pay Raise	+44,353	
FERS Contribution Increase	+128,568	
Hiring Restrictions	-49,037	-372
Working Capital Fund (WCF) Adjustments	+606	
Adjustments to Programs	**-$36,358**	
Unspecified Contract Reductions	-54,130	
Transition to Operations and Maintenance	+17,772	
FY 2015 Request	**$9,750,000**	**40,925**

Operations Summary
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$9,651,422**	**41,787**	**898**	**40,471**
Adjustments to Base	**+$134,330**			**+454**
Internal Transfer				
Annualized FY 2014 Pay Raise	+10,446			
FERS Contribution Increase	+128,568			
Annualization of FY 2014 Hiring				+826
FY 2015 Pay Raise	+44,353			
Hiring Restrictions	-49,037			-372
Other Changes	**-$53,524**			
WCF Adjustments	+606			
Unspecified Contract Reductions	-54,130			
Discretionary Adjustments	**+$17,772**			
Transition to Operations and Maintenance (TOM)	+17,772			
Base Transfers				
Staffing Resources Reassignment				
Technical Center Guard Services				
Occupational Safety and Health Workplace Inspections				
FY 2015 Request	**$9,750,000**	**41,787**	**898**	**40,925**

Base Transfer Summary
($000)

	From	FTE	FTP	Funding	To	FTE	FTP	Funding
Staffing Reassignment	ATO/AJV	-1	-1	$0	AGC	+1	+1	$0
Security Guard Service	ATO/AJW	0	0	-$316	ANG	0	0	+$316
Occupational Safety & Health (OSH)	AHR	-6	-6	-$1,560	ATO/AJW	+6	+6	+$1,560
Total		**-7**	**-7**	**-$1,876**		**+7**	**+7**	**+$1,876**

Staffing Summary -- FY 2013 – FY 2015

		Type	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request
Air Traffic Organization (ATO)		FTP	30,290	30,899	30,904
		OTFTP	261	687	687
		FTE	30,850	30,168	30,387
Associate Administrator for Aviation Safety (AVS)		FTP	7,019	7,238	7,238
		OTFTP	26	125	125
		FTE	7,184	6,916	7,063
Associate Administrator for Commercial Space Transportation (AST)		FTP	71	81	81
		OTFTP	1	2	2
		FTE	74	77	82
Assistant Admin. for Finance and Mgmt.	Financial Services (ABA)	FTP	231	247	247
		OTFTP	1	2	2
		FTE	231	228	242
	Acquisitions & Business Services (ACQ)	FTP	222	244	244
		OTFTP	1	1	1
		FTE	224	225	222
	Information Services (AIT)	FTP	183	717	717
		OTFTP	0	9	9
		FTE	188	644	678
	Regions and Center Operations (ARC)	FTP	550	582	582
		OTFTP	5	9	9
		FTE	568	561	540
Assistant Administrator for Next Generation Air Transportation System (ANG)		FTP	178	201	201
		OTFTP	5	7	7
		FTE	191	191	205
Staff Offices	Assistant Administrator for Human Resource Management (AHR)	FTP	511	563	557
		OTFTP	4	31	31
		FTE	540	507	533
	Office of the Administrator and Deputy (AOA)	FTP	18	20	20
		OTFTP	4	4	4
		FTE	21	23	24
	Assistant Administrator for Audit and Evaluation (AAE)	FTP	19	20	20
		OTFTP			
		FTE	19	20	20
	Assistant Administrator for Civil Rights (ACR)	FTP	66	80	80
		OTFTP	1	4	4
		FTE	70	81	80
	Asst. Administrator for Government and Industry Affairs (AGI)	FTP	8	10	10
		OTFTP	1		
		FTE	10	10	10
	Assistant Administrator for Communications (AOC)	FTP	28	34	34
		OTFTP	1	1	1
		FTE	30	32	34
	Office of Chief Counsel (AGC)	FTP	236	233	234
		OTFTP	8	9	9
		FTE	241	235	236
	Asst. Administrator for Policy, Int'l Affairs and Environment (APL)	FTP	131	136	136
		OTFTP	3	7	7
		FTE	136	132	139
	Asst. Administrator for Security & Hazardous Materials Safety (ASH)	FTP	473	482	482
		OTFTP	1		
		FTE	478	421	430
	Total	FTP	40,234	41,787	41,787
		OTFTP	323	898	898
		FTE	41,055	40,471	40,925

FY 2013 – FY 2015 Resource Summary

			FY 2013 Actual	FY 2014 Enacted	FY 2015 Request
Air Traffic Organization (ATO)		pcb	5,329,164,007	5,284,343,000	5,405,305,000
		o/o	1,941,374,140	2,027,447,000	1,991,349,000
ATO Total			**$7,270,538,147**	**$7,311,790,000**	**$7,396,654,000**
Associate Admin. for Aviation Safety (AVS)		pcb	996,168,406	987,875,000	997,663,000
		o/o	221,383,647	216,902,000	217,795,000
AVS Total			**$1,217,552,053**	**$1,204,777,000**	**$1,215,458,000**
Associate Admin. for Commercial Space Transportation (AST)		pcb	11,818,380	13,201,000	13,475,000
		o/o	3,601,549	3,130,000	3,130,000
AST Total			**$15,419,929**	**$16,331,000**	**$16,605,000**
Assistant Admin. for Finance and Mgmt.	Financial Services (ABA)	pcb	32,780,626	38,125,000	38,615,000
		o/o	76,638,857	79,475,000	79,475,000
	Acquisitions & Business Services (ACQ)	pcb	29,507,359	30,194,000	30,376,000
		o/o	13,269,575	15,606,000	15,606,000
	Information Services (AIT)	pcb	32,361,594	107,065,000	107,904,000
		o/o	53,493,635	194,135,000	194,126,000
	Regions and Center Operations (ARC)	pcb	73,690,957	72,742,000	73,536,000
		o/o	239,926,185	225,120,000	225,409,000
	Total	pcb	168,340,536	248,126,000	250,431,000
		o/o	383,328,252	514,336,000	514,616,000
AFN Total			**$551,668,788**	**$551,668,788**	**$765,047,000**
Assistant Admin. for NextGen Air Transportation System (ANG)		pcb	25,301,349	24,845,000	24,922,000
		o/o	31,687,282	34,851,000	35,167,000
ANG Total			**$56,988,631**	**$59,696,000**	**$60,089,000**
Staff Offices	Office of the Administrator and Deputy (AOA)	pcb	2,799,754	3,414,000	3,446,000
		o/o	999,372	603,000	603,000
	AOA Total		**$3,799,126**	**$4,017,000**	**$4,049,000**
	Assistant Admin. for Audit and Evaluation (AAE)	pcb	2,744,724	2,857,000	2,884,000
		o/o	92,535	343,000	343,000
	AAE Total		**$2,837,259**	**$3,200,000**	**$3,227,000**
	Assistant Administrator for Civil Rights (ACR)	pcb	8,800,249	8,690,000	8,762,000
		o/o	1,293,172	3,178,000	3,178,000
	ACR Total		**$10,093,421**	**$11,868,000**	**$11,940,000**
	Assistant Admin. for Govt. and Industry Affairs (AGI)	pcb	1,356,652	1,247,000	1,258,000
		o/o	133,494	283,000	283,000
	AGI Total		**$1,490,146**	**$1,530,000**	**$1,541,000**
	Assistant Administrator for Communications (AOC)	pcb	5,404,218	5,660,000	5,713,000
		o/o	448,120	343,000	343,000
	AOC Total		**$5,852,338**	**$6,003,000**	**$6,056,000**
	Office of Chief Counsel (AGC)	pcb	37,058,193	37,203,000	37,574,000
		o/o	7,414,999	6,987,000	7,198,000
	AGC Total		**$44,473,192**	**$44,190,000**	**$44,772,000**
	Asst. Admin. for Policy, Int'l Affairs and Environ. (APL)	pcb	23,679,961	23,030,000	23,213,000
		o/o	9,681,369	10,366,000	10,366,000
	APL Total		**$33,361,330**	**$33,396,000**	**$33,579,000**
	Assistant Admin. for Human Resource Mgmt. (AHR)	pcb	67,564,793	65,084,000	64,612,000
		o/o	26,122,340	38,406,000	36,583,000
	AHR Total		**$93,687,133**	**$103,490,000**	**$101,195,000**
	Asst. Admin. for Security & HazMat Safety (ASH)	pcb	66,504,249	66,097,000	66,744,000
		o/o	21,398,779	22,575,000	23,044,000
	ASH Total		**$87,903,028**	**$88,672,000**	**$89,788,000**
Grand Total			**$9,395,664,521**	**$9,651,422,000**	**$9,750,000,000**

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AIR TRAFFIC ORGANIZATION (ATO)

Air Traffic Organization (ATO)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$7,311,790**	**30,899**	**687**	**30,168**
Adjustments to Base	**+$119,942**			**+214**
Internal Transfer				
Annualized FY 2014 Pay Raise	+7,680			
FERS Contribution Increase	+115,895			
Annualization of FY 2014 Hiring				+504
FY 2015 Pay Raise	+34,633			
Hiring Restrictions	-38,266			-290
Other Changes	**-$54,094**			
WCF Adjustments	+36			
Unspecified Contract Reductions	-54,130			
Discretionary Adjustments	**+$17,772**			
Transition to Operations and Maintenance (TOM)	+17,772			
Base Transfers	**+$1,244**	**+5**		**+5**
Staffing Resources Reassignment		-1		-1
Technical Center Guard Services	-316			
Occupational Safety and Health Workplace Inspections	+1,560	+6		+6
FY 2015 Request	**$7,396,654**	**30,904**	**687**	**30,387**

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Executive Summary: Air Traffic Organization (ATO)

What Is The Request And What Will We Get For The Funds?

The request of $7,396,654,000 and 30,904 FTP / 30,387 FTE allows FAA to maintain our position as the global leader in delivering the world's safest, most secure air traffic services. This request provides an adjustment to base of $34,633,000 for pay inflation. It also provides for other adjustments of $7,680,000 for the annualized cost of the FY 2014 pay increase. The request includes $115,895,000 for the increase in the agency's contribution rates to the FERS retirement system. Also included in the request is a reduction of -$38,266,000 for hiring restrictions. Included in the request are other changes of $36,000 for Working Capital Fund adjustments and -$54,130,000 for unspecified contract reductions. The request includes a discretionary adjustment of $17,772,000 for Transition to Operations and Maintenance (TOM) costs.

Transition to Operations and Maintenance requirements include:

Program	Service Unit	Amount
En Route Automation and Modernization (ERAM)	AJM*	$12,652,000
Terminal Automation Modernization and Replacement (TAMR)	AJM	$5,120,000

* AJM = Vice President Program Management Organization, AJM

Additionally, this request provides for three base transfers that will have a net total of $1,244,000 and 5 FTP / FTE.

What Is The Request And What Will We Get For The Funds?

FY 2015 – Air Traffic Organization (ATO)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Total	**$7,270,538**	**$7,311,790**	**$7,396,654**	**+$84,864**
Air Traffic Services (ATS)*	-	3,860,044	3,942,430	+82,386
Terminal Services	2,183,548	-	-	-
En Route and Oceanic	1,758,214	-	-	-
Technical Operations (AJW)	1,664,199	1,586,695	1,587,678	+983
System Operations (AJR)	288,559	309,601	308,752	-849
Safety and Technical Training (AJI)	227,409	274,878	274,229	-649
Mission Support Services (AJV)	266,126	292,642	292,028	-614
Management Services (AJG)	276,632	326,341	327,287	+946
Program Management (AJM)	605,851	661,589	664,250	+2,661

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

* Note: Terminal Services and En Route and Oceanic were separate service units in FY 2013 and merged in FY 2014 as Air Traffic Services.

What Is The Program?

ATO is a Performance-Based Organization providing safe, secure, and cost-effective air traffic control services to commercial and private aviation and the military. We are more than 30,000 professional employees committed to providing safe and efficient air traffic control services. Many of our employees, including approximately 15,000 air traffic controllers, 5,000 air traffic supervisors and air traffic managers, 1,800 engineers, and 6,100 maintenance technicians, directly serve our customers. Our remaining employees work in a wide variety of professions to sustain the smooth operations of ATO. They research, plan, and build air traffic control equipment and programs; manage payroll and benefits programs; maintain productive relationships with the aviation industry and the general public; and ensure that the environment and ATO employees are protected. ATO supports the Department of Transportation's (DOT) strategic goals and outcomes related to Safety: "Reduction in transportation related fatalities and injuries" and Economic Competitiveness: Maximum economic returns in transportation policies and investments." The ATO also supports DOT's Priority Goal: "Reduction of Total Runway Incursions."

Why Is This Particular Program Necessary?

ATO provides air traffic services for the Nation and is fully committed to the agency's mission. We handle 69,000 flights per day and transport 737 million passengers per year; a vital part of the Nation's economy. FAA data shows that civil aviation accounted for over $1.3 trillion in total economic activity, supporting 5.2 percent of U.S. Gross Domestic Product. Earning over $394 billion a year, 10 million people are employed in aviation-related fields.

Safety is ATO's highest priority. While the system is already exceedingly safe, we are making it safer by moving to a proactive safety culture in which every individual in ATO is committed to assessing and mitigating risks. While safety is paramount, we are also taking steps to enable growth and changes in aviation.

How Do You Know The Program Works?

ATO sets annual performance goals in safety, economic competitiveness, finance, international leadership, and organizational excellence. In safety, we track the commercial fatal accident rate, general aviation fatal accidents, rate of runway incursions, and operational errors. For economic competitiveness, we track average daily airport capacity, on-time arrivals, and adjusted operational availability. In the area of finance, we measure program performance using schedule and budget metrics. In international leadership, we measure the number of countries for synchronization of Next Generation Air Transportation System (NextGen) systems and technologies. For organizational excellence, we measure the number of air traffic controllers on-board as well as new hires.

Over the past 10 years, ATO has made extensive progress in all areas. The safety of American aviation is unparalleled. Since 2003, we have coordinated more than 135 million successful flights on commercial aircraft, transporting over 7 billion passengers safely to their destinations. This outstanding record is attributable to our efforts at reducing fatal accident rates, deploying systems and procedures to reduce serious runway incursions, and conducting training programs aimed at reducing operational errors. We have institutionalized acquisition best practices and workforce planning development, key elements to FAA's success by being removed from the Government Accountability Office's High Risk List for Acquisitions in FY 2009. We provide direct assistance to over 100 countries around the world to help improve their aviation systems, and have entered into numerous bilateral agreements to extend global connectivity. Overall, we achieved 12 of our 14 performance targets in FY 2013.

Why Do We Want/Need To Fund The Program At The Request Level?

ATO operates the most complex and technically advanced air traffic control system in the world. In FY 2015, an operating budget of $7,396,654,000 is required to sustain and improve effective and efficient air traffic control throughout U.S. airspace. Since our inception, we have been effective in restructuring and re-engineering our operational and administrative functions.

Detailed Justification for the - Vice President Air Traffic Services, ATS-0

What Is The Request And What Will We Get For The Funds?

FY 2015 – Air Traffic Services – Budget Request
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Air Traffic Services*	-	$3,860,044	$3,942,430	+$82,386
Terminal Services	2,183,548	-	-	
En Route and Oceanic	1,758,214	-	-	

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

*Note: Terminal Services and En Route and Oceanic were separate service units in FY 2013 and merged in FY 2014 as Air Traffic Services.

The FY 2015 budget request for Air Traffic Services is $3,942,430,000 and 19,531 FTP / 19,292 FTE. This request provides an adjustment to base of $24,385,000 for pay inflation. It also provides for other adjustments of $5,409,000 for the annualized cost of the FY 2014 pay increase. The request includes $81,603,000 for the increase in the agency's contribution rates to the FERS retirement system. Also included in the request is a reduction of -$26,944,000 for hiring restrictions.

Key outputs expected to be achieved in the budget year with the requested resources:

- Maintain daily operation of the 566 service delivery points (23 en route and 543 terminal) in the U.S., Puerto Rico, and Guam.
- Select the required number of potential candidates to meet our hiring goal for air traffic controllers in accordance with the Air Traffic Controller Workforce Plan.

Key outcomes expected to be achieved in the budget year with the requested resources:

- Achieve an average daily airport capacity for the Nation's Core Airports during reportable hours of 59,062 arrivals and departures per day and maintain that level through FY 2018.
- Achieve a National Airspace System (NAS) on-time arrival rate of 88 percent at the Nation's Core Airports and maintain that level through FY 2018. FY 2015 Target: 88 percent.
- Decrease the rate of commercial air carrier fatalities per 100 million passengers on-board aircraft by 24 percent over a 9-year period (2010-2018). FY 2015 Target is 6.9.

The FY 2015 request will fund the following outputs and outcomes:

Safety

- Maintain the rate of serious runway incursions (Category A and B) at a rate of no more than 0.395 per million operations by improving training, procedures, evaluation, analysis and testing, and by designing, developing, and implementing an improved runway incursion analysis capability.
- Reduce risks in-flight by limiting the rate of the most serious losses of standard separation to 20 or fewer for every thousand (.02) losses of standard separation within the National Airspace System (NAS) by developing a system that integrates remotely retrievable radar and other NAS data feeds to provide a common platform for the detection and reporting of suspected losses of separation in the En Route, Terminal, and surface environments by the end of FY 2018.
- Support the design, development, and implementation of an improved runway incursion analysis capability by developing a Runway Incursion Reduction Plan. This plan will determine root causal factors of pilot deviations, operational errors, and vehicle/pilot deviations and identify intervention

strategies to eliminate and/or mitigate the root causal factors leading up to the incident while also providing a strategy for implementation of the recommendations.

- Provide the day-to-day management oversight and support for all terminal contract tower facilities and for contract weather services within Air Traffic Service's three service areas (Eastern, Central, and Western) to ensure safe and efficient operations.

Economic Competitiveness:

- Implement Wake Turbulence Re-categorization by implementing new technology-based solutions that will allow, when the runway crosswind is favorable, the lifting or reduction of the wake turbulence separation time constraint and is expected to yield more arrival and departure slots per airport which will directly increase the average daily airport arrival and departure capacity.
- Reduce means and variances of average time it takes to go from one core airport to another affecting at least 90 percent of passengers by supporting research to improve safety and increase throughput using wake turbulence monitoring, operational procedures, and controller tools.
- Meet 90 percent of all Next Generation Air Transportation System (NextGen) acquisition milestones on schedule and at or below original budget while continuing to expand FAA's NextGen Implementation Plan to incorporate critical path decisions and milestones necessary to accomplish the mid-term commitments.
- Provide the oversight, management, and support necessary to enable safe increases in capacity and efficiency through changes in airspace, improved procedures, and insertion of new technology into the operation. This includes providing complete analysis/report of NextGen arrival procedures initiatives and establishing a more effective separation standard for Instrument Flight Rule (IFR) operations between the final approach fix and runway threshold.
- Lead the evaluation and expansion of the use of Converging Runway Display Aids (CRDAs) at airports with intersecting runways.

What Is This Program?

Air Traffic Services program provides air traffic control operations from 566 service delivery points in the U.S., Puerto Rico, and Guam; and we control more than 59 million square miles of airspace over the continental U.S. and the Atlantic and Pacific Oceans including the South Pacific, to the Northern Polar Routes, the North Atlantic, the Caribbean, and the Gulf of Mexico. Every day we ensure that thousands of positively controlled aircraft, en route from one terminal area to another, are directed to the safest, most efficient path onto their destinations.

The en route and oceanic domain provides service by en route and oceanic controllers at 21 air route traffic control centers (ARTCCs) and 2 combined control facilities, who interface with more than 18 air navigation service providers. Terminal air traffic control (ATC) services include both airport surface operations and terminal area operations. Airport surface operations are conducted by controllers at 515 federal and contract towers located at the Nation's airports. Terminal area operations are conducted by controllers at 161 TRACON facilities, which routinely handle aircraft within 40 miles of an airport.

The Contract Weather Program provides quality weather monitoring, augmentation, and backup of automated weather systems (Automated Surface Observing System and Automated Weather Observation System). The program has undergone changes based on revalidated requirements and revised FAA Orders, which has reduced the program significantly. Weather observations continue under the Limited Aviation Weather Reporting Station (LAWRS) program.

Air Traffic Services supports the Department of Transportation's (DOT) Strategic Plan's Safety Goal to reduce transportation related injuries and fatalities. We measure our progress in achieving aviation safety by tracking the following performance targets, as well as accomplishing the identified related initiatives.

- Reduce the rate of fatalities per 100 million passengers on-board by 24 percent over a 9-year period (2010-2018). FY 2015 Target: 6.9
- Support development of a system that integrates recorded radar and other similar data feeds to provide a common platform for the detection and reporting of suspected loss of standard separation events.

- Improve situational awareness for pilots and controllers in the NAS by providing them with additional information concerning potential conflicts and offering possible resolutions.
- Enhance database source inputs and transition to a dashboard graphical user interface.
- Maintain and continuously improve the En Route and Oceanic Services Safety Management System (SMS) for the delivery of safe air traffic services.
- Execute the requirements of the En Route Continuous Improvement Plan, conduct internal audits, and provide safety-related training.
- Support performance measure to reduce the transportation and related injuries and fatalities through its support to achieve the annual FAA's Targets for Commercial Air Carrier Fatality Rate, General Aviation Fatal Accident Rate, and Total Runway Incursions.

This Service unit also supports the DOT's Strategic Plan's Economic Competitiveness Goal of achieving maximum economic returns on transportation policies and investments outcomes. Our performance is tracked by the following metrics, supported by achievement of related initiatives.

- Achieve an average daily airport capacity for the Nation's Core Airports during reportable hours of 59,062 arrivals and departures per day and maintain that level through FY 2018.
- Continue strategic investment in the current NAS infrastructure to sustain NAS services and reduce operational risk while providing a foundation to increase capacity in a safe and efficient manner for all users.
- Increase the percentage of oceanic airspace using reduced separation standards to 100 percent from previous fiscal year baselines.
- Supporting performance measure to maximize economic returns on transportation policies and investments through its support to achieve FAA's annual targets for average daily airport capacity at the Nation's Core Airports and adjusted operational availability.
- Supporting performance measure to be a competitive air transportation system responsive to consumers through its support to achieve FAA's annual targets for annual service volume and NAS on-time arrivals.
- Supporting performance measure U.S. transportation interests advanced in targeted markets around the world through its support to achieve FAA's annual targets for NextGen technologies.

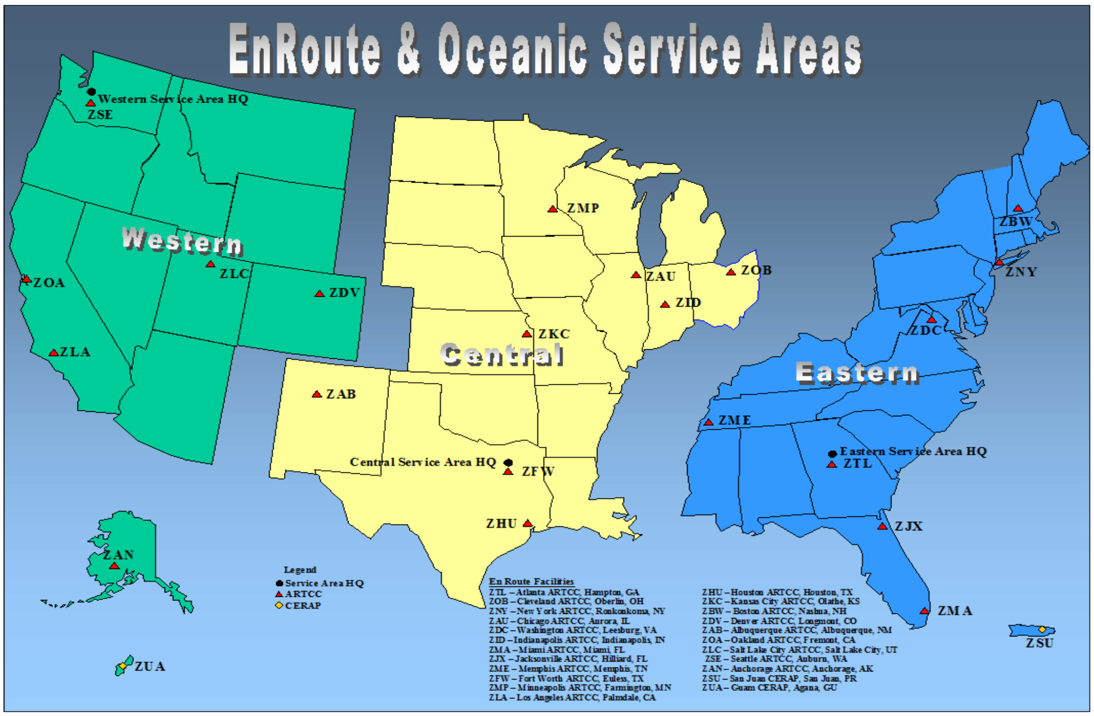
Air Traffic Services supports the FAA Mission and U.S. Transportation interests in advancing aviation in the U.S. and beyond. One of the activities we will assist in is to:

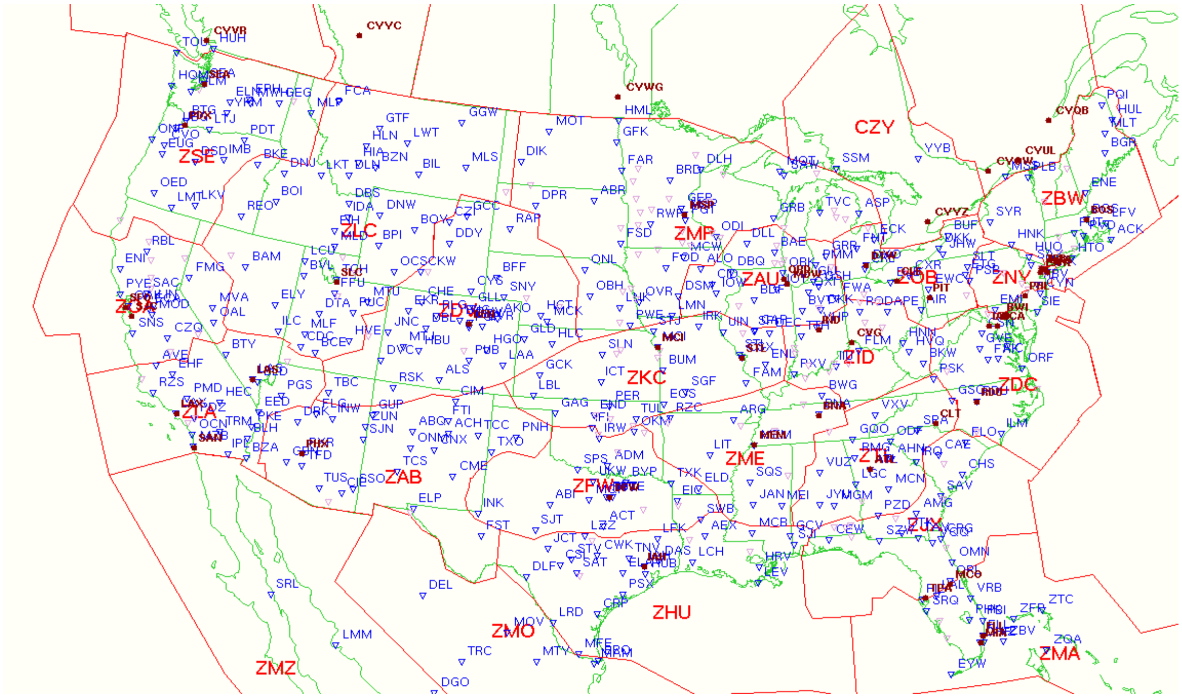
- Ensure harmonization of service improvements through collaboration with international and industry service providers by active participation and leadership in regional International Civil Aviation Organization (ICAO) and other inter-organizational workgroups and decision making processes.

Our partners and stakeholders include:

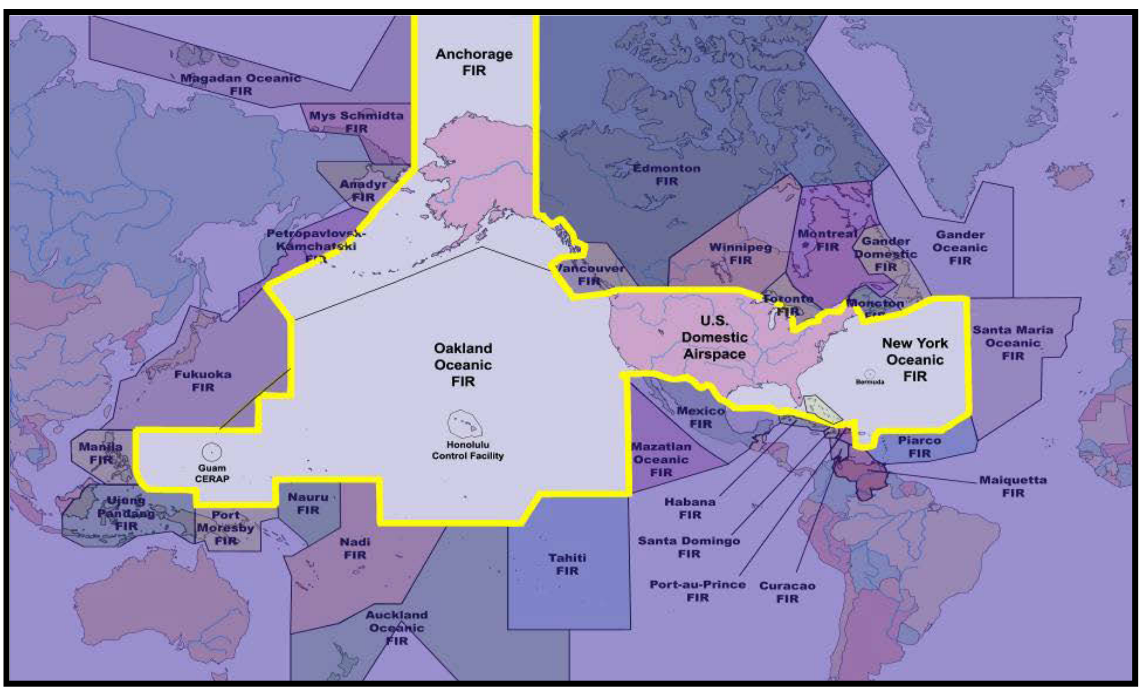
- Department of Defense (DoD)
- Department of Homeland Security (DHS)
- National Aeronautics and Space Administration (NASA)
- Academia
- Airlines and other aircraft operators
- Radio Technical Commission for Aeronautics (RTCA)
- National Air Traffic Controllers Association (NATCA)
- Professional Airways Safety Specialists (PASS)
- National Transportation Safety Board (NTSB)
- International Civil Aviation Organization (ICAO)
- EUROCONTROL and other Air Navigation Service Providers
- MITRE's Center for Advanced Aviation System Development (CAASD)
- Single European Sky Air Traffic Management Research (SESAR) program
- Other ATO Business Units, Service Units, and Offices
- Other FAA Offices and Lines of Business
- Aviation community
- State and municipal governments
- Air Line Pilots Association (ALPA)

Air Traffic Services is divided into three geographical service areas (Eastern, Central, and Western) to better manage the delivery of ATC services. The primary function of each service area is to oversee ATC operations within its geographical area and to ensure that quality standards established for Safety, Capacity, and Organizational Excellence are met. The first chart below shows where the 23 service delivery points are for en route (21 ARTCCs and 2 combined control facilities). The second chart depicts the location of ATO's air traffic control towers and en route center airspace.





In addition to the above charts, Air Traffic Services also provides control services outside of the contiguous U.S. as shown in the chart below.



By the end of FY 2014, the accomplishments for Air Traffic Services include:

- Continue reporting loss of standard separation.

- On-going improvement and use of the SMS within En Route for the delivery of safe air traffic services. Building on prior SMS activities, we will develop an En Route and Oceanic Continuous Improvement Plan, conduct internal audits, and provide safety-related training.
- Oceanic Research and Development Plan for NextGen mid-term and beyond.
- Continue efforts to ensure global harmonization of service improvements through collaboration with international and industry service providers by active participation and leadership in regional ICAO and inter-organizational workgroups and decision making processes.
- Conduct research to improve safety and increase throughput using wake turbulence monitoring, operational procedures, and controller tools.
- Using the cross-organizational Airport Obstructions Standards Committee (AOSC) to develop recommended standards and action plans for runway procedures and other initiatives identified by the AOSC Steering Committee, while maintaining an optimum balance among safety, capacity, and efficiency considerations.
- Continue to support establishment of Facility Hiring Plan requirements and selection of potential candidates for placement into terminal and enroute facilities in accordance with the ATC Workforce Hiring Plan.
- Deconflict congested airports in and out of closely located airports to provide greater efficiencies including assessing year end performance goals for the areas of New York, New Jersey, Philadelphia, and Chicago.

By the end of FY 2015, anticipated accomplishments for Air Traffic Services include:

- Continue efforts to improve the ATO's Air Traffic Services' (Terminal and En Route and Oceanic) SMS for the delivery of safe air traffic through participation in conducting compliance assessments at service area facilities, on-going participation of internal audits, and by conducting analysis of safety data for the purpose of proposing solutions to major safety risk concerns in the Terminal and En Route and Oceanic environment.
- Continue efforts to ensure global harmonization of service improvements through collaboration with international and industry service providers by active participation and leadership in regional ICAO and inter-organizational workgroups and decision making processes.
- Continue to conduct research to improve safety and increase throughput using wake turbulence monitoring, operational procedures, and controller tools.
- Analyze each facility that has widely space parallel approaches to determine if benefits can be derived from use of color displays to identify parallel operations in lieu of existing final monitor positions.
- Review and validate analysis and implementation strategy of color use for parallel operations.
- Conduct annual review process for all sites to assess benefits for CRDA use.
- Continue to support the RCAT in examining data from FAA investigations related to Pilot Deviations, loss of standard separation, and Vehicle/Pilot Deviations in order to determine root causal factors for the incident.
- Support Tower Flight Data Management (TFDM) system engineering activities to finalize requirements and continue prototyping activities.
- Establish a more effective separation standard for Instrument Flight Rule (IFR) operations between the final approach fix and runway threshold.
- Ensure terminal facilities can maximize airspace design for arrivals and departures by completing a study to assess the viability of reducing the separation minima from obstructions including assessing any reductions of separation minima for obstruction and terrain that is based upon new radar capabilities or NextGen technologies for terminal approach controls including validation of analyses for operations near obstructions and near terrain.
- Continue to support establishment of Facility Hiring Plan requirements and selection of potential candidates for placement into terminal and en route facilities in accordance with the ATC Workforce Hiring Plan.

Why Is This Particular Program Necessary?

FAA's ATO handles 69,000 flights per day and helps transport over 737 million passengers per year, contributing to 5.2 percent of total U.S. economy. ATO relies on numerous programs to maintain the safety and efficiency of the current system and ensure its viability well into the future.

Air Traffic Services will provide ATC operations at 566 service delivery points in the U.S., Puerto Rico, and Guam. This Service unit will continue to provide its owners, customers, and system operators the highest degree of safety and service in the most efficient manner.

We will ensure the Service unit meets future capacity demands by ensuring provision of safe and efficient air traffic control services throughout the en route portion of the NAS through targeted increases. The benefits and outcomes expected to be achieved with the funds provided in this budget request are:

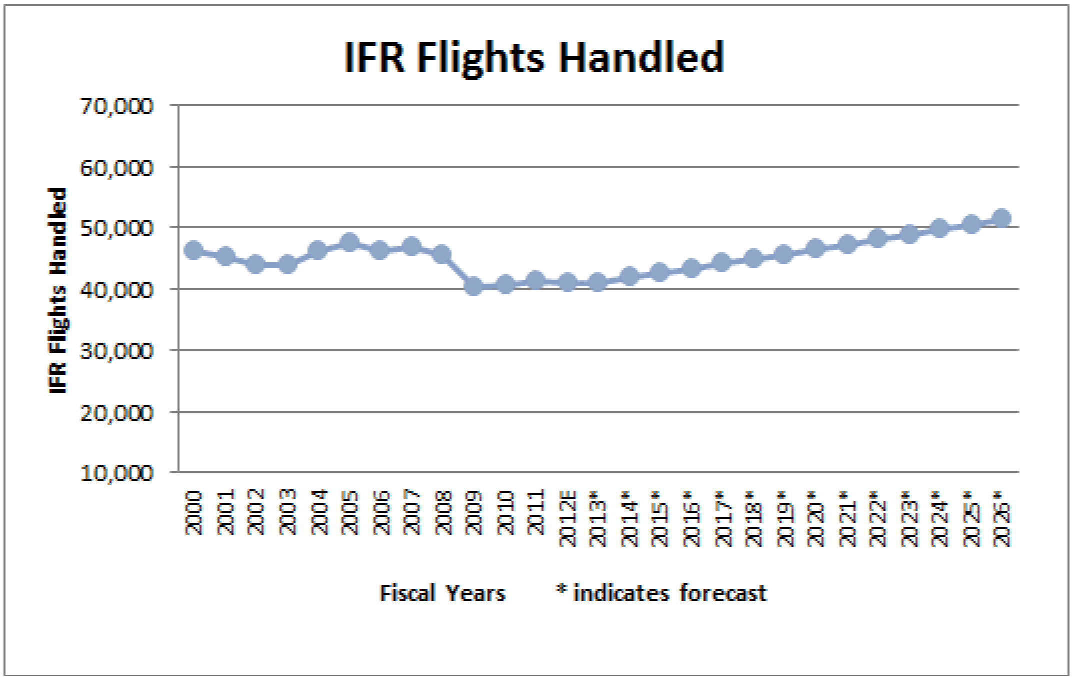
- Achieve an average daily airport capacity for the Nation's Core Airports during reportable hours of 59,062 arrivals and departures per day and maintain that level through FY 2018.
- Achieve a National Airspace System (NAS) on-time arrival rate of 88 percent at the Nation's Core Airports and maintain that level through FY 2018. FY 2015 Target: 88 percent.
- Decrease the rate of commercial air carrier fatalities per 100 million passengers on-board aircraft by 24 percent over a 9-year period (2010-2018). FY 2015 Target is 6.9.
- Improve situational awareness for pilots and controllers in the NAS by providing them with additional information concerning potential conflicts and offering possible resolutions.

Air Traffic Services is also unique in that it is not redundant or duplicative of any other Federal, state, local, or private effort. There is no overlap between FAA's management of the NAS and any other entity. Public Law (49 U.S.C.A. § 106) charges FAA with "controlling the use of the navigable airspace of the United States by regulating both civil and military operations in that airspace in the interest of safety and efficiency." While other entities provide air traffic control services (e.g., Department of Defense and Contract Towers), they do so only under FAA's authority and oversight. These arrangements are documented through agreements, Executive Orders, and Executive Policy. The specific responsibility to operate the NAS is carried out through the ATO, with Air Traffic Services managing airport and arrival/departure operations near the airport. Any activities involving other parties are coordinated and carried out under the auspices of FAA and governed by advisory circulars for establishment of airport services. We coordinate air traffic services with the other ATO operating units (i.e., System Operations Services, and Technical Operations Services).

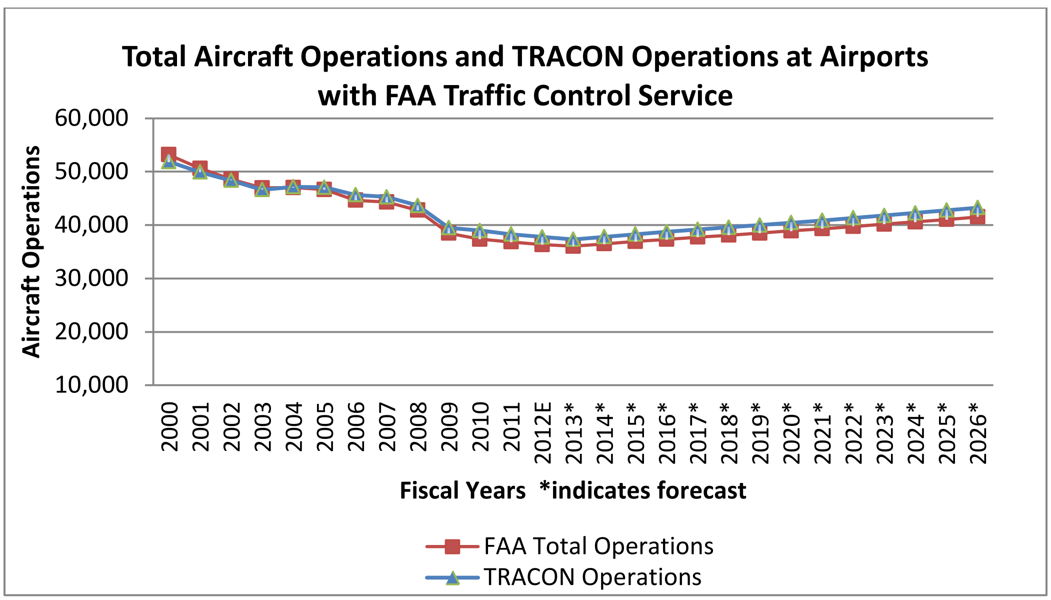
How Do You Know The Program Works?

ATO sets annual performance goals in key categories including safety, capacity, efficiency, finance, international leadership, and organizational excellence, including hiring and training. To measure our progress, we employ a set of metrics. The success of a particular program is determined by assessing its cost, schedule, and performance.

The chart below depicts the number of Instrument Flight Rules (IFR) flights handled. The number of IFR flights handled is calculated by multiplying the number of IFR departures (an en route IFR flight which originates in the center's area and enters that center's airspace) by two, then adding the number of en route IFR flyovers (an IFR flight that originates outside the center's area and passes through the area without landing).



The chart below shows the total aircraft operations at airports with FAA traffic control services.



In FY 2015, we will continue to increase safety efforts as well as increase capacity and efficiency of the NAS. We will continue to support achieving an average daily airport capacity for the Nation's Core Airports during reportable hours of 59,062 arrivals and departures per day in FY 2015 and a NAS on-time arrival rate of 88.0 percent at the Nation's Core Airports. In addition, we will continue efforts to decrease the number of operational errors in the Terminal and En Route environments. In the Oceanic airspace, our plan is to reduce separation to improve the percentage of NAS on-time arrivals and increase fuel efficiency.

We have an important support role for initiatives related to the measurement and analysis of safety performance; global interoperability; reduction in transportation-related injuries; fatalities; and economic competitiveness. Air Traffic Services' efforts support an air transportation system responsive to consumer needs and helps maintain a well-trained controller workforce.

The Air Traffic Services unit is effective in achieving its annual performance goal for runway incursions. This goal is tracked at all airports for which Air Traffic Services is responsible. We have also achieved the annual performance goals for NAS on-time arrival and average daily airport capacity, which are tracked at the Nation's Core Airports and seven metropolitan areas. The Terminal domain also tracks efficiency measures: unit cost, productivity, and staffing ratio.

The terminal and en route domains have specific long-term performance measures, tied to specific programs/projects, which support the accomplishment of long-term DOT and FAA goals. Of the DOT performance goals, four serve as the long-term performance measures for the Air Traffic Services program (two Safety goals – "reducing the commercial air carrier and general aviation fatal accident rates;" two Reduced Congestion goals – "increase reliability/on-time performance of scheduled carriers" and "increase capacity for the Nation's Core Airports to meet projected demand/reduce congestion").

The two Reduced Congestion goals, "increase reliability/on-time performance of scheduled carriers" and "increase capacity," are direct indicators of Air Traffic Services program performance for capacity and efficiency and are tracked against the Nation's Core Airports. Air Traffic Services manages one supplemental safety measure that is tracked against the FAA-staffed terminal facilities and the largest Federal Contract Towers for which Air Traffic Services is responsible for "reducing the rate of runway incursions." This supplemental safety goal is Air Traffic Services leading indicator of safety performance. The four specific long-term performance measures are used by Air Traffic Services to measure progress towards the four DOT performance measures mentioned above.

Independent internal audits are also performed on a recurring basis by FAA's Office of Safety to ensure the operational services units are complying with established policies, orders, directives, and guidance. These periodic assessments are conducted on a site-by-site basis to ensure adherence at all levels of the organization. Once a year, at a minimum, internal reviews are conducted for each FAA-staffed facility. Facility evaluations of FAA's federal contract staffed towers are conducted biennially. The review criteria are defined in FAA's Air Traffic Control Quality Assurance and Air Traffic Facility Evaluation orders.

Why Do We Want/Need To Fund The Program At The Requested Level?

The Federal Government continues to explore ways to reduce costs and maximize efficiency. While pursuing costs savings, Air Traffic Services endeavors to maintain its same standards for safety.

FY 2015 funding levels will support 19,531 FTPs in the Air Traffic Services unit whose primary function is to ensure the safe and efficient flow of ATC services throughout the NAS. In support of DOT's Safety, Economic Competitiveness, Organizational Excellence, and Strategic Plan's goals, this funding will:

- Oversee ATC operations for aircraft operating under instrument flight rules between airport terminal areas, which is performed by air traffic controllers located in 402 service delivery points in the U.S., Puerto Rico, and Guam;
- Reduce the number and rate of Category A and B (most serious) runway incursions; and
- Achieve the specified average daily airport capacity at the Nation's Core Airports and the NAS on-time arrival rate.

For controllers in en route and oceanic, their primary function is to keep track of the progress of all instrument flights within the center's airspace, which typically extends over a number of states and covers more than 100,000 square miles. Terminal ATC specialists at FAA towers transfer control of aircraft on instrument flights to our en route controllers when aircraft leave the terminal's airspace. The en route controllers transfer control of aircraft back to terminal ATC specialist as they return to a terminal's airspace. Through innovative training techniques and efficient database tracking, we are also ensuring that a consistent progression of air traffic controllers is available to staff our facilities now and in the future.

Terminal controllers are responsible for directing the movement of aircraft on and in the vicinity of airports, usually within 40 miles, using visual or instrument flight rules. Terminal controllers provide separation between landing and departing aircraft, transfer control of aircraft on instrument flight to en route controllers when aircraft leave the terminal airspace, and receive control of aircraft coming into the terminal's airspace from controllers at air route traffic control centers.

Detailed Justification for the – Vice President Technical Operations, AJW-0

What Is The Request And What Will We Get For The Funds?

FY 2015 – Technical Operations Services – Budget Request ($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Technical Operations Services	$1,664,199	$1,586,695	$1,587,678	+$983

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

The FY 2015 budget request for Technical Operations Services is $1,587,678,000 and 8,123 FTP / 7,859 FTE. This request provides an adjustment to base of $6,942,000 for pay inflation. It also provides for other adjustments of $1,539,000 for the annualized cost of the FY 2014 pay increase. The request includes $23,230,000 for the increase in the agency's contribution rates to the FERS retirement system. Also included in the request is a reduction of -$7,670,000 for hiring restrictions. Also, this request includes two base transfers for a total of $1,244,000.

Funding the FY 2015 request at this level will allow Technical Operations to achieve these initiatives:

- Continue development and implementation of policies/procedures and technology, coupled with strategic investment in the current NAS infrastructure and improve services safely and efficiently.
- Develop and implement NAS technology, policies, and procedures. Invest in the current NAS infrastructure to sustain services, increase capacity, and enhance safety.
- Deploy runway status lights at Airport Movement Area Safety System (AMASS) and Airport Surface Detection Equipment – Model X (ASDE-X) airports.
- Increase capacity by evaluating and certifying modified and/or augmented procedures, implementing new technology, and increasing service efficiency for all users.
- Follow policies and procedures to monitor, control, maintain, and restore NAS equipment, and provide operational oversight of leased NAS services.
- Continue development and implementation of Technical Operations Control Centers to provide operational improvements such as improved response times, reduced service caused delays, reduced impact of NAS infrastructure anomalies, and reduced NAS service outage occurrences and durations.
- Provide technical support to the Integrated Display System (IDS4) Replacement Program in site planning and coordination for systems installations.
- Conduct accurate inventory of the real property assets for ATO facilities.
- Sustain and improve an efficient and effective cyber security program by protecting FAA-sensitive and individual privacy information from unauthorized disclosure, improving incident detection within the NAS infrastructure environment, and improving incident response.
- Sustain the functionality of Computer Aided Engineering Design (CAEG) software and investigate methods for reducing CAEG operating costs.
- Perform Configuration Management for the Air Traffic Control (ATC) Facilities Directorate.
- Develop and manage an ATC facilities evolution plan that maps future and planned future sustainment of infrastructure to right size the NAS.
- Sustain unstaffed infrastructure in accordance with International Agreements and sound business practices.
- Administer security requirements and performance standards across all facilities to improve the quality and effectiveness of the guard services.
- Maintain and sustain the Weather and Radar Processor (WARP) service in accordance with the program specification and requirements.

Key outputs expected to be achieved in the budget year with the requested resources:

- Provide continuous NAS information to external aviation partners by monitoring, restoring, and directing restoration of the systems and networks providing the information.

- Provide Environmental and Occupational Safety & Health (EOSH) training and personal protective clothing and equipment to personnel, obtain regulatory permits, e.g. (air, water, fuel storage tanks (FST)) to ensure operation of FST, conduct compliance inspections, materials testing, and pollution prevention to support NAS operations.
- Sustain operational availability of all facilities at 99 percent by sustaining power systems; evaluating system operations; and implementing deficit solutions to increase operational readiness. In addition, complete funded activities of preventive maintenance, equipment modifications, service certifications, and restoration activities to include flight inspection and oversight of leased services.
- Improve response times, reduce service caused delays, reduce impact of NAS infrastructure anomalies, and reduce NAS service outage occurrences and durations.
- Improve incident detection within the NAS infrastructure environment and improve cyber incident response.
- Improve professionalism in the facility security officers through the use of standardization and oversight that ensure that qualification and certification requirements are being met.

Key outcomes expected to be achieved in the budget year with the requested resources:

- Reduce the commercial air carrier fatalities per 100 million persons on board by 24 percent over a 9-year period (2010-2018). No more than 6.2 in 2018.
- Reduce the general aviation fatal accident rate to no more than 1 fatal accident per 100,000 flight hours by 2018.
- Decrease in the number of site physical security discrepancies, including guard services that would lead to an increase in the number of accreditations.
- Sustain adjusted operational availability of 99.7 percent for the reportable facilities and services that support the Nation's Core Airports through FY 2015.
- Reduce the U. S. population exposed to significant aircraft noise around airports to less than 300,000 persons.
- Achieve zero cyber-security events that disable or significantly degrade FAA services.
- Achieve a 90 percent success rate in the areas of financial management and human resources management.

What Is This Program?

The purpose of the Technical Operations Service Unit is to:

- Improve situational awareness for pilots, controllers and airfield operators by providing them with additional information concerning potential conflicts and offering possible resolutions;
- Increase NAS capacity for all users through changes in technology;
- Maintain NAS services for all users by strategically investing in the current infrastructure and providing operational oversight of leased NAS services; and
- Ensure efficient delivery of all NAS services for all stakeholders by effectively managing the Technical Operations Services Unit.

Technical Operations supports the delivery of safe and efficient flight services to customers through responsive and cost effective maintenance of the NAS facilities, systems, and equipment, and by providing operational oversight of leased services. The work consists of:

- System design, development, acquisition, installation, maintenance, restoration, modification, and certification;
- Inspection to support restorations and periodic inspection of NAVAIDs and the validation of amended instrument flight procedures;
- Facilities maintenance;
- Engineering and assignment of aeronautical frequency spectrum;
- Safety integration;
- Oversight of vendor supplied NAS services and vendor maintenance programs;
- Information and physical security management; and
- Administrative and business support functions.

The Technical Operations Services Unit supports DOT Strategic Plan's Economic Competitiveness goal to maximize economic returns on transportation policies and investments through its support to achieve FAA's annual targets for average daily airport capacity at the Nation's Core Airports and adjusted operational availability.

Our core work is performed by the System Support Centers, Flight Inspection Field Offices, and Technical Operations Control Centers. These professionals focus daily on optimizing NAS performance through prioritization of response based on factors such as importance of the airport or ATC facility that is directly or indirectly affected by the equipment or service outage. This core work includes certification, logging, maintenance, modifications, and technical documentation.

Strategic efforts and related program management is primarily provided by headquarters organizations. Technical Operations strategic activities supporting the FAA goals include NextGen development and implementation. Funding the Wide Area Augmentation System (WAAS) approaches contributes toward this effort.

The Technical Operations Service Unit is made up of the following directorates:

National Enterprise Operation's primary role is to effectively manage enterprise level NAS infrastructure events to prevent and mitigate their impacts on NAS operations, and to provide around-the-clock operational management of the National Airspace System services and infrastructure from a global perspective.

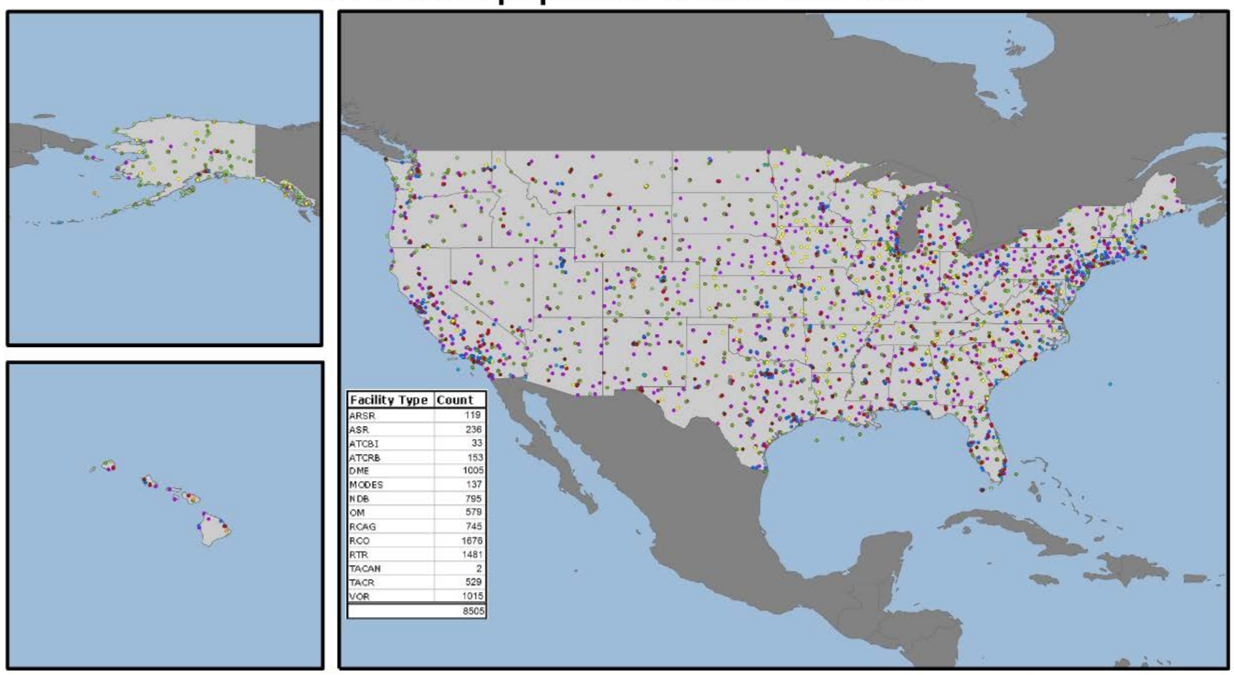
Operational Support provides technical support to ATO's service units, through a strategy of focused engineering, policy, data, and in-service management by providing the support structure, methodology, tools, procedures, performance monitoring and assurance, necessary for the proper operation and maintenance of the NAS. Spectrum Engineering Services obtains, assigns, and protects radio frequencies for the FAA's communication, navigation, and surveillance programs. This includes resolving Radio Frequency Interference (RFI) events that affect the NAS as well as developing and coordinating the civil aviation radio frequency standards and protection criteria to support future NAS systems.

The ATC Facilities Office provides safe and effective lifecycle management of the NAS and facilities infrastructure. They also provide policy and guidance, programming, requirements, engineering, integration and implementation support, service life extension, and maintenance support.

The Flight Inspection Services' mission ensures the evaluation and certification of public use and DOD NAVAIDS, airspace systems, instrument flight procedures, and equipment in the NAS and worldwide for DOD. The organization operates aircraft for the purpose of flight inspection.

The Air Traffic Control Facilities Directorate's, Facilities Security Risk Management Office provides guard services for Security Level (S/L) 3 and 4 facilities. This designation is given to facilities because of the size and scope of the operation and criticality of the mission they are assigned to perform. Additionally, FAA Order 1600.69B change 1 identifies the need for guards and the functions they are expected to perform at S/L 3 and 4 facilities in the FAA Guard Staffing Standard.

Aircraft Equipment Across the NAS



These graphics represent 8,505 of 66,749 facilities and equipment maintained by the FAA. Produced by AJW-1B , May 2013

Our partners and stakeholders include:

- Commercial Aviation Safety Team (CAST)
- International Civil Aviation Organization (ICAO)
- International Telecommunication Union – Radio Communications (ITU-R)
- National Telecommunication and Information Administration (NTIA)
- Department of Defense (DOD)
- Federal Communications Commission (FCC)
- National Transportation Safety Board (NTSB)
- Department of Homeland Security (DHS)
- Radio Technical Commission for Aeronautics
- The Airline community
- RTCA, Inc.
- Academia
- FAA lines of business (other ATO Service Units, AVS, ANG,AFN, ARP, ASH)
- Industry and state/local governments
- Inter-Agency Security Council

By the end of FY 2014, accomplishments for Technical Operations include:

- Increasing capacity by evaluating and certifying modified and/or augmented procedures, implementing new technology and increasing service efficiency for all users, including new runway commissioning.
- Sustain and improve an efficient and effective cyber security program.
- Prevent unauthorized disclosure of FAA-sensitive and individual privacy information.

By the end of FY 2015, anticipated accomplishments for Technical Operations include:

- Increase capacity by evaluating and certifying modified and/or augmented procedures, implementing new technology and increasing service efficiency for all users, including new runway commissioning.
- Sustain and improve an efficient and effective cyber security program.
- Prevent unauthorized disclosure of FAA-sensitive and individual privacy information.
- Complete 106 engine generator sustainment projects.

Why Is This Particular Program Necessary?

FAA's ATO handles 69,000 flights per day and helps transport over 737 million passengers per year, contributing to 5.2 percent of the total U.S. economy. ATO relies on numerous programs to maintain the safety and efficiency of the current system and ensure its viability well into the future.

The safety of air travelers and the ability to get them to their destination on-time is dependent on the availability of navigational and communications equipment and redundant back-up systems. The availability of the equipment necessary to provide service directly affects the performance of the NAS. Loss of radar or communications equipment will affect the speed and number of aircraft that can be handled. The ability of the NAS to continually provide guidance is crucial and affects both safety and capacity.

The target performance level is met by adherence to FAA maintenance policies and procedures for NAS monitoring, control, maintenance, and restoration. This strict adherence optimizes service availability for the Nation's Core Airports. Most of the unscheduled downtime for the fiscal year was due to equipment and power outages.

The goal for Adjusted Operational Availability is expected to remain at 99.7 percent. ATO analyzes various performance data to increase or maintain targeted level of performance and determine metric goal in order to provide appropriate Safety and Economic Competitiveness outcomes for the flying public.

Complementing the safety of air travelers is the security of the FAA facilities and employees whose job it is to ensure the safe and efficient control of flight operations. The provisioning of high quality, professional guard services at staffed FAA facilities ensures that the work of controlling flight operations can proceed without interruption.

How Do You Know The Program Works?

ATO sets annual performance goals in key categories including safety, capacity, efficiency, finance, international leadership, and organizational excellence, including hiring and training. To measure our progress, we employ a set of metrics. The success of a particular program is determined by assessing its cost, schedule and performance.

The NAS is an inherently complex system, with multiple levels of redundancy to assure availability of key services. We have adjusted response time at low-level facilities to ensure service is restored first to the most critical facilities. The Technical Operations Services Unit has established the following target for this performance goal:

Sustain Adjusted Operational Availability at 99 percent for reportable facilities that support the NAS

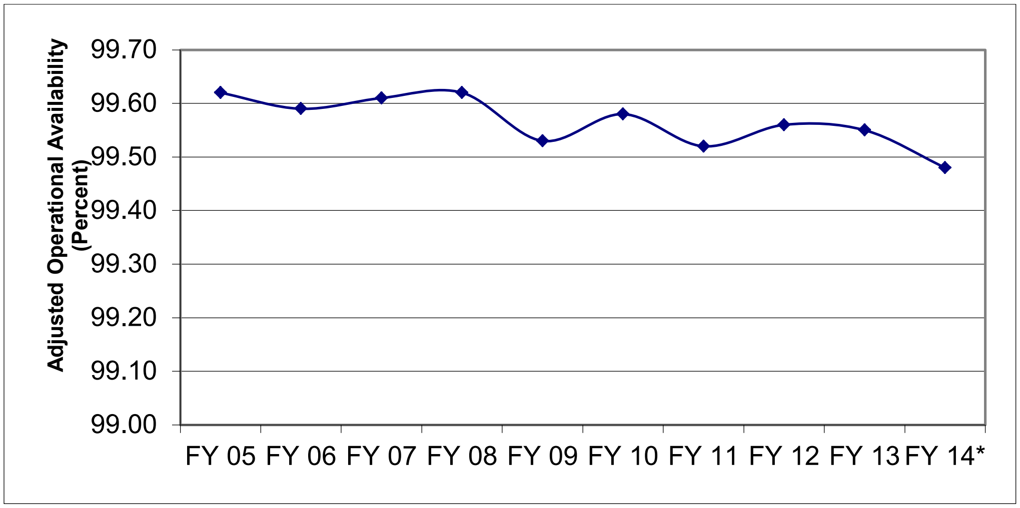


Figure 7: Adjusted Operational Availability of NAS Capabilities
Note: *FY 2014 data thru 12/31/13 (December 2013 data is preliminary)

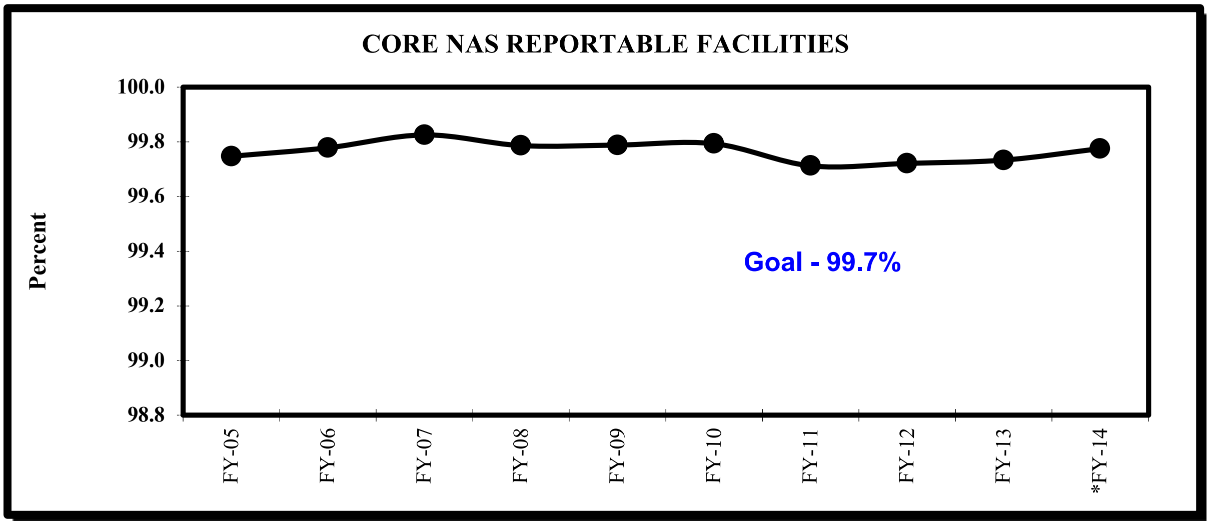
Systems Maintenance Field Maintenance Performance Indicators

Fiscal Year	Number of Facilities**	Adjusted Operational Availability	Reliability
2005	22,792	99.62%	99.90%
2006	22,860	99.59%	99.85%
2007	22,637	99.62%	99.84%
2008	22,611	99.62%	99.84%
2009	22,804	99.53%	99.85%
2010	22,419	99.58%	99.85%
2011	22,451	99.52%	99.85%
2012	22,022	99.57%	99.86%
2013	26,624	99.55%	99.85%
2014	26,590	99.48%	99.86%

*FY 2014 data thru 12/31/13 (December 2013 data is preliminary)
**Operational facilities deemed reportable in FAA Order 6040.15, "National Airspace Performance Reporting System." (The grouping in NASPAS for "NAS Reportable Facilities" was updated in October 2013)

Adjusted Availability for Nation's Core Airports
(Reportable Facilities)
FY 2013 Goal (Maintain adjusted availability of Nation's Core Airports NAS reportable facilities at 99.70%)

Target: 99.70%
FYTD: 99.78%
Nov 13:........99.78%
Dec 13:........99.81%
Dec 12:........99.74%



Preliminary numbers show, for the month of December 2013, we are above the goal for adjusted operational availability. Compared to November 2013, the adjusted operational availability for the Core Airports (reportable facilities) increased by 0.029%. Compared to December 2012, the adjusted operational availability for the Core Airports (reportable facilities) increased by 0.066%.

Note: Data Source – NASPAS *(The NASPAS database is validated continuously)*
Official data through November 2013; Preliminary data through December 2013

Why Do We Want/Need To Fund The Program At The Requested Level?

Technical Operations ensures that thousands of systems, facilities, and pieces of equipment are operationally ready to manage our Nation's air traffic control system. Without system specialists and management teams working to complete preventive maintenance and repair equipment, unscheduled outages can result in delays in the system, negatively impacting the flying public. Technical Operations ensures that leased services are maintained properly and are operationally ready.

Another component of the Technical Operations organization that serves as a vital link in delivering air traffic control services is Flight Inspection Services. Technical Operations employees conduct airborne inspection of electronic signals from ground-based NAVAIDS to support aircraft departure, en route, and arrival procedures. This group evaluates flight procedures for accuracy, human factors fly-ability, and obstacle clearance. Without this "check," the NAS would not be as safe as it is today.

Technical Operations manages their operations by measuring performance of the NAS based on what systems or services are available for air traffic control operations (Adjusted Operational Availability). However, this metric directly impacts FAA's airport capacity metric (Average Daily Airport Capacity) as noted above, as well as our safety reduction goals (Commercial and General Aviation Fatal Accident Rates). Technical Operations ensures that terminal and en route controllers have all critical parts of the NAS infrastructure available for the safety and efficient delivery of air traffic services.

Technical Operations manages and protects all civil aviation radio frequencies used by NAS communication, navigation, and surveillance systems. We resolve RFI that disrupt NAS operations and promote U.S. radio frequency spectrum positions and initiatives in the International Telecommunications Union Radio communication study groups and related World Radio Communication Conference activities. The management of radio frequency spectrum resources is vital to efficient operation of the NAS.

The provisioning of guards at Security Level 3 and 4 facilities fills a critical role in the safe operation of the NAS. If one of these facilities is adversely affected by an intrusion or other disruptive event, the ability to safely control flight operations may be in jeopardy. The use of a highly trained, professional security force will act as a deterrent to those who would attempt to disrupt the operation of the NAS.

Detailed Justification for the - Vice President System Operations, AJR-0

What Is The Request And What Will We Get For The Funds?

FY 2015 – System Operations Services – Budget Request
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
System Operations Services	$288,559	$309,601	$308,752	-$849

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

The FY 2015 budget request for System Operations Services is $308,752,000 and 482 FTP / 449 FTE. This request provides an adjustment to base of $550,000 for pay inflation. It also provides for other adjustments of $122,000 for the annualized cost of the FY 2014 pay increase. The request includes $1,842,000 for the increase in the agency's contribution rates to the FERS retirement system. Also included in the request is a reduction of -$608,000 for hiring restrictions.

Funding the FY 2015 request at this level will allow System Operations to maintain the National Airspace System (NAS) by accomplishing the following:

The Air Traffic Control Systems Command Center (ATCSCC) Directorate will:

- Continue to execute the real-time management of the NAS to ensure safe and efficient use of available airspace, equipment, and workforce resources through planning, directing, implementing, overseeing, and continuously regulating the flow of air traffic to minimize delays and congestion while maximizing the overall operation of the NAS throughout the United States;
- Continue to support a customer-focused, safe, efficient, and affordable air transportation system that is environmentally responsible that through International leadership and coordination promotes global understanding and acceptance of the FAA mission, operations, and ATO modernization efforts;
- Oversee and manage the establishment of program directives, policies, standards, strategies, plans, and management methods to support the operational requirements of national and international flight operation, worldwide contingency planning, promoting flight data exchange programs, and establishing traffic flow management standards and technologies that harmonize ATM operations and develop a seamless and fully interoperable global air traffic management (ATM) system;
- Will continue long-term planning, development, and analysis of the FAA system of air traffic management, manage new technologies, apply and test new tools and concepts, enhance current system tools, develop traffic management processes and procedures, examine current methods and implementation of solutions to improve efficiency within the NAS;
- Continue to use the Integrated Collaborative Routing (ICR) process during weather events;
- Enhance, expand, and train employees on the ICR process for use during the severe weather season;
- Adjust traffic demands to meet system capacity when a significant weather event impacts an airport or portion of airspace;
- Continue to develop the Collaborative Decision Making (CDM) process model and share airport surface data with stakeholders;
- Develop an airport CDM process model at a target airport in the NAS;
- Continue to collaborate with aviation stakeholders in support of a seamless, safe, and efficient air traffic operation, emphasizing a system focus, and conduct stakeholder forums and meetings to address concerns and follow-up on operational and procedural issues across organizational boundaries and to jointly create technological and procedural solutions to traffic flow problems that face the NAS; and
- Continue to incorporate commercial space launches into the NAS while ensuring maximum capacity and efficiency through coordination with multiple lines of business to develop and implement training, notification processes, decision authority processes, airspace management, and traffic flow management procedures.

The System Operations Security Directorate will:

- Continue to collaborate with Department of Homeland Security (DHS), Department of Defense (DOD), and other security stakeholders to protect the country and its interest from threats involving the air domain;
- Continue to use ATM-related capabilities to directly protect the NAS from attack or exploitation by terrorists and other hostile actors in partnership with the DOD, DHS, and other key stakeholders;
- Continue to use ATM-related capabilities to mitigate the impact of security threats and Government responses to those threats on the safety and efficiency of the NAS; and
- Continue to lead ATO's crisis management efforts to sustain the continuity of NAS operations and to support National Response Framework driven disaster response efforts in the face of critical events such as catastrophic hurricanes or large scale terrorist attacks.

The Flight Services Directorate will:

- Continue to provide flight services in the contiguous (CONUS) U.S. via the Automated Flight Service Stations (AFSS) contract (FAA will continue to provide Flight Services in Alaska), ensuring that safety and quality services are foremost in the delivery of flight services; and
- Conduct acquisition analysis that may result in extensions to the AFSS and DUATS contracts, and will identify requirements for future Flight Services competitions.
- Work in conjunction with the PMO to continue to modernize Flight Services through the Future Flight Service Program in order to create efficiencies through automation (i.e., web based), reducing the need for human delivery of services with initial focus on the CONUS, Hawaii, Puerto Rico, Alaska and portions of the Caribbean.

The Data Management Directorate will:

- Support implementation of the President's Open Data Policy and the associated Executive Orders in ATO;
- Chair the NAS Data Release Board, evaluating and approving external data release requests of NAS data;
- Maintain databases on aeronautical data, Freedom of Information Act requests, and litigation and accidents as well as overflight fees;
- Track and bill operators subject to the overflight fee statute billing approximately $75 million for the DOT's Essential Air Service program;
- Develop policies, standards, and technology approaches to support complex data and information exchange environments to support internal and external stakeholders, including representing ATO at the FAA Enterprise Architecture Board and co-chairing the FAA Information and Data Advisory Board; and
- Execute the statutorily mandated blocking program for aircraft owners that blocks display of their flight information in the Aircraft Situation Display to Industry data feed.

The Surface Operations Directorate will integrate Surface CDM initiatives, RTCA recommendations, data and data management strategies, facilitate changes to operations and operational systems, and policies/procedures to produce measureable NAS efficiency performance improvement in surface occupancy time, reduced surface delay, noise, and emissions. In addition, the Surface Operations Directorate will:

- Continue LaGuardia Airport (LGA) collaborative Airport Surface Capacity Optimization (CASCO) evaluation in support of ATO's COO commitments to the Port Authority of New York and New Jersey;
- Provide sponsorship and integrated operational oversight of surface operations activities;
- Provide ATO support for orders, regulations, or rulemaking to address congestion at the New York Metro airports as need ('slots'); and
- Manage Airport Schedule Restriction and Air Traffic Demand Analyses projects.

The International Directorate will:

- Provide direct technical support and strategic guidance to support daily requirements of operational facilities that interface with foreign air navigation service providers;
- Ensure harmonization of domestic U.S. air traffic operations and Next Generation Air Transportation System (NextGen) technologies, procedures, and standards with the global civil aviation community;
- Support ATO implementation of ICAO's Global Air Navigation Plan (GANP) and Global Air Safety Plan (GASP);
- Support ATO personnel participating in international activities, providing briefings, talking points, and logistical information;
- Coordinate ATO international activities with other lines of business;
- Facilitate execution of the ATO International Strategic Plan; and
- Provide leadership to the core business of the safe, secure, and efficient operation of the NAS as it pertains to International issues.

The Performance Analysis Directorate will:

- Track average flight and surface times within the NAS by including Airport Surface Detection Equipment (ASDE-X) data in the Performance Data and Analysis Reporting System (PDARS) data set and integrating that data with the terminal and en route data already available to provide a consolidated gate-to-gate measurement and analysis capability;
- Provide oversight and expertise for the development of metrics used to report FAA performance;
- Serve as ATO's principal contact for coordinating approval of metrics for FAA and is responsible for developing, enhancing, and maintaining FAA's performance metrics website;
- Serve as the official source for domestic and international performance metrics and analysis for ATO;
- Support international initiatives on performance analysis through Eurocontrol, CANSO, and ICAO, including the North Atlantic Economic Finance Group;
- Analyze data to determine the key drivers of NAS-wide performance and operations;
- Support agency investment and shortfall analysis by producing standard operational traffic schedule;
- Evaluate airline schedules and behavior to determine their effect on NAS performance;
- Simulate airport capacity for use in FAA planning and investment analyses; and
- Support the agency's research needs by sponsoring the NEXTOR II Center of Excellence in Aviation Operations Research.

In FY 2015, key outputs expected to be achieved with the requested resources:

The ATCSCC will:

- Continue to manage the establishment of policies, standards, and procedures covering air traffic flow management and airspace management, to support the safe, secure, and efficient use of navigable airspace;
- Develop tools, guidance, and procedures that match system capacity, efficiency and predictability to user demands while improving access to, and increasing the capacity of the nation's aviation system;
- Continue to coordinate traffic flow to assure efficient movement of air traffic; and
- Use the following targets to measure its performance:
    - Average Daily Airport Capacity (Nation's Core Airports) – Achieve an average daily airport capacity for the Nation's Core Airports of 86,606 arrival and departures per day by FY 2011 and maintain that level through FY 2015.
    - Average Daily Airport Capacity (metropolitan areas) – achieve an average daily airport capacity for the seven metropolitan areas of 39,484 arrivals and departures per day by FY 2009 and maintain that level through FY 2015. The ATCSCC will continue to improve critical information-sharing and incorporate aviation stakeholder recommendations to help guide decision-making that will more effectively manage flight diversions during severe weather events.

The System Operation Security's Directorate will:

- Provide specialized ATM-related measures (e.g., security driven Temporary Flight Restrictions) to continue to protect sensitive activities, locations, and events, such as Presidential movements, from aviation-related threats while minimizing safety and efficiency effects on civil aviation; and

- Provide crisis management efforts to continue to strengthen the preparedness and consequence management capabilities used to sustain NAS operations and to support disaster response air missions in the face of critical events, including natural disasters and large scale terrorist attacks.

- Flight Services will continue to manage the AFSS contract to provide quality flight services to the CONUS, Puerto Rico, and Hawaii. Flight Services will continue to provide preflight briefings, flight planning services, inflight services, search and rescue, Notice to Airmen processing through the AFSS and Direct User Access Terminal (DUATS) contracts in the CONUS/Hawaii and Puerto Rico. Additionally, these services, plus airport advisory service, are provided by a federal workforce in Alaska utilizing the OASIS automation system.

The Data Management Directorate will:

- Develop policy and procedures for implantation of President's Open Data Policy in ATO;
- Approve and disapprove requests for NAS data from external parties including making an managing agreements with external parties;
- Provide aeronautical data for Freedom of Information Act (FOIA) requests, litigation, and accidents as well as overflight fees;
- Track all flights to determine which flights meet statutory definition for overflight fees billing, generate proposed billing and develop policy and support rulemaking for fees used by DOT Essential Air Service Program;
- Support data and information exchange for internal and external stakeholders by representing ATO in the FAA Enterprise Architecture Board and co-chairing FAA Information and Data Advisory Board and;
- Process requests, develop policy, and manage the blocking of the display of flight information in the Aircraft Situation Display to Industry data feed as appropriate.

The Surface Operations Directorate will:

- Provide real-time sharing of accurate operational data to foster common situational awareness among the flight operators, airport operators, pilots, air traffic control (ATC), and the ATCSCC;
- Improve situational awareness to facilitate continuous predictions of demand and capacity, enabling the stakeholders to work collaboratively to more effectively manage real demand and respond to predicted demand/capacity imbalances in the NAS;
- Improve management of surface flow operations to increase throughput, reduce surface-related delays and decrease fuel consumption and emissions, while providing opportunities to reduce noise and improve safety;
- Collaborate with industry on surface operations efficiencies through the Surface CDM Team (SCT) and other stakeholder forums;
- Deliver joint operational performance analysis with EUROCONTROL and
- Provide recommendations for research activities to enable FAA to meet its commitments to industry.

The International Directorate will:

- Coordinate and facilitate the ATO strategic vision and supporting activities in the Europe, Africa, and Middle East regions, as well as global forums dealing with cross-regional air traffic initiatives, policies, and standards;
- Support ATO participation in CANSO Operations Standing Committee and Safety Standing Committee;
- Represent ATO at meetings of the CANSO Polity Standing Committee, Asia Pacific CEO Committee, and Latin America/Caribbean CEO Committee;
- Facilitate and participate in meetings of the ICAO Cross-Polar Working Group (CPWG) and in meetings of the ICAO Volcanic Ash Exercise Steering Group (VOLCEX);
- Represent ATO at meetings of ICAO Planning and Implementation Regional Groups (PIRGs) and of the Asia-Pacific Air Traffic Flow Management Steering Group (ATFMSG);
- Represent ATO at the annual meeting of the Asia-Pacific Initiative to Reduce Emissions (ASPIRE);
- Facilitate and participate in meetings for the Informal Pacific ATM Coordinating Group (IPACG) and represent ATO at Future Air Transportation System (FATS) working group meetings with Japan; and
- Facilitate meetings of ATO personnel with international counterparts on various topics as needed.

The Performance Analysis Directorate will:

- Provide a consolidated gate-to-gate measurement and analysis capability (PDARS);
- Assist in providing accurate and consistent workload planning and NAS modeling for investment analysis by delivering detailed demand forecasts at the service delivery point (SDP) level;
- Collaborate with international organizations to produce ICAO and CANSO documents recommending improved operational practices and analyzing operational performance;
- Provide a monthly report projecting the effect of airline schedules on NAS delays at the core airports; and
- Provide simulation and modeling support to airport and airspace improvement projects, including the Future Airport Capacity Task (FACT 3) and SFO and JFK construction projects.

What Is This Program?

This program supports DOT's goals of Safety: Reduction in transportation-related fatalities and injuries and Economic Competitiveness: Maximum economic returns on transportation policies and investments.

The System Operations Service Unit consists of several directorates that perform essential functions in the daily operation of the NAS. These directorates are:

- Air Traffic Control System Command Center (ATCSCC);
- Security;
- Flight Services;
- Data Management;
- Surface Operations;
- International; and
- Performance Analysis.

The ATCSCC coordinates air traffic flow. System demand frequently exceeds system capacity due to weather, airport delays, special use restrictions, and security restrictions. The ATCSCC regulates the flow of air traffic to minimize delays and congestion while maximizing the overall operation of the NAS. Traffic Management Specialists adjust traffic demands to meet system capacity utilizing traffic flow management tools such as Traffic Management Advisor (TMA), Ground Delay Programs (GDP), Airspace Flow Programs (AFP), Severe Weather Avoidance Programs (SWAP), Miles-in-Trail (MIT), and others.

The Security Directorate orchestrates ATO's efforts to protect the U.S. and its interests from national defense, homeland security, and law enforcement-related threats and natural hazards involving the air domain. This is accomplished by using ATO's air navigation services capabilities, particularly ATM. The Security Directorate leads ATO's efforts to mitigate the impact of those threats, hazards, and Government responses on the safety and efficiency of the NAS. System Operations Security comprises a small headquarters command and support component and Air Traffic Security Control (ATSC) watch-standing teams and operations liaisons at key air defense and homeland security nodes, including a national watch cell at FAA Headquarters in Washington, DC; the Freedom Center in Herndon, Virginia; the North American Aerospace Defense Command (NORAD) facilities in Colorado Springs, CO; Tyndall Air Force Base, FL; Rome, NY; McChord Air Force Base, WA; and the Air Marine Operations Center in Riverside, CA. The Directorate actively participates in various international forums, including ICAO working groups, to advance ATM Security and Civil-Military cooperation on ATM-related matters globally.

Flight Services collects and disseminates aeronautical and meteorological information, providing customized pre-flight and in-flight briefings to domestic and international general aviation (GA) communities, as well as to military, air carriers, and federal and local law enforcement. FAA expects to achieve $2.020 billion in total savings and cost avoidance (capital and labor) over the 13 years of this program.

The Data Management Directorate is responsible for four primary functional program areas: Data Release Process, NAS Data Repository, ATO Data and Information Sharing Policy and Standards, and ATO Block Aircraft Registration Request (BARR).

- **Data Release Process:** The Director of Data Management chairs the NAS Data Release Board and provides guidance for the NAS Data Release Process for the Vice President of Systems Operations. The NAS Data Release Board has members from various organizations in the agency. The NAS Data Release Board evaluates all applicable NAS Data Release requests for FAA to determine if they are eligible for approval by the Data Management Director. The FAA may only release NAS data to external organizations identified in a Memorandum of Agreement (MOA). All data releases must be approved by the Data Management Director pursuant to guidelines set forth in Order 1200.22E. Data recipients must submit a new data release request if they wish to provide NAS data to any third party not listed in an existing MOA. This is intended to prohibit further release of NAS data without FAA approval. All NAS data that is released, including Aircraft Situational Display to Industry (ASDI) data must be filtered for all sensitive data by the FAA prior to release. Due to increasing concern for security, new security screening procedures are needed to reduce the risk of NAS data being used for unlawful purposes or in a manner that could harm National Security.
- **NAS Data Repository:** The program maintains relational databases on aeronautical data and supports user applications for approximately 250 customers. The program also maintains aeronautical data in support of FAA's FOIA program, ATO litigation, accident investigations, and other FAA organizational safety programs. This program's effort includes the statutorily required (49 USC §45301 et seq) Overflight Fees Program that generates approximately $92 million for FY 2015 DOT's Essential Air Service.
- **ATO Data and Information Sharing Policies and Standards:** The program develops policies, standards, and technology approaches to support complex information exchange environments to support internal and external stakeholders such as CDM, Joint Planning and Development Office (JPDO), and NextGen. The program coordinates policies and standards for enterprise-wide use with the Chief Information Officer (CIO), the Office of Aviation Policy and Plans (APO), and security stakeholders in part by being the ATO member of the FAA Enterprise Architecture Board and co-chairing the FAA Information and Data Advisory Board.
- **ATO Block Aircraft Registration Request (BARR) Program:** The BARR program protects the privacy and security interests of aircraft owners, operators, and their passengers. The program is the single point of contact for individuals and groups who want to block the display of their flight information in ASDI. The program develops and maintains MOAs with data users to accomplish data sharing in accordance with the statutory mandate to protect their privacy. The BARR program ensures release of flight information and data from the ASDI feed is not compromised and that the availability of the information to the FAA and law enforcement agencies is not diminished.

In conjunction with the Program Management Office, the Flight Service Directorate is leading a Strategic Initiative to "Right Size" Flight Services and is examining acquisition alternatives for Future Flight Service Program (FFSP), which is comprised of services currently provided by AFSS, DUATS and OASIS. Flight Services will initially focus on the CONUS, Hawaii, Alaska, Puerto Rico and portions of the Caribbean. An objective of the initiative is to take advantage of commercially available system efficiencies. In Alaska, three AFSS and 14 satellite Flight Service Stations (FSS) remain government-operated. The Operational and Supportability Implementation System (OASIS) has been in operation since 2007 and will continue to operate until a replacement through FFSP is acquired.

The Surface Operations Directorate serves as a single point of responsibility, authority, and accountability for improving surface operations in coordination with industry. It provides shared situational awareness of surface movements through surveillance and data exchange; with industry, defines system requirements, metrics, and interoperability standards for improved decision making of traffic flow management, and; facilitates the implementation of integrated airport movement management decision support tools, standards, and processes.

International is focused on the harmonization of international standards for ATM services. This requires extensive multilateral and bilateral consultation in international forums with global partners, civil aviation authorities, and air navigation service providers.

The Performance Analysis Directorate monitors the operational performance of the NAS and provides guidance to decision makers through detailed analysis. Performance Analysis is responsible for developing and coordinating FAA operational metrics. The Directorate also maintains an analytical tool, PDARS, which provides operational facilities with gate-to-gate flight and operational data. As part of its performance analysis role, the Directorate monitors airline schedules and behavior, reporting monthly on the likely impact of schedules on performance. Performance Analysis supports long-range workforce and capital planning by providing detailed future airline schedules based on FAA forecasts of aviation demand. In addition, the Directorate provides simulation and modeling support to a large number of different airport and airspace improvement projects, such as the Future Airport Capacity Task (FACT 3) effort. Performance Analysis also leads international efforts to produce recommended practices on analyzing operational performance.

System Operations coordinates with representatives from all groups when building new products or establishing policies and procedures.

Our partners and stakeholders include:

- Airline Operations Centers for the Commercial Airlines
- GA Community
- Department Of Homeland Security, including the Transportation Security Administration, U.S. Secret Service, Customs and Border Protection, U.S. Coast Guard, and Federal Emergency Management Agency
- Port Authority of New York
- Metropolitan Airport Authority of Washington
- Aircraft Owners and Pilots Association
- National Business Aviation Association
- Airlines for America (A4A)
- Department of Defense/Military services, including all services and many of the combatant commands
- Department of Justice, to include the Federal Bureau of Investigation
- Foreign Civil Aviation Authorities and Air Navigation Service Providers
- International Civil Aviation Organization
- Civil Air Navigation Service Organization
- International Air Transport Association
- EUROCONTROL
- European Commission

By the end of FY 2014, the accomplishments for System Operations include:

Safety:

- Implement Safety Management System (SMS) for the FAA. Manage and oversee implementation of FAA Order 1100.61, Air Traffic Safety Oversight and ATO Order JO 1000.37, Air Traffic Organization Safety Management System to ensure compliance with Safety Standards and Safety Management System.
- Manage the AFSS contract to provide quality flight services to the contiguous U.S., Puerto Rico, and Hawaii.
- Sustain Flight Services and continue preparation for modernizing Alaska Flight Service in order to identify efficiencies and improvements in the service delivery. Provide support to other service units and Federal agencies.
- Enhance system security through collaboration with DOD and DHS, providing air traffic operations-related support to national defense and homeland security missions. Collaborate with DHS and other security stakeholders to protect national special security events. Coordinate with Department of State and other stakeholders on special air traffic secure routing of flights by countries of special security interest to the U.S. in order to mitigate potential security threats.

Economic Competitiveness:

- Use CDM to enhance traffic management tools, net-centric information sharing vehicles and processes to yield the most effective NAS decisions through the CDM process.
- Achieve a NAS on-time arrival rate of 88 percent at the Nation's Core Airports and maintain through FY 2014.
- In accordance with Destination 2025, achieve a reduction in average taxi-time at the Nation's Core Airports, identified by the Future Airport Capacity Task 3 (FACT 3) for surface traffic management, a surface management system will be operational by 2016.

- Reduce the impact of security-related activities on the efficiency and performance of the NAS through planning, engaging with interagency partners, and mitigating consequences using technology and advanced operational procedures.
- Detailed operational schedules at the SDP level to assure accurate and consistent workload planning and NAS modeling for investment analysis.
- A consolidated gate-to-gate measurement and analysis capability.
- A detailed analysis of the operations of 12 percent of the ticketing carriers; trending the directional changes in delays and total operations.
- A 5-year operational outlook of aviation demand based on industry trends.
- Manage the slot authorization process for the FAA.

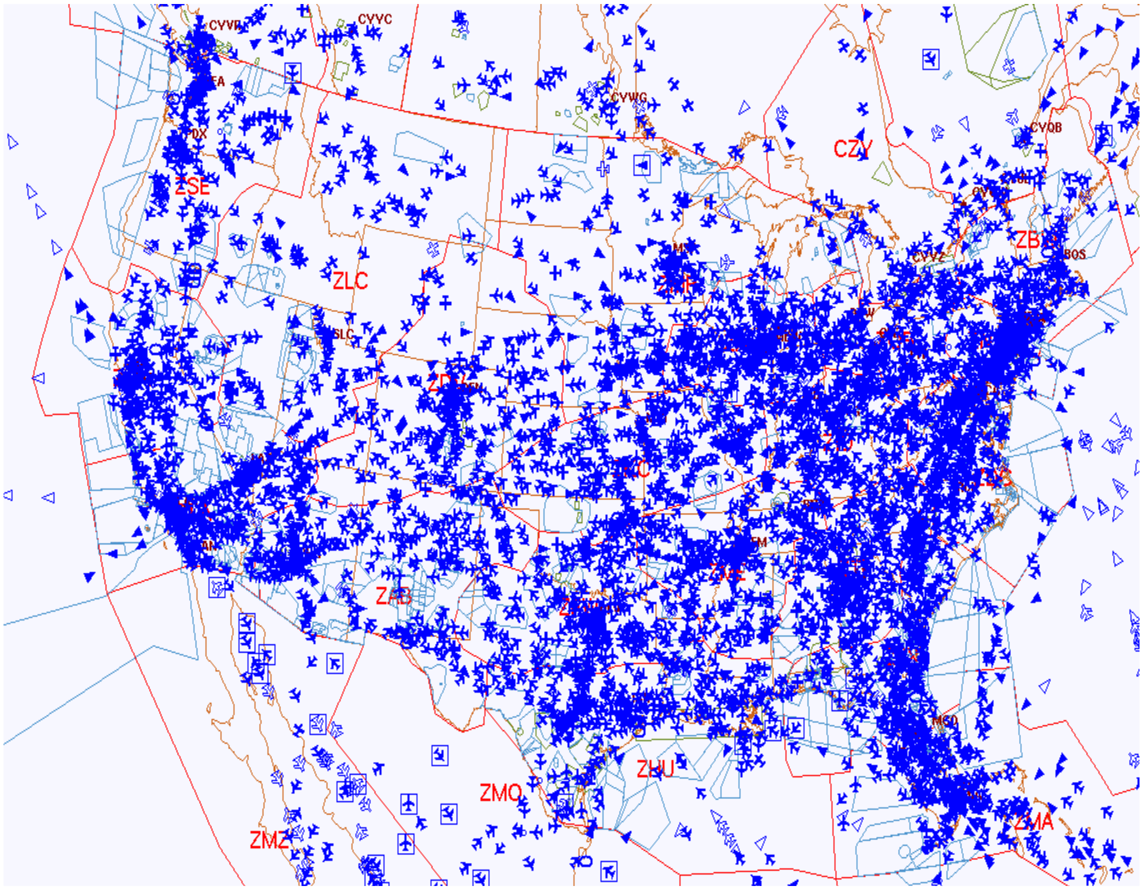
By the end of FY 2015, the anticipated accomplishments for Systems Operations include:

Safety:

- Continue to manage the AFSS contract to provide quality flight services to the continental U.S., Puerto Rico, and Hawaii.
- Provide high quality flight services to our customers in Alaska.
- Promote a positive safety culture by ensuring that our service complies with FAA Order 1100.161 and ATO Order JO 1000.37. We will educate all employees in all aspects of safety management.
- Continue to protect the NAS from attack or exploitation from hostile actors, in partnership with interagency and other stakeholders.

Economic Competitiveness:

- Achieve an average daily airport capacity for the Nation's Core Airports of 59,062 arrivals and departures by FY 2014 and maintain that level through FY 2015.
- Achieve a NAS on-time arrival rate of 88 percent at the Nation's Core Airports and maintain that level through FY 2015. Provide daily improvements to traffic flow by routing around obstacles such as weather, congested airports, and equipment outages. Short-term benefits realized include reduced congestion and delays, making the flying experience more desirable for the general public.
- Detailed operational schedules at the SDP level to assure accurate and consistent workload planning and NAS modeling for investment analysis.
- The traffic flow efficiency on airport surfaces will be greatly enhanced by the use of "real time" situational analysis capabilities, including data exchange procedures, and associated policies that promote planning and predictability. The anticipated benefits of these initiatives include: improved situational awareness of actual NAS demand; more timely, efficient and accurate surface decisions; increased predictability and less variability in surface movement; reduced taxi time/block time; enabled flexibility for tactical operational changes; reduced fuel burn and emissions, and improved operational productivity.
- An enhanced consolidated gate-to-gate measurement and analysis capability.
- A detailed analysis of the operations of 12 percent of the ticketing carriers; trending the directional changes in delays and total operations.
- A 5-year operational outlook of aviation demand based on industry trends.
- Manage the AFSS contract to provide quality flight services to the CONUS U.S., Puerto Rico, and Hawaii.
- Continue to sustain efficient NAS operations for critical events, natural disasters, and human-caused disasters.
- Serves as the lead for ATO in managing the Air Traffic Demand and Analysis (slot) Program and coordinate actions with the office of the General Counsel.
- Support the decisions with the allocation, transfer, and use of airport operating slots/operating authorizations under the High Density Rule.
- Coordinate modeling and analysis activities for construction events at slot controlled airports.



Why Is This Particular Program Necessary?

FAA's ATO handles 69,000 flights per day and helps transport over 737 million passengers per year, contributing to 5.2 percent of the total U.S. economy. ATO relies on numerous programs to maintain the safety and efficiency of the current system and ensure its viability well into the future.

The Systems Operations Service Unit provides services that are critical in the operation of the NAS:

- The ATCSCC personnel optimize the capacity of the NAS. The ATCSCC coordinates streams of aircraft over and around constraints and provides traffic flow management information to FAA facilities, while also coordinating their actions and recommendations with the airline home offices. ATCSCC communicates airport and system capacity information factors that influence aviation stakeholder flight decisions. During severe weather and irregular operation situations this information assists airlines in making fully informed decisions to effectively manage schedules and flight diversions.

- The System Operations Security Directorate mitigates the impact of aviation-related threats to national defense, homeland security, natural disasters, and disruptions to air commerce and the associated response measures (i.e., airport terminal shutdowns) on the safety and efficiency of the country's aviation system. We use a broad range of air traffic management tools (e.g., temporary flight restrictions) to carry out this mission using air traffic controllers that are dedicated to security functions to help quickly resolve potential airborne and other threats involving the NAS. The Directorate is instrumental in working with DHS, DOD, and other partners as well as the private sector, to enable security solutions that meet the country's national defense, homeland security, law enforcement, and emergency operations demands while mitigating undesirable impacts on the safety and efficiency of the NAS and air commerce. The Directorate also serves as a key factor in working with ICAO and other international partners to ensure ATM-related capabilities are used by foreign Civil Aviation Authorities

(CAA)/Air Navigation Services Providers (ANSP) in a manner that the aforementioned objectives globally, particularly including airspace affecting the NAS and airspace in which U.S. operators and residents, regularly fly.

- Flight Services is the primary interface for general aviation, some corporate and military customers using the NAS. Flight Services collects and disseminates aeronautical and meteorological information, providing customized pre-flight and in-flight services to the domestic and international general aviation communities, as well as to military, air carriers, and Federal and local law enforcement. These services are provided to pilots by telephone, radio, the Internet, and face-to-face meetings. Flight Services provides the primary support to Search and Rescue for both the general aviation and military users of the NAS.

- The Data Management Directorate supports the President's Open Data Policy in ATO, endeavors to ensure that NAS data is properly released to external entities; manages the Overflight Fees Program to bill flights that neither take off nor land in the U.S. for FAA air traffic services obtained in the U.S. managed airspace; executes the Block Aircraft Registration Request Program; and assists in the development of ATO data policies, processes, and procedures.

- The Surface Operations Directorate works closely with industry stakeholders using Collaborative Decision Making ("CDM") processes to enhance the safety and efficiency of surface traffic at our nation's airports and within the overall aviation system to provide the public better reliability and a more satisfying flying experience.

- International continues its active leadership in diverse international forums towards the goal of harmonizing and integrating foreign air navigation services with those being planned and implemented in the United States NAS and to accomplish this in the most effective and efficient manner possible. ATO International is also committed to leading global and regional efforts to foster air navigation solutions that result not only in operational efficiency gains for providers, but reduced fuel consumption and carbon emissions for operators and an overall decrease in civil aviation's carbon footprint. The leadership continues to be showcased in regional partnerships such as the Atlantic Interoperability Initiative to Reduce Emissions (AIRE) and the Asia and Pacific Initiative to Reduce Emissions (ASPIRE).

- The Performance Analysis Directorate provides the operational analysis that is needed to make informed decisions to improve the current operational performance of the NAS, and the understanding of the key drivers of operational performance that allows the ATO to plan strategically for the future. FAA management requires a single focal point for performance analysis and metrics to ensure the agency can execute its mission. Performance Analysis also has the expertise in and historical knowledge of FAA metrics to help the ATO both monitor performance and communicate this performance to all aviation stakeholders. The FAA relies on the Directorate as the single source for operational traffic levels and constraints to support FAA planning projects. The Directorate also serves as the agency's principal liaison for international performance benchmarking, metrics, and economic analysis. Performance Analysis provides an analytical tool (PDARS) to 62 operational facilities such as air traffic control towers, terminal radar approach controls and air route traffic control centers.

How Do You Know The Program Works?

ATO sets annual performance goals in key categories including safety, capacity, efficiency, finance, international leadership, and organizational excellence, including hiring and training. To measure our progress, we employ a set of metrics. The success of a particular program is determined by assessing its cost, schedule, and performance.

The Flight Services AFSS contract is on schedule to reach its expected savings and cost avoidance of $2.020 billion in capital and labor over the 13-year period of the contract. Additionally, the AFSS contract reduced leased space for automated flight service stations when opportunities occurred and exceeding their goal of 150,000 square feet to approximately 77,105 square feet. The service unit's Flight Services Directorate continues to provide pre-flight, in-flight, and post-flight services within established cost estimates for the AFSS contract. The Flight Service Directorate provides oversight of the AFSS contract performance through the evaluation and validation of established performance measurement criteria, to ensure safety and quality service are foremost in delivery of flight services.

Systems Operations' management of air traffic was reviewed by DOT's Inspector General (IG) and found to be effective. As described in DOT IG Report Progress and Remaining Challenges in Reducing Flight Delays and Improving Airline Customer Service, May 20, 2009, Project ID: CC-2009-067 (http://www.oig.dot.gov/library-item/4965), the Systems Operations Service's processes are effective in reducing air traffic delays. The report concluded that delays in 2008 were down from 2007 and that current delay statistics and customer service trends looked favorable. We continue to focus on the issue of delays at the New York/New Jersey/Philadelphia airports described in the report.

Another operational area of System Operations, the management of flight services, has also been reviewed and found to be effective by DOT IG. The System Operations AFSS contract was reviewed in DOT IG Report, "Interim Report on Controls Over the Federal Aviation Administration's Conversion of Flight Service Stations to Contract Operations"**,** Report Number: AV-2007-048, May 18, 2007 (http://www.oig.dot.gov/library-item/4500). The report found the transition from FSS to contract operations was effective. The System Operations Service Unit has implemented effective controls over the transition of FSS to contract operations.

The Systems Operations Security Directorate has demonstrated sound operational performance and adherence to national security guidance in a number of real-world and exercise scenarios. The directorate's response and performance during the 2010 earthquake in Haiti, 2010 Deep Water Horizon oil spill, and Hurricanes Katrina, Ike, and Gustav validated the ATO's operational actions and processes were sound in protecting lives and resources and in maintaining economic stability for aviation.

System Operations develops annual targets to measure how effectively the service unit manages traffic flow capacity. The service unit collects and reviews data to determine whether performance targets are being met. Cost targets for the AFSS contract are used as performance metrics for Flight Services.

The Surface Operations Directorate has developed a Strategy and Performance Work Plan that identifies FAA's commitment to industry, strategic focus areas, goals, and a work plan with required resources. These documents provide the framework for managing and overseeing the directorate's work, resources, and performance.

The Performance Analysis Directorate demonstrates success by the continued growth in users of the future schedules, which reduces costs for program offices and ensures accuracy and consistency of major investment decisions across FAA. The NEXTOR II program demonstrates success by the generation of actionable studies from the partner universities, and by the large number of STEM (Science, Technical, Engineering, and Math) graduate degrees funded by the research, resulting in improved human capital in the aviation industry, academia, and government. Improved operational metrics and analysis lead to management actions which result in significant operational improvements.

Why Do We Want/Need To Fund The Program At The Requested Level?

The ATCSCC Directorate optimizes the capacity of the NAS by coordinating the daily air traffic flow, assuring on-time departures and arrivals for the flying public. ATCSCC Traffic Management Specialists plan and regulate the flow of air traffic to minimize delays and congestions while maximizing the overall operation of the NAS. When significant events, such as adverse weather, equipment outages, runway closures, and national emergencies impact an airport or portion of airspace, the Traffic Management Specialists adjust traffic demands to meet system capacity. The output of the ATCSCC is maximum airport capacity and minimum flight delay.

The System Operations Security Directorate orchestrates air navigation services related operational efforts, particularly ATM focused activities, that provide an integral part of the Government's ability to protect the U.S. and its interests from air domain related threats and natural hazards in the national defense, homeland security, law enforcement, and emergency operations arenas. This Directorate is the critical tool used to mitigate the immediate impact of security threats, natural disasters, and Government responses to threats on the safety and efficiency of the NAS.

Flight Services provides flight planning, advisory, operations, and search and rescue coordination services in the CONUS U.S., Puerto Rico, Alaska, and Hawaii. AFSS primarily provides weather and aeronautical briefings and flight planning services to pilots ensuring pilots have all the necessary information to make safe decisions associated with their flight. Flight Services also coordinates visual flight rules, search and rescue services, provide orientation service to lost or disoriented aircraft, maintain continuous weather broadcasts on selected Navigational Aids, and coordinate and disseminate Notice to Airmen (NOTAM). While flight service functions in Alaska are provided by Government personnel, flight service functions in the lower 48 states are provided through a contract managed by the Flight Services Directorate. Without the requested level of funding, flight services would be reduced (i.e., flight planning services, NOTAM data, search and rescue, and weather and aeronautical briefings to pilots), thus impacting safety.

The Data Management Directorate supports the Presidents Open Data Policy implementation in ATO, endeavors to ensure that NAS data is properly released to external entities; manages the Overflight Fees Program to ensure that flights that neither take off nor land in the U.S. are billed for using FAA services while in the U.S. managed airspace; executes the Block Aircraft Registration Request Program; and assist in the development of ATO data policies.

The Surface Operations Directorate will address the recommendations identified in the RTCA Task Force 5 report that the agency has committed to implement. The directorate will facilitate the implementation of Surface Collaborative Decision Making (SCDM) tools in cooperation with industry.

The International office provides effective, consistent and well-coordinated leadership, strategic guidance and support to achieve ATO and FAA international leadership goals. The office also provides institutional knowledge of issues, organizations, and contacts in preparation for international meetings. The office helps to ensure the harmonization of domestic U.S. air traffic operations, including NextGen, with the global civil aviation community. Without the requested level of funding, there would be an increases risk of lack of harmonization between U.S. and international aviation, leading to increased costs and schedule delays for FAA air traffic management programs, as well as a competitive disadvantage for the U.S. aviation industry.

The Performance Analysis Directorate provides critical analytical and metrics support to a wide variety of programs in the ATO and FAA. Operational facilities need access to critical analytical tools which are used to monitor and improve the safety and efficiency of the NAS. In addition, many airport and airspace projects need modeling and simulation support, to avert an increase in costs and programmatic delays. FAA metrics activities ensure ATO meets its statutory obligations to report on performance. The FAA will continue to support its goal of international leadership through work with ICAO and CANSO on optimizing operational performance. The FAA will have a required capability to anticipate future changes in airline demand and the resulting impact on operations.

Detailed Justification for the - Vice President Safety and Technical Training, AJI-0

What Is The Request And What Will We Get For The Funds?

FY 2015 – Safety and Technical Training Services – Budget Request ($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Safety and Technical Training	$227,409	$274,878	$274,229	-$649

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

The FY 2015 budget request for Safety and Technical Training is requesting $274,229,000 and 557 FTP / 545 FTE. This request provides an adjustment to base of $561,000 for pay inflation. It also provides for other adjustments of $124,000 for the annualized cost of the FY 2014 pay increase. The request includes $1,876,000 for the increase in the agency's contribution rates to the FERS retirement system. Also included in the request is a reduction of -$619,000 for hiring restrictions.

In FY 2015, key outcomes expected to be achieved with the requested resources:

- Conduct analysis and disseminate findings of Risk Analysis Events (loss of less than 66 percent required radar separation) on a quarterly basis which supports the identification of ATO system issues hazards.
- Improved identification of system risk for surface safety occurrences which support the development and implementation of corrective actions to mitigate hazards associated with identified risk. This will mitigate risk associated with runway incursions (total and A&B (most serious)).
- Annual development (by fiscal year) of identified ATO system hazards and associated corrective actions for airborne operations in the National Airspace System (NAS).
- Improved safety data collection and analysis through enhanced reporting processes, tools, and policies.
- Improved integrated safety management through enhanced safety risk analytics.
- Improved safety culture that promotes a non-punitive, voluntary reporting environment that encourages employees at all levels to report safety issues and concerns without fear of reprisal.
- Improved litigation support to the FAA's Office of Chief Counsel, Aircraft Accident Litigation and Enforcement Divisions, by managing discovery and coordinating with the air traffic facilities for access to air traffic witnesses and the collection of evidence in property lost, personal injury, and wrongful death tort actions against the government; provides expert consultation regarding all air traffic matters;
- Improved liaison with law enforcement and other agencies seeking aeronautical records regarding criminal prosecution; and
- Improved reception and coordination of Freedom of Information Act (FOIA) requests for ATO.
- Better trained workforce.
- Assurance that new and maintained systems in the NAS have been analyzed for risk.
- Safer, more efficient U.S. and international air navigational services.
- Safety Management System (SMS) Continuous Improvement Plan that continues to evolve as recommended improvements are implemented.
- ATO Safety and Technical Training international activities to ensure global harmonization of safety management in the provision of air navigation services.
- Improve workforce knowledge and skills.
- Provide sufficient numbers of trained/qualified individuals to meet the needs of the operation.
- Manage, develop, and maintain the technical training curriculum.
- Maximize the benefit of the air traffic controller training contract to augment delivery of curriculum at the ATC Academy and at field facilities.
- Continue to maintain cost control of the controller training contract to budget targets. The early years of the current training contract (ATCOTS) experienced significant cost overruns. The contract experienced a base period ceiling issue in FY 2012 and entered the first option period early in FY 2013. The cost of the contract was on budget for FY 2013 and is on track to maintain budget in FY 2014.
- During FY 2013 significant efforts were expended by the FAA and the controller training contract vendor to improve the requirements identification, tracking, and resource distribution methodologies. Those

efforts have continued in FY 2014 and the Agency is pursuing development to more fully describe the complete training requirement. That complete training requirement would be an identified and understood blend of FAA delivered and contract support delivered training.
- Expand technology for training development and delivery.
- Reduce travel costs related to training for field personnel.
- Improve training life-cycle management.
- Transition from information-based training to performance-based training.
- Update systems (i.e., Learning Management System, Learning Content Management System, Blackboard, Connect) required to design, develop, and manage training/proficiency.
- Comprehensive job task analysis for controllers and technicians aligned with operational performance needs to ensure validity of learning objectives, assessments, and curriculum footprint.
- Improve the technical requirements for air traffic controller training to standardize training across the NAS.
- Provide maximum training content reusability enabling content for flexible publishing (e.g., web, instructor-led, mobile, student guides, instructor guides, books, etc.).
- Conduct annual and recurrent training along with SMS workshops.
- Continue to manage risk, assure quality standards, instill open disclosure, and educate and promote continuous improvement.
- Develop Simulation and Technology Strategy.
- Continue to implement action plan from Independent Review Panel recommendations.

In FY 2015, key outputs expected to be achieved with the requested resources:

- Improve training, procedures, evaluation, analysis, testing, and certification to reduce the risk of runway incursions resulting from errors by pilots, air traffic controllers, pedestrians, vehicle operators, tug operators, and individuals conducting aircraft taxi operations.
- Reduce risks in-flight by limiting the rate of the most serious losses of standard separation to 20 or fewer for every thousand (.02) losses of standard separation within the NAS.
- Implement 80 percent of approved interventions to mitigate hazards associated with airborne losses of separation.
- Continue to develop the Safety Analysis System which will provide a forward-looking approach to analyze trends, data, and systems to manage risk before it leads to a future incident or accident.
- Continued identification and analysis of significant events, reports on risks, compliance, and safety in air traffic management.
- Design and establish NAS safety and policies to support the mission and safety objectives of ATO.
- Accurate data collection, reporting, and categorization of safety occurrences, accidents, equipment failures, and other events that may affect NAS safety.
- Continue litigation support to the agency concerning aircraft accidents/incidents and pilot enforcement issues.
- Improve headquarter ATO on-time Freedom of Information Act (FOIA) responses by 5 percent.
- Establish and manage safety and technical training audits and assessments to ensure that ATO complies with requirements to ensure the integrity of technical training curriculum and courses.
- Completed independent safety reviews and assessments of NAS systems, processes, and procedures, including NextGen operational concept demonstrations and prototyping, to identify safety risk.
- Ensure the implementation of the Deployment Planning Process and In-Service Decision as governed by the FAA Acquisition Management System policy.
- Ensure seamless support to Operational Units through the training and certification of proficient air traffic controllers and technicians at the lowest possible cost, in adequate quantity, with a focus on field customers.
- Manage, develop, and maintain the technical training curriculum.
- Maximize the benefit of the air traffic controller training contract to augment delivery of curriculum at the ATC Academy and at field facilities.
- Continue to maintain cost control of the controller training contract to budget targets.
- Ensures continuity with mission and curriculum in the delivery of technical training at the Aeronautical Center in Oklahoma City.

What Is This Program?

Safety and Technical Training supports the Department of Transportation's (DOT) goal of reducing transportation-related injuries and fatalities, the Workplace of Choice goal, and is also the lead for two of FAA's Priority Goals – Runway Incursion Rate and Hazards Mitigation.

Safety and Technical Training is moving from an events-based, reactive approach to safety analysis to a risk-based proactive approach. Data is reviewed to predict and prevent risk situations. As a result, we have implemented a SMS-based approach to loss mitigation, incorporating risk analysis that will increase our ability to mitigate risk associated with losses of separation. The agency will use analytics to identify the top hazards in the NAS. Corrective action plans are identified for each risk to modify policies, procedures, and training.

Safety and Technical Training uses contract resources to provide a broad range of comprehensive professional, technical, and support services including, but not limited to, air transportation support, engineering services, training development and maintenance and raining delivery. Our safety programs validate and categorize of airborne and surface safety occurrence's; conduct in-depth analysis of airborne and surface events to identify hazards (determine casual factors and root causes); and implement corrective actions to mitigate identified hazards. In addition, Safety and Technical Training manages policy development; improving fatigue risks through reduction strategies; and implementing a safety culture transformation process to enhance all safety programs, leading to improved safety performance.

Safety and Technical Training provides comprehensive safety and training services for ATO. Our safety programs are an integrated collection of processes, policies, procedures, and programs that are used to assess, define, and manage risk associated with the provision of ATC and navigational services. Our training programs develop and deliver technical training programs for a workforce of approximately 14,500 air traffic controllers, more than 6,000 Airway Transportation Systems Specialist (ATSS), and 1,800 engineers to effectively deliver state-of-the-art training solutions to meet our ever-changing employee demographics and operational requirements both today and throughout the transition to NextGen.

Safety and Technical Training provides logistical support and subject matter expertise in aircraft accident litigation where allegations of negligence are made, in whole or part, involving ATO employees. Such allegations may arise from personal injury and/or wrongful death in aircraft accidents/incidents where air traffic services may have been provided. The mission is to retrieve and preserve records that will enable the FAA to defend cases in the most cost efficient way, allowing for the earliest possible resolution and the least amount of disruption to the operation. The Litigation Liaison Office also provides support in pilot enforcement litigation, prosecuted by the FAA's Office of the Chief Counsel concerning airmen regulation violations. The Joint Procedures Automation and Management System (JPAMS) is already working with the Litigation Liaison Office as part of the historical library automation.

Safety and Technical Training provides and maintains a world class level of air traffic workforce competency and performance by providing the right training to the right people at the right time. As we leverage people, processes, tools, and technology to optimize operational performance, we also measure our success through robust and concrete data.

This transformation requires FAA to take advantage of the latest techniques and technology as well as the resources of both government and industry to become more efficient and effective in training.

Utilizing support contracts, with close supervision and guidance from FAA, we are undertaking major course redesign work, augmenting field training, and providing a high-level of service and customer support to our facilities.

Safety and Technical Training support operational leadership by:

- Improving measurement and analysis of safety performance including identifying areas of non-compliance and ensuring ATO's leadership is informed of significant events in the NAS.
- Reducing risks in-flight and on the surface by identifying hazards, and developing, deploying, and monitoring corrective actions.

- Supporting SMS policy.
- Ensuring that the agency's In-Service Decision process is effectively applied across NAS system acquisitions.
- Maintaining a non-punitive, voluntary safety reporting system.
- Identifying and prioritizing operational risks due to fatigue and human factors.
- Communicating and disseminating safety information to further strengthen ATO safety culture.
- Designing, developing, and establishing policies, plans, processes, and training requirements to implement NextGen SMS requirements.
- Promoting international activities with the International Civil Aviation Organization (ICAO), Civil Air Navigation Service Organization (CANSO), EUROCONTROL, and other international bodies.
- Provide a rapid deployment capability for training operational personnel on an ad hoc basis (changes to policies, procedures, processes, etc.) to meet the needs of a rapidly changing operational environment.
- Deliver state-of-the-art training solutions to meet our ever-changing employee demographics and operational requirements.
- Provide a single performance-based contract that uses quality processes, methodologies, and cost-reduction strategies for air traffic controller training leading to certification.
- Undertaking major course redesign work, augmenting field training, and providing a high-level of service and customer support to our facilities.

With our people, our processes, and our tools, we are increasingly integrating reactive and proactive actions to materially enhance our ability to manage risk and significantly improve the safety and efficiency of the NAS.

Our partners and stakeholders include:

- Other ATO Business Units, Service Units, and Offices
- Other FAA Offices and Lines of Business (LOBs)
- Employee unions
- Chief Learning Officer (CLO)
- Information Technology Executive Board (ITEB)
- Learning Enterprise Architecture (LEA) Steering Committee
- Learning Development Council
- eLearning Training Architecture Group (eLTAG)
- AVS Training Council
- ATO Training Council
- FAA CIO Council
- Office of Inspector General (OIG)
- Office of Management and Budget (OMB)
- Office of the Secretary of Transportation (OST)
- General Accountability Office (GAO)
- Congress
- Aircraft Owners and Pilots Association (AOPA)
- American Association of Airport Executives (AAAE)
- Civil Air Navigation Services Organization (CANSO)
- Air Line Pilots Association (ALPA)
- International Civil Aviation Organization (ICAO)
- National Business Aviation Association (NBAA)
- FAA Air Traffic Collegiate Training Initiative (CTI) partner institutions
- FAA Technical Operations CTI partner institutions
- University Aviation Association
- EUROCONTROL
- European Aviation Safety Agency (EASA)

By the end of FY 2014, the accomplishments for Safety and Technical Training include:

- Implementing interventions developed by ATO to address the top hazards in the NAS.
- Evolving our comprehensive event reporting (new Air Traffic Occurrence Reporting Order, JO 7210.632), as well as our risk reduction (new Quality Assurance (QA) Order, JO 7210.633), and

investigation (new Quality Control (QC) Order, JO 7210.634) processes to help us measure the effectiveness of our SMS.

- Continuing development of technology to support enhanced reporting and analysis requirements. The Comprehensive Electronic Data Analysis and Reporting (CEDAR) system enables ATO to develop significant improvements to measuring system safety performance and risk evaluation.
- Use the best analytical tools, Traffic Analysis Review Program (TARP) to not only measure compliance with safety standards but to also enable digital analysis of radar data throughout the NAS. This sophisticated tool will enable management at all levels to identify safety issues, determine the likelihood of occurrence, target correction, and establish monitoring systems to evaluate the effectiveness of mitigations implemented.
- Continuing to target efforts to significantly remove risk from the NAS with new risk analysis processes, new safety performance metrics (i.e., System Risk Event Rate (SRER), Performance Data Analysis and Reporting System (PDARS)) and tools (i.e., Risk Analysis Process (RAP), Event Review Committee (ERC), Corrective Action Requests (CAR), Partnership for Safety (PFS), and Safety Analysis System (SAS)).
- Ensuring integration of safety initiatives at all levels of the ATO.
- Enhancing coordination of safety initiatives with interagency and industry stakeholders.
- Promoting safety programs through effective communications.
- Implementing safety culture principles that address human behavior and the tools to improve such behaviors.
- Limiting the rate of serious losses of standard separation by implementing intervention developed through risk analysis of airborne losses of separation.
- Expanding the scope of safety occurrences to include runway excursions and runway confusion.
- Obtaining an ISO 9001-2008 certificate and implementing a Quality Management System to support improved product, services, and continuous improvement.
- Attain at least 650 new hire air traffic controller training completions.
- Develop specific guidance and standards for ATO technical training.
- Provide a map of technology options to competencies, skills, and objectives.
- Develop requirements for 100 percent of approved and validated technical training requirements.
- Improve metrics tracking hire success rate and total cost to train.
- Develop standardized guidance for the development and delivery of ATO technical training.
- Improve student throughput while reducing cost.
- Maximize the benefit of the air traffic controller training contract to augment delivery of curriculum at the ATC Academy and at field facilities.
- Continue to maintain cost control of the controller training contract to budget targets. The early years of the current training contract (ATCOTS) experienced significant cost overruns. The contract experienced a base period ceiling issue in FY 2012 and entered the first option period early in FY 2013. The cost of the contract was on budget for FY 2013 and is on track to maintain budget in FY 2014.
- During FY 2013 significant efforts were expended by the FAA and the controller training contract vendor to improve the requirements identification, tracking, and resource distribution methodologies. Those efforts have continued in FY 2014 and the Agency is pursuing development to more fully describe the complete training requirement. That compete training requirement would be an identified and understood blend of FAA delivered and contract support delivered training.

By the end of FY 2015, anticipated accomplishments for Safety and Technical Training include:

- Integrating SMS and Risk Management philosophies, processes, and tools throughout ATO.
- Reducing the risk associated with the total number of runway incursions, specifically the number of Category A&B (most serious).
- Maintaining a National Runway Safety Plan.
- Conducting analysis and disseminate findings on incidents and provide recommended mitigations to identified causal factors.
- Maintaining and analyzing the System Risk Event Rate to reduce risks in-flight by limiting the rate of most serious losses of standard separation.
- Completing initial Air Traffic Safety Action Program (ATSAP) training to all new air traffic control personnel.
- Continuing to implement voluntary safety reporting programs (VSRPs) of safety-related events and issues from controllers and other employees providing air traffic services.
- Expanding ATO knowledge of safety events through confidential reporting and requests.

- Improving safety performance capabilities and analysis of events through TARP and PDARS.
- Improving safety performance measures and risk evaluation using CEDAR.
- Supporting harmonization of International Runway Safety process and procedures based on research and analysis of emerging technologies.
- Continuing to identify operational fatigue risks and develop and recommend fatigue risk mitigations.
- Increasing awareness throughout ATO on fatigue risks and mitigation approaches.
- Implementing policies, plans, processes, and training requirements to implement NextGen Integrated Safety Risk Management (SRM) requirements for ATO.
- Providing tools used to identify safety issues, principles, and methods to improve team and individual performance via recurrent training.
- Establish methodologies and guidance to assess safety risk during the concept validation phase of NextGen products.
- Expanding the role of System Safety Working Group to include integrated safety management.
- Developing and validating risk-based assessment methodology to support integrated safety risk management.
- Transition of the aircraft accident generator software program to a web-based interface or revised stand-alone generator, which allows multiple employees in multiple locations to track and manage the production of the accident files.
- Modify current controller hiring and assignment to a system based on predictive success models.
- Implement Virtual Classroom Training (VCT) in partnership with the FAA Academy.
- Implement simulation standards for training in the field.
- Make adaptive learning available for a large percentage of technical operations courses.
- Implement ATO instructional design and development guidance/standards.
- Implement guidance on the standardization of all facility training.
- Implement the legacy computer-based instruction conversion plan.
- Complete the integration of ATO Content Management System (CMS).
- Deploy annual controller and technician recurrent training while incorporating ATO professional standards.

Why Is This Particular Program Necessary?

FAA's ATO handles 69,000 flights per day and helps transport over 737 million passengers per year, contributing to 5.2 percent of the total U.S. economy. ATO relies on numerous programs to maintain the safety and efficiency of the current system and ensure its viability well into the future.

Safety and Technical Training ensures the safety and success of ATO by managing risks, assuring quality standards, instilling an open culture of disclosure, educating employees, and promoting continuous improvement. We identify and mitigate aircraft collision risks during the delivery of air traffic separation services. We are the focal point for auditing safety, quality assurance, and risk identification in ATO, and reporting findings to improve safety performance. Our office integrates the functions of data and information from investigations, evaluations, independent assessment, safety risk management, runway safety, and operational services in order to identify collision risks, influence their resolution, and provide information on assessments of operational and safety performance within the NAS. The risk associated with runway incursions, loss incidents, failure to report incidents, lack of training, fatigue, human factors, and lack of communication make it imperative we maintain a proactive approach for preventing serious incidents.

The benefits of our program will be manifested in risk reduction. Through risk mitigation, risk management, SMS, and the voluntary reporting system, we will help FAA accomplish its commitment to the flying public to provide the safest aviation system in the world. The work of ATO Safety benefits DOT's goal of Safety and will assist in preventing the loss of human life. Additionally, the benefits will result in a reduction of near misses, collisions, and associated costs.

Safety and Technical Training is the only organization within FAA that provides the technical training to CPCs, ATSS, and engineers required to perform their duties to the prescribed standards in a safe and efficient manner. Safety and Technical Training provides technical training solutions, applications and infrastructure development, and implementation. This training enables the technical workforce to effectively perform their duties and provide for the safe operation of the NAS.

We are expanding our technological base to meet the growing needs of FAA. Innovative training technology solutions will provide an effective method for improving technical training programs, incorporating existing and emerging learning technologies, and identifying future training technology options.

We ensure the technical competency (knowledge and skills) of the workforce, and ensure that we create enough of the right workers to meet operational needs. We also tightly manage costs (expenditures and productivity), and manage partner and stakeholder relationships to support the mission of ATO.

How Do You Know The Program Works?

ATO sets annual performance goals in key categories including safety, capacity, efficiency, finance, international leadership, and organizational excellence, including hiring and training. To measure our progress, we employ a robust set of metrics. The success of a particular program is determined by assessing its cost, schedule, and performance. A new safety metric, System Risk Event Rate (SRER), was developed that highlights incidents where the risk is high and measures the rate at which the event occurs. Safety and Technical Training is also measured on the Runway Incursion Rate and Hazards Mitigation. These three metrics are updated monthly on the FAA public website.

The structure of Safety and Technical Training is designed to enhance organizational performance. The realignment of Safety and Technical Training into one robust organization provides an environment where issues identified through analysis can influence the course design for the workforce. Safety and Technical Training is expanding an evaluation and reporting toolset (i.e., monthly metrics reporting and drill down data) to measure organizational training performance.

We have completed certification of new professional controllers in a time frame that meets agency Destination 2025 goals and with a failure rate that meets acceptable parameters. The FAA Academy offers initial training and contract instructor-led training while on-the-job training is offered at FAA facilities. Typical training time for en route and terminal controllers continues to be in line with our expectations set out in the Controller Workforce Plan.

In the last 12 months, we have made tremendous progress. Some of our accomplishments include:

- Evaluating all 37 of the Technical Operations CTI schools and reviewing their curriculum.
- Implementing resource allocation and surveillance tools to control expenditures and optimize budgeting for air traffic controller training.
- Completing the redesign of the En Route initial training course at the Academy to incorporate training on the new En Route Automation Modernization (ERAM) system.
- Designing and delivering a new TRACON workshop to better prepare developmental controllers.
- Incorporating additional Tower Simulation Systems into training programs.
- Establishing training partnerships with ATO business units, including the bargaining units, to enhance communications on training initiatives throughout the training community.
- Organizational re-alignment to meet the growing training needs of FAA's technical employees to further enhance the safety of the NAS.
- Establishing the program office to manage the Independent Review Panel (IRP) recommendations.
- Completion of the preliminary analysis of ATC and ATSS Training programs.
- Held Best Practices and Academy Open House for FAA AT-CTI institutional partners to improve the candidates' knowledge of ATO expectations.
- Determine method and process to assess training progress at ATC facilities.
- Baseline current state of NAS simulation configuration.
- Successful implementation of ATO's Flight Deck Training Program.
- Identified the Top 5 NAS Hazards for 2013, solidifying the move towards risk-based decision making and prioritization.
- Achieved all ATO Goal targets for 2013 in the ATO business plan as well as the FAA Flight Plan.

- Produced and published the first ever ATO Safety Performance Report available to the public as well as a companion document on FAA Runway Safety Programs and Measures.
- Closed 14 NTSB safety recommendations, 7 FAA safety recommendations and 27 AOV compliance issues in fiscal year 2013, exceeding all previous agency goals.
- Launched a comprehensive plan to reduce the risk associated with converging runway operations whose flight paths intersect. When completed, these actions will represent the single most significant improvement in Air Traffic Safety in the last decade.
- Developed new policy and sophisticated analytical tools to provide facilities with safety performance data on their operations as well as to benchmark their activities with cohorts. Resulting in the implementation of Partnership for Safety at 18 EnRoute and 47 Terminal facilities during a fiscally challenging year. The program is extremely popular with Managers and Unions alike.
- Implemented 8 major revisions to the ATC Handbook that furthered the implementation of NextGen.
- Improved mitigations for a safety risk between skydive flights and airline flights. This is a major collaborative effort with airports, flight standards, ATO, Untied States Parachute Association (USAPA) and airlines.
- Completed a major achievement in ensuring that Digital Audio Legal Recorder (DALR) Remote Audio Access System (DRAAS) became available for synchronization with events. Saved over $2.0M through effective negations with the software vendor.
- Developed a surface risk assessment program that is being used to identify the Top 5 surface hazards in the NAS.
- Established a Governance Council for Runway Safety to manage regional runway safety programs.
- In partnership with the Office of Airports, established a Surface Safety Strategy group to align agency efforts from finance, research, and procurement for an effective and affordable strategy that significantly improves airport surface safety.
- Implemented TARP at all En Route facilities.
- Initiated development of a Service Integrity Risk Analysis Process (SIRAP) for Technical Operations; which, when combined with Airborne RAP will contribute to the identification of the Top 5 hazards in Tech Ops.
- Established the ATO Fatigue Risk Management System (FRMS) and delivered Fatigue Risk Management (FRM) education.
- Established a Fatigue Risk Safety Steering Committee and completed the Controller Alertness and Fatigue Monitoring Study (CAFMS) and the Tech Ops Fatigue Baseline Study (TOFBS).
- Conducted 35 audits and assessments, including: three Independent Operational Assessments (IOAs); Eighteen assessments of NAS Technical Evaluation Program (NASTEP) and NASTEP Quality Control Response (QCR); Five assessments of effectiveness of policy/procedures; Six SMS Compliance and Performance Assessments; and, Three Operational Peer Assessments (OPAs) at terminal facilities
- Very successful year in ATSAP; selected highlights:
    - 9% increase in reports vs. previous year (more than 78,000 reports now in database)
    - More than 50 ATSAP and CISP Positives documented
    - Confidential Information Sharing Program (CISP) airline ATSAP/ASAP partnership
        - 4,863 reports shared to/from airlines
        - 9 new airline ASAP partners added for a total of 14
    - T-SAP
        - Completed first full year of demonstration program in CSA
- Issued 18 new CARS/Closed 21 during FY 2013
- Launched Round 2 of Recurrent training in January 2013 (joint effort with Technical Training and NATCA),
- Launched a new magazine, Safety Matters, combining several service-unit only safety newsletters into one AT0-wide electronic publication.
- Established a National Training Simulation Office
- Successfully transitioned the Tower Simulation program from Terminal Services.
- Made significant improvements to the process and control of flight deck training and provided over 4,000 training opportunities for controllers in 2013.
- Safety and Technical Training supports 43 tort cases where claims of negligence by air traffic controllers contributed to death, injury, or property damage. The total of these claims are $500 million. Of this, $158 million in claims were issued against the FAA, and only $6.2 million was paid out in settlements.

- Reduced the time needed to gather, analyze, and report safety information by incorporating safety-related data requirements into ATO's Business Intelligence software, "Business Objects," to perform trend analysis, report back to the field, assist in the development of metrics, and verify safety concerns.
- Airport Surface Detection Equipment (ASDE-X) systems installed at all 35 designated airports.
- We reach out to thousands of pilots, airport vehicle drivers, and air traffic controllers every year while conducting/participating in at least 22 of the following: Pilot Seminars, Flight Instructor Refresher Courses (FIRC), Commercial Flight Instructor (CFI)/Designated Pilot Examiner (DPE) refresher courses, Airport Safety Meetings (ASM), ATC Safety Awareness Initiatives, and major industry conferences or fly in events.
- We have established a process for conducting risk analysis of losses of radar separation in the NAS, allowing the FAA to identify risks in the system and implement mitigations. We have identified several suspected risk trends for mitigation to date.
- Additionally, Technical Training has undergone an organizational re-alignment to meet the growing training needs of the FAA's technical employees to further enhance the safety of the NAS.
- We presented ATO's Fatigue Risk Management program to the Aerospace Medical Association, a gathering of clinical health care directors, physicians, scientists, and nurses from the armed services, civil and military aviation, and industry, which care for the total civilian flying population on a daily basis. Many in attendance benefited from the increased awareness and understanding of fatigue risk.
- In an effort to maintain and improve safety performance, ATO Safety and Technical Training realigned its resources and talent to support new priority programs. We estimate improved efficiencies in the following areas based on the realignment:
    - Programs to increase safety culture and engage the workforce in developing and suggesting safety improvement;
    - Better analyses to support Quality Assurance/Quality Control – our critical function of measuring and trending safety performance;
    - Integration of the SMS into a Safety Promotion Campaign that incorporates all safety principles and policies; and
    - Increased ability to ensure internal/external coordination and effective SMS integration and review of safety products

Safety and Technical Training continues to provide the flying public with the safest aviation system, by continuing to focus on safety culture, outreach, awareness, improved procedures and infrastructure, and technology. Additionally, it ensures all technical employees in every FAA facility are educationally equipped to perform their duties in the NAS. We have become more efficient not only within our office, but our outreach activities and technological advances have also helped improve the way FAA conducts safety as a whole. Further, new groups have been established to help improve technical training programs by exploring new emerging learning technologies, provide future training technology options, and revise existing courses and development.

Why Do We Want/Need To Fund The Program At The Requested Level?

Safety and Technical Training is responsible for providing comprehensive safety and training services for ATO. We provide overall safety services within ATO by providing services that allow ATO to identify and manage risk, assure quality standards, instill an open culture of disclosure, educate employees, and promote continuous improvement. Safety and Technical Training provides overall training services within ATO that ensure the agency efficiently recruits, hires, and trains operational personnel to match the needs of the organization. In addition, Safety and Technical Training is applying new learning principles and advanced learning technologies to enhance the delivery and effectiveness of recurrent training. The provision of services by Safety and Technical Training includes support provided by staff embedded within the operational service units in ATO. These embedded personnel are now joined into a larger safety and training organization. This reduces duplication of work and takes full advantage of greater resources at reduced costs thus more efficiently providing services to ATO. The combination of safety and training into one organization creates the ability to match training solutions to identified learning gaps thus more effectively addressing system issues in the delivery of air navigation services by ATO.

Funding of Safety and Technical Training programs at the requested level will provide the necessary resources to ensure that risk in the delivery of air navigation services is effectively managed, operational personnel understand and participate in disclosing and addressing safety issues, air traffic facilities are properly staffed with the optimum number of qualified individuals, and that personnel receive timely training directly tied to addressing safety concerns in the NAS.

Funding of Safety and Technical Training creates the ability to defend judgments against the government that come out of the Department of Treasury Judgment Fund. The cost savings to the government is significant. The most significant cost saving is prevention of costly hearings and trials and our ability to settle cases in summary judgment or settlements.

Funding of Safety and Technical Training programs impact the development and implementation of NextGen. Controllers and technicians need significant training to operate and maintain NextGen systems. Safety and Technical Training are working in partnership with the NextGen program office to ensure that training is an integral part of the transformation of the NAS and in the development and implementation of NextGen systems.

Safety and Technical Training has already undertaken measures to reduce costs through more effective contract management and will continue to work toward maximizing available resources. In order to fulfill our core responsibilities and to deploy new technologies, process, and policies in support of these efforts, the requested level of funding is necessary to fully realize the capabilities of a realigned organization that provides safety and technical training services for the entire ATO.

Detailed Justification for the - Vice President for Mission Support Services, AJV-0

What Is The Request And What Will We Get For The Funds?

FY 2015 – Mission Support Services – Budget Request ($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Mission Support Services	$266,126	$292,642	$292,028	-$614

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

The FY 2015 budget request for Mission Support Services is $292,028,000 and 1,372 FTP / 1,385 FTE. Mission Support Services is comprised of three service centers (Eastern, Central, and Western), and the following directorates: Airspace Services, Aeronautical Information Management (AIM), AeroNav Products, Litigation Liaison, and Operational Concepts, Validation, and Requirements. This request provides an adjustment to base of $1,294,000 for pay inflation. It also provides for other adjustments of $287,000 for the annualized cost of the FY 2014 pay increase. The request includes $4,330,000 for the increase in the agency's contribution rates to the FERS retirement system. Also included in the request is a reduction of -$1,430,000 for hiring restrictions.

Mission Support has one base transfer. This base transfer will finalize the reassignment of 1 FTE / FTP from the Air Traffic Organization/Mission Support to the Office of the Chief Counsel (AGC). The transfer is intended to increase the level of support within AGC for the Aeronautical Navigation Products organization and address a need within AGC for acquisition legal expertise in the Service Center Counsel Office. No budgetary funds are being requested for this transfer.

Funding the FY 2015 request at this level will allow Mission Support Services to support FAA's transformation of the National Airspace System (NAS) under the Next Generation Air Transportation System (NextGen) by accomplishing the following objectives:

The Airspace Services Directorate will:
- Continue to develop and implement integrated procedures for PBN, incorporating airspace redesign, and environmental analysis, with the goal of meeting Radio Technical Commission for Aeronautics (RTCA) Taskforce 5 recommendations and expediting OAPM NextGen capabilities;
- Continue implementation of the Navigation Procedures Implementation Plan (NAV Lean) to streamline and accelerate the internal processes necessary to implement Instrument Flight Procedures (IFP) requests;
- Conduct design and modeling for Stage 3 of the NY/NJ/PHL Airspace Redesign Project;
- Implement PBN by continuously developing and implementing beneficial Area Navigation (RNAV) Q, Tango (T) and TK routes, Standard Instrument Departures (SIDs), and Standard Terminal Arrivals (STARs), and RNAV/Required Navigation Performance (RNP) instrument approach procedures;
- Continue to support development of policies, procedures, safety studies, and research and development to meet congressional language of the integration of Unmanned Aircraft Systems (UAS) into the NAS;
- Complete development and implementation of Joint Procedures Automation Management System (JPAMS);
- Implement rulemaking actions for airspace use;
- Analyze proposals for rulemaking activities in support of air traffic;
- Provide process oversight of any document changes to technical air traffic control (ATC) orders;
- Streamline processes for document change processes;
- Provide policy guidance for environmental actions in support of airspace changes and continue to develop new and incorporate changes to ATC procedures and directives; and
- Within the Obstruction Evaluation/Airport Airspace analysis (OE/AAA) process, issue final FAA determinations based on outcomes of an aeronautical study to ensure safe and efficient use of navigable airspace.
- Provide holistic operation perspective in the promotion of airspace changes to the NAS

The Aeronautical Information Management Directorate will:

- Provide aeronautical information enhancements to improve the accuracy and timeliness of information on Special Activity Airspace (SAA) and airport data;
- Deploy capture and dissemination capabilities for digital aeronautical information, which will result in relevant information being integrated into the common operating picture of the NAS, via Notice to Airmen (NOTAM) distribution services over System-Wide Information Management (SWIM);
- Provide as-built obstacle data to support charting and instrument approach procedure development;
- Validate and process airport surveys submitted by private surveying firms in support of the airport Geographic Information System (GIS) program;
- Continue to support all mission support and Airport Geographic Information System (AGIS) to include but not limit to the Federal NOTAM System (FNS), Temporary Flight Restriction (TFR), Sector Design Analysis Tool (SDAT) and AIM/National Flight Data Center (NFDC) web Portal.
- Continue deployment of the Federal NOTAM System (FNS) NOTAM Manager origination tool;
- Publish the National Flight Data Digest and Aeronautical Information 56-day subscriber files to notify users of changes to the NAS; and
- Develop NOTAM Improvement Program milestones, in cooperation with the Tactical Operations committee (TOC) guidance for defining NOTAM relevance, as mandated in the Pilots Bill of Rights legislation.
- Participate in International Global Aeronautical Information Management information and enterprise architecture standard development including the Aeronautical Information Exchange Model (AIXM), an international standard for the digital, system-to-system exchange of aeronautical information.
- Provide near real-time Alaska Weather Camera images to pilots for situational awareness, pre-flight planning, and en route weather briefings.

AeroNav Products Directorate will:

- Provide continual modification, revision, and updates to Approach, Departure, Arrival and Airway IFP's through the issuance of critical amendments, NOTAMs, completing periodic reviews, and updating/revising Aeronautical Chart Products as necessary;(This activity equates to over 3,500 amendments; over 40,000 NOTAM's; over 10,000 periodic reviews; and over 20,000 non-procedural chart revisions being accomplished annually.
- Analyze, enhance and publish the FAA's Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) Aeronautical Chart Products ensuring charts are updated and revised as necessary to support civilian and military pilots. Maintain the Airport and Facilities Directory (A/FD) ensuring the necessary revisions are updated. Maintaining, updating and revising airport diagrams and sketches in support of the A/FD and Terminal Procedure Publications (TPPs);
- Provide obstacle review and analysis of all proposed construction to protect for the existing IFP's or any future IFP development in conjunction with the OE/AAA Program in support of NextGen;
- Perform overall project and program management responsibilities ensuring necessary revisions, changes, and updates are completed to the automated production tools in support of IFP design, development, maintenance and Aeronautical Charting Products;
- Produce and maintain ATC Radar Video Maps (RVMs), Minimum Safe Altitude ATC facility RVMs, Minimum Safety Altitude Warning (MSAW) system data files, and Minimum Vector Altitude (MVA) maps;
- Produce ARINC-424 format Coded Instrument Flight Procedure (CIFP), flight management system product, and Digital Enroute Supplement (DERS) product for both public and ATC systems support including flight inspection, HOST and ERAM; and
- Provide replication and dissemination services for FAA aeronautical charts and publications through approximately 350 chart agents worldwide and other government entities.

Operational Concepts, Validation, and Requirements Directorate will:

- Support publication of the NextGen Implementation Plan reflecting the agency and aviation community priorities;
- Develop concepts and validate requirements for existing technology to transition into the NAS for NextGen; and

- Ensure Operational Concepts, Validation, and Requirements works through the cross-agency workgroup to develop key messages and annotated outline for incorporation into the NextGen Implementation Plan.

Key outputs and outcomes expected to be achieved in the budget year with the requested resources:

The Airspace Services Directorate will:

- Develop regulatory policy related to the NAS; rules, policy, and standards for the use of navigable airspace;
- Direct the development, testing, and analysis of current airspace design and proposed changes to airspace design, efficiency, and use through modeling and simulation;
- Conduct reviews and analysis of the potential effect of proposed changes in airspace allocation and all proposed permanent and temporary construction on the safe and efficient use of the navigable airspace;
- Optimize airspace and PBN procedures to improve efficiency an average of 10 percent across core airports by 2018;
- Provide guidance, oversight, and coordination in the development and implementation of RNAV helicopter routes;
- Reduce risks in-flight by limiting the rate of the most serious losses of standard separation to 20 or fewer for every thousand (.02) loss of standard separation within the NAS;
- Reduce the need for existing positions in procedures and process/publications by automating work with JPAMS implementation;
- Refine design and conduct transition planning for NY/NJ/PHL airspace redesign;
- Create airspace and related policies and procedures to facilitate integration of unmanned aircraft into the NAS;
- Complete airspace and related safety studies and research to assist in the integration of unmanned aircraft into the NAS; and
- Within the OE/AAA process, issue final FAA determinations based on outcomes of an aeronautical study to ensure safe and efficient use of navigable airspace.

The Aeronautical Information Management Directorate will:

- Continue to provide AIM services including via web services and portals by delivering accurate and timely digital aeronautical information, products, and services to customers, including NOTAM, improved information on restricted and regulated airspace, and SAA information collection and management capabilities;
- Publish and provide aeronautical information in the National Flight Data Digest/56-day airspace cycle and/or mid-cycle subscriber files, NOTAMs, and obstacle repository services to inform users of dynamic and static changes to the NAS;
- Continue to provide data and automation to support FAA aeronautical charts and publications;
- Provide automation support to field facilities to enhance the generation of Sector Design Airspace Tool (SDAT)/Minimum Vector Altitude (MVA) data; and
- Continue to provide field automation platform to support the generation of Temporary Flight Restriction (TFR) and the Central Altitude Reservation Function (CARF).
- Provide near real-time Alaska Weather Camera images to pilots for situational awareness, pre-flight planning, and en route weather briefings

AeroNav Products Directorate will:

- Provide continual modification, revision, and updates to Approach, Departure, Arrival and Airway IFP's through the issuance of critical amendments, NOTAMs, completing periodic reviews, and updating/revising Aeronautical Chart Products as necessary;
- Analyze, enhance and publish the FAA's Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) Aeronautical Chart Products ensuring charts are updated and revised as necessary to support civilian and military pilots. Maintain the Airport and Facilities Directory (A/FD) ensuring the necessary revisions are updated. Maintaining, updating, and revising airport diagrams and sketches in support of the A/FD and Terminal Procedure Publications (TPPs);

- Provide obstacle review and analysis of all proposed construction to protect for the existing IFP's or any future IFP development in conjunction with the OE/AAA Program in support of NextGen;
- Perform overall project and program management responsibilities ensuring necessary revisions, changes, and updates are completed to the automated production tools in support of IFP design, development, maintenance, and Aeronautical Charting Products;
- Produce and maintain ATC Radar Video Maps (RVMs), Minimum Safe Altitude ATC facility RVMs, Minimum Safetly Altitude Warning (MSAW) system data files, and Minimum Vector Altitude (MVA) maps;
- Produce ARINC-424 format Coded Instrument Flight Procedure (CIFP), flight management system product, and Digital Enroute Supplement (DERS) product for both public and ATC systems support including flight inspection, HOST and ERAM; and
- Provide replication and dissemination services for FAA aeronautical charts and publications through approximately 350 chart agents worldwide and other government entities.

Operational Concepts, Validation, and Requirements Directorate will:

- Finalize stakeholder scope agreements for all new operational initiatives;
- Establish processes necessary to develop concepts and requirements on behalf of ATO Operational Service Units within the Acquisition Management System (AMS) with NextGen and the Program Management Organization;
- Support comments and clearances necessary for the NextGen Organization to publish the NextGen Implementation Plan;
- Respond to inquiries and establish data trends to target areas for process quality and quantity improvement and improve lines of communications between ATO operations and headquarters;
- Develop a strategy to implement transformational technologies demonstrating the benefits of "most capable, best served;"
- Establish criteria and standards for implementation of weather and communication systems;
- Act as ATO focal point for operational needs and provides input to NAS Architecture and to development of operational concepts;
- Validate needs requested by facilities and ensures validated requirements are implemented;
- Recommend improvements and establishes criteria and standards for implementation of automation systems; and
- Determine operational suitability of terminal systems and upgrades through Operational Test and Evaluation activities prior to implementation.

What Is This Program?

Mission Support Services directorates provide shared services which promote standardization of processes, efficiency, and effectiveness while achieving results for the following Service Units: Air Traffic Services, Technical Operations, and System Operations. This includes FAA headquarters programs for air traffic rules, policies, and standards for airspace structure, design and allocation; obstruction evaluation; air traffic environmental policy; expediting the implementation of optimized airspace and procedures; management of UAS operating authorizations; design and implementation of RNAV/RNP procedures; air traffic procedures development; instrument flight procedures production/charting; support for litigation and enforcement activities; and aeronautical information management.

Mission Support Services is also responsible for three service centers located in Atlanta, Fort Worth, and Seattle that provide support to the Director of Operations in matters concerning airspace and procedures, quality assurance, equipment installation, financial management, materiel management, procurement, hiring, and training. Each service center is comprised of five groups: Administrative Services, Business Services, Planning and Requirements, Operations Support, and Quality Control. The shared services model brings people together with similar expertise, allows sharing of ideas and resources, fosters collaboration to promote standardization of processes, improves efficiency and effectiveness, and enhances communication to achieve results among service units.

Mission Support Services is developing an integrated aeronautical information management system by creating mechanisms for aeronautical exchange between providers, stewards, and distributors within the aviation authority and external aviation data users. Our FY 2015 efforts will deliver global digital aeronautical information and manage the information for increased capacity, efficiency, and predictability in the airspace, routes, and airports of the NAS.

The Airspace Services Directorate provides an important systems view that incorporates transition access/egress points available through newer technology that are not tied to ground-based navigation aids; considers concurrent development and implementation of arrivals and departures, ensuring an integrated approach to procedural optimization; decouples operations between primary and secondary/satellite airports serviced by complex terminal airspace; develops high altitude routes through congested airspace better connecting major metropolitan areas; and provides new means to access airspace based on new technology. The structured approach to airspace analysis for integration efforts of new technology encompasses environmental review efficiencies, airspace regulations, and legal review with analysis.

The FAA will also focus on tools acceleration to include additional applications of existing specialized tools and improved obstacle evaluations. Training development efforts will focus on Flight Standards and ATC workforce training on the application of new routes and procedures.

Joint Procedures Automation and Management System (JPAMS) is a system that automates existing paper ATC directives change processes (change request, validation, development, coordination, comment, documentation collection, signature, final disposition, distribution, and publication in directives). It also has functions of an electronic library of all existing directives change history and packages, directives editing, taxonomy and cross referencing (makes finding the history of a change instantaneous for litigations and historical research), automates aircraft characteristics and other informational databases accessible through a user information portal (outdated appendices then removed from current directives). JPAMS replaces many procedures/process/publications personnel and functions existing today.

AIM is responsible for providing quality aeronautical data and aeronautical information necessary for the safety, regularity, and efficiency of the NAS. AIM provides static aeronautical information to users along with dynamic real-time updates in support of the NAS, flight operations, and industry. AIM achieves this goal by working in collaboration with industry and international standards by which aeronautical information is exchanged. Additionally, AIM serves as the FAA's central authority responsible for the validation, quality control, creation, maintenance, and dissemination of aeronautical data in support of activities of government, industry, and the aviation community.

At the end of January 2014, the new NOTAM manager was activated in 251 airports including all 30 Nation's core airports and 132 of the top 250 NOTAM producing airports, which has significantly improved the accuracy and timeliness of the information on temporary changes to the airspace, such as hazards, restrictions, and obstructions, for pilots and ATC. Enhancements have been implemented for the CARF for military airspace scheduling.

The Weather Camera Program in Alaska provides near real-time camera images, updated every 10 minutes to pilots for situational awareness, pre-flight planning, and en route weather briefings for reduction of weather-related accidents. In FY 2013, 25 additional weather cameras were installed and in FY 2014, technical refresh of existing sites will begin along with the installation of 6 additional weather cameras. The 217th weather camera site was installed at the end of April 2013. In FY 2015 the program begins sustainment, which includes maintenance and operations, of all 221 weather camera sites and its services.

AeroNav Products serves as the FAA's aeronautical charting authority to ensure the design, development, and publication of aeronautical charts and products necessary for the safe and efficient navigation of aircraft in the NAS. AeroNav Products:

- Provides continual modification, revision, and updates to Approach, Departure, Arrival and Airway IFP's through the issuance of critical amendments, NOTAMs, completing periodic reviews, and updating/revising Aeronautical Chart Products as necessary;
- Analyzes, enhances, and publishes the FAA's Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) Aeronautical Chart Products ensuring charts are updated and revised as necessary to support civilian and military pilots. Maintain the Airport and Facilities Directory (A/FD) ensuring the necessary revisions are updated. Maintaining, updating, and revising airport diagrams and sketches in support of the A/FD and Terminal Procedure Publications (TPPs);

- Provides obstacle review and analysis of all proposed construction to protect for the existing IFP's or any future IFP development in conjunction with the OE/AAA Program in support of NextGen;
- Performs overall project and program management responsibilities ensuring necessary revisions, changes, and updates are completed to the automated production tools in support of IFP design, development, maintenance, and Aeronautical Charting Products;
- Produces and maintains ATC Radar Video Maps (RVMs), Minimum Safe Altitude ATC facility RVMs, Minimum Safety Altitude Warning (MSAW) system data files, and Minimum Vector Altitude (MVA) maps;
- Produces ARINC-424 format Coded Instrument Flight Procedure (CIFP), flight management system product, and Digital Enroute Supplement (DERS) product for both public and ATC systems support including flight inspection, HOST and ERAM; and
- Provides replication and dissemination services for FAA aeronautical charts and publications through approximately 350 chart agents worldwide and other government entities.

Operational Concepts, Validation, & Requirements is the Operations organization for creating planned efforts to increase organizational effectiveness and efficiency, to address evolving needs, and future readiness to meet operational and technical changes in the NAS. As such, need to ensure appropriate level of support for a long-range approach to improving organizational performance, efficiency, and increase the organizations relevance and viability.

Our partners and stakeholders include:

- Department of Defense (DOD)
- Department of Homeland Security (DHS)
- National Aeronautics and Space Administration (NASA)
- Aviation industry
- Aviation community
- State and municipal governments
- National Transportation Safety Board (NTSB)
- International Civil Aviation Organization (ICAO)
- EUROCONTROL
- Academia
- Department of Commerce – NOAA
- Department of Justice (DOJ)
- Environmental Protection Agency (EPA)
- Department of Energy (DOE)

By the end of FY 2014, the accomplishments for Mission Support Services will include the following:

Airspace Services will:

- Conduct design and modeling for Stage 3 of the NY/NJ/PHL Airspace Redesign Project.
- Continue design of Q-routes between metroplex areas.
- Assess Westgate routes for New York metro area implemented as part of the NY/NJ/PHL Airspace Redesign.
- Develop Certificate of Waiver or Authorization (COA) compliance policy for UAS flight in the NAS.
- Complete JPAMS test and first phase implementation.
- NAV Lean will:
    - Establish standardized databases with designated custodianship and data stewards;
    - Deliver data layer (data services) for NAV Lean subject areas; support provision of a single set of data via web services in conjunction with other NAV Lean recommendations;
    - Develop and implement a secured technical solution for authentication and access point for external users;
    - Complete integration and implementation of Survey, Obstacles, and Navaids Authoritative Sources;
    - System development and testing phase of Airports, Points and Holding, En Route, Departures, and Approaches Authoritative Sources;
    - Identify conditions and amend policy to allow expedited processing and clear definition of minor revisions to IFPs;
    - Establish electronic process to allow abbreviated amendments for STARs;

- Fully implement re-engineered initial environmental review process and prescreening filter tool for instrument flight procedures;
- Revise FAA Order 7400.2, Procedures for Handling Airspace Matters, (chapter 32), to clearly define responsible federal official authorized to sign applicable environmental documents;
- Establish a web-based Operations Approval Entry portal and a web-based work package; and
- Establish and implement a web-based request and access portal as the mandatory entry point for all IFP requests and/or inquiries.

Aeronautical Information Management will:

- Continue development of the Federal NOTAM system including 120 additional deployments of the NOTAM Manager to public use airports in FY 2014.
- Implement the AIM developed interface between the Air Force Central Scheduling Enterprise (CSE) and the FAA Special Use Airspace Management System (SAMS) for the coordination of dynamic Special Use Airspace (SUA) schedule data between the two systems.
- Ensure FAA participates in at least 75 percent of ICAO Aeronautical Information Service (AIS) to AIM working group meetings.
- Complete installation and make services available to the public for 6 additional weather camera sites while maintaining all existing operational sites.
- Provide aeronautical information enhancements to improve the accuracy and timeliness of information on SAA and airport data.
- Disseminate digital aeronautical information, which will result in relevant information being integrated into the common operating picture of the NAS.
- Provide as-built obstacle data to support charting and instrument approach procedure development.
- Manage the airport and obstacle data collection in support of WAAS and PBN.
- Validate and process airport surveys submitted by private surveying firms in support of the airport GIS program.
- Publish the National Flight Data Digest and Aeronautical Information 56-day airspace cycle and/or mid-cycle subscriber files to notify users of changes to the NAS.
- Provide near real-time Alaska Weather Camera images to pilots for situational awareness, pre-flight planning, and en route weather briefings.

AeroNav Products will:

- The TPP group will develop and publish 100+ WAAS LPV/LP procedures.
- Provide continual modification, revision, and updates to Approach, Departure, Arrival and Airway IFP's through the issuance of critical amendments, NOTAMs, completing periodic reviews, and updating/revising Aeronautical Chart Products as necessary;
- Analyze, enhance, and publish the FAA's Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) Aeronautical Chart Products ensuring charts are updated and revised as necessary to support civilian and military pilots. Maintain the Airport and Facilities Directory (A/FD) ensuring the necessary revisions are updated. Maintaining, updating, and revising airport diagrams and sketches in support of the A/FD and Terminal Procedure Publications (TPPs);
- Provide obstacle review and analysis of all proposed construction to protect for the existing IFP's or any future IFP development in conjunction with the OE/AAA Program in support of NextGen;
- Perform overall project and program management responsibilities ensuring necessary revisions, changes, and updates are completed to the automated production tools in support of IFP design, development, maintenance, and Aeronautical Charting Products;
- Produce and maintain ATC Radar Video Maps (RVMs), Minimum Safe Altitude ATC facility RVMs, Minimum Safety Altitude Warning (MSAW) system data files, and Minimum Vector Altitude (MVA) maps;
- Produce ARINC-424 format Coded Instrument Flight Procedure (CIFP), flight management system product, and Digital Enroute Supplement (DERS) product for both public and ATC systems support including flight inspection, HOST and ERAM; and
- Provide replication and dissemination services for FAA aeronautical charts and publications through approximately 350 chart agents worldwide and other government entities.

By the end of FY 2015, the anticipated accomplishments for Mission Support Services will include the following:

Airspace Services will:

- Coordinate required ATO support to the New York Area Program Integration Office for ATO Matrix team representation. Assist development of stakeholder scope agreements and further develop the Delay Reduction Plan.
- Refine design and conduct transition planning for NY/NJ/PHL Airspace Redesign.
- Deliver changes to ATC procedures, directives, waivers, notices, and General Notice (GENOT).
- Provide regulatory work required for UAS, COAs, airspace changes, and ATC facility operations changes in the NAS.
- Implement integrated airspace and efficient PBN procedures, including Optimized Profile Descents (OPDs) in the Charlotte, Atlanta, and Northern California metroplexes.
- Complete final phase JPAMS implementation
- Support the stand up of the UAS test sites and UAS Roadmap where applicable
- NAV Lean will:
  - Migrate NAS Resource (NASR) functionality into AirNav 2.0;
  - Complete implementation of a secured technical solution for authentication and access point for external users; complete system development and testing of Airports, Points and Holding, En Route, Departures, and Approaches Authoritative Sources;
  - Complete integration and implementation of Airports, Points and Holding, En Route, Departures, and Approaches Authoritative Sources;
  - Complete web-based Request and Access Portal Testing and Implementation;
  - Complete web-based Request and Access Portal Stakeholder and User Training;
  - Standardize software and data formats that allow auto-population/extraction of data to produce, populate, and edit documents that are accessible to all parties for review; and
  - Develop, implement, and ensure standards to electronically communicate, transfer, and integrate data among tools.

Aeronautical Information Management will:

- Provide aeronautical information enhancements to improve the accuracy and timeliness of information on SAA and airport data.
- Demonstrate capture and dissemination capabilities for digital aeronautical information, which will result in relevant information being integrated into the common operating picture of the NAS, via NOTAM distribution services over SWIM.
- Provide as-built obstacle data to support charting and instrument approach procedure development.
- Validate and process airport surveys submitted by private surveying firms in support of the airport GIS program.
- Continue to support all mission support and AGIS systems including by not limited to Federal NOTAM System (FNS), Temporary Flight Restriction (TFR), Sector Design Analysis Tool (SDAT), and AIM/National Flight Data Center web portal.
- Continue deployment of the FNS NOTAM Manager Origination tool to public use airports.
- Publish the National Flight Data digest and Aeronautical Information 56-day subscriber files to notify users of changes to the NAS.
- Provide near real-time Alaska Weather Camera images to pilots for situational awareness, pre-flight planning, and en route weather briefings
- Develop NOTAM Improvement Program milestones in cooperation with TOC guidance for defining NOTAM relevance, as mandated in the Pilots Bill of Rights legislation.
- Continued participation in Global aeronautical information architecture and standard working groups further developing the Aeronautical Information Exchange Model (AIXM) Technical refreshes of existing hardware platforms for mission support systems to improve system performance, storage capacity and security.

Operational Concepts, Validation and Requirements will:

- Centralize functions to provide a clear method for achieving operational goals by developing operational requirements and prioritizing objectives across the ATO.
- Identify, coordinate, and interpret the end users' needs, while articulating the original ATO operational requirements.

Safety:

Airspace Services will:

- Complete Safety Risk Management Document (SRMD) on unmanned aircraft operating in Class A, B, C, D, E, and G airspace and ad hoc assessments that support UAS integration into the national airspace system.

Aeronautical Information Management will:

- Develop and implement aeronautical information enhancements for SAA management and airport data.
- Complete all camera site installation and transition program to sustainment, which includes maintenance and operations of the weather camera sites and its services.
- Complete Federal NOTAM System work to support the Pilot Bill of Rights.
- Disseminate digital aeronautical information via both web services and portals, which will result in relevant information being integrated into the common operating picture of the NAS.
- Provide as-built obstacle data to support charting and instrument approach procedure development.
- Validate and process airport surveys submitted by private surveying firms in support of the airport GIS program.
- Provide quality data and aeronautical information necessary for the safety, regularity, and efficiency of the NAS. Provide static aeronautical information to users along with dynamic real-time updates in support of the NAS, flight operations, and industry.
- Achieve and implement International Standards Organization (ISO) for data distribution services.
- Publish the National Flight Data Digest and Aeronautical Information 56-day airspace cycle and/or mid-cycle subscriber files to notify users of changes to the NAS.

AeroNav Products will:

- Provide continual modification, revision, and updates to Approach, Departure, Arrival and Airway IFP's through the issuance of critical amendments, NOTAMs, completing periodic reviews, and updating/revising Aeronautical Chart Products as necessary;
- Analyze, enhance, and publish the FAA's Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) Aeronautical Chart Products ensuring charts are updated and revised as necessary to support civilian and military pilots. Maintain the Airport and Facilities Directory (A/FD) ensuring the necessary revisions are updated. Maintaining, updating, and revising airport diagrams and sketches in support of the A/FD and Terminal Procedure Publications (TPPs);
- Provide obstacle review and analysis of all proposed construction to protect for the existing IFP's or any future IFP development in conjunction with the OE/AAA Program in support of NextGen;
- Perform overall project and program management responsibilities ensuring necessary revisions, changes, and updates are completed to the automated production tools in support of IFP design, development, maintenance, and Aeronautical Charting Products;
- Produce and maintain ATC Radar Video Maps (RVMs), Minimum Safe Altitude ATC facility RVMs, Minimum Safety Altitude Warning (MSAW) system data files, and Minimum Vector Altitude (MVA) maps;
- Produce ARINC-424 format Coded Instrument Flight Procedure (CIFP), flight management system product, and Digital Enroute Supplement (DERS) product for both public and ATC systems support including flight inspection, HOST and ERAM; and
- Provide replication and dissemination services for FAA aeronautical charts and publications through approximately 350 chart agents worldwide and other government entities.

Economic Competitiveness:

Airspace Services:

- In order to address RTCA Taskforce 5 recommendations, the FAA will develop and implement PBN routes and procedures, including RNP, RNAV, and Optimum Profile Descent (OPD) to expand development, based on targeted benefits.

Why Is This Particular Program Necessary?

FAA's ATO handles 69,000 flights per day and helps transport over 737 million passengers per year, contributing to 5.2 percent of the total U.S. economy. ATO relies on numerous programs to maintain the safety and efficiency of the current system and ensure its viability well into the future.

The Mission Support Services mission is to achieve results for ATO's service units by promoting standard processes, efficiency, and effectiveness through shared services. Core competencies support the following activities:

- Standardized administrative services;
- Financial, material, procurement, and logistics;
- Integrated planning, requirements, and program implementation management;
- Oversight of NAS procedures and changes affecting NAS operations and special activities; and
- Inspections, evaluations, safety risk management, accident and incident information gathering, and reporting services.

Airspace Services:

- Authorizes UAS operations in the NAS and to ensure that UAS flights do not compromise the high level of safety for other aviation, the public, and people and property on the ground while minimizing the impact to efficiency.
- Supports the development and implementation of UAS specific procedures and policies.
- Develops and implements PBN routes and procedures that leverage emerging technologies and aircraft navigation capabilities. PBN is comprised of RNAV and RNP and describes an aircraft's capability to navigate using performance standards. RNAV enables aircraft to fly on any desired flight path within the coverage of ground- or spaced-based navigation aids, within the limits of the capability of the self-contained systems, or a combination of both capabilities. As such, RNAV aircraft have better access and flexibility for point-to-point operations.
- Redesigns airspace to improve flight efficiency. Airspace redesign and procedure development are targeting congested airspace areas such as Chicago, Southern California, and New York. Development efforts will include analysis and simulations, assessments of alternatives, and modeling of projected airspace and procedures.

Aeronautical Information Management:

- Provides aeronautical information enhancements to improve the accuracy and timeliness of information on SAA and airport data.
- Demonstrates capture and dissemination capabilities for digital aeronautical information, which will result in relevant information being integrated into the common operating picture of the NAS, via NOTAM distribution services over SWIM.
- Provides as-built obstacle data to support charting and instrument approach procedure development;
- Validates and processes airport surveys submitted by private surveying firms in support of the airport GIS program;
- Continues to support all mission support and AGIS systems including but not limited to Federal NOTAM System (FNS), Temporary Flight Restriction (TFR), Sector Design Anaylsis Tool (SDAT), and AIM/National Flight Data Center web portal;
- Continues deployment of the FNS NOTAM Manager origination tool to public use airports;
- Provides near real-time Alaska Weather Camera images to pilots for situational awareness, pre-flight planning, and en route weather briefings for all 221 sites
- Publishes the National Flight Data digest and Aeronautical Information 56-day airspace cycle and/or mid-cycle subscriber files to notify users of changes to the NAS; and
- Develops NOTAM Improvement Program milestones in cooperation with TOC guidance for defining NOTAM relevance, as mandated in the Pilots Bill of Rights legislation.

AeroNav Products:

- Provides continual modification, revision, and updates to Approach, Departure, Arrival and Airway IFP's through the issuance of critical amendments, NOTAMs, completing periodic reviews, and updating/revising Aeronautical Chart Products as necessary;
- Analyzes, enhances, and publishes the FAA's Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) Aeronautical Chart Products ensuring charts are updated and revised as necessary to support civilian and military pilots. Maintains the Airport and Facilities Directory (A/FD) ensuring the necessary revisions are updated. Maintains, updates, and revises airport diagrams and sketches in support of the A/FD and Terminal Procedure Publications (TPPs);
- Provides obstacle review and analysis of all proposed construction to protect for the existing IFP's or any future IFP development in conjunction with the OE/AAA Program in support of NextGen;
- Performs overall project and program management responsibilities ensuring necessary revisions, changes, and updates are completed to the automated production tools in support of IFP design, development, maintenance, and Aeronautical Charting Products;
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- Produces ARINC-424 format Coded Instrument Flight Procedure (CIFP), flight management system product, and Digital Enroute Supplement (DERS) product for both public and ATC systems support including flight inspection, HOST and ERAM; and
- Provides replication and dissemination services for FAA aeronautical charts and publications through approximately 350 chart agents worldwide and other government entities.

How Do You Know The Program Works?

ATO sets annual performance goals in key categories including safety, capacity, efficiency, finance, international leadership, and organizational excellence, including hiring and training. To measure our progress, we employ a set of metrics. The success of a particular program is determined by assessing its cost, schedule, and performance.

The "shared services environment" concept, under which many ATO processes have been standardized and regional resources consolidated, was the primary driver behind creating the service centers. As a result, we anticipate considerable cost savings over time. Pre-deployment estimates suggested an estimated savings of $360 million over a 10-year period. The service center roll-out took place in FY 2006; to date, a net savings of approximately $225 million has been realized.

The Airspace Services Directorate's' Major Airspace Redesign program delivered Stage 2 of the NY/NJ/PHL Airspace Redesign. Stage 2 was implemented in two parts. In May 2011, Stage 2a was implemented and the activity consisted of the New York Terminal Radar Approach Control (N90) integrating airspace to achieve efficiency gains through better internal coordination for aircraft closest to the airports. This was accomplished by re-aligning key positions in the control room. Also, the New York Air Route Traffic Control Center (ZNY) acquired radar data from eight radar sites to expand areas eligible for reduced separation from 5 nautical miles to 3 nautical miles. The final Stage 2a implementation element completed in October 2011 was the addition of a new departure route for the John F. Kennedy International Airport (JFK) enabling departures to reach optimal altitude more quickly and reduce airspace complexity; the addition of a new departure fix for all New York metropolitan area airports; and a new arrival route to Dulles International Airport (IAD). In May 2012, Stage 2b was implemented that included the activation of new dispersal headings on the west and east departure flow at Philadelphia International Airport (PHL). The headings, as per the Environmental Impact Statement/Record of Decision, are designed to increase departure efficiency and mitigate significant noise impact. Airspace design activities continue and full implementation of the airspace redesign project is planned for December 2016.

Other accomplishments made by the Major Airspace Program include: the completion of stakeholder meetings and the issuance of an airspace analysis for North Texas Airspace Review; completion of the Nevada Supplemental Airport (SNSA) airspace study and technical report; and the completion of Chicago Airspace Project in alignment with the O'Hare Modernization Program.

The FAA, in its firm commitment to provide end-to-end PBN capabilities in the NAS, has already developed and implemented 593 RNAV SIDs/STARs; 675 RNP Authorization Required (AR) instrument approach procedures; and 189 Q/T Routes in addition to Global Navigation Satellite System Minimum En Route Altitude (GNSS MEA) RNAV routes as of February 6, 2014. The use of these procedures has already provided significant efficiency and safety benefits to operators.

In the fall of 2010, FAA initiated two "prototype" OAPM study teams for Washington, DC, and the North Texas metropolitan areas. The prototype study teams were used to validate and verify team approach and provide lessons learned for integration at other sites. In FY 2011, five additional OAPM study teams completed studies at Charlotte, Northern California, Houston, Atlanta, and Southern California. The South/Central Florida Study Team was completed in FY 2012. The Phoenix Study Team was completed in FY 2013. The Cleveland/Detroit Study Team schedule (planned for FY 2013) is under review while subject matter expert availability is being assessed. Design and implementation efforts are underway at seven sites. Two sites (South/Central Florida, Phoenix) were set to begin design phase in FY 2013. SME availability has also placed the design schedule under review. Cleveland/Detroit will be studied in FY 2014. Cleveland/Detroit and Phoenix are scheduled to begin design and implementation activities in FY 2014. The third FY 2014 study team will begin design activities in FY 2015. The OAPM initiative is a multi-year activity that will bring PBN-based airspace and procedure solutions to many major airports by the end of 2017.

In FY 2015, funding is requested to support the following OAPM activities:

- Complete design activities at two metroplex locations (Phoenix and Cleveland/Detroit), focusing on expedited integrated PBN procedure development coupled with airspace design to optimize benefits.
- Begin OAPM pre-implementation/evaluation activities at two metroplex locations (Phoenix and Cleveland/Detroit) and complete implementation activities at Washington, DC, and Northern California.

Mission Support continues to participate in the UAS Executive Committee (EXCOM), an interagency group consisting of the Department of Defense, Department of Homeland Security, FAA, and National Aeronautical Space Administration that focuses on the safe and efficient integration of UAS into the NAS. The service unit also completed four UAS international meetings working towards global harmonization of UAS operations criteria and procedures.

The Aeronautical Information Management Modernization Segment 1 Program implemented the digital NOTAM System at Atlantic City (ACY). ACY, located at FAA's William J. Hughes Technical Center, is the first in the NAS to deliver digital NOTAMs, which provide computer-generated safety information to pilots and air traffic controllers about conditions at an airport such as construction and hazards. As of the end of January 2014, 251 airports are using the NOTAM Manager. The initial CARF capability and integration was completed for military airspace.

In Alaska, Aeronautical Information Management's Weather Camera Program is installing and making services available to the public. In FY 2013, 25 additional weather camera sites were installed, continuing efforts to supply visual meteorological information to pilots to reduce weather-related accidents from a baseline level of 0.28 to no more than 0.15 accidents per 100,000 operations within the State of Alaska. In FY 2014, 6 additional weather cameras will be installed for a total of 221 sites. In FY 2015 the program begins sustainment, which includes maintenance and operations for all weather camera sites and its services.

Aeronautical Information Management will:

- Provide aeronautical information enhancements to improve the accuracy and timeliness of information on SAA and airport data.
- Disseminate digital aeronautical information via web services and portals, which will result in relevant information being integrated into the common operating picture of the NAS.
- Publish the National Flight Data Digest and Aeronautical Information 56-day airspace cycle and/or mid-cycle subscriber files to notify users of changes to the NAS.
- Provide as-built obstacle data to support charting and instrument approach procedure development.
- Validate and process airport surveys submitted by private surveying firms in support of the airport GIS program.

The AeroNav Products Directorate will:

- Complete all required modification, revision, and updates to Approach, Departure, Arrival and Airway IFP's through the issuance of critical amendments, NOTAMs, completing periodic reviews, and updating/revising Aeronautical Chart Products as necessary;
- Complete all required revisions and updates on Instrument Flight Rule (IFR) and Visual Flight Rule (VFR) Aeronautical Chart Products. Airport and Facilities Directory (A/FD), airport diagrams and sketches and the Terminal Procedure Publications (TPPs);
- Complete all required obstacle review and analysis of all proposed construction to protect for the existing IFP's or any future IFP development in conjunction with the OE/AAA Program in support of NextGen;
- Complete all necessary revisions, changes, and updates are completed to the automated production tools in support of IFP design, development, maintenance, and Aeronautical Charting Products;
- Create/build new and maintain ATC Radar Video Maps (RVMs), Minimum Safe Altitude ATC facility RVMs, Minimum Safety Altitude Warning (MSAW) system data files, and Minimum Vector Altitude (MVA) maps;
- Complete all revisions to ARINC-424 format Coded Instrument Flight Procedure (CIFP), flight management system product, and Digital Enroute Supplement (DERS) product for both public and ATC systems support including flight inspection, HOST and ERAM; and
- Print and distribute all FAA aeronautical charts and publications as required annually

Why Do We Want/Need To Fund The Program At The Requested Level?

The Mission Support Services mission is to promote the standardization of processes, efficiency, and effectiveness among ATO service units in Air Traffic Services, Technical Operations, and System Operations through shared services. The service unit's core work is performed at the three service center locations (Western, Eastern, and Central). Core work includes providing:

- Standardized administrative support services;
- Financial, material, procurement, and logistical support services;
- Integrated planning, requirements management and program implementation management support services;
- Oversight and support for NAS procedures and changes which affect operations and special activities with the NAS; and
- Inspections, evaluations, safety risk management, accident and incident information gathering and reporting services, and support for NAS procedures and changes which affect operations and special activities with the NAS.

Funding requested in FY 2015 will fund continued Mission Support Services contributions in the transition to NextGen. Funding will allow for continued development of PBN criteria and procedures.

Funding will facilitate implementation of the NAV Lean recommendations to include a streamlined version of the current core process (request, design and development, approval, implementation, and maintenance). Additionally, auxiliary processes, such as Safety Management System (SMS), environmental, and operational approval have recommendations aligned with this effort. The overall process will be better managed by having all IFP requests submitted through an authorized web-based portal established as the entry point into a system for processing, tracking, and managing the IFP development life cycle.

Funding will allow additional staffing at headquarters and service centers for continued development of cornerstone documents, safety studies, and research needed for the safe integration of UAS into the NAS.

Funding requested will be used to refine design and conduct transition planning for the NY/NY/PHL Airspace Redesign.

The FY 2015 funding requested for AIM is to support NextGen and the Pilots Bill of Rights initiatives:

- Provide on-demand NAS operational performance information, and airspace management for situational awareness and trajectory based operations, and
- Provide quality information to NAS and external users to directly support the safe operation of the NAS.

AIM is responsible for providing quality aeronautical data and aeronautical information necessary for the safety, regularity, and efficiency of the NAS. AIM provides static aeronautical information to users along with dynamic real-time updates in support of the NAS, flight operations, and industry. AIM achieves this goal by working in collaboration with industry and international standards by which aeronautical information is exchanged. Additionally, AIM serves as the FAA's central authority responsible for the validation, quality control, origination, maintenance, and dissemination of aeronautical data in support of activities of government, industry, and the aviation community.

SAA is defined as any airspace with defined dimensions within the NAS wherein limitations may be imposed upon aircraft operations. SAA may be restricted areas, prohibited areas, military operations areas, ATC assigned airspace, and any other designated airspace areas.

A reduction in requested funding would delay the development of an intrinsic component, integrated aeronautical information, which provides the information and service foundation to deliver NextGen operational capabilities.

The FY 2015 funding requested by AIM is required to continue:

- Providing aeronautical information enhancements to improve the accuracy and timeliness of information on SAA and airport data;
- Demonstrating capture and dissemination capabilities digital aeronautical information via web services and portals, which will result in relevant information being integrated into the common operating picture of the NAS via NOTAM distribution services over SWIM;
- Providing as-built obstacle data to support charting and instrument approach procedure development;
- Validate and process airport surveys submitted by private surveying firms in support of the airport GIS program;
- Supporting all mission support and AGIS including but not limited to Federal NOTAM System (FNS), Temporary Flight Restriction (TFR), Sector Design Analysis Tool (SDAT), and AIM/National Flight Data Center web portal;
- Deployment of the FNS NOTAM Manager origination tool to public use airports;
- Publishing the National Flight Data Digest and Aeronautical Information 56-day airspace cycle and/or mid-cycle subscriber files to notify users of changes to the NAS; and
- Developing NOTAM Improvement Program milestones, in cooperation with the TOC guidance for defining NOTAM relevance, as mandated in the Pilots Bill of Rights legislation US Senate, 112th Congress, S. 1335.
- Participation in the continued development of a global aeronautical information architecture including enhancements to the Aeronautical Information Exchange Model (AIXM)

The FY 2015 funding requested for AeroNav Products is required to continue:

- Providing Aeronautical Navigation Products to pilots, air traffic controllers, and aviation planners with a myriad of products and services to promote safe and efficient aeronautical navigation;
- Ensuring the safety of the NAS Terminal and En Route IFP's through the issuance of critical amendments, NOTAMs, completing periodic reviews and updating/revising Aeronautical Chart Products as necessary;
- Compiling and publishing FAA's IFR and VFR Aeronautical Chart Products ensuring charts are updated and revised as necessary to support civilian and military pilots; maintain the A/FD ensuring the necessary revisions are updated; maintaining, updating, and revising airport diagrams and sketches in support of the A/FD and TPPs;
- Supporting the OE/AAA Program providing obstacle review and analysis of all proposed construction to protect for the existing IFP's or any future IFP development in support of NextGen;
- Producing ARINC-424 format CIFP flight management system product and DERS product for both public and ATC systems support;

- Performing overall project and program management responsibilities ensuring necessary revisions, changes, and updates are completed to the automated production tools in support of IFP design, development, maintenance, and Aeronautical Charting Products;
- Producing and maintaining ATC RVMs, Minimum Safe Altitude ATC facility RVMs, MSAW system data files and MVA maps;
- Providing replication and dissemination services for FAA aeronautical charts and publications and NOAA nautical charts and maps; and

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Detailed Justification for the - Vice President Management Services, AJG-0

What Is The Request And What Will We Get For The Funds:

FY 2015 – Management Services – Budget Request ($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Management Services	$276,632	$326,341	$327,287	+$946

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

The FY 2015 budget request for Management Services is $327,287,000 and 259 FTP / 273 FTE. This request provides an adjustment to base of $263,000 for pay inflation. It also provides for other adjustments of $58,000 for the annualized cost of the FY 2014 pay increase. The request includes $879,000 for the increase in the agency's contribution rates to the FERS retirement system. Also included in the request is a reduction of -$290,000 for hiring restrictions. This request includes a change of $36,000 for Working Capital Fund adjustments.

Funding the FY 2015 request at this level will allow Management Services to:

- Lead the process for strategic and business planning and integration of the ATO Business Plan with FAA's Destination 2025 Strategic Plan and the FAA Administrator's 5-Year plan. Leads the Budget and Performance Integration Initiative including oversight of performance measures to be used by ATO service units. Lead the process to develop and oversee the annual ATO Priority Initiatives and tie these efforts to organization and individual performance.
- Lead the development and management of ATO Community metrics, focusing on workforce training and improvement in collaboration.
- Coordinate Capital Investment Plan submission to Congress.
- Coordinate Operations Budget prioritization, allocation, and tracking for the entire ATO, as well as align the Operations and Facilities and Equipment allocations appropriately based on the operational needs of the National Airspace System (NAS).
- Allocate and manage resources to meet financial performance target and provides support to FAA and ATO with financial, business, and planning services.
- Lead the execution and refreshment of the 3-5 year organizational development strategy for ATO to integrate organizational development with performance management, succession management, and leadership development; create a culture of collaboration and continuous learning; and institutionalize collaborative work habits throughout the entire ATO workforce. As an internal consultant to ATO, utilize consistent frameworks such as change management, process improvement, and facilitation to foster increased efficiency and effectiveness of the organization.
- Develop and implement an integrated strategy in managing labor relationships and liaison activities across ATO organizations and bargaining units. Provide Human Resource Management (AHR) with a centralized and focused point of contact for technical information.
- Establish and mature a leadership assessment process based on the leadership competency model.
- Ensure ATO Career Progression Plan tools are accessible to ATO's workforce.
- Manage ATO human capital and ensure the implementation of standardized administrative processes and policies for ATO including position management and classification, career paths and succession management, workforce planning, professional training, leadership development and performance management and recognition which all support long-term ATO talent management and business goals.
- Develop and provide oversight for the implementation of ATO administrative policies, processes, and guidance to ensure uniform application and standardization.
- Implement ATO Leadership Development Plan to enable achievement of business goals.
- Identify, acquire, deliver, and evaluate non-operational training in support of ATO requirements.
- Manage and implement FAA telework within ATO. Establish baseline of participation to monitor increases and reductions.
- Provide policy, guidance, training, and tools for managing directives/records in ATO.

- Monitor reports and make recommendations to ATO senior management on issues of diversity, including demographics, employment trends, and recruitment strategies.
- Develop and facilitate delivery of outreach strategies and major initiatives to promote education and public awareness of aviation occupations and other critical hiring opportunities within ATO to establish broad-based diversity pipeline.
- Manage and oversee ATO contract acquisition and execution process and data to increase effectiveness of contract support, reduce overall expenses, and eliminate unnecessary redundancy in support tasks and contract vehicles. Establish a process and database by which Management Services can monitor all contracts and make sound business decisions.
- Lead ATO efforts related to the hiring process for controllers and technicians. Coordinate hiring/staffing model development and application, and conduct staffing analyses for en route and terminal facilities. Also lead ATO/FAA efforts to complete various staffing studies mandated by reauthorization, to include front line managers, technicians, and air traffic controllers.
- Manage all personnel actions on behalf of the ATO service units.
- Manage logistics of ATO physical space including requirement gathering, day-to-day employee/office tactical moves, new lease coordination/approval and existing lease oversight and associated utility costs, strategic space consolidation and new business case validation and approvals.

Key outputs and outcomes expected to be achieved in budget year with the requested resources:

- A collaborative process in 100 percent of our facilities that engages our employees and unions in technical, procedural, and airspace changes in their work environment.
- An integrated strategy in managing labor relationships and liaison activities across ATO organizations and bargaining units.
- The accurate number of controllers and technicians hired and trained needed to operate and maintain the NAS.
- Outreach strategies and major initiatives to promote education and public awareness of aviation occupations and other critical hiring opportunities within ATO to establish broad-based diversity pipeline.
- Improved customer service.
- A fully engaged ATO workforce that practices collaboration in all facets of daily business, and models that behavior in leadership development, succession planning, and performance management.
- Improve personnel quality through more upstream recruitment, better training, succession planning, and more diligent performance management.
- A contracts system of records to provide information to better manage contract resources and maximize the best value for our investment.
- Redesigned ATO metrics in the four key areas of safety, efficiency, cost effectiveness and community and fully integrated ATO processes to manage to the numbers.
- An organizational development strategy that will position the ATO over the next 3-5 years to adapt to changing operational demands, reduced staffing and budgets, and increased need to provide safe and efficient service throughout the NAS.
- A robust and repeatable process to assess annual Operations requirements, allocate limited resources by priority, monitor expenditures throughout the year, and align budget planning and execution processes for all ATO funding sources (Operations, F&E).
- Evaluation of legacy activities to maximize the value across ATO.
- Fully coordinated ATO Space Strategy that co-locates offices and reduces the ATO physical space footprint and annual costs.

What Is This Program?

Management Services supports DOT's Strategic Plan's Organizational Excellence: Financial Performance goals. We recruit, develop, and retain a diverse and collaborative workforce by providing an all-encompassing career progression plan and leadership development program along with personnel and organizational policies that meet the needs of our highly skilled workforce. We ensure that performance stays on track by providing the framework to integrate ATO's plans, programs, and activities.

We work with aviation stakeholders to develop strategies for implementing solutions and to continue coordination with FAA offices.

Our partners and stakeholders include:

- Office of the Inspector General (OIG)
- Congress
- Congressional Oversight Committees
- Local, county and state authorities
- Other Federal agencies
- Office of Management & Budget (OMB)
- Government Accountability Office (GAO)

By the end of FY 2014, the accomplishments for Management Services include:

- A cadre of highly trained and experienced internal facilitation resources for field and headquarters ATO service units for meeting facilitation, team building support, workplace conflict resolution, and organizational development activities. The facilitation services will be provided at lower cost than hiring external facilitators.
- Ensure that 70 percent of all eligible ATO management workforces attend, at least, one training in the following training areas: Model Work Place (MWP); Equal Employment Opportunity (EEO); or Diversity Workshop training. Ensure 90 percent of all eligible ATO management work forces complete the required Accountability Board Training.
- A Recruitment and Outreach Program to attract a diverse applicant pool for ATO mission-critical occupations in FY 2014.
- A national program to prepare air traffic controllers, technicians, front line managers, and operations managers for success in their next level of leadership responsibility.
- A resource/clearinghouse to address ATO leaders' needs for coaching and developmental workshops, targeted at both individual and team level.
- Standardized processes and tools to support employee career progression throughout ATO.
- A reduced number of employees on Office of Workers' Compensation Programs roles and associated compensation costs.
- An air traffic controller and technician workforce that supports the changing operational demands of the U.S. National Airspace System (NAS) and that is in support of the agency goals and priorities. This includes establishing prioritized and effective hiring and retention processes that supports a right-sizing of the NAS and supporting workforce as a result of significant budget reductions.
- Significant improvement and success in ATO workforce collaboration initiatives and programs.
- A contracts system of records to provide information to better manage contract resources and maximize the best value for our investment.
- A more cost effective organization with less legacy activities to maximize value.
- A space strategy to co-locate offices and reduce the ATO space footprint and annual lease costs.

By the end of FY 2015, anticipated accomplishments for Management Services include:

- A collaborative process in 100 percent of our facilities that engages our employees and unions in technical, procedural, and airspace changes in their work environment.
- Standardized policy processes for ATO labor strategies.
- ATO Career Progression Plan tools will be accessible to 100 percent of the ATO population.
- National ATO hiring programs and processes to ensure that FAA has the controllers and technicians needed to operate and maintain the NAS, including leading the Centralized Selection Process.
- An integrated strategy in managing labor relationships and liaison activities across ATO organizations and bargaining units.
- The accurate number of controllers and technicians hired and trained needed to operate and maintain the NAS.
- An ATO Leadership Development Plan to enable achievement of business goals.
- Outreach strategies and major initiatives to promote education and public awareness of aviation occupations and other critical hiring opportunities within the ATO to establish broad-based diversity pipeline.

- Continued consolidation of ATO space leases to result in savings in operations dollars for reinvestment in the operation of the National Airspace System.

Why Is This Particular Program Necessary?

FAA's ATO handles 69,000 flights per day and helps transport over 737 million passengers per year, contributing to 5.2 percent of the total U.S. economy. ATO relies on numerous programs to maintain the safety and efficiency of the current system and ensure its viability well into the future.

Management Services ensures that performance stays on track by providing the framework to integrate ATO's plans, programs, and activities with available budgets and resources. We provide a wide variety of administrative services that support the overall operation of ATO as an organization and help plan for a successful future. By providing performance measures, a foundation for administration, and communication of key goals and information to ATO, we support ATO in its core functions in accomplishing the organization's mission.

How Do You Know The Program Works?

ATO sets annual performance goals in key categories including safety, capacity, efficiency, finance, international leadership, and organizational excellence, including hiring and training. Annually, ATO (and Management Services) establishes the top priorities and initiatives for the organization. We map these initiatives directly to the performance plans of our executives, managers, and general workforce to ensure the proper focus and attention is given. To measure our progress, we employ a set of operational, safety, and community metrics. Management Services develops, oversees, and tracks progress on the Community Metrics which were developed to track the success of many of the programs and initiatives under the direction of Management Services. The success of a particular program is determined by assessing its cost, schedule, performance, and outcomes. Selected programs are reviewed under the FAA's Post Implementation Review process to determine overall performance of the program against its metrics and the extent of operational benefits achieved.

Why Do We Want/Need To Fund The Program At The Requested Level?

ATO is a performance-based organization and Management Services ensures that performance stays on track by providing the framework to integrate ATO's plans, programs, and activities within allocated budgets. The organization is diverse and works together to provide a wide variety of administrative type services that support the overall operation and inter-workings of ATO and help plan for a successful future.

Management Services organization also supports the Workplace of Choice initiatives in a number of ways. For example, ATO's Community Enterprise Office provides training, development, and certification programs to ATO leaders and other professionals across ATO. Our goal is to ensure that ATO has the skills it needs to meet current and future mission business strategies and help employees find training for their organizational needs, whether it is offered in-house, on-line, or through external providers. Human capital planning services, which support ATO's organizational change strategies, are also provided.

Management Services organization provides leadership and guidance to ATO in creating and maintaining a diverse, productive, professional workplace that enhances all ATO operations. The Management Services organization develops diversity and inclusion strategies and serves as ATO's center of expertise for resources, training, knowledge, and best practices for all diversity and inclusion efforts.

Appropriate funding allows Management Services to support key initiatives such as meeting Office of Personnel Management Hiring Standards and maintaining the air traffic controller, technician and field/Headquarters management workforce at optimum levels. Appropriate funding also allows Management Services to provide training services, consultations, and interventions to ATO service units to identify and reduce or eliminate barriers to maintaining a professional, model workplace.

The services provided by this organization are integral to the support and operation of the entire FAA and as such, the work being done by this organization to some extent supports all of DOT Strategic and FAA goals. However, there are several goals that are heavily supported by the Office of Finance and Management: Critical Acquisitions on Budget, Critical Acquisitions on Schedule, Unqualified Audit Opinion, Air Traffic Controller Workforce Plan, Continuity of Operations and Cost Control, which tie to DOT's goals of Organizational Excellence.

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Detailed Justification for the - Vice President Program Management Organization, AJM-0

What Is The Request And What Will We Get For The Funds?

FY 2015 – Program Management Organization – Budget Request ($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Program Management Organization	$605,851	$661,589	$664,250	+$2,661

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

FAA's Program Management Organization (PMO) request is $664,250,000 and 580 FTP / 583 FTE. This request provides an adjustment to base of $638,000 for pay inflation. It also provides for other adjustments of $141,000 for the annualized cost of the FY 2014 pay increase. The request includes $2,135,000 for the increase in the agency's contribution rates to the FERS retirement system. Also included in the request is a reduction of -$705,000 for hiring restrictions.

This budget request provides for a discretionary adjustment of $17,772,000 for Transition to Operations and Maintenance (TOM).

Discretionary Adjustments include:

Transition to Operations and Maintenance requirements include:

En Route Automation and Modernization (ERAM) ($12,652,000): ERAM is replacing HOST at 20 en route centers as the computer system that processes flight radar data, provides communications, and generates display data for air traffic controllers. Funding is requested to support Second-Level Engineering; software and hardware modification support at the following sites: Albuquerque, Chicago, Denver, Minneapolis, Houston, Kansas City, Oakland, and Indianapolis.

Terminal Automation Modernization and Replacement (TAMR) ($5,120,000): TAMR provides direct mission support to the FAA by ensuring the efficient flow of traffic through the NAS, principally in the terminal airspace domain. The terminal automation system is the critical backbone of the information network for our nation's airports. Funding is requested to support Second-Level Engineering and Telecommunications costs associated with three TAMR Phase 1 systems (Philadelphia, Northeast Operating Support Facility, and Traverse City) and 6 TAMR Phase 3 Segment 1 systems (DFW TRACON, two operational support systems at DFW, one training support system at DFW and support systems at Mike Monroney Aeronautical Center [MMAC] and the William J. Hughes Technical Center [WJHTC]).

Funding the FY 2015 request at this level will allow the PMO to support FAA's strategic plan initiatives for:

- Upgrading ASTI, National Engineering Support to assist with system optimization, engineering services to complete engineering at selected Airport Surface Detection Equipment-Model X (ASDE-X) sites. Assist in establishing/enhancing infrastructure in support of NAS wide common platform for the detection and reporting of suspected loss of standard separation events in the en route, terminal, and surface environments.
- Continuing sustainment of operational Wide Area Augmentation System (WAAS) through procurement of spares for logistics support, Radio Frequency Interference (RFI) Testing, evaluation of potential threats, mitigation needed for the restoration of any outages experienced by WAAS, providing Second-Level Engineering Support for hardware/software support, repairs performed, anomaly investigation, and site restoration of WAAS. Planning and engineering to support development and deployment of WAAS maintenance releases.
- Continuing support of NAS Voice System (NVS), SWIM, and Data Communication System (DataComm) operational programs.

- Developing Security Certification and Accreditation Packages (SCAPs), manage contracts, and maintain the Federal Telecommunications Infrastructure (FTI).
- Continuing development and deployment of new Collaborative Air Traffic Management Technologies (CATMT) capabilities in support of Collaborative Decision Making (CDM). These capabilities reduce traffic delays associated with disruptive events in the NAS, such as severe weather, NAS equipment outages, and excessive traffic volume.
- Continuing to support the Flight Service Directorate in executing the future flight service concept of operations in the CONUS, Hawaii, and Puerto Rico. Enhancing automation through a web based self-service system mitigating loss of human delivery of preflight functions currently provided through the Automated Flight Service Station (AFSS) contract. Providing Alaska flight services with an automation system, all leading to future cost savings and increased efficiency.
- Maintaining and sustaining the Weather and Radar Processor (WARP) service in accordance with the program specification and requirements.

Key outputs expected to be achieved in the budget year with the requested resources:

- Continued sustainment of operational WAAS through procurement of spares for logistics support, RFI Testing, evaluation of potential threats, mitigation needed for the restoration of any outages experienced by WAAS, providing Second-Level Engineering Support for hardware/software support, repairs performed, anomaly investigation, and site restoration of WAAS. Complete annual maintenance release to the fielded WAAS.
- Development and test of CATMT Work Package (WP) 3 enhancement capabilities. CATMT WP3 will make software infrastructure changes which will allow airlines to switch to the FAA's Traffic Situation Display. The enhancement will provide improved performance, collaboration and decision support capability, and shared situational awareness to the user community.
- The Traffic Flow Management System (TFMS) Technical Refresh program will perform system test, installation, and continue deployments of replacement hardware for the Traffic Flow Management (TFM) Processing Center (TPC), at the WJHTC, the Disaster Recovery Center at Mt. Weather, and the developmental laboratory. In November 2012 the refresh was completed for the hardware replacement of the TFMS legacy application National Traffic Management Log (NTML).
- Implement modifications to HOST and En Route Automation Modernization (ERAM) systems to establish a common platform for the detection and reporting of suspected loss of standard separation events.
- Maintain service availability of automation platforms by providing sufficient second-level engineering and supply support for critical operational systems, such as: En Route Communications Gateway (ECG), ERAM, User Request Evaluation Tool (URET), Advanced Technologies and Oceanic Procedures (ATOP), En Route Information Display (ERIDS), Display System Replacement (DSR), Enhanced Back-Up Surveillance (EBUS), Micro En Route Automated Radar Tracking System (MEART), and HOST.
- Improve oceanic fuel efficiency per passenger seat for select city pairs and similar fleet by an average savings of 1 percent compared to the previous fiscal year's 2 year rolling average.
- Develop oceanic fuel burn performance metric for FY 2015 and beyond.

Key outcomes expected to be achieved in budget year with the requested resources:

- Sustain adjusted operational availability of en route equipment at 99.7 percent for the reportable facilities that support the Nation's Core Airports Economic Competitiveness.
- Continuing sustainment of operational WAAS through procurement of spares for logistics support, RFI Testing, evaluation of potential threats, mitigation needed for the restoration of any outages experienced by WAAS, providing Second-Level Engineering Support for hardware/software support, repairs performed, anomaly investigation, and site restoration of WAAS.
- Meet 90 percent of all NextGen acquisition milestones on schedule and at or below original budget while continuing to expand FAA's NextGen Implementation Plan to incorporate critical path decisions and milestones necessary to accomplish the mid-term commitments.
- Continue to sustain the adjusted operational availability of select terminal equipment at 99.7 percent for the reportable facilities that support the Nation's Core Airports through FY 2015. Accomplish this by maintaining the operation of the NAS Terminal environment by sustaining the terminal automation systems of towers and Terminal Radar Approach Controls (TRACONs) to meet target levels of performance.
- Lead the evaluation and expansion of the use of Converging Runway Display Aids (CRDAs) at airports with intersecting runways.

What Is This Program?

The PMO supports the Department of Transportation's (DOT) Strategic Plan's: Provide full-life cycle program management capability across all of ATO from initial definition, through design, development, and effective deployment of both NAS sustainment and NextGen modernization systems.

The PMO is made up of the following directorates:

- Air Traffic Systems Directorate and
- Enterprise Services Directorate.

The Air Traffic Systems Directorate develops, acquires, deploys, maintains, sustains, and improves automation, surveillance, and decision support systems that provide aircraft separation assurance and system-wide efficiency through flow control. We have approximately 8,500 pieces of 66,749 facilities and equipment to be maintained by the FAA. Headquarters and Technical Center employees are responsible for sustainment management, engineering, production, logistics, testing, training, and systems and procedures implementation. Since the mid-1990s, we have fielded modern air traffic control, communications, display, and weather systems for controller use. Major acquisition programs such as ERAM and Automatic Dependent Surveillance-Broadcast (ADS-B) are replacing yesterday's equipment with flexible, resilient, scalable, and adaptive systems that will provide the platform for NextGen. We are saving money for air carriers and general aviation, reducing delays for passengers, and decreasing airplane emissions.

Enterprise Services Directorate develops, acquires, deploys, maintains, sustains, and improves navigation, communications, weather, and aeronautical information products and services for the NAS. Navigation Services covers projects in the following areas: Global Positioning System (GPS) Satellite-Based Augmentation, GPS Ground-Based Augmentation, Ground Systems, Lighting Systems, and Technical Support. Communications Services provides communications and telecommunications services consistent with International Civil Aviation Organization (ICAO) standards required for air traffic control within the NAS. It provides communications infrastructure and services for the Department of Defense (DOD) to ensure interoperability with the NAS. Weather services provide sensor, processor, and distribution systems required to provide accurate forecasts for timely air traffic decisions. Through unique customer/client relationships and customer-derived requirements, our full life-cycle service has the capability to define, design, build, deploy, commission, operate, support, and decommission communications, navigation, and weather services.

Our partners and stakeholders include:

- Other ATO Business Units, Service Units, and Offices
- Other FAA Offices and Lines of Business
- Department of Defense (DOD)
- International Civil Aviation Organization (ICAO)
- Airlines
- Business Aviation
- General Aviation

By the end of FY 2014, the accomplishments for the PMO include:

- Implement key work plans in support of delivering the NextGen mid-term operational vision for collaborative air traffic management. Work plans include:
  - Strategic Flow Management Integration (execution of flow strategies into controller tools). The program provides for the implementation of ERAM modifications needed to receive/process the Traffic Management Initiatives (TMI) in the ERAM baseline timeframe.
  - Flow Control – Strategic Flow Enhancement. This program will analyze the mid-term (FY 2012-2018) air traffic management (ATM) building blocks needed for the transition to the future NextGen system and the capability to improve the predictions for both capacity and demand.

- Improve on-time performance and operator and passenger access to information by using TFM, Traffic Management Advisor (TMA) Time Based Flow Management (TBFM), and CATMT, such as Airspace Flow Programs.
- Complete deployment of Collaborative Airspace Constraint Resolution Phase 2 which identifies constrained airspace and provides potential solutions for airborne and pre-departure flights while taking NAS users into account.
- Upgrading Alaskan Satellite Telecommunications Infrastructure, National Engineering Support to assist with system optimization, engineering services to complete engineering at selected ASDE-X sites.
- Operational support of NVS, SWIM, and DataComm programs.
- Continued sustainment of operational WAAS through procurement of spares for logistics support, RFI Testing, evaluation of potential threats, mitigation needed for the restoration of any outages experienced by WAAS, providing Second-Level Engineering Support for hardware/software support, repairs performed, anomaly investigation, and site restoration of WAAS. Plan, engineer, and develop WAAS changes to support yearly maintenance release.
- On-going efforts to complete documentation in support of Common Support Services – Weather(CSS-Wx) formerly NextGen Network Enabled Weather (NNEW) Work Package 1, NextGen Weather Processor (NWP) Work Package 1, and Aeronautical Information Management Modernization (AIMM) Segment 2 Final Investment Decision.

By the end of FY 2015, anticipated accomplishments for the PMO include:

- Deploy over 1,000 new Digital Multimode Radios.
- Continue the acquisition and deployment of NVS, SWIM, and DataComm programs.
- Continued sustainment of operational WAAS through procurement of spares for logistics support, RFI Testing, evaluation of potential threats, mitigation needed for the restoration of any outages experienced by WAAS, providing Second-Level Engineering Support for hardware/software support, repairs performed, anomaly investigation, and site restoration of WAAS. Plan, engineer, and develop WAAS changes to support yearly maintenance release.
- Develop and test CATMT WP3 which provides two additional capability suites to improve the congestion management tools available to the Traffic Management Units.
- Continue the TFMS Technology Refresh which replaces the hardware of the TPC at the FAA's WJHTC, Disaster Recovery Center (DRC), and developmental facility.
- Sustain the system hardware and software which includes developing software corrections, testing, and implementing them for a safer and more efficient air traffic control system. It also provides for the on-site corrective and preventive maintenance and depot repair parts system. Modernizing and sustaining physical plant infrastructure is a long-term priority with remediation efforts planned across multiple fiscal years. We must maintain service availability of the en route and oceanic platforms by providing adequate second-level engineering and supply support as well.
- Continue to improve the safety, capacity, and efficiency of the NAS by strengthening our efforts to reduce the number of operational errors in the en route environment. In the oceanic airspace, we plan to reduce separation minima, thereby improving NAS on-time arrival percentages and increasing fuel efficiency.
- Continue air traffic operations at 21 air route traffic control center (ARTCC) and 2 combined control facilities.
- Continue to provide the support and technology to enable the safe increase in en route and oceanic capacity.
- Continue on-going efforts that support en route air traffic operations and service level availability by providing Life-Cycle Management of the physical plant infrastructure at the 21 ARTCCs and 2 combined control facilities.
- Maintain en route and oceanic air traffic systems in a state which will not degrade the services provided to the flying public.
- Sustain terminal air traffic systems in a state which will not degrade the services provided to the flying public.

Why Is This Particular Program Necessary?

FAA's ATO handles 69,000 flights per day and helps transport over 737 million passengers per year, contributing to 5.2 percent of the total U.S. economy. ATO relies on numerous programs to maintain the safety and efficiency of the current system and ensure its viability well into the future.

The PMO centralizes program offices that manage NextGen initiatives and the majority of other ATO programs under one organization that will specialize in program management. The PMO has expertise and responsibility to manage program cost, schedule, and scope. The PMO plays a critical role in the success of NextGen by acting as the bridge between strategic requirements and tactical program implementation to improve the safety and efficiency of the NAS. The PMO ensures tighter alignment and closer integration of NextGen initiatives and elevate visibility and consistency. The PMO clarifies program management career paths, and helps us attract and retain the most highly skilled and motivated individuals on program management teams. This organization boosts key individual and organizational capabilities, such as program management, systems integration, software engineering, and communication, which are necessary to fully support and develop NextGen.

The PMO defines, designs, develops, and deploys ATC systems, equipment, and other services necessary to operate, maintain, and improve the NAS. It provides the critical infrastructure and first phase of NextGen with ERAM and ADS-B Systems implementation. This organization continues to provide its owners, customers, and system operators the highest degree of safety and service in the most efficient manner.

How Do You Know This Program Works?

ATO sets annual performance goals in key categories including safety, capacity, efficiency, finance, international leadership, and organizational excellence, including hiring and training. To measure our progress, we employ a set of metrics. The success of a particular program is determined by assessing its cost, schedule, and performance. Selected programs are reviewed under FAA's Post Implementation Review process to determine overall performance of the program against its metrics and the extent of operational benefits achieved. The PMO, through its second-level engineering function, also supports several operational metrics including:

- Sustain Adjusted Operational Availability at 99 percent for reportable facilities that support the NAS.
- Continue to sustain the adjusted operational availability of select terminal equipment at 99.7 percent for the reportable facilities that support the Nation's Core Airports through FY 2015. Accomplish this by maintaining the operation of the NAS Terminal environment by sustaining the terminal automation systems of towers and TRACONs to meet target levels of performance.

Why Do We Want/Need To Fund The Program At The Requested Level?

The PMO plays a significant role associated with transition to NextGen. Controllers currently communicate with pilots using voice where revisions to aircraft flight paths are made through multiple instructions or lengthy verbal exchange. Many of the transformational improvements associated with NextGen including trajectory-based flight and net-centric operations cannot be achieved using the present automation, decision support, or voice-based communications system.

Funding requested in the FY 2015 submission will continue the transition to NextGen. In addition to en route automation modernization, supported by ADS-B, we are modernizing and providing commonality in terminal automation, coupling it with ADS-B and providing upgrades to Collaborative Air Traffic Management Tools to support NextGen operations. Connecting all of the automation to and through a flexible digital communications infrastructure, and feeding it with spaced-based navigation will provide the information to both controllers, flow managers, dispatchers, and pilots necessary for the efficient and responsive NAS envisioned by NextGen.

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Explanation of Funding Changes

	Dollars ($000)	FTE
Air Traffic Organization	**+$84,864**	**+219**
Overview: For FY 2015, ATO requests $7,396,654,000 and 30,387 FTE to meet its mission. The FY 2015 request corresponds to an increase of $84,864,000 from the FY 2014 President's Budget request. The FY 2015 request level reflects adjustments to base, other adjustments, discretionary adjustments, and base transfers.		
Adjustments to Base	**+$119,942**	**+214**
FY 2015 Pay Raise: This increase is required to provide for costs associated with base salary increases (January to September) resulting from the proposed government-wide pay raise. The factor used is (0.75) of 1.0 percent.	+34,633	
Annualization of the FY 2014 Pay Raise: This increase is required to provide for the remaining quarter of the FY 2014 government-wide pay raise of 1.0 percent. The factor used is (0.25) of 1.0 percent.	+7,680	
FERS Contribution Increase: OMB Circular A-11 has increased the agency's contribution rates to the FERS retirement system. This increase in cost to the FAA represents the increased rates for both Air Traffic Controllers and other agency employees.	+115,895	
Annualization of FY 2014 Hiring: This increase in FTE's is required to cover the increased staff hired during FY 2014 but were on board for only a portion of the year. No funding is necessary for the additional FTE's since the added cost is offset by the savings due to the new hires having a lower payroll cost than the staff they are replacing.		+504
Restricted Hiring: It may be necessary to slow down hiring during FY 2015 if the planned hiring for FY 2014 is achieved. The restricted hiring will mean that we may not meet the staffing levels called for in the Air Traffic Controller and Safety Workforce Plans.	-38,266	-290
Other Changes	**-$54,094**	
Working Capital Fund: This cost adjustment is requested to support the Department of Transportation's (DOT) Working Capital Fund (WCF) profile. These adjustments are being made to best align each office's resources within their expected WCF costs.	+36	
Contract Reductions: Contract and other non-pay costs will decrease in FY 2015 through continued efforts to review agency costs and make reductions where possible. Some FY 2015 contact costs associated with pre-defined requirements will be funded in FY 2014 rather than FY 2015 if delays in hiring make funding available. To meet the final contract reduction target, ATO will concentrate these reductions primarily in the area of administrative support contracts, as well as to some enhancements of operational programs currently supporting the NAS, such as telecommunications or NOTAMs improvements.	-54,130	
Discretionary Adjustments	**+$17,772**	
Transition to Operations and Maintenance (TOM) / Long Term Maintenance Cost (LTMC): A number of systems and equipment were fully operational in FY 2013. Guidelines state that after the second year of operations and maintenance (O&M) costs are covered in the Facilities and Equipment appropriation, O&M costs are transitioned to the Operations appropriation. This funding request is for the transition of the on-going O&M costs into the Operations appropriation. Funds are requested for all activities required for the in-service management phase, including directly operating, providing maintenance functions (both scheduled and unscheduled), and furnishing technical and logistics support for maintenance of FAA	+$17,772	

	Dollars ($000)	FTE
systems, sub-systems, service, or equipment. All engineering activities in support of the delivery of service, to include development of modifications, documentation, testing, and implementation of technology refresh initiatives. The travel associated with the delivery of these services is also included in this request.		
En Route Automation and Modernization (ERAM): ERAM is replacing Host at 20 en route centers as the computer system that processes flight radar data, provides communications, and generates display data for air traffic controllers. Funding is requested to support Second-Level Engineering; software and hardware modification support at the following sites: Albuquerque, Chicago, Denver, Minneapolis, Houston, Kansas City, Oakland, and Indianapolis.	[+12,652]	
Terminal Automation Modernization and Replacement (TAMR): TAMR provides direct mission support to the FAA by ensuring the efficient flow of traffic through the National Airspace System (NAS), principally in the terminal airspace domain. The terminal automation system is the critical backbone of the information network for our nation's airports. Funding is requested to support Second-Level Engineering and Telecommunications costs associated with three TAMR Phase 1 systems (Philadelphia, Northeast Operating Support Facility, and Traverse City) and 6 TAMR Phase 3 Segment 1 systems (DFW TRACON, two operational support systems at DFW, one training support system at DFW and support systems at Mike Monroney Aeronautical Center [MMAC] and the William J. Hughes Technical Center [WJHTC]).	[+$5,120]	
Base Transfers	**+$1,244**	**+5**
Staffing Reassignment: This base transfer is moving staff support from Air Traffic Organization (ATO/AJV) to the Office of General Counsel (AGC); transfer with no funding and 1 FTP/FTE.	0	-1
Tech Center Guard Services Requirement: This base transfer request is to move funding from Air Traffic Organization (ATO/AJW) to NextGen (ANG) to support the additional requirements to the security guard contract. Costs are associated with conducting x-ray screening at the William J. Hughes Technical Center (WJHTC) Security Operations Center, and due to the size of the perimeter fence, provide more frequent patrols of the fence line; transfer with funding $316 and no staffing.	-316	
Occupational Safety and Health (OSH) Workplace Inspections: This base transfer request from the Office of Human Resources agrees to transfer the agency's corporate policy, oversight, reporting and liaison program functions and systems for FAA Occupational Safety and Health Program to the Air Traffic Organization (ATO/AJW); transfer with funding $1,560 and 6 FTP/FTE.	+1,560	+6

Traditional Tables for Air Traffic Organization

The following pages represent information traditionally provided to the Committees on Appropriation for the FAA's air traffic control functions.

Controller Workforce FY 1981 through FY 2013

FY 1981	6,578	FY 1993	14,970	FY 2005	14,540
FY 1982	11,290	FY 1994	14,953	FY 2006	14,618
FY 1983	11,980	FY 1995	14,614	FY 2007	14,874
FY 1984	12,213	FY 1996	14,360	FY 2008	15,381
FY 1985	12,968	FY 1997	14,588	FY 2009	15,770
FY 1986	12,615	FY 1998	14,966	FY 2010	15,696
FY 1987	13,007	FY 1999	15,096	FY 2011	15,418
FY 1988	13,960	FY 2000	15,153	FY 2012	15,211
FY 1989	14,340	FY 2001	15,233	FY 2013	14,463
FY 1990	14,645	FY 2002	15,478	FY 2014 Estimate	14,481
FY 1991	14,976	FY 2003	15,691	FY 2015 Requirement	14,817
FY 1992	15,147	FY 2004	14,934		

System Maintenance Overtime

	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request
Field Maintenance			
Hours	253	287	296
Amount	14,459	16,415	16,990
Program and Technical Support			
Hours	20	23	23
Amount	1,286	1,742	1,475
Total			
Hours	273	310	319
Amount	15,745	17,875	18,465

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AVIATION SAFETY (AVS)

Aviation Safety Organization (AVS)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$1,204,777**	**7,238**	**125**	**6,916**
Adjustments to Base	**+$9,788**			**+147**
Internal Transfer				
Annualized FY 2014 Pay Raise	+1,918			
FERS Contribution Increase	+8,664			
Annualization of FY 2014 Hiring				+201
FY 2015 Pay Raise	+6,360			
Hiring Restrictions	-7,154			-54
Other Changes	**+$893**			
WCF Adjustments	+893			
FY 2015 Request	**$1,215,458**	**7,238**	**125**	**7,063**

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Executive Summary: Aviation Safety (AVS)

What Is The Request And What Will We Get For The Funds?

The request of $1,215,458,000 and 7,063 full-time equivalents (FTEs) allows AVS to promote aviation safety by regulating and overseeing the civil aviation industry and continued airworthiness of aircraft, as well as certification of pilots, mechanics, and others in safety-related positions. The AVS submission maintains the number of safety inspectors, engineers and other safety critical positions, while limiting the growth of FTE levels to stay within funding constraints.

The request provides an adjustment to base of $6,360,000 for a pay raise, $8,664,000 for FERS employee benefit changes, $1,918,000 for the annualized cost of the FY 2014 pay increase and a reduction of $7,154,000 based on agency hiring restrictions. The request also adds an additional $893,000 for the Working Capital Fund.

What Is The Program?

The AVS organization is responsible for setting the safety standards for every product, person and organization that produces and operates aircraft in the national airspace system (NAS). AVS employees determine compliance with those standards and issue certificates to demonstrate compliance. AVS employees provide oversight and surveillance to ensure certificate holders continue to comply with the standards.

Why Is This Particular Program Necessary?

The AVS organization is responsible for:

- Providing surveillance and oversight of existing certificate holders.
- Developing and establishing the safety and certification standards for the civil aviation industry.
- Determining compliance with certification standards.
- Issuing or denying certifications.
- Ongoing and wide-ranging transformation of the United States NAS encompassed by NextGen.
- Leading the FAA in the integration of Safety Management System (SMS) principles across the organization.

These essential activities contribute to the Department of Transportation's safety goal, which is the FAA's highest priority.

How Do You Know The Program Works?

In three of the last four calendar years, U.S. airlines have not had a fatal accident, and the U.S. airlines fatal accident rate has decreased by 82 percent since the late 1990's. The standards set by AVS, as well as the continued oversight and surveillance to assure compliance with those standards, are key contributors to this outstanding safety record.

AVS programs continue to contribute to the unparalleled safety of American aviation. The commercial air carrier fatality rate per 100 million persons on board was not to exceed 7.4 for FY 2013. The FAA exceeded this target with 1.1 fatalities per 100 million on board for FY 2013.

Why Do We Want/Need To Fund The Program At The Requested Level?

The public expects the FAA to continually reduce the risk of flying while improving the efficiency of the system. This funding level will enable AVS to maintain existing staffing levels for continued operational safety services.

Detailed Justification for – Aviation Safety (AVS)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aviation Safety (AVS)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Total	**$1,217,552**	**$1,204,777**	**$1,215,458**	**+$10,681**
Flight Standards Service	807,954	841,106	848,773	+7,667
Aircraft Certification Service	206,770	212,981	215,291	+2,310
Office of Aerospace Medicine	54,279	56,103	56,272	+169
Office of Rulemaking	5,187	6,195	6,218	+23
Air Traffic Safety Oversight Service	21,368	23,248	23,492	+244
Accident Investigation and Prevention Service	19,258	21,545	21,587	+42
Office of Quality, Integration and Executive Service	102,736	43,599	43,825	+226

FY 2013 includes amounts provided through the Reducing Flight Delays Act of 2013.

The request of $1,215,458,000 and 7,063 full-time equivalents (FTEs) allows AVS to promote aviation safety by regulating and overseeing the civil aviation industry and continued airworthiness of aircraft, as well as the certification of pilots, mechanics, and others in safety-related positions. The AVS submission maintains the number of safety inspectors, engineers and other safety critical positions, while lowering FTE levels to stay within funding constraints.

The request provides an adjustment to base of $6,360,000 for a pay raise, $8,664,000 for FERS employee benefit changes, $1,918,000 for the annualized cost of the FY 2014 pay increase and a reduction of $7,154,000 based on agency hiring restrictions. The request also adds an additional $893,000 for the Working Capital Fund.

NextGen:
AVS will be able to provide current levels of support for NextGen initiatives at the requested level. NextGen is a wide ranging transformation of the entire national air transportation system - not just certain pieces of it - to meet future demands and avoid gridlock in the sky and in the airports. Within AVS, Flight Standards (AFS), Aircraft Certification Services (AIR) and Air Traffic Safety Oversight (AOV) are responsible for setting, overseeing and enforcing safety standards for all parts of the aviation industry.

Air Operator Certification:
The FY 2015 budget request allows AVS maintain service to air operator certification services for new Part 121, 125, 129 and 133. AFS resources will only be able to support new certification requests, assisting applicants across Federal Aviation Regulations (FAR) Parts at current levels. AFS uses the Certification Services Oversight Process (CSOP) as the single authorized method for accepting, sequencing, and reporting original organizational certification activities.

Type and Production Certification:
AVS will maintain resources for type and production certification services based on available engineering and inspector resources. AIR will maintain positions for activities such as NextGen implementation and type and production certification.

AVS FY 2015 key initiatives include:

- Supporting Agency emerging technology initiatives by developing standards, policy, and guidance needed to transition and operate in the NextGen environment.
- Establishing regulations and standards, conducting inspections, audits, surveillance, investigations, enforcement and certification activities related to operators, airmen and designees, aircraft manufacturers and suppliers. AFS, AIR, AAM and AVP partner with other AVS organizations, other FAA lines of business and other aviation agencies to assist with NextGen implementation. AVS also promotes safety of flight for civil aircraft and air commerce.
- Providing project management and analytical support to FAA teams on all agency rules as well as safety critical data analysis of the aviation industry. ARM and AQS work with other AVS organizations, FAA lines of business and other aviation agencies to help support system safety.
- Establishing, approving and accepting safety standards in providing independent oversight of the ATO through safety surveillance, audits, and targeted inspections; monitoring ATC procedures and operations, technical operations and facilities, personnel certification criteria.
- Establishing standards and managing the credentialing of ATO safety personnel, including air traffic controllers and airway transportation specialists, executing approvals, acceptances, or updates of new ATO safety standards, waivers, or modifications and monitoring the daily operations of the National Airspace (NAS).
- Supporting a proactive approach to safety by leading the agency efforts to adopt a Safety Management System.
- Increasing capabilities and expansion of Aviation Safety Information Analysis and Sharing system, (ASIAS) to provide better access and more effectively monitor safety data.
- Providing accident and incident investigation services, as well as safety critical data analysis of the aviation industry: working closely with the National Transportation Safety Board, (NTSB) for appropriate aviation-related matters.
- Directing and managing the maintenance and improvement of the International Organization Standardization (ISO) 9001:2008-based Quality Management System, (QMS). The AVS QMS ensures AVS meets its safety requirements and continuously improves its processes for safety systems.
- Supporting the implementation of an enhanced AVS telework program by conducting research and performing other executive services.

What Is This Program?

AVS consists of seven distinct organizational elements. Of the seven AVS organizational elements two – the Office of Rulemaking (ARM) and the Accident Investigation and Prevention Service (AVP) are solely Washington Headquarters elements. The other five – Flight Standards Service (AFS), Aircraft Certification Service (AIR), the Office of Aerospace Medicine (AAM), the Air Traffic Safety Oversight Service (AOV), and the Office of Quality, Integration, and Executive Services (AQS) – have field structures (including some overseas offices). The resource request would provide AVS staffing of approximately 7,238 personnel.

The seven AVS organizations perform the following activities:

Flight Standards (AFS) promotes aviation safety by establishing and overseeing operations, maintenance and certification standards for air carriers, commercial operators, air agencies, airmen, and civil aircraft, including aircraft registration.

Anticipated FY 2015 accomplishments include:

- Conducting and participating in Pilot Seminars and Flight Instructor Refresher Courses and Commercial Flight Instructor/Designated Pilot Examiner refresher courses at towered and non-towered airports.
- Developing appropriate policy, procedural guidance, and aircraft certification programs for the emerging technologies needed to transition and operate in the NextGen environment.
- Validating effectiveness of initiatives, interventions, and recommendations, implemented by the GA loss of control workgroup and the amateur-built flight standardization board to mitigate loss of control causes in GA.

- Establishing the infrastructure necessary to oversee the implementation of Safety Management System, (SMS) by 14 CFR Part 121 Air Carriers.
- Safety Assurance System (SAS) full deployment to field offices.
- Formalize an AFS Internal Safety Assurance Program.
- Developing a secure FAA airman test delivery system that incorporates new technology and is supported by training and testing documents, which embraces NextGen concepts.

Aircraft Certification (AIR) promotes aviation safety by developing and administering safety standards governing the type, production, and original airworthiness certification of aircraft, engines, propellers, appliances and noise level certification.

Anticipated FY 2015 accomplishments include:

- Working toward the availability of an unleaded Avgas that is usable by most general aviation aircraft.
- Initiating rulemaking projects for rotorcraft bird strikes.
- Initiating part 23 rulemaking to improve the certification standards of small airplanes leading to improved safety and reduced cost.
- Continue to work with engine industry stakeholders to evaluate improved standards for bird ingestion and engine rotor lock.

Office of Aerospace Medicine (AAM) promotes aviation safety by developing safety standards for the medical certification of airmen and medical clearance of Air Traffic Control Systems, (ATCS), surveillance of industry drug and alcohol testing programs, implementing substance abuse testing for FAA personnel in testing-designated positions, and aerospace medicine and human factors research.

Anticipated FY 2015 accomplishments include:

- Continuing development and establishment of medical standards for pilots and ATCSs.
- Continuing to determine eligibility and issue medical certificates to qualified airmen.
- Continuing to issue medical clearances to ATCSs.
- Continuing conducting compliance and enforcement surveillance inspections of aviation industry employers that have required employee drug and alcohol testing programs.
  - Managing the FAA "internal" substance abuse testing program.
  - Overseeing the Aviation Medical Examiner (AME) Training and Oversight program for designees.
- Continuing to provide physiological and survival training to airmen.

Office of Rulemaking (ARM) directs and manages FAA's rulemaking program and supports the agency's regulatory priorities.

Anticipated FY 2015 accomplishments include:

- Sending critical safety rules to the Office of the Secretary of Transportation within 90 days of planned date.
- Continuing to process 85 percent of exemption requests within 120 days.
- Continuing improvements in FAA's rulemaking program.

Accident Investigation and Prevention Service (AVP) investigates aviation accidents and incidents to identify unsafe conditions and trends in the NAS and coordinates the corrective action process. The organization also provides analytical capabilities based on SMS principles and sound safety data analysis and process sharing, incorporating future hazardous/emerging risk assessments affecting the entire air transportation system and industry.

Anticipated FY 2015 accomplishments include:

- Leading agency efforts to effectively address NTSB recommendations issued to the FAA.
- Leading agency efforts to effectively address FAA Safety recommendations.
- Collecting and analyzing aviation safety data at a national level and consolidate the data under ASIAS.
- Facilitating the FAA's implementation of SMS focusing on the effective use of safety risk management and safety assurance processes.

- Advancing accident investigation by using root cause analysis techniques in analyzing data in conjunction with activity surrounding major accident investigations.
- Leading government/industry efforts for the Commercial Aviation Safety Team and the General Aviation Joint Steering Committee.

Air Traffic Safety Oversight Service (AOV) provides safety oversight of the Air Traffic Organization (ATO), including oversight of SMS, new acquisitions, ATC procedures and operations, technical operations, and personnel certification criteria.

Anticipated FY 2015 AOV accomplishments include:

- Conducting risk-based audits of 60 facilities.
- Conducting risk-based audits of 15 Technical Operations facilities/locations.

Office of Quality, Integration, and Executive Services (AQS) provides overall planning, direction, management, and evaluation of AVS programs. This office also directs and manages the maintenance and improvement of the ISO-9001:2008-based QMS for all AVS services and offices, and establishes integration policy and processes for safety systems.

Anticipated FY 2015 accomplishments include: *Note: Starting in FY 2014, all IT-related activities and staff will migrate to Shared Services (AFN).*

- Supporting AVS delegation management, including the migration of the designee data from the current systems.
- Continuing efforts to maintain the AVS ISO Certification.
- Meeting the National Archives and Records Administration (NARA) annual requirements for Records Management.
- Supporting the Government-wide initiative on Teleworking
- Implementing the engineering portion of the AVS Staffing Tool and Reporting System (ASTARS).
- Developing and implementing AVS-wide Leadership Development Programs in support of agency programs.

AVS supports the Department of Transportation Strategic Plan Safety Goal – specifically contributing toward the outcome of reducing transportation related injuries and fatalities. AVS activities in support of the safety strategic plan safety goal include:

- Establishing regulations and standards, conducting inspections, audits, surveillance, investigations, enforcement and certification activities related to operators, airmen and designees, aircraft manufacturers and suppliers. AFS, AIR, AAM and AVP partner with other AVS organizations, other FAA lines of business and other aviation agencies to assist with NextGen implementation. AVS also promotes safety of flight for civil aircraft and air commerce.
- Providing project management and analytical support to FAA teams on all agency rules as well as safety critical data analysis of the aviation industry. ARM and AQS work with other AVS organizations, FAA lines of business and other aviation agencies to help support system safety.
- Establishing, approving and accepting safety standards in providing independent oversight of the ATO through safety surveillance, audits, and targeted inspections; monitoring ATC procedures and operations, technical operations and facilities, personnel certification criteria; establishing standards and managing the credentialing of ATO safety personnel, including air traffic controllers and airway transportation specialists, executing approvals, acceptances, or updates of new ATO safety standards, waivers, or modifications and monitoring the daily operations of the NAS.
- Providing accident and incident investigation services, as well as safety critical data analysis of the aviation industry. We work closely with the NTSB for appropriate aviation-related matters.
- Directing and managing the maintenance and improvement of the ISO-9001:2008-based QMS for all AVS services and offices and establishing integration policy and processes for safety systems.
- Leading the FAA in the integration of Safety Management System (SMS) principles across the organization to improve safety by helping to ensure that the outcomes of any management or system activity incorporate safety considerations. As implied by its name, a Safety Management System is a formal, comprehensive, process-oriented approach to managing safety throughout an organization.

Why Is This Particular Program Necessary?

Most AVS responsibilities are based on statutes, regulations, orders and policy. AVS personnel establish safety standards, ensure compliance with those standards, and provide ongoing oversight of FAA approval/certificate holders. We certify pilots, mechanics and others in key aviation positions and provide oversight of the Air Traffic Organization. These efforts have enabled us to achieve the safest period of civil aviation in aviation history. Without these necessary and essential services, the potential for aircraft accidents would dramatically increase.

The AVS organization is necessary to continue safe aircraft operations and maintenance for commercial and general aviation operators. Without these essential services:

- Continued operational safety of air carriers and air agencies would be jeopardized and the potential for aircraft accidents would dramatically increase, resulting in loss of property and/or life.
- Activities involving certification programs would decline significantly and limit airlines' ability to grow and to adapt to changing economic conditions, negatively impacting the national economy.
- Our ability to investigate accidents and incidents would be diminished. These investigations are necessary to find and fix safety problems before they become major deficiencies in the National Airspace System

The AVS organization is responsible for approving the design and manufacture of aeronautical products and parts (including replacement parts to maintain the operation and safety of the existing fleet). Without these functions, there would be no safety system governing aircraft design, manufacture, and oversight and the flying public would encounter unsafe aircraft. Similarly, AVS has the responsibility of determining if a person is medically qualified to operate an aircraft. If the organization did not determine if the pilot was medically competent to operate an aircraft, individuals with debilitating medical conditions could attempt to fly and cause an accident with potentially disastrous consequences. AAM's Air Traffic Controller Specialist (ATCS) Health Program protects public safety by ensuring that ATCS are medically fit to perform their duties. AAM leverages resources through Aviation Medical Examiner (AME) who ensure ATCS are medically fit to control air traffic operations within the NAS.

The AVS mission is carried out by seven organizational units, each having a responsibility for providing safety services for the National Airspace System (NAS). The following paragraphs identify specific programs and responsibilities within the AVS services and offices that support safety:

AFS is responsible for certification and surveillance of U.S. air carriers and foreign air carriers operating in and over the U.S. through the establishment and oversight of safety requirements, standards and regulations. AFS operations vital to aviation safety include:

- Promoting the flight safety of civil aircraft in air commerce by setting certification standards for air carriers, commercial operators, air agencies, and airmen (except ATC operators).
- Directing, managing, and executing certification, inspection, and surveillance activities to ensure the adequacy of flight procedures, operating methods, airman qualification and proficiency, aircraft maintenance, and maintenance aspects of continued airworthiness programs.
- Managing systems for the registry of domestic civil aircraft and official airman records and supporting law enforcement agencies responsible for drug interdiction.
- Supporting strategic partnership efforts within the FAA and other aviation agencies.
- Providing regulatory and technical assistance to international civil aviation authorities.
- Performing surveillance and certification of foreign repair stations.
- Providing certification and operation policy recommendations governing foreign air operators operating within the United States.

AIR has the regulatory responsibility for type, production, and airworthiness certification of civil aeronautical products and parts. AIR's functions which are essential to ensure the safety of the NAS include the following:

- Establishing safety standards and procedures governing the design, production, and continued airworthiness of aircraft and aircraft parts.
- Approving aircraft design, aircraft engines, propellers, and parts.
- Issuing approvals to manufacturing facilities upon showing compliance to the applicable safety standards.
- Determining whether aircraft meet applicable standards and are safe to fly.
- Providing oversight and surveillance of approval holders to ensure continued compliance to safety standards
- Collecting and reviewing safety data, performing trend analysis, and taking the appropriate actions to ensure continued operational safety of the existing fleet.
- Managing designee qualifications, appointments and oversight.
- Investigating possible violations and initiating compliance and enforcement actions.
- Partnering with other AVS organizations, FAA lines of business and other aviation agencies to facilitate the needed certification to enable the equipage of aircraft with the technology to support NextGen.

AOV has the regulatory responsibility to provide independent safety oversight of the ATO and monitor ATO's compliance with safety standards and the SMS. AOV accomplishes its safety oversight functions by:

- Executing investigations of ATO accidents, incidents, and other occurrences that happen within the NAS.
- Approving changes to separation standards, procedures, new systems, hardware, and automation modifications and upgrades.
- Conducting system audits based on risk factors for accidents, incidents, Operational Errors, Operational Deviations, Runway Incursions, or significant non-compliance with approved safety standards in over 600 Air Traffic facilities.
- Analyzing the causes of Operational Errors to enable development and implementation of safety critical corrective actions.

AAM is responsible for a broad range of external and internal aviation safety programs related to medicine. These safety critical programs include:

- Developing and maintaining medical standards for pilots and ATCSs.
- Implementing and managing systems to medically certify commercial and GA pilots.
- Processing pilot medical certification and appeal cases.
- Managing medical clearance of air traffic controller specialists.
- Designating and overseeing AMEs.
- Conducting compliance and enforcement inspections of aviation industry drug and alcohol testing programs.
- Implementing and overseeing drug and alcohol testing of FAA employees in safety critical and security jobs.

ARM is responsible for ensuring FAA regulations are developed to improve safety levels and are developed according to approved processes and are completed within mandated timelines. ARM accomplishes its rulemaking functions by:

- Developing, with the assistance of other internal stakeholders, FAA's rulemaking priorities for the current year and out-years.
- Coordinating the development of rules with all internal and external stakeholders.
- Processing petitions for rulemaking and petitions for exemption received from the aviation community.
- Developing and implementing improvements to critical FAA rulemaking and exemption processes and systems, and facilitates the ability of internal stakeholders to support such processes and systems.

AFS, AIR, AAM, and AOV will partner with other AVS organizations, FAA lines of business and other aviation agencies to implement NextGen. Additional specific skill sets are needed to develop standards, rulemaking and policy for flight technologies and procedures supporting safe flight using Enhanced Flight Vision System, Synthetic Vision systems, Area Navigation/Required Navigation Performance procedures, ADS-B and NextGen weather in the cockpit initiatives. ADS-B represents the foundation of the NextGen air traffic system. Unmanned aircraft systems are playing an increased role in daily operations in the NAS and must be safely integrated.

The implementation of Performance-Based Navigation within the NextGen framework requires changes in the character and manner by which instrument procedure standards and criteria are developed. Certification and Flight Standardization Boards of New Aircraft provide risk assessments and safety analyses and are required to prepare the NAS for the introduction of new aircraft. This includes international introduction of new aircraft as well. AVS is responsible for delivering new training on the certification, installation and operation of the new NextGen equipment to inspectors in multiple NextGen technologies.

The requested funding level will enable AVS to maintain resources for surveillance and oversight of the existing aviation fleet and production manufactures.

How Do You Know The Program Works?

Our effectiveness is acknowledged by stakeholders who continue to operate in a safe aviation system. As regulators, we are unique by the nature of what we do. Our work typically receives public attention only following an accident, incident, or other unwished-for circumstances, while our successes often go unnoticed. AVS is moving from diagnostic to prognostic identification of risk factors that are causal factors of accidents or incidents to learn and find ways to enhance aviation safety.

Although AVS continues to meet performance goals, the increased introduction of new aircraft technologies (both commercial and GA,) and the longer life expectancy of the current fleet has heightened public, Congressional and DOT-Office of Inspector General inquiries regarding aviation safety concerns. This requires AVS to increase its focus on risk-based analysis, information technology and designee management to mitigate these concerns.

AVS programs continue to contribute to the unparalleled safety of American aviation. The commercial air carriers' fatality rate per 100 million persons on board were not to exceed 7.6 for FY 2012. The FAA exceeded the goal by achieving a rate of 0% fatalities.

Why Do We Want/Need To Fund The Program At The Requested Level?

The requested funding level will enable AVS to maintain surveillance and certification services. Our strategic goal for staffing is to have the right number of safety critical and support employees in the right locations thereby providing the aviation community with surveillance and oversight of air carriers, GA operations, repair stations and manufacturers. This request will enable oversight, audit activities and certification activities for FAR Parts 121, 135, and 145 and manufactures to be maintained at current levels.

The request enables AVS to provide current levels of oversight and surveillance, rulemaking and certification services for existing and new operators and manufacturers. As the number of aircraft flying in the NAS grows, and new aircraft models and technologies are introduced, they will be sequenced for certification services based on available resources. This resource request will require continued sequencing time for operator and production certification services.

The market segment will receive certification and operation services for operators, manufacturers and air traffic controllers based on available AVS resources to assist in the introduction of new technologies that will identify precisely where an aircraft is at any given moment, and how long it's going to take to reach its destination. NextGen satellite technologies will make this information available to both pilots and controllers, with levels of accuracy and precision unattainable by radar. Even though planes will be flying closer together, the precise information provided by NextGen will increase safety by allowing pilots to know exactly where their aircraft is located in relation to other aircraft throughout all phases of flight. AVS will continue to balance certification resources against the need to maintain safety operations for the existing fleet and manufacturers.

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Explanation of Funding Changes

	Dollars ($000)	FTE
Aviation Safety	**+$10,681**	**+147**
Overview: For FY 2015, the Associate Administrator for Aviation Safety requests $1,215,458,000 and 7,063 FTEs to meet its safety mission. The FY 2015 request level reflects adjustments to base, other adjustments and discretionary adjustments		
Adjustments to Base	**+$9,788**	**+147**
FY 2015 Pay Raise: This increase is required to provide for costs associated with base salary increases. (January to September) resulting from the proposed government-wide pay raise. The factor used is (0.75) of 1.0 percent	+6,360	
Annualization of the FY 2014 Pay Raise: This increase is required to provide for the remaining quarter of the FY 2014 government-wide pay raise of 1.0 percent. The factor used is (0.25) of 1.0 percent.	+1,918	
FERS Contribution Increase: OMB Circular A-11 has increased the agency's contribution rates to the FERS retirement system. This increase in cost to the FAA represents the increased rates for both Air Traffic Controllers and other agency employees.	+8,664	
Annualization of FY 2014 Hiring: This increase in FTE's is required to cover the increased staff hired during FY 2014 but were on board for only a portion of the year. No funding is necessary for the additional FTE's since the added cost is offset by the savings due to the new hires having a lower payroll cost than the staff they are replacing.		+201
Restricted Hiring: It may be necessary to slow down hiring during FY 2015 if the planned hiring for FY 2014 is achieved. The restricted hiring will mean that we may not meet the staffing levels called for in the Air Traffic Controller and Safety Workforce Plans.	-7,154	-54
Other Changes	**+$893**	
Working Capital Fund: This cost adjustment is requested to support the Department of Transportation's (DOT) Working Capital Fund (WCF) profile. These adjustments are being made to best align each office's resources within their expected WCF costs.	+893	

AVS Primary Stakeholders
(General Public is our Ultimate Customer)

Air Operator Certificates:	**5,458**	**Active Pilots:**	**747,959**
Major Air Carriers – (e.g. United Airlines)	89	ATP	145,994
Commuter Air Carriers/On Demand Air Taxis	2,174	Commercial	136,790
Commercial Operators (e.g. Baltimore Orioles)	99	Private	213,044
Foreign air carriers (e.g. Lufthansa)	496	Recreational	225
External Load (Logging/Oil Platform)	324	Sport	4,044
Agricultural Operators	1,884	Student	119,239
Public Use Authorities (State/City/Police)	392	Foreign Pilot	128,623
Air Agency Certificates:	**5,912**	**Non-Pilot Air Personnel:**	**737,192**
Pilot Training Schools	663	Mechanics & Repairmen	378,561
Repair stations	4,852	Control Tower Operators	39,517
Maintenance Training Schools	166	Flight Attendants	166,636
Pilot Training Centers	258	Ground Instructors	74,664
		Other (Dispatchers /Flight Navigators / Navigators /Parachute Riggers / Flight Engineers	77,814
Aircraft:	**210,463**		
Air Carrier Aircraft	2,729	**Flight Instructors:**	**97,398**
Commuter Air carrier Aircraft	471		
On-Demand Air Taxi Aircraft	10,420	**Airmen Medical Examinations:**	**379,358**
General Aviation Aircraft	181,782	Special Issuances	29,396
Inactive Aircraft	10,511	Special Issuances	349,962
Aviation Authorities – Other Countries:	**414**	**Approved Manufacturers:**	**1,619**
36 Bilateral Agreements	36		
Foreign Carrier Aviation Authorities	190	**Aviation Industry Entities Covered by Anti-Drug & Alcohol Programs**	**7,200**
Accident Investigation Authorities	188		
Check Airmen:	**7,747**	**National Transportation Safety Board**	
Part 121	4,453	Safety Recommendations (5-year average)	96
Parts 121/135	167	Major Investigations (avg/yr)(new)	32
Part 135	3,127		
		ATCS Medical Clearance Exams:	**14,747**
Designees:	**10,629**	Controller Workforce	13,745
Aircraft Certification	3,447	Flight Service Station Workforce	107
Flight Standards	3,689		
Aerospace Medicine	3,493		
Mechanics with Inspection Authority:	**21,740**		

As of June 2013

Staffing Information

	FY 2013 Actual	FY 2014 Enacted	Proposed Change	FY 2015 Request
Direct Full Time Equivalents (FTEs)	**7,184**	**6,916**	**147**	**7,063**
Flight Standards	5,064	5,026	107	5,133
Aircraft Certification	1,282	1,268	23	1,291
Aerospace Medicine	368	362	7	369
Rulemaking	31	29	3	32
Air Traffic Safety Oversight	121	117	3	120
Accident Investigation and Prevention	62	59	2	61
Quality, Integration and Executive Services	256	55	2	57
End of Year Employment (FTP)	**7,019**	**7,238**	**0**	**7,238**
Flight Standards	4,965	5,254	0	5,254
Aircraft Certification	1,249	1,319	0	1,319
Aerospace Medicine	347	369	0	369
Rulemaking	28	36	0	36
Air Traffic Safety Oversight	120	133	0	133
Accident Investigation and Prevention	62	67	0	67
Quality, Integration and Executive Services	248	60	0	60

Notes: AVS staffing for FY 2013 is as of 09/21/13, the last full pay period of the fiscal year. AVS staffing on 09/30/13 was 7,067. Quality, Integration and Executive Services headcount is 60 in FY 2014, which reflects a transfer of IT resources to AFN in 2013.

As of February 2014

Safety Critical/Operational Support Staffing
End of Year Employment, Full Time Permanent

	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request
Flight Standards	**4,965**	**5,254**	**5,254**
Engineers	21	12	12
Aviation Safety Inspectors	3,864	4,104	4,104
Safety Technical Specialists	376	448	448
Operational Support	704	690	690
Aircraft Certification	**1,249**	**1,319**	**1,319**
Manufacturing Safety Inspectors	247	258	258
Pilots, Engineers and CSTAs	703	734	734
Safety Technical Specialist	160	170	170
Operational Support	139	157	157
Aerospace Medicine	**347**	**369**	**369**
Physicians, Physician Assistants, Nurses	52	55	55
Alcohol/Drug Abatement Inspectors	67	68	68
Safety Technical Specialist	192	206	206
Operational Support	36	40	40
Air Traffic Safety Oversight	**120**	**133**	**133**
Air Traffic Safety Inspectors	50	58	58
Safety Technical Specialist	67	68	68
Operational Support	3	7	7
Rulemaking	**28**	**36**	**36**
Safety Technical Specialist	26	33	33
Operational Support	2	3	3
Accident Investigation and Prevention Service	**62**	**67**	**67**
Air Safety Inspectors	10	9	9
Safety Technical Specialist	45	48	48
Operational Support	7	10	10
Quality, Integration and Executive Services	**248**	**60**	**60**
Safety Critical Staff	119	12	12
Operational Support	125	48	48
Total	**7,019**	**7,238**	**7,238**
Safety Critical Staff	5,996	6,283	6,283
Operational Support	1,023	955	955

As of February 2014

Note II: AVS staffing for FY 2013 is as of 09/21/13, the last full pay period of the fiscal year. AVS staffing on 09/30/13 was 7,067. Quality, Integration and Executive Services headcount is 60 in FY 2014, which reflects a transfer of IT resources to AFN in 2013.

Workload Indicators

	FY 2013 Actual	Estimated Change	FY 2014 Estimate	Estimated Change	FY 2015 Estimate
Flight Standards					
Airmen Certification Activities	107,840	+20.5%	129,905	+7.8%	139,990
Operator Certification / Certificate Management Activities	94,564	+9.1%	103,179	+5.3%	108,670
Investigation Activities	35,440	+7.0%	37,929	+10.8%	42,009
Non-ATOS Air Operator / Air Agency Surveillance Activities [Includes other than Part 121 Carriers]*	196,466	+10.5%	217,159	+0.8%	218,806
ATOS Operator Surveillance Activities	100,509	-4.5%	96,003	+5.5%	101,244
Enforcement and Investigation Activities	11,546	+4.9%	12,115	-1.6%	11,923
Education and Safety	10,650	0.0%	10,650	+10.0%	11,715
Aircraft Registration Examinations	224,882	+6.2%	238,801	+0.5%	240,000
Airmen Certification Examinations	239,614	+4.6%	250,560	+10.0%	275,675
Aircraft Certification					
TC/STCs Issued	1,020	+0.7%	1,027	+0.7%	1,034
Other Design Approvals Issued	3,106	+0.5%	3,122	+0.5%	3,137
Production Approvals Issued	65	0.0%	65	0.0%	65
Airworthiness Directives Issued	355	+0.8%	358	0.0%	358
Certificate Management Audits	2,378	+1.5%	2,414	+2.0%	2,462
Aerospace Medicine					
Applications Processed / Received	378,187	0.0%	378,187	0.0%	378,187
DWI/NDR Recommendations Processed	7,099	-16.7%	5,916	0.0%	5,916
Number of AMEs	3,354	-2.5%	3,270	-2.1%	3,200
Anti-Drug and Alcohol Registrations Completed	700	0.0%	700	0.0%	700
Anti-Drug and Alcohol MIS Annual Reports	3,800	-7.9%	3,500	0.0%	3,500
Compliance and Enforcement Inspections	1,750	-17.1%	1,450	6.9%	1,550
Number of Drug Tests	10,470	5.0%	10,994	5.0%	11,543
Number of Alcohol Tests	5,353	5.0%	5,621	5.0%	5,902
Accident Investigation and Prevention					
NTSB Recommendations Received	105	0.0%	105	0.0%	105
Accidents / Incidents Investigated	30	+3.3%	31	0.0%	31
Follow-up Investigations	300	+1.0%	303	0.0%	303
Special Accidents / Incidents Investigated	250	0.0%	250	0.0%	250
NTSB Hearings Participated In	3	0.0%	3	0.0%	3
FAA Recommendations Received	325	0.0%	325	0.0%	325
NTSB Requests Received	650	0.0%	650	0.0%	650
Rulemaking					
Exemptions	478	1.2%	500	0.0%	500
Petitions for Rulemaking	15	25.0%	17	5.9%	18
Rulemaking Projects	21	0.0%	22	9.1%	24
Aviation Rulemaking Advisory Committee					
Tasks	3	0.0%	2	0.0%	2
Recommendations	3	0.0%	2	0.0%	2
Air Traffic Safety Oversight					
Safety Analysis and Audits	168,500	0.0%	168,500	0.0%	168,500
Safety Incident Investigations	12,569	0.0%	12,569	0.0%	12,569
Air Traffic Change Approvals	10,400	0.0%	10,400	0.0%	10,400
Safety Report Reviews	24,599	0.0%	24,599	0.0%	24,599
Airmen Credentialing / Examination	27,899	0.0%	27,899	0.0%	27,899
Education and Safety	52,500	0.0%	52,500	0.0%	52,500

As of February 2014

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COMMERCIAL SPACE TRANSPORTATION (AST)

Commercial Space Organization (AST)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$16,331**	**81**	**2**	**77**
Adjustments to Base	**+$274**			**+5**
Internal Transfer	+148			
Annualized FY 2014 Pay Raise	+21			
FERS Contribution Increase	+112			
Annualization of FY 2014 Hiring				+6
FY 2015 Pay Raise	+86			
Hiring Restrictions	-93			-1
FY 2015 Request	**$16,605**	**81**	**2**	**82**

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Executive Summary: Commercial Space Transportation (AST)

What Is The Request And What Will We Get For The Funds?

The request of $16,605,000 and 82 FTE allows AST to ensure protection of the public, property, and the national security and foreign policy interests of the United States (U.S.) during commercial space launch or reentry activities, as well as encourage, facilitate and promote U.S. commercial space transportation. The request includes base funding of $16,331,000 plus Adjustments to Base of $126,000 and Internal Transfers of $148,000. Key outputs of the request include: issuing licenses and permits to support the increase of space launch or reentry activities, conducting a corresponding number of inspections, carrying out operational safety oversight related to commercial human spaceflight activities, and coordinating planning and oversight of commercial space transportation activities with the United States Air Force (USAF) and the National Aeronautics and Space Administration (NASA).

What Is The Program?

AST's mission is to ensure protection of the public, property, and the national security and foreign policy interests of the United States during commercial launch or reentry activities, and to encourage, facilitate, and promote U.S. commercial space transportation. In all endeavors, safety is AST's highest priority. Our specific actions to ensure safe operations include: developing and publishing regulations; conducting environmental assessments; granting licenses, experimental permits, and safety approvals; conducting safety inspections; and supporting range operations as well as traffic management activities.

Why Is This Particular Program Necessary?

AST was established in 1984 by Executive Order to provide a one-stop-shop in overseeing commercial space transportation activities. A key challenge we face today is to keep pace with rapid expansion of the commercial space transportation industry, including both suborbital and orbital domains, as well as both cargo and crew activities. Publication of the National Space Policy in 2010 and the National Space Transportation Policy in 2013 signaled an even greater role for the growing commercial space industry in America's overall space strategy and utilization of space-based systems. AST's activities support this expanding commercial space industry and the nation's increasing reliance on the industry's success.

How Do You Know The Program Works?

AST's safety record has been excellent. Since 1989, we have licensed 222 commercial space launches and five reentries, along with 32 permitted launches, without any loss of life, serious injuries, or significant property damage to the general public. This record has been maintained while experiencing significant growth in the number of space launch systems, operators, and spaceports.

Why Do We Want/Need To Fund The Program At The Requested Level?

The funds in this request are necessary to enable AST to keep pace with the rapid growth of the U.S. commercial space transportation industry and to achieve vital national goals. Commercial space transportation activities are expanding, at the same time that NASA is relying increasingly on the commercial sector to provide cargo and crew services for the International Space Station, and there is growing need to ensure the safe integration of space and air traffic, both domestically and internationally.

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Detailed Justification for – Commercial Space Transportation (AST)

What Do I Need To Know Before Reading This Justification?

The 2010 National Space Policy states that the United States "is committed to encouraging and facilitating the growth of a U.S. commercial space sector that supports U.S. needs, is globally competitive, and advances U.S. leadership in the generation of new markets and innovation-driven entrepreneurship." The 2013 National Space Transportation Policy reaffirms the commitment to "encourage and facilitate the U.S. commercial space transportation industry to increase industry robustness and cost effectiveness, foster innovation-driven entrepreneurship and international competitiveness, and benefit the U.S. economy...." AST has an essential role to play in enabling full implementation of these Policies.

What Is The Request And What Will We Get For The Funds?

FY 2015 – Commercial Space Transportation (AST)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Commercial Space Transportation	$15,420	$16,331	$16,605	+$274

*FY 2014 includes below threshold funding adjustments

AST's FY 2015 budget request must be considered in light of important developments in the commercial space transportation industry. A major increase in AST licensed and permitted launch operations began with dramatic expansion in a single year – from three in FY 2012 to 18 in FY 2013. Based on industry-provided launch manifests and planned flight test programs, AST conservatively forecasts further increases to approximately 33 in FY 2014 and at least 51 in FY 2015. This growth in commercial launch activity reflects a higher flight rate by experienced launch operators under multi-launch licenses from existing spaceports, as well as initiation of new launch licenses and permits for recently developed launch systems and spaceports. AST is already performing initial safety analyses for new launch systems forecast to be operating in 2015.

This growth in licensing and permitting activity has led to a major increase in AST safety inspections, which monitor compliance after licenses and permits have been issued. Comparing FY 2012 to FY 2013, the increase in safety inspections was over 176 percent, and the need for inspections appears likely to continue growing rapidly. The challenge associated with timely inspections is greatly augmented by the fact that most inspection work cannot be carried out in Washington, DC but rather at widely distributed field sites across the nation.

AST is experiencing similar challenges with regard to its environmental reviews. Since 2012, the number of active and proposed environmental reviews has increased 110 percent. In FY 2015, AST is expecting a 55 percent increase in level of effort compared to FY 2014. AST must continue to conduct environmental reviews to support existing launch site and launch operator license renewal requests, as well as the ongoing mitigation and monitoring requirements. AST anticipates environmental compliance requirements to increase at a steady rate as the industry continues to expand and private entities, as well as State governments and local municipalities, develop additional launch sites.

Industry has also increased the number of AST safety approval applications, which evaluate space-related components or services. AST has already issued two safety approvals in FY 2014, raising to seven the total number in force. Other companies have also expressed interest in applying for a safety approval. For example, one company, which already possesses one safety approval from AST, plans to apply for an additional safety approval in the future. Although safety approvals are voluntary, they do consume significant AST resources, given that most of the approvals involve unique circumstances. Furthermore, evaluation criteria and requirements are not as well-established as in the licensing or permitting process and consequently require considerably more analysis.

As for AST's regulatory rulemaking role, it is necessary to engage continually with those developing new projects, in order to keep regulations current with the increasing complexity and diversity of suborbital as well as orbital flight, including new manned space launch and reentry systems. A key goal of future rulemaking projects will be to decrease the regulatory burden on industry, while maintaining or increasing safety.

Beyond this, AST participates in the joint USAF/FAA/NASA Common Standards Working Group and in the Department of Defense (DoD) Range Commanders Council, which continues to develop and maintain common launch safety requirements at Commercial, U.S. Air Force, and NASA launch sites. Beyond this, we aid the DoD and NASA in understanding commercial space entrepreneurial capabilities and their potential to fulfill military and civil requirements. Increasingly, commercial operations are utilizing government-owned launch facilities in Florida, California and Virginia. To support these range activities, AST has employees located at Patrick AFB in Florida, Vandenberg AFB in California, and Wallops Flight Facility in Virginia, with direct input provided from other AST staff as required. AST also maintains engineering staff at NASA facilities in Texas, Florida, and California to jointly develop plans for regulatory oversight of commercial space transportation involving U.S. government and private crews to and from orbit. Our collaboration extends within FAA as well, to ensure commercial space transportation requirements and operating characteristics are effectively captured within the evolving Next Generation Airspace System (NextGen) requirements and that commercial spaceflight operations are safely integrated within the National Air Space (NAS).

Since 2013, AST has been confronted with the challenge of deploying the same size workforce to manage a significantly larger workload. Major expansion of commercial space launch and reentry operations, and expanded industry research and development efforts, are causing a significant increase in AST licenses, permits, safety inspections, and safety approvals, as well as expanded need for interagency coordination. Compared to FY 2014, the FY 2015 budget does not involve an increase in staff, because the budget is based on the assumption that it will be possible to increase productivity sufficiently to meet the challenge of industry growth.

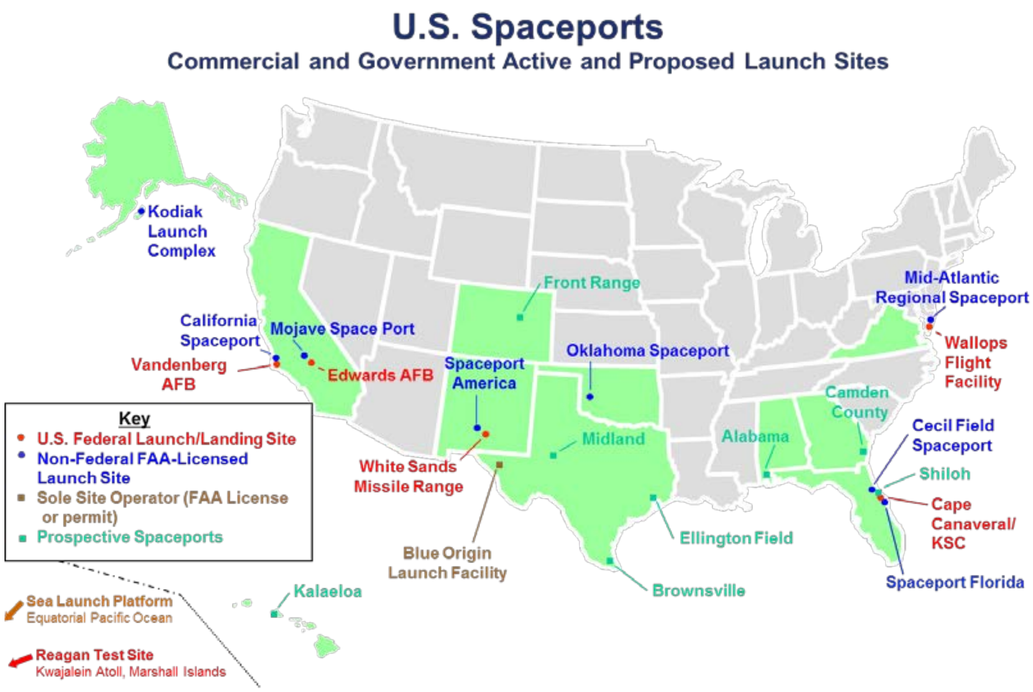
The distribution of FY 2015 resources among AST's core business operations is illustrated in the table below, identifying both staff and funds allocations to core business functions.

FY 2015 Program/Function	(Dollars in Thousands)					
	FTE	%	PC&B	Non-PCB	Total	%
Core Programs Total	**82**	**100%**	**$13,475**	**$3,130**	**$16,605**	**100%**
Licenses, Permits & Safety Approvals	13	16%	2,156	501	2,657	16%
Safety Inspections	15	18%	2,424	563	2,987	18%
Safety Engineering Oversight	5	6%	809	188	997	6%
Regulations and Analysis	14	17%	2,290	532	2,822	17%
Environmental Analysis	3	4%	539	125	664	4%
Operations Integration for Safety	7	9%	1,213	282	1,495	9%
Spaceport Safety Oversight & NAS Integration	7	9%	1,213	282	1,495	9%
Safety Management Oversight	5	6%	809	188	997	6%
International Policy and Outreach	1	1%	135	31	166	1%
Industry Viability	1	1%	135	31	166	1%
Resource Management & Administration	11	13%	1,752	407	2,159	13%

SAFETY – FY 2015 Key Outputs and Outcomes:

- Execute the licensing process for reusable launch vehicles that will carry people on suborbital trajectories;
- Make experimental permit determinations within 120 days of receiving an acceptable application, make license determinations within 180 days of receiving an acceptable application, and make safety approval determinations within 180 days of receiving an acceptable application;
- Inspect and monitor licensed operations to ensure the license holder is in compliance with all terms and conditions of the license during launch and reentry operations;

- Develop analysis tools and models to improve the safety of commercial space transportation;
- Collect and analyze launch and reentry vehicle anomaly and failure data to track trends and monitor safety indicators;
- Continue rulemaking efforts for clarifying part 420 (License to Operate a Launch Site), parts 431 and 435 (Launch and Reentry of Reusable Launch Vehicle), part 417 (Launch Safety), and part 437 (Experimental Permit);
- Develop advisory circulars and guidance materials for commercial space transportation; and
- Provide for comprehensive environmental analyses and compliance during the development and operation of space launch sites, spaceflight preparation, and space launch and reentry activities, consistent with the National Environmental Policy Act.



ECONOMIC COMPETITIVENESS – FY 2015 Key Output and Outcome:

- Maximize AST's contribution to U.S. economic competitiveness by maximizing the positive economic impact of AST's safety role, as well as carry out its statutory mandate to "encourage, facilitate, and promote" commercial space transportation, through effective licensing, permitting, inspections, safety approvals, environmental reviews, economic data reporting, and industry dialogue.

What Is This Program?

FAA's Office of Commercial Space Transportation (AST) was established by Executive Order in 1984. Our mission is to ensure protection of the public, property, and the national security and foreign policy interests of the United States during commercial launch or reentry activities, and to encourage, facilitate, and promote U.S. commercial space transportation. Safety is our highest priority. The National Space Policy of 2010, the National Space Transportation Policy of 2013, and current NASA direction all reflect a greater reliance by the Federal Government on the commercial space industry to accomplish national objectives. We also support the Department of Transportation (DOT) Strategic Goals for Safety and Economic Competitiveness.

Safety

AST has an outstanding safety record. Since 1989, we have licensed 222 commercial launches, along with 32 permitted launches, without any loss of life, serious injuries, or significant property damage to the general public. AST activities in the support of the DOT Strategic Plan include:

- Granting licenses, experimental permits, and safety approvals;
- Conducting inspections;
- Developing and issuing regulations;
- Performing accident investigation and prevention activities; and
- Supporting federal range operations and related aircraft traffic management.

Safety inspection is an AST core function, ensuring that license and permit holders adhere to regulatory requirements. At least one inspection of launch operations is required at time of flight, but inspection encompasses far more than flight activities alone. Inspectors also monitor and participate in mission dress rehearsals, safe and arm checks, flight termination system installation and checkout, accident investigation, and other activities related to public safety. AST also inspects all licensed site operators and safety approval holders. Due to the rapid growth in the commercial space transportation industry, safety inspection activity is also expanding quickly. As noted earlier, inspections increased over 176 percent from FY 2012 to FY 2013. The need for inspections appears likely to continue growing rapidly, as industry expands in both suborbital and orbital domains, providing human as well as cargo transportation services.

Licensing is another AST core function that fulfills statutory mandates and regulatory requirements, which are designed to ensure public health and safety, safety of property, and compliance with U.S. foreign policy and national security requirements. Licensing includes policy and payload reviews to determine that the proposed activity does not adversely affect foreign policy or national security.

AST is also responsible for licensing the operation of launch sites or "spaceports." Since 1996, we have licensed the operation of California Spaceport at Vandenberg Air Force Base; Spaceport Florida at Cape Canaveral Air Force Station; Mid-Atlantic Regional Spaceport at Wallops Flight Facility in Virginia; Mojave Air and Space Port in California; Kodiak Launch Complex on Kodiak Island, Alaska; Oklahoma Spaceport in Burns Flat, Oklahoma; Spaceport America near Las Cruces, New Mexico; and Cecil Field in Jacksonville, Florida.

Organizational Excellence

AST has reorganized and continues to improve our effectiveness and efficiency by examining our staff assignments and focusing work into new functional organizations. For example, we consolidated the Licensing, Permitting & Safety Approval functions into one organization and reassigned our staff to become specialists in AST's core operations disciplines. We are also deploying more staff to work at launch site locations to provide continuous and direct oversight of spaceport and launch operator operations.

<u>Response to GAO Recommendation</u>: AST is taking action to implement a GAO recommendation calling for external review of Maximum Probable Loss (MPL) methodology. The GAO recommendation was stated in the GAO-12-899 report titled "Commercial Space Launches - FAA Should Update How It Assesses Federal Liability Risk." MPL is used to determine the financial responsibility requirement of launch license and experimental permit holders, and is the greatest dollar amount of loss for bodily injury or property damage that is reasonably expected to result from a licensed or permitted activity. While AST believes the current methodology is effective, GAO's recommendation to conduct a review of the methodology is prudent, given the growth of industry and the amount of time that has passed since modification. Within the limits of current budget constraints, AST is studying various means of conducting an appropriate MPL review. In this effort, we have enlisted the support of the Business/Legal Working Group of FAA's Commercial Space Transportation Advisory Committee (COMSTAC), which has been helpful in clarifying issues and options.

Economic Competitiveness:

AST supports the DOT's Economic Competitiveness Goal by:

- Publishing Reports Conveying Key Industry Data to the Public. We publish reports to provide information about significant capabilities and developments in the commercial space transportation industry. We also maintain the Space Transportation Analysis and Research (STAR) database, considered the "gold standard" for commercial space transportation information.
- Maintaining Frequent Communication with Industry and Stakeholders. Our Commercial Space Transportation Advisory Committee provides guidance in identifying and determining activities that will help us keep pace with emerging space industry developments, so that we can appropriately regulate and support the industry. Our partners and stakeholders include other FAA lines of business, U.S. Air Force Space Command (AFSPC – specifically AFSPC Headquarters at Peterson AFB in Colorado, as well as the 14th Air Force, 30th and 45th Space Wings), NASA, the Department of State, the Department of Commerce, the Department of Energy, the Federal Communications Commission, the National Transportation Safety Board, Academia (COE-CST), industry and state/local governments.

Anticipated accomplishments in FY 2015 for the Office of Commercial Space Transportation involve initiatives that will:

- Make determinations on orbital launch operator licenses and reentry operator licenses, including those necessary to support NASA's Commercial Resupply Services Contract, as well as responding to other companies that have informed AST they will apply for commercial launch licenses;
- Make determinations related to the issuance of launch licenses and experimental permits for suborbital spaceflight, to facilitate growth in suborbital human spaceflight and research missions;
- Carry out safety inspections to address compliance with licenses and permits already issued;
- Conduct commercial space transportation studies, safety analyses, and safety tools development;
- Issue safety approvals to suppliers of space transportation components or services; and
- Continue Rulemaking efforts on part 420 (License to Operate a Launch Site), parts 431 and 435 (Launch and Reentry of Reusable Launch Vehicle), part 417 (Launch Safety), and part 437 (Experimental Permit).

Why Is This Particular Program Necessary?

The X-Prize winning flight of Spaceship One in 2004 awakened the nation and the world to the potential for both a new space-related market and a new way of doing space business. Today AST is working with a number of different companies, each of which is in the process of designing, building, and testing rocket-powered suborbital vehicles capable of carrying people to the edge of space, where they will be able to look out at the black sky above, see the curvature of the Earth below, and experience the magic of weightlessness.

Compared to suborbital missions, orbital flights include a number of additional challenges. For example, the mission durations of orbital flights will be significantly greater than those for suborbital flights. While a suborbital flight will most likely be measured in minutes, orbital operations are typically measured in days. As a result, extended reliable system performance and more complex systems are required for orbital flights.

Commercial space transportation, licensed and regulated by the FAA, is an essential element of our nation's space transportation policy. Both commercial crew and cargo systems and services are in development. Utilizing commercial services for space transportation has been a national policy item for many years, and now, the commercial space entrepreneur has achieved financial and technical sophistication that allows commercial space transportation to assume in practice what has been promised in policy. With regard to cargo, NASA has recognized the capability of the commercial industry and awarded the Commercial Orbital Transportation Services and Commercial Resupply Services contracts to two entrepreneurial companies. NASA is also pursuing with industry the development of crew capabilities. Congress recognized its value with its termination of government programs replicating available commercial space products. The President highlighted the inherent value of commercial space transportation in recent budget submissions to Congress, directing NASA to utilize commercial space transportation to fulfill low earth orbit requirements with commercially available services, freeing up valuable resources for inherently government missions and programs.

How Do You Know The Program Works?

The effectiveness of the U.S. approach to commercial space transportation is evident both in the successes to date of U.S.-based industry and in the increasing number of foreign space agencies seeking AST advice and guidance on how to replicate these successes in their own countries.

AST issues licenses for commercial launches of both orbital and suborbital rockets, and our stewardship and regulation have been highly effective. The first AST licensed launch was the suborbital launch of a Starfire vehicle on March 29, 1989. Since then, the Office has licensed 222 commercial launches, along with 32 permitted launches, without any loss of life, serious injuries, or significant property damage to the general public.

Maintaining this outstanding safety record is our highest priority. As we gain experience with an increased number of commercial launches, we will be establishing new metrics to measure the success of our program. Current indicators of our success to date include:

- Rendering a license within the congressionally mandated 180 day time limit following receipt of a complete application.
- Meeting the congressional standard of 120 days to issue a permit upon receipt of a complete application.
- Licensing eight commercial spaceports in six states within the congressional timelines in every instance upon receipt of a complete application.
- Passing every internal and external audit of our Environmental Management System.
- Identifying safety issues early so that no major public safety related non-compliances have occurred and no resulting enforcement actions have been necessary.
- Awarding Safety Approvals for unique commercial training facilities and technician education programs.
- Creating and co-chairing the world's first international Human Spaceflight Safety Committee, within the International Astronautical Federation.
- Actively exploring opportunities to increase international leadership in spaceflight safety, based on our successful program, while responding to requests by representatives of several foreign governments for advice on establishing spaceflight regulatory regimes.

Why Do We Want/Need To Fund The Program At The Requested Level?

The U.S. commercial space transportation industry is expanding on a dramatic scale and at a breathtaking pace. New commercial transportation ventures are gathering momentum, at the same time that NASA is relying increasingly on commercial services. With the retirement of the Space Shuttle Program, NASA must depend on private industry to launch cargo, supplies, and astronauts to the International Space Station, as well as to return high-value payloads back to Earth. Because those missions involve commercial launches, the FAA is responsible for issuing the necessary licenses. AST also faces policy and procedural challenges as it works within FAA for cost-effective integration of spacecraft operations into U.S. and international air space.

Expansion of commercial space transportation is significantly increasing AST's regulatory workload, while the Office's resources remain essentially unchanged. Accordingly, AST is continuing a concerted effort to enhance productivity, so as to protect its record of continuous success in ensuring safety, over more than two decades. Any reductions to AST's funding request for FY 2015 would increase the risk that AST's resource limitations might slow the pace of industry growth. Job-creating commercial initiatives might suffer costly delays, as they are forced to suspend progress while waiting for issuance for licenses, permits, inspections, safety approvals, and environmental reviews. Clearly, timely and efficient safety oversight is essential in fueling one of the nation's most promising engines of economic growth.

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Explanation of Funding Changes

	Dollars ($000)	FTE
Commercial Space Transportation	**+$274**	**+5**
Overview: For FY 2015, the Associate Administrator for Commercial Space Transportation requests $16,605,000 and 82 FTE to meet its mission of protecting the public, property, and national security and foreign policy interests of the United States during a commercial launch or reentry activity and to encourage, facilitate, and promote U.S. commercial space transportation.		
Adjustments to Base	**+$274**	**+5**
FY 2015 Pay Raise: This increase is required to provide for costs associated with base salary increases. (January to September) resulting from the proposed government-wide pay raise. The factor used is (0.75) of 1.0 percent.	+86	
Annualization of the FY 2014 Pay Raise: This increase is required to provide for the remaining quarter of the FY 2014 government-wide pay raise of 1.0 percent. The factor used is (0.25) of 1.0 percent.	+21	
FERS Contribution Increase: OMB Circular A-11 has increased the agency's contribution rates to the FERS retirement system. This increase in cost to the FAA represents the increased rates for both Air Traffic Controllers and other agency employees.	+112	
Annualization of FY 2014 Hiring: This increase in FTE's is required to cover the increased staff hired during FY 2014 but were on board for only a portion of the year. No funding is necessary for the additional FTE's since the added cost is offset by the savings due to the new hires having a lower payroll cost than the staff they are replacing.		+6
Restricted Hiring: It may be necessary to slow down hiring during FY 2015 if the planned hiring for FY 2014 is achieved. The restricted hiring will mean that we may not meet the staffing levels called for in the Air Traffic Controller and Safety Workforce Plans.	-93	-1
FY 2014 Internal Adjustments: This action completes the movement of staff and funding between ANG and AST, which was partially accomplished during FY 2014 execution.	+148	

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FINANCE AND MANAGEMENT (AFN)

Finance and Management (AFN)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$762,462**	**1,790**	**21**	**1,658**
Adjustments to Base	**+$2,305**			**+24**
Internal Transfer				
Annualized FY 2014 Pay Raise	+424			
FERS Contribution Increase	+2,004			
Annualization of FY 2014 Hiring				+38
FY 2015 Pay Raise	+1,674			
Hiring Restrictions	-1,797			-14
Other Changes	**+$280**			
WCF Adjustments	+280			
FY 2015 Request	**$765,047**	**1,790**	**21**	**1,682**

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Executive Summary - Office of Finance and Management (AFN)

What Is The Request And What Will We Get For The Funds?

The FY 2015 request of $765,047 and 1,790 full-time permanents (FTPs), and 1,682 full-time equivalents (FTEs) allows AFN to continue to provide the critical financial, acquisitions, information technology (IT), and regions and center operations support services that the agency's 14 lines of business and staff offices require to support and achieve the agency's aviation safety mission.

The request provides for salaries, benefits, annualized pay for FY 2014 hiring and pay raise, as well as FY 2015 pay raise and increased FERS contribution. It also includes rent and basic fixed operating expenses such as telecommunications, IT infrastructure and security, maintenance, and financial systems operations. The realignment of internal resources is reflected in the movement of funding and FTEs across the service organizations that comprise AFN. Details of all movements are provided in each service organization's narrative.

At this funding level, AFN will continue the following key initiatives:

- Support the achievement of the FAA's mission and Destination 2025 goals.
- Guide the agency through the constrained fiscal climate by finding ways for the FAA to work smarter, improve processes, and implement cost efficiencies.
- Identify modifications to cost and schedule baselines for capital programs due to resource constraints.
- Leverage technology and automation.
- Lead the way for the agency's clean financial statement audit.
- Oversee the acquisition strategy for NextGen systems.
- Continue to focus on reducing the agency's footprint to save money on administrative rent and leases by expanding telework across the FAA.

What Is the Program?

AFN's mission is to provide efficient and effective business solutions and services to its customers in order to accomplish the FAA mission. AFN is responsible for the consistent delivery of the agencies:

- Financial Services (ABA)
- Acquisitions and Business Services (ACQ)
- Information Services (AIT)
- Regions and Center Operations Services (ARC)

Why Is This Particular Program Necessary?

AFN is the value-added, cost-efficient shared services provider to the FAA's 14 lines of business and staff offices. By consolidating and centralizing the agency's common financial, acquisitions, information technology and regions and center operations services functions under AFN, those lines of business and staff offices are now able to better focus their attention and resources on supporting the FAA mission.

How Do You Know the Program Works?

AFN used customer feedback from the Customer Commitment agreement, Customer Forums, and Customer Satisfaction Surveys to establish customer performance measures. AFN tracks these quantitative and qualitative performance targets to ensure the support provided meets customers' needs and expectations. Since centralizing these four common functions under AFN beginning in September 2011, the agency has:

- Reduced Duplication of Functions
- Increased Efficiencies through Continuous Process Improvement

- Achieved Cost Savings.

Reduced Duplication of Functions. As part of its transformation of Information Technology (IT) units spread across 11 FAA Lines of Business and Staff Offices, AIT centralized all IT functions in a single shared services organization (ITSSO) within AFN. In preparation for this realignment, AIT conducted individual Knowledge, Skills, Abilities and Interests Assessments (KSAI) of all IT managers and employees across the agency. The results were then used as part of the organizational design process to help match the skills and interests/preferences of IT employees to positions within the new ITSS organization. Not only did this transformation consolidate agency-wide IT services under a single umbrella, but it also reduced redundant functions while maintaining operational excellence by ensuring the right IT professional with the right skills set is in the right role.

Increased Efficiencies through Continuous Process Improvement. AFN established and manages the FAA Community of Practice on Continuous Process Improvement (COP PI) to support process efficiencies across the FAA and provide oversight and accountability for agency-wide process improvement activities. AFN leads an agency-wide collaborative workgroup that reviews existing processes, eliminates redundancies and improves business efficiencies. CoP PI members meet quarterly to develop a repository of Business Process Reengineering (BPR), Quality Assurance (QA), and Process Improvement (PI) lessons learned, best practices and initiatives. Various communication vehicles (e.g., AFN Customer Newsletter, Focus FAA articles, AFN-1 Updates, etc.) are then employed to share these findings with employees and stakeholders, including information on when and how new processes are implemented and the resulting improvements. The COP PI is tracking 11 major initiatives focused on improving processes such as data sharing, business planning, time and attendance reporting, acquisitions approach, automation tools, compliance, and rulemaking economic evaluation.

Achieved Cost Savings. ACQ leads the FAA's Strategic Sourcing for the Acquisition of Various Equipment and Supplies (SAVES) Program. The program is used by all FAA lines of business, staff offices, regions, and centers to purchase selected commodities at a lower cost while maintaining or improving the quality of those products. ACQ evaluated how and from whom the FAA purchases office supplies and equipment, delivery services, and IT hardware. The organization then implemented new processes and established or modified relationships with suppliers, improving efficiencies and saving the agency money.

Why Do We Want/Need to Fund the Program at the Requested Level?

This funding level will enable AFN to provide the agency with the financial, acquisitions, IT, and regions and center operations support services the FAA lines of business and staff offices rely on to operate and mitigate risks in the National Airspace System (NAS) while improving the efficiency of the system.

Detailed Justification for – Finance and Management (AFN)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Finance and Management (AFN)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Finance and Management (AFN)	**$551,669**	**$762,462**	**$765,047**	**+$2,585**
Financial Services (ABA)	109,420	117,600	118,090	+490
Acquisition and Business Services (ACQ)	42,777	45,800	45,982	+182
Information Services (AIT)	85,855	301,200	302,030	+830
Regions and Center Operations (ARC)	313,617	297,862	298,945	+1,083

Finance and Management (AFN)

The FY 2015 request of $765,047,000, 1,790 full-time permanents (FTPs), and 1,682 full-time equivalents (FTEs) allows AFN to continue to provide the critical financial, acquisitions, IT, and regions and center operations support services that the agency's 14 lines of business and staff offices require to support and achieve the agency's aviation safety mission.

The request provides for salaries, benefits, annualized pay for FY 2014 hiring and pay raise, as well as FY 2015 pay raise and increased FERS contribution. It also includes rent and basic fixed operating expenses such as telecommunications, IT infrastructure and security, maintenance, and financial systems operations. The realignment of internal resources is reflected in the movement of funding and FTEs across the service organizations that comprise AFN. Details of all movements are provided in each service organization's narrative.

At this funding level, AFN will be able to continue to provide the following critical services in its four functional areas:

- Financial Services (ABA): ABA will provide agency-level financial, analytical and modeling expertise that promotes the achievement of FAA performance goals, cost efficient operations and leadership in global aviation.
- Acquisition and Business Services (ACQ): ACQ will oversee FAA acquisitions and contracting efforts while developing, implementing and tracking policies and guidance to support agency-wide procurement of major systems, goods, services and real estate. ACQ will chair the FAA's investment review board and manage the agency's Acquisition Management System (AMS), Acquisition Workforce Plan and certification, acquisition program evaluation and oversight, and small business advocacy efforts.
- Information Services (AIT): AIT will manage agency-wide Information Technology (IT) infrastructure and operations; and provide enterprise program and business partnership management, security and privacy, information delivery, and strategy and performance management.
- Office of Regions and Center Operations (ARC): ARC will provide property management, regional facility emergency operations, training, logistics support and other critical services to both internal and external customers across nine FAA regions and the Aeronautical Center.

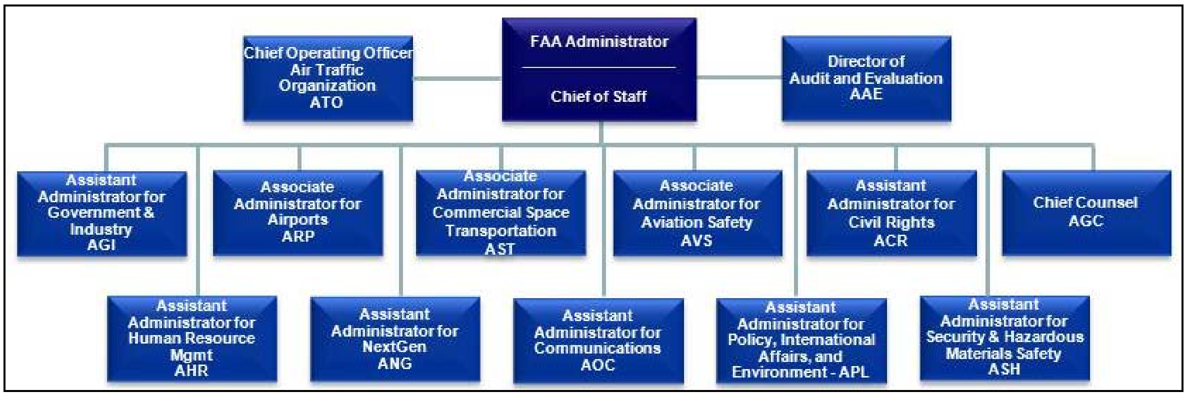
What Is the Program?

AFN is the agency's shared services provider for all common support needs. As the FAA's administrative backbone, AFN manages all financial, acquisitions, IT, and region and center operation functions for the agency:

- Enabling each of the 14 lines of business and staff offices to devote their time, attention and resources to achieving their individual tactical missions in support of the safest, most efficient airspace system in the world.
- Optimally positioning the agency to provide the next generation of air traffic management.

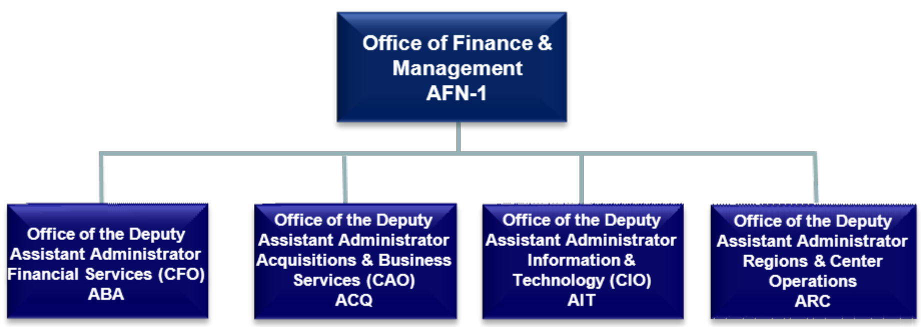
Since its establishment in September 2011, AFN is progressing in its phased shared services maturation approach from creating an effective organization in FY 2012 and 2013 to becoming a more efficient organization in FY 2014 and 2015. With its basic business processes and supporting metrics now in place, AFN's emphasis will continue to shift to consolidating duplicate work across the agency, accelerating cross-functional integration, eliminating gaps, embracing innovation, ensuring accountability and identifying continuous process improvements.

Internal Customers:



Organizational Alignment:

AFN is comprised of four functional areas.



Core Services:

Financial Management – ABA	
Critical Responsibilities:	Budget formulation; budget execution; oversight; workforce planning; financial planning and analysis.
Key Activities:	▪ Serves as the agency's Chief Financial Officer ▪ Provides accounting, and financial advisory services ▪ Serves as financial audit liaison ▪ Provides investment planning and analysis ▪ Formulates and executes budgets ▪ Provides/analyzes pricing associated with labor negotiations ▪ Establishes financial policy, guidance and internal controls ▪ Develops financial training ▪ Oversees travel card policy and management

	▪ Provides controller workforce planning models and supports AVS workforce plan ▪ Manages financial and accounting system processes, data standardization, and requirements
Acquisitions and Business Services - ACQ	
Critical Responsibilities:	Acquisition and contracting support (excluding real estate, property, and transportation); acquisition policy, guidance and oversight; acquisition workforce development, planning and training.
Key Activities:	▪ Serves as the agency's Chief Acquisitions Officer ▪ Manages contract award and administration ▪ Oversees small business development ▪ Conducts cost/price analysis and audits ▪ Develops acquisition policy, guidance, and tools ▪ Provides acquisition oversight and evaluation ▪ Manages FAA Purchase Card Program ▪ Provides investment decision and acquisition program governance ▪ Oversees earned value management ▪ Conducts post implementation acquisition review ▪ Streamlines and automates procurement processes ▪ Manages acquisition workforce planning ▪ Oversees acquisition career management and workforce training
Information Services - AIT	
Critical Responsibilities:	IT solutions, services and products; IT infrastructure; cyber security; IT training; automation.
Key Activities:	▪ Serves as the agency's Chief Information Officer (CIO) ▪ Develops and maintain the IT strategic plan for the FAA ▪ Directs the operations for FAA-wide IT resources for the shared services organization ▪ Manages and provides centralized governance for FAA enterprise-wide IT functions ▪ Provides IT-focused process engineering, training, consultation, evaluation, and support to FAA ▪ Maintains the information management program ▪ Manages and directs the Information Systems Security Program ▪ Ensures future IT requirements are satisfied ▪ Provides IT services and local area network administration ▪ Manages the FAA Enterprise Architecture for National Airspace (NAS) and non-NAS systems
Regions and Center Operations - ARC	
Critical Responsibilities:	Emergency readiness; property management; facilities management; transportation; space consolidation; NAS supply support.
Key Activities:	▪ Provides leadership for vital FAA and NextGen initiatives including integration of efforts in the field ▪ Provides command, control, communication support, and emergency planning ▪ Provides national policy, training, and oversight for life-cycle accountability for real, personal and government furnished property ▪ Manages FAA administrative office space ▪ Provides administrative services

Why Is This Particular Program Necessary?

Because of the intricacies and scope of its operational requirements, the FAA is a large agency with a critical mission. AFN was established to effectively manage the vast resource needs required by the agency to achieve this mission. AFN continues identifying trends across procurements of all types, developing economies-of-scale, and centralizing efforts, while also ensuring the integrity, transparency, efficiency, and consistency of business, financial, information technology, acquisitions, and regions and center operations.

Each year, the AFN shared services organization:

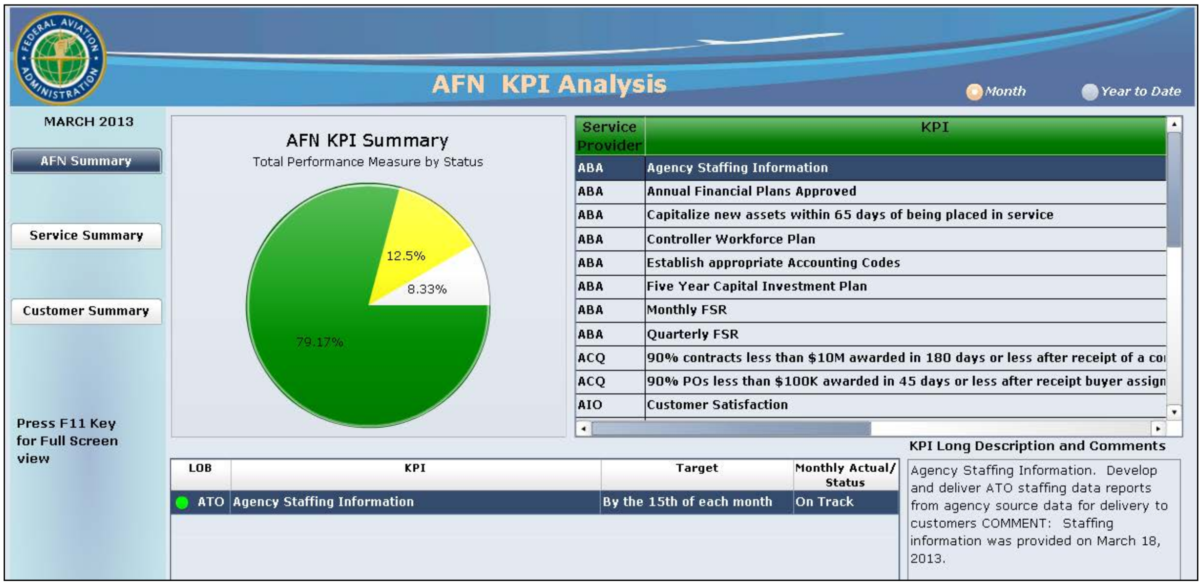
- Manages nearly $15 billion in financial resources.
- Obligates nearly $5 billion in contracts.
- Maintains the DOT-wide real property asset portfolio and all data associated with approximately 61,761 buildings, structures, and land parcels encompassing over 26 million square feet of space.
- Fields and maintains over 1,000 IT applications that keep the agency running.
- Monitors more than 10 billion cyber security event alerts.

Anticipated FY 2015 Accomplishments – Summary

Function	
Financial Services (ABA)	• Develop and enhance Agency-wide training in financial management and financial systems to increase efficiency and accountability objectives. • Lead the agency-wide cost efficiency program. • Collect and analyze cost control efficiency data to identify trends in operational and overhead costs by facility. • Produce the Controller Workforce Plan for 2015 – 2024 to forecast controller and resources requirements.
Acquisition and Business Services (ACQ)	• Provide expert-level cost/price analysis tools, training, advice, and assistance to FAA contracting and program personnel. • Support informed investment decisions (e.g., NextGen and other NAS system acquisitions) by managing FAA's investment decision-making process. • Increase the use of eFAST procurement vehicles to streamline procurement lead times and deliver competitively-priced services.
Information Services (AIT)	• Deliver at least two new cutting edge technology capabilities. • Implement standard client configuration enterprise wide. • Improve IT policies, capital planning and investment control plans to assist the agency in meeting its financial and performance goals.
Regions and Center Operations (ARC)	• Utilize the Quality Management System to integrate environmental, occupational safety and health requirements, minimize pollution and waste, conserve natural resources, and prevent injury and illness while at work. • Conduct yearly test and support of DOT's Crisis Management Center (CMC) system. • Provide quality NAS assets to ATO technicians by utilizing root cause analysis, trending, and action plan tools to decrease the number of defective parts.

How Do You Know the Program Works?

In collaboration with its internal customers, AFN established a quantitative and qualitative Customer Commitment agreement to ensure the support provided meets their needs and expectations. The agreement defines and holds AFN accountable for the services it provides, and the target activities associated with these goals are monitored on a monthly basis. To ensure transparency, AFN created and maintains an electronic dashboard (pictured below) that is updated monthly to give customers a current snapshot of AFN's overall performance as well as the status of each individual metric contained in the Customer Commitment agreement.



AFN also develops a Business Plan each year that focuses on activities and initiatives that promote cost efficiencies while also driving the maturation of the shared services operational concept. Since AFN centers its annual performance measures on the FAA and DOT goals of Organizational Excellence and Corporate Support Services, the plan provides a clear line of sight that aligns AFN's priorities to the DOT's goals as well as to the agency's Destination 2025 goals and 5-Year Strategic Initiatives. It then cascades down to each functional area's individual targets. The plan tracks 29 measures, including 2 AFN-led Destination 2025 goals:

- IT Risk Management and Information Systems Security: As a result of AIT's tenacity, for all of FY 2012 and 2013 and as of February 2014, the agency has experienced 0 cyber security events that have significantly degraded or disabled a mission-critical FAA system.
- Major System Investments: Also for FY 2012 and as of February 2014, ABA has maintained 90% of major acquisition programs within a 10% variance of their current cost and schedule baseline.

Since meeting the needs of both the customers and the agency informs the goals, milestones, and targets included in the business plan, customer feedback plays a vital role in the plan's development. AFN conducts a Customer Satisfaction Survey and Customer Forums with the senior leadership from each customer organization to gauge how AFN is doing as an organization and to identify ways it can better serve its customers. This ongoing feedback is then used to create the business plan for each fiscal year.

The plan is also built in collaboration with representatives from each functional area to integrate and focus the strategic activities. Once fully vetted and finalized, the plan is used as a tool to measure and track progress and to ensure AFN is providing quality service to its customers and achieving exceptional results for the agency.

Why Do We Want/Need to Fund the Program at the Requested Level?

The level of funding and staffing requested is required for AFN to continue to provide the financial, acquisitions, IT, and regions and center operations support services necessary for its customers to support and achieve the agency's critical aviation safety mission. Space and property management, IT infrastructure, acquisition of goods and services, and payment for those goods and services are just a few examples of the types of support that the FAA must obtain in order for their employees to work effectively and safely.

While significant amounts of the AFN budgetary request is for payroll and rent, the vast majority of the remaining funding is slated for basic fixed operating expenses such as telecommunications, IT infrastructure and security, maintenance and operations of financial systems.

Financial Services (ABA)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$117,600**	**247**	**2**	**228**
Adjustments to Base	**+$490**			**+14**
Internal Transfer				
Annualized FY 2014 Pay Raise	+71			
FERS Contribution Increase	+444			
Annualization of FY 2014 Hiring				+16
FY 2015 Pay Raise	+251			
Hiring Restrictions	-276			-2
FY 2015 Request	**$118,090**	**247**	**2**	**242**

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Detailed Justification for-Financial Services (ABA)

What Do I Need To Know Before Reading This Justification?

Financial Services (ABA) is one of the four main functional areas under the Assistant Administrator for Finance and Management (AFN). ABA's mission is to provide timely business consulting, products, and services that promote the achievement of FAA performance goals, cost efficient operations, and FAA leadership in global aviation. ABA provides centralized agency-level financial functions (i.e., budget and accounting) which have improved accountability and enhanced operational efficiency in the usage of FAA resources. ABA is responsible for overseeing FAA's financial systems and financial reporting, leading and implementing FAA's cost efficiency program, supporting FAA in labor negotiations, establishing staffing standards, enforcing government-wide reforms, and ensuring resources are managed in accordance with all laws, policies, directives, and procedures.

What Is The Request And What Will We Get For The Funds?

FY 2015 – Financial Services (ABA)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Financial Services (ABA)	$109,420	$117,600	$118,090	+$490

The FY 2015 budget request of $118,090,000, 247 FTPs, 2 OTFTPs and 242 FTEs will support the ABA program. This will provide for salaries, benefits, annualized pay, and non-pay ABA activities including ongoing program support costs to sustain continuing financial operations for the Agency. This also provides funding for AFN front office staff and non-pay activities including centralized administrative services and integrated communications for all the functional areas under AFN.

ABA's key outputs and outcomes for FY 2015 include:

- Continue to leverage centralized Agency-level functions
  - Investment and planning analysis;
  - Budget formulation, execution and oversight for all FAA funding;
  - Pricing associated with labor negotiations, contracts, and memorandums of understanding (MOUs);
  - Financial training development;
  - Travel card management; and
  - Workforce planning models/staffing standards development and oversight.
- Continue to lead in the production of the Congressionally mandated Controller Workforce Plan
- Continue to improve and simplify business processes;
- Obtain unqualified audit opinion with no material weakness in internal controls;
- Continue to improve the quality, timeliness, and usefulness of financial information for management decision-making;
- Continue to implement an aggressive agency-wide cost efficiency program;
- Continue to provide analytic, resource-based support to the Agency's financial decision-making processes and in Agency negotiations with our labor unions;
- Continue to provide integrated communications, process improvement and organizational performance services to customers nationwide

What Is This Program?

ABA serves as FAA's primary budget and financial management steward overseeing and maintaining financial systems, financial policy, financial reporting, and spearheading cost efficiency as well as Agency-wide management reforms to ensure resources are managed in accordance with all laws, policies, and procedures. ABA is the shared services provider to the FAA's 14 lines of business and staff offices. By consolidating and centralizing the agency's common financial services, ABA is able to lead the agency in identifying cost savings, increasing efficiencies, and reducing duplication while the lines of business and staff offices are now able to better focus their attention and resources on achieving their individual goals in supporting the FAA mission. Our program primarily supports the DOT goal of Organizational Excellence and the outcome of Improved Financial Performance.

ABA is responsible for managing all of FAA's annual and multi-year enacted appropriations. In FY 2015, ABA will oversee nearly $16 billion across its four major appropriations. ABA is constantly evaluating ways to meet current financial needs while still making smart business decisions to invest in the future. Our organization is structured to provide budget services for all appropriations. ABA ensures the effective use of agency resources, which is critical in the ever-changing budget environment.

The Office of Budget and Programs (ABP) develops the FAA budget requests and submits budget justifications to the Department of Transportation's Budget Office, Office of Management and Budget (OMB), and various Congressional committees of the House and Senate. ABP ensures that budget needs are well justified and explained while managing Congressional activities with the appropriation committee/subcommittees including programmatic briefings, hearings, report preparations, and technical assistance. ABP leads the development and oversight of the FAA's budget ensuring that sufficient funding is available to support critical strategic activities and initiatives. ABP oversees the execution of the agency's current and prior year appropriations, manages the Airport and Airway Trust Fund, and oversees the reimbursable program. This includes issuing guidance for spending, Lines of Business/Staff Office allowances, tracking obligations versus allowances throughout the year, as well as preparing and coordinating with external authorities regarding numerous apportionment requests for all FAA organizations. ABP issues and maintains funds control policies, systems, and processes for all budgetary activities, and procedures to ensure compliance with budget-related legislation, OMB circulars, and appropriation law. In dealing with the complexity of reimbursable agreements, ABP leads a multi-organizational workgroup to update national policy on the establishment and management of those agreements.

ABP also provides "end user" training on various financial management processes and procedures to employees across the FAA, such as funds certification, financial management, internal controls, and purchase card use. This training assists in our Agency-wide effort to ensure standardization of financial processes that are consistently compliant with the proper usage of appropriations, as well as increases our effort to reduce error-prone, redundant data entry workload. Financial policies are actively promoted through our FAA website. We have established the website as the "go to" hands-on tool to increase user compliance with FAA financial policies, directives, and standard operating procedures.

The Office of Financial Analysis (AFA) conducts financial analyses required by the Administrator and other stakeholders. This office reviews all contracts above $10 million to ensure that cost estimates are reasonable, contract types are justified, and contracts are competitively bid. This office manages the Agency's Cost Control and Efficiency Measures programs and has a dedicated metrics team providing reports to AFN, Air Traffic Organization (ATO), and other audiences. AFA is responsible for updating several Agency user fees, including registry fees and overflight fees.

The Office of Investment Planning & Analysis (AFI) ensures that proposed capital investments undergo a rigorous investment analysis process, resulting in business cases that support Joint Resource Council decisions. The office provides full-service business case support including cost estimating, benefits analysis and operations research, business case integration, schedule assessment, and economic assessments of the proposed investments. AFI works closely with all stakeholders including ATO's Program Management Organization and the NextGen Air Transportation System (NextGen) organization to advance major capital investment decisions.

The Office of Financial Operations (AFO) leads all accounting operations, including processing all financial transactions as well as managing the DELPHI general ledger system and the Procurement Requisition Information System for Management (PRISM) system. AFO purchases the actual services for accounting data entry, billing, collection, payments, etc., and the management and operation of the DELPHI operating system from the Enterprise Services Center (ESC) in Oklahoma City, OK, through the DOT. AFO will continue post implementation support of the upgrade of the DOT core accounting system to Oracle release 12i as necessary to maintain software and system support.

The Office of Financial Reporting and Accountability (AFR) is responsible for all agency external financial reporting, financial policy, and financial internal control functions across the agency. AFR prepares the agency's consolidated financial statements, ensures quality assurance over the agency's general ledger, and reconciles general ledger activity and balances. AFR also issues and maintains all agency financial and accounting policies and manages the government travel charge card program for over 43,000 travel cardholders. AFR routinely prepares a statement of net cost (a cost accounting report) that determines the cost of providing FAA services. This assists organizations in making educated business decisions. AFR also develops financial systems training so that procedures are understood and followed.

The Office of Labor Analysis (ALA) supports FAA organizations in labor negotiations, staffing standards development, and resource optimization. ALA conducts and develops benchmarking, plans, analyses, and models for labor-related data, to support bargaining unit negotiations and cost efficiency in the FAA. ALA also leads in the development of the annual Controller Workforce Plan and provides increasing support for other FAA workforce plans such as the AVS Workforce Plan. For the Controller Workforce Plan, ALA analyzes and refines the staffing standard models that are utilized in producing the Controller Workforce Plan each year for the Administrator and Congress. The plan is a key document that drives hiring, training, and staffing requirements, supports the FAA's safety mission, and meets external stakeholder requirements. ALA plays a pivotal role in advising Congress on the appropriate level of FAA controllers through publication and transmission of the annual Controller Workforce Plan. ALA has a structured approach for planning air traffic controller hiring, training, and placement across all FAA ATC facilities through use of the workforce plan as a business tool. ALA supports the Office of Aviation Safety (AVS) in the development of the Congressionally-mandated AVS Workforce Plan. ALA provides analytical support that combines workload activity standards, attrition forecasts, and other information to assist in the development of staffing forecasts and hiring plans.

The Finance and Management (AFN) front office provides centralized administrative services and integrated communications for all the functional areas under AFN. This includes workforce services, performance management services, operational services, and labor relations. The AFN front office also works to bring together existing business practices and subject matter expertise to integrate like - processes into an optimal standard of services provided across AFN.

Anticipated FY 2015 Accomplishments:

Function	Anticipated FY 2015 Accomplishments
Office of Budget and Programs (ABP)	• Continue to present effective budget requests, conduct effective program oversight, and maintain required funding needs for total agency programs, including Operations, AIP, RE&D, Facilities and Equipment, and NextGen modernization activities; • Continue to ensure Agency funds and resources are utilized effectively and maintain compliance with the Anti-Deficiency Act; • Continue to implement and improve the centralized structure for oversight of well over $400 million in reimbursable work; • Continue to develop and enhance agency-wide training in financial management to ensure that executives and managers understand their fiscal roles and responsibilities and that employees are better equipped to meet increased efficiency and accountability objectives; and • Continue to conduct a suite of formal financial training classes hosted within the FAA to standardize operating procedures, internal controls, purchase card use, and fund certification.
Office of Financial Analysis (AFA)	• Serve as Lead for agency-wide cost efficiency program. Continue to collect and analyze cost control efficiency data from multiple sources to identify trends in operational and overhead costs by facility such as cost per controlled flight and ATO overhead rates; • Continue to review acquisitions of $10 million or more to ensure the procurement represents a good investment of taxpayer resources and that appropriate alternatives were considered; • Continue to develop and establish, with program and management elements, numerical measures and indicators of financial performance,

Function	Anticipated FY 2015 Accomplishments
	program performance, and the resulting public benefits achieved; and • Continue updates to registry fees and overflight fees.
Office of Investment Planning and Analysis (AFI)	• Continue to perform analysis of Agency investments and monitor acquisition program baselines; • Continue to support a full range of FAA acquisition decisions for both NAS and non-NAS programs; • Continue to apply business case discipline to new investment categories (e.g., facilities and variable quantity investments); and • Continue to develop and update cost estimator, schedule development, and other investment analysis training in support of the larger acquisition community.
Office of Financial Operations (AFO)	• Continue to support the upgrade of the DOT core accounting system to Oracle release 12i in order to maintain software and system support. • Continue to lead the Agency on all accounting operations and provide financial oversight and information to assist FAA organizations with making business decisions.
Office of Financial Reporting and Accountability (AFR)	• Obtain an unqualified audit opinion on Agency financial statements with no material weaknesses; • Expand the internal controls function to more rigorously identify both financial and operational areas for improvement which promotes required transparent and detailed reporting to the public; and • Test grant program payments as required by the Improper Payments Information Act of 2002 (as amended by the Improper Payments Elimination and Recovery Act of 2010) and Executive Order 13520, Reducing Improper Payments and Eliminating Waste in Federal Programs dated Nov. 2009 • Continue to maintain and update accounting policies and procedures and develop associated financial systems training.
Office of Labor Analysis (ALA)	• Produce the Controller Workforce Plan for 2015 – 2024 which is a projection of changes in air traffic forecasts, controller retirements, and staffing requirement ranges for our air traffic control facilities to support FAA's safety mission to meet external stakeholder requirements; • Continue implementation of the Operational Planning and Scheduling (OPAS) System in air traffic control facilities; and • Continue to expand the role of the Labor Analysis group to include workforce planning and labor cost analysis for FAA business units.

Why Is This Particular Program Necessary?

ABA provides budget guidance and oversight for all appropriations, establishing and providing agency-wide financial policy and reporting, establishing Agency staffing standards, and supporting labor negotiations, and analyzing agency investments and acquisition program baselines. ABA also leads the Agency's efforts to achieve its Cost Control and Efficiency Measures and Unqualified Audit Opinion performance targets. In addition to ABA's strategic work linked to the DOT's Strategic Plan, the office has fundamental responsibilities to maintain a strong agency-wide foundation of accountability and financial management. ABA continues to support the secure and efficient storage and exchange of critical financial information. The ability to capture this financial data ensures we achieve the President's goal of greater transparency in government. Our organizational financial management policies further the President's goals to encourage economic growth, invest in the future, and responsibly govern FAA resources.

The upgrade of the DOT core accounting system to Oracle release 12i is necessary to maintain software and system support. As a result of the core accounting system upgrades, ABA must routinely train over 5,000 users on the upgraded system and have more than 100 program management systems that must be re-engineered in connection with the upgrade. Training is critical to the successful implementation of the new core accounting system to ensure our managers and employees are able to use and interpret timely and accurate financial data while making program management decisions. The office's internal controls activities, such as testing in accordance with OMB Circular A-123, are also necessary to provide management with assurance that our financial and Federal spending data being disseminated to the public are reliable and that our operations are effective and efficient.

Partners and stakeholders include:

- FAA's Line of Business/Staff Offices;
- Department of Transportation;
- Office of the Inspector General (OIG);
- Other Federal agencies;
- Office of Management and Budget (OMB);
- Congress/Congressional oversight committees;
- Government Accountability Office (GAO);
- Local, county, and state authorities; and
- Airlines and equipment manufacturers.

How Do You Know The Program Works?

In recent years, there has been an increasing recognition of the need for effective oversight of financial decision-making processes. The Agency has implemented oversight of proposed acquisitions, travel, and conferences, as well as new procedures to provide executive oversight over administrative information technology investments. This added oversight demonstrates how serious the Agency's commitment is to ensuring that we manage the taxpayer's resources effectively.

ABA's contributions to the Agency's success have been measured by how well cost and financial information are integrated into the Agency's business processes and by the analytical contribution that ABA-generated information makes to data-based decision-making at the Agency and Lines of Business levels. ABA's highest priorities include:

- Improving business processes and resolving issues related to the DOT core accounting system (DELPHI), our acquisition system (PRISM, or replacement system), our Cost Accounting System, (CAS), and our Labor Distribution Reporting (LDR) system;
- Maintaining an "unqualified audit opinion" with no material weaknesses in internal controls with a focus on managing agency assets; and
- Continuing to implement and improve the Cost Control Program in support of DOT and FAA's strategic goals and objectives.

While ABA seeks the resources to continue to improve the quality, timeliness, and usefulness of our financial data, the program works through several indicators:

- As external recognition of our transparency and accountability, the Association of Government Accountants awarded FAA its Certificate of Excellence in Accountability Reporting (CEAR) for our FY 2012 Performance and Accountability Report (PAR). ABA continuously strives to clearly and simply present its performance against its performance targets and link expenses to strategic goals so the American people can understand how the organization is using tax dollars to serve them. The awarded CEAR marks the ninth time we have received this award. ABA has applied for the CEAR award for its FY 2013 PAR and expects to achieve this recognition once again in April 2014, marking the tenth time in a row.

- Because of rigorous internal controls and carefully monitored financial processes, we have received unqualified audit opinions since FY 2007 and no material weaknesses since FY 2008. Our most recent external financial statements audit did identify a significant deficiency which is defined as a matter warranting management's attention. We are addressing this weakness with robust corrective actions. We expect another unqualified audit in FY 2014 with no material weaknesses, which will continue to demonstrate a substantial improvement since 2007.
- We continue to improve the use of cost and program management data for effective decision-making decisions about the implementation of Agency programs and resources.

- We are held accountable for meeting performance objectives, such as capitalization of assets, through the agreed upon measures outlined in the AFN Customer Commitment.

Why Do We Want/Need To Fund The Program At The Requested Level?

The funding request of $118,090,000 is essential for ABA to continue to serve as FAA's primary budget and financial management steward. ABA will continue to oversee and maintain the Agency financial systems, financial policies, financial reporting, and spearheading the Agency cost efficiency program and other agency-wide management reforms to ensure resources are managed in accordance with all laws, policies, and procedures. ABA will continue to reinforce its financial management knowledge base with the improvement of DELPHI, PRISM (or replacement system), CAS, and LDR data. This funding will allow us to continue to provide centralized agency-level financial functions that help improve accountability and enhance operational efficiency in the usage of FAA resources.

The requested funding also supports the continued evaluation of FAA capital and operational business cases for thoroughness and accuracy in preparation for investment decisions, and ensures investments meet established business case criteria. Investment planning and analysis plays a significant role in the development and analysis of program requirements for the NextGen programs. Funding below the requested level would not allow the FAA to perform the necessary analysis and evaluation of many FAA capital and operational business cases, including many NextGen related investments.

The requested funding also supports the upgrade of the DOT core accounting system to Oracle release 12i in order to maintain software and system support. Funding below the requested level would not allow FAA to fully support the required upgrades to the DOT core accounting system. ABA may not be able to adequately provide agency-wide financial support for the accounting system, and there would be potential risks in delayed and /or inaccurate reporting if we are not be able to code, generate, and interpret financial management data that ensures proper management of the Agency's resources. If FAA's mixed financial and program management systems are not re-engineered to comply with the upgrade to the DOT core accounting system, we would not be able to:

- Interface procurement transactions with the core accounting system, which would result in manual processing which would delay Agency procurement actions;
- Develop the allocation and reporting of Agency cost accounting data to program managers;
- Provide financial data to the Agency's Corporate Work Plan which is used to manage FAA project implementations and reimbursable project management;
- Train over 5,000 employees on the new standardized accounting code structure. This will result in the delay of processing and impact the accuracy of FAA's accounting transactions;
- Re-engineer our financial and program systems which allow the Agency to manage its programs and financial resources;
- Maintain our unqualified audit opinion with no material weakness since the Agency will not be able to track and manage its program transactions in a timely and accurate manner and on a platform that continues to be supported by Oracle; and
- Maintain our LDR system which is a key component of cost accounting data, representing labor costs which comprise about 45 percent of our total appropriated costs.

Acquisition and Business Services (ACQ)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$45,800**	**244**	**1**	**225**
Adjustments to Base	**+$182**			**-3**
Internal Transfer				
Annualized FY 2014 Pay Raise	+51			
FERS Contribution Increase	+140			
Annualization of FY 2014 Hiring				-1
FY 2015 Pay Raise	+210			
Hiring Restrictions	-219			-2
FY 2015 Request	**$45,982**	**244**	**1**	**222**

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Detailed Justification for Acquisition and Business Services (ACQ)

What Is The Request And What Will We Get For The Funds?

FY 2015 –Acquisition and Business Services (ACQ)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Acquisition and Business Services (ACQ)	$42,777	$45,800	$45,982	+$182

The FY 2015 budget request for Acquisition and Business Services (ACQ) is $45,982,000, 244 FTPs, and 222 FTEs. This request will provide for salaries, benefits, and annualized pay.

ACQ is led by FAA's Chief Acquisition Officer and serves as the executive agent for FAA's Acquisition Management System (AMS). It is one of the four pillars within the Office of Assistant Administrator for Finance and Management (AFN) shared services organization.

The Chief Acquisition Officer chairs the FAA's investment review board (the Joint Resources Council) and manages FAA's investment management process for capital investments including Next Generation Air Transportation System (NextGen) and other major systems acquisitions. ACQ is responsible for the award and administration of all types of contracts, purchase orders, delivery orders, agreements, and aviation research grants for customers in FAA Headquarters, Technical Center, Service Centers, and other external customers.

ACQ monitors contractors' quality assurance systems and accepts or rejects systems, equipment, and materials. ACQ manages the FAA acquisition policy and the investment decision process. Specialists provide support and training to major programs to apply the use of Earned Value Management. ACQ manages FAA's Small Business Program and the achievement of small business contract goals. ACQ manages all training, certification, and workforce planning for FAA's acquisition workforce. The ACQ organization includes program managers, systems engineers, contracting officers, cost estimators, quality reliability officers, test and evaluation specialists, and other core acquisition disciplines. ACQ conducts oversight and review of Agency acquisitions. ACQ also manages FAA's Strategic Sourcing program, which delivers cost savings and efficiencies in commodities' procurements such as office supplies, equipment, delivery services, and IT hardware.

FAA's strategic business plan, "Destination 2025", outlines FAA's performance goals, strategies, and associated metrics. Acquisitions and Business Services contributes in some way to each of FAA's strategic goals. For example, the acquisition of critical NextGen systems and technologies contributes to the goal of Delivering Aviation Access through Innovation; and the acquisition of other products, services, systems, and facility infrastructure programs supports the goals of Moving to the Next Level of Safety, and Sustaining Our Future. Additionally, FAA's Acquisition Workforce Plan, which ACQ leads, contributes directly to the goal of Creating Our Workplace of the Future, by developing a skilled acquisition workforce. Moreover, ACQ directly supports a variety of cost savings and efficiency targets and government-wide acquisition and procurement initiatives established by OMB, DOT, and FAA. We use metrics and performance measures to assess our progress.

Funding at the requested level will allow ACQ to accomplish/manage:

Award of Contracts, Orders, Agreements and Grants	• Advise, plan, negotiate and award all types of contracts, purchase orders, delivery orders, agreements, and aviation research grants for FAA headquarters, Technical Center, and the Service Areas. We support all FAA Lines of Business and all FAA programs. We procure essential equipment, facilities, major systems, construction, research and development, supplies and services needed to maintain FAA

	operations and programs, and for transition to NextGen.
Contract Administration	• Perform a full range of Contract Administration Services in accordance with AMS Policy; • Ensure contractor performance in accordance with contract terms and conditions; issue contract modifications, and monitor contract deliverables; • Assure that subcontracting policies and requirements are followed; • Review contractor invoices for payment; and • Close out completed contracts.
Implement Process Improvements	• Develop best practices in acquisition to improve the overall business operation and increase efficiency; • Increase the use of best practices to streamline time to award;
Small Business Development	• Manage small business policy, guidance and tools, to meet agency, department, and administration goals; • Conduct internal and external small business outreach/training; and • Target at least 25 percent of total direct procurement dollars as Small Business awards.
Cost/Price Analysis & Audits	• Provide expert-level cost/price analysis tools, training, advice, and assistance to FAA contracting and program personnel; • Strengthen price negotiation to ensure that FAA pays fair and reasonable rates for the products and services it procures; • Manage agreements with Defense Contract Audit Agency (DCAA) to perform audits of cost reimbursable, time, material, and labor hour contracts with an estimated value of $100 million or more; • Request audits of cost reimbursable and time, material, and labor hour contracts under $100 million using non-DCAA sources; and • Update/maintain FAA Pricing Handbook.
Acquisition Policy	• Manage, update, and strengthen FAA's AMS to ensure FAA's acquisition policy and guidance is compliant with applicable laws and regulations; • Provide clear direction to Agency personnel; and • Support timely, proper, and best-value acquisition of the goods and services that support the safe and efficient operation of the NAS.
Strategic Sourcing	• Implement strategic sourcing contracts and other strategic acquisition initiatives to realize cost control; • Establish sourcing vehicles that realize administrative efficiencies and meet agency needs in a streamlined and consistent manner; and • Promote the expanded use of environmentally preferable products and services through "Green" requirements and processes embedded in strategic sourcing contracts.
Acquisition Oversight	• Perform nationwide contract reviews for compliance with policies and procedures, and implement corrective actions where necessary and • Track findings and recommendations to promote consistent implementation of FAA's process improvement and procurement integrity policies.
FAA's Purchase Card Program	• Provide oversight of FAA's purchase card program to ensure compliance with regulation and policy; • Promote uniform standards and policy interpretation, and identify and take appropriate action against improper use; and • Increase usage of purchase cards to gain increased cost savings.
Investment Decision Process & Acquisition Program Governance	• Support informed investment decisions (e.g., NextGen and other NAS system acquisitions) by managing FAA's investment decision-making process and • Serve as the Executive Secretariat of the Joint Resources Council, ensuring that the AMS requirements leading to an investment decision are met prior to requests for investment decisions being presented to the Joint Resources Council. • Plan and support on-going acquisition program oversight reviews;

	• Plan decision meetings, document decisions made and action items assigned, tracking them to closure; • Populate and maintain the agency's official repository of required investment decision documents and other records; and • Serve as the focal point for providing documentation to internal and external stakeholders, such as Office of the Inspector General (OIG), Office of Management and Budget (OMB), and Government Accountability Office (GAO).
Earned-Value Management	• Support the Earned Value Management (EVM) process in the agency by serving as the FAA's EVM Focal Point ensuring that the AMS outlined EVM policy and guidance is carried out by investment programs; • Provide guidance and assistance to investment programs in the application of (EVM); • Ensure training is provided to investment programs in support of the application of EVM; • Conduct Integrated Baseline Reviews on investment programs along with validations of contractor EVM Systems; and • Serve as the focal point for providing EVM data to internal and external stakeholders, such as the DOT OIG, OMB and GAO.
Post-Implementation Reviews	• Serve as the Post Implementation Review (PIR) Quality Officer ensuring implementation of the PIR policy as outlined in the AMS and • Conduct post-implementation reviews (PIRs) of investment programs and act as independent reviewer of directorate lead PIRs to assess achievement of cost, performance, and benefits baseline expectations.
Streamline and Automate Procurement Processes	• Continue development of FAA's Unified Contracting System (UCS) which will be an electronic, secure, internet-based, contract lifecycle management system.
Acquisition Workforce Plan	• Manage annual updates of FAA's Acquisition Workforce Plan and implement Plan strategies and initiatives and • Track gains, losses, and actual on-board data for personnel in the various acquisition professions, as well as tracking other workforce metrics, such as certification levels.
Acquisition Career Management	• Manage training and certification programs for acquisition personnel, including program/project managers, contracting officers/specialists, contracting officer's representative (CORs), systems engineers, test and evaluation specialists, and logistics specialists and • Develop and maintain an acquisition workforce portal, automated certification process tool, career path guidance, and other tools and guidance to build FAA's acquisition and program management capabilities.

Key outputs expected to be achieved in budget year with the requested resources:

- Cost effective, best value contract award decisions;
- Improved contract management through standardization of processes, process improvement, and operating efficiency;
- Implement process improvement initiatives within the contracting operation to ensure that we are continuously improving our work operation;
- Actively work with National Acquisition Evaluation Program (NAEP) to ensure that action plans and other process improvements developed in response to NAEP reviews address targeted and critical areas for improvement;
- Ensure that an optimal acquisition approach has been selected for each support service acquisition over $5m, through oversight provided by the Acquisition Strategy Review Board;
- Meet on a quarterly basis with customers to discuss programs, pertinent issues and areas to improve customer service;
- Annual update of FAA's Acquisition Workforce Plan and implementation of initiatives;

- Continued improvements resulting from oversight controls; and
- Development of effective Small Business policies and programs.

Key outcomes expected to be achieved in budget year with the requested resources:

- Meet or exceed time-to-award metrics for defined classes of new procurement actions in accordance with Customer Commitment Performance Measures;
- Increase the use of eFAST procurement vehicles to streamline procurement lead times and deliver competitively-priced services;
- Increase the use of construction services Basic Ordering Agreement (BOA) vehicles by the Service Area Acquisition Offices and improve nationwide planning for construction contracts;
- Ensure that all major acquisitions have oversight by a Senior AAQ leadership team (via weekly Contract Administration Reviews);
- Maintain a fully compliant ISO 9000 Quality Management System for our Quality Management System;
- Achieve cost savings/efficiencies due to improved contracting practices;
- Increase the use of the Acquisition Document Library in order to collect and make available best practice samples for use by all acquisition offices;
- Ensure that 80 percent of invoices are paid on time;
- Close 85 percent cost reimbursable contracts eligible for close-out and report on these quarterly;
- Award 25 percent of the total direct procurement dollars to small businesses;
- Improve cost and pricing support to the Contracting Officers/Program Offices to ensure that the FAA receives the best price/value for goods and services;
- Complete storage of all contract documents in the UCS electronic document management system, deployment of an invoice module, beta testing of the pre- and post-award procurement processing modules, and integration testing of UCS with FAA's financial system; and
- Strengthen Agency capability and performance to effectively manage acquisitions; and
- Achieve increased cost savings through strategic acquisition/sourcing initiatives.

What is the Program?

Acquisition and Business Services acquires the goods and services to support the safe and efficient operation of the NAS. It supports the Department of Transportation's Organizational Excellence goal, contributing to the outcome of Improved Financial Performance.

The FAA contracted for $4.8 billion in goods and services in FY 2012. These procurement actions were accomplished by warranted and certified Contracting Officers and involved the procurement of essential equipment, facilities, major systems, construction, research and development, supplies, and services needed to maintain FAA operations and programs, and for transition to NextGen. ACQ provides Quality Reliability Officers to ensure that all systems, equipment, material and services conform to the technical requirements established in the contract. ACQ provides policy, oversight, training, and services to the acquisition workforce.

ACQ serves as the executive agent for 1) FAA's procurement policy (AMS), 2) investment decision process, 3) Acquisition Workforce Plan, 4) certification program for personnel in a broad range of acquisition-related professions, and 5) acquisition program evaluation and oversight. We also act as the Agency's small business advocate.

ACQ manages the investment decision-making process for all investment decision authorities, including the Joint Resources Council (JRC), which assists Agency executives in making timely and better-informed investment decisions. Additionally, we manage the EVM and post-implementation review processes on behalf of the Agency in accordance with OMB, GAO, and AMS policy requirements.

The UCS Program will provide an end-to-end electronic contracting system to produce, route, manage, store, retrieve, and report against the roughly 50,000 contractual documents that are produced yearly by the FAA. It is being developed and deployed in an iterative, modular approach. UCS will improve oversight, standardization, information management, and reporting capabilities. This is particularly important considering the growing complexity and volume of contracting actions. The FY 2015 Operations budget request provides for completion of scanning and storage of all contract documents in the UCS electronic document management system; deployment for the invoice module; hardware hosting; Operations and Maintenance of the second generation Purchase Card Processing System (PCPS2); and program management support activities.

The quality and effectiveness of the acquisition process depends on the development of a capable and competent acquisition workforce. Since FAA is exempt from the Federal Acquisition Regulation (FAR) and has its own Acquisition Management System (AMS), FAA provides AMS-specific training that builds upon federal acquisition training and certification standards.

The Acquisition Career Management Program provides Agency contracting officers and specialists with competency-based training and certification, at progressive career levels, and continuous learning training that meets and/or exceeds government-wide standards.

Having a comprehensive Acquisition Workforce Plan is critically important as FAA transitions to NextGen while simultaneously maintaining the current system safely and effectively. Today, FAA's acquisitions are more complex than ever and require new approaches and skills to support NextGen acquisition work. The Acquisition Workforce Plan is integral to ensuring FAA's acquisition workforce staffing and professional development requirements are met in the coming years. The plan serves as FAA's guide for workforce staffing and development decisions and provides strategies for hiring, training, developing, and retaining acquisition employees.

Why is this Particular Program Necessary?

FAA handles nearly 70,000 flights per day and helps transport over 730 million passengers per year, contributing to 5.2 percent of the total U.S. gross domestic product. FAA relies on numerous programs to maintain the safety and efficiency of the current system and ensure its viability well into the future.

Congress directed FAA to establish an acquisition system that would meet the unique needs of the Agency, and prohibited the Agency from applying the Federal Acquisition Regulation or any law authorizing implementation in the Federal Acquisition Regulation. It is critically important for us to establish and adhere to a strong acquisition policy to ensure the sustainability of the NAS and the agency as a whole. It ensures the proper use and control of federally-funded contracts for services and materials. We are responsible for establishing the FAA's AMS and overseeing policy adherence.

Contracting officers are warranted by the Federal Government as the only individuals who can obligate the government to pay for goods and services. Warrants are graduated by knowledge, ability, and experience. Contracting officers and other workforce personnel are trained not only in the Federal laws and policies surrounding procurement, but also in the specifics of the AMS. FAA issued $4.8 billion in contract awards in FY 2012. The complexity of the contracts associated with the NextGen effort coupled with the need to find innovative methods of acquiring the goods and services needed by the Agency at less cost will substantially increase our workload in FY 2015.

We are working to ensure that FAA's acquisition workforce has the right skill mix to ensure success. The acquisition workforce includes:

- Contracting Officers
- Contracts Specialists
- Acquisition Analysts
- Program Managers
- Project Managers
- Researchers
- Engineers
- Systems Engineers
- Contracting Officers Representatives
- Business and Financial Analysts
- Cost Analysts

- Logistics Specialists
- Test and Evaluation Specialists
- Procurement Attorneys
- Other specialized acquisition support personnel

Our partners and stakeholders include both internal and external customers. Internally, we provide agency-wide support on acquisition and contracts management as well as quality assurance on major NAS systems contract deliverables to FAA. We are an integral part of the NextGen development and support related changes to the NAS. We will also continue to support existing FAA programs and lead the efforts in developing a competent and well-trained acquisition workforce.

Externally, we have a reporting relationship with the DOT, OIG, GAO, OMB, and Congress. Ultimately, we support the flying public as the services provided by this office are core to the maintenance of the NAS and the development of the next generation of aircraft control and safety. Finally, we support Federal taxpayers by enforcing a sound acquisition policy to deliver best value procurement actions and control of federally funded contracts for services and materials.

How Do You Know the Program Works?

For FY 2012, 90% of our critical acquisitions were on budget and schedule. Our goal is to continue to meet or exceed this percentage for FY 2013, 2014, and 2015.

In ACQ, we have undertaken initiatives that are intended to strengthen our capabilities in managing our systems acquisition programs. We have incorporated key practices into our investments and operational review processes. We have established Performance Metrics to measure the length of time taken to award particular categories of contracts. These metrics will allow us to report progress over time.

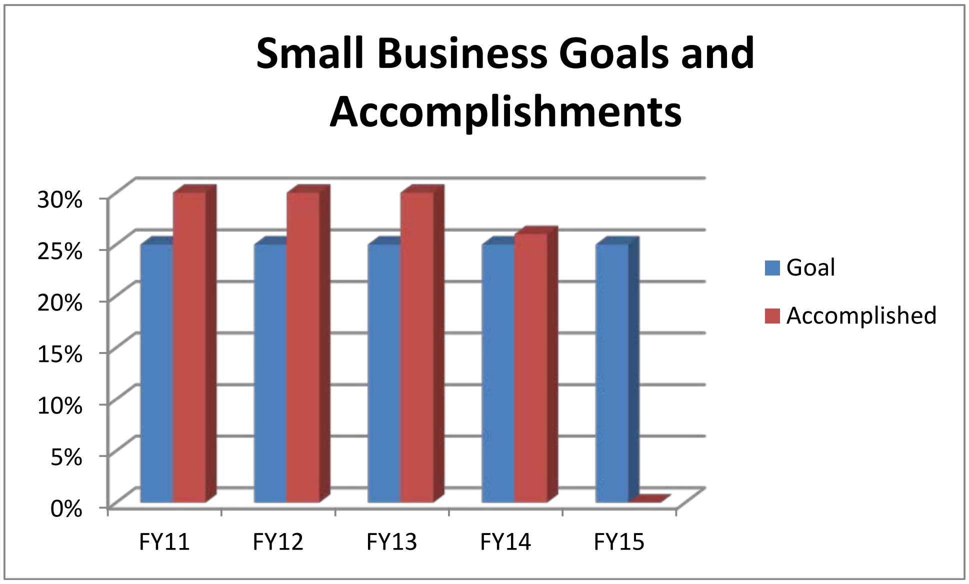
We have established mechanisms for monitoring and evaluating the effectiveness of the Small Business Program. These mechanisms will ensure FAA-wide implementation and accomplishment of the Small Business Program objectives.

Through our National Acquisition Evaluation Program, we conduct reviews of contract files to assess compliance with procurement laws, regulations, and agency policy. We share best practices and take actions to address areas requiring more focus.

We conduct customer satisfaction surveys as one means to assess quality and responsiveness in meeting Agency requirements, and we use employee attitude surveys to assess employee engagement. We have established metrics to determine the success of the Acquisition Workforce Plan which will be used to report progress over time. The metrics include counts of on-board staff, including gains and losses, and training and certification data by discipline. As of a result of our improved acquisition record, FAA was removed from the GAO's High Risk List in 2009.

UCS will allow us to easily track and monitor contract data and contract processing time. Anticipated improvements from this system will streamline document processing and storage, converting a manual process into a more efficient automated process. This will avoid time and labor costs associated with manual contract management processes as a whole. Efficiencies generated by this program will be realized across all FAA Lines of Business and Staff Offices, including budget, finance, security, and program management offices. UCS will allow FAA to make process changes and managerial decisions to improve the acquisition processes. Given the increase in workload, budget reductions that demand fewer federal staff, and complexity anticipated for the implementation of NextGen such efforts will be critically important.

We have established mechanisms for monitoring and evaluating the effectiveness of the Small Business Development Program to ensure FAA-wide implementation and accomplishment of the Program's objectives. Program metrics include the percentage of the total contract dollar obligations awarded to small businesses. In fiscal year 2013, the FAA exceeded small business goals including awards to small disadvantaged and women-owned businesses. We met the goal for service-disabled veteran-owned businesses. The effectiveness of the Small Business Program is determined by the 25% Small Business Goal achievement as indicated in the chart below. Note that as of February 2014 awards to small business are at 26%. The goal has already been exceeded.



Why do We Want/Need to Fund the Program at the Requested Level?

The development and implementation of NextGen is one of the most critical issues facing the FAA. The Agency must position itself to meet the increased acquisition workforce demands of NextGen through focused planning, competency development, and targeted recruiting and hiring. At the same time, Acquisition and Business Services must provide acquisition support to the existing NAS infrastructure and the FAA as a whole.

Acquisition of quality goods and services is a core service, integral to the support and operation of the entire FAA and as such, the work being done by this organization to a large extent supports all of the DOT and FAA Strategic Plan Goals. However, there are three goals that are specific to acquisition that are heavily supported by the Office of Acquisition and Business Services: Critical Acquisitions on Budget, Critical Acquisitions on Schedule, and Unqualified Audit Opinion which tie to the DOT goals of Organizational Excellence.

The funding in this request allows ACQ to execute contractual actions on behalf of the FAA and other external customers, conduct effective workforce planning and to train, develop, and certify personnel in key acquisition disciplines to ensure FAA has sufficient numbers of skilled acquisition professionals (current and pipeline) to successfully manage acquisitions. This funding will further allow ACQ to continue to strengthen and streamline acquisition policy and processes and provide adequate oversight of procurement actions throughout the Agency.

The FY 2015 budget request will allow us to perform our mission. Our current staff has already assumed a larger work load because of NextGen activities and increased support to the Program Management Office in the ATO. Reduction to the ACQ budget will result in: 1) bottlenecks and delays in providing procurement support to NextGen investments and other agency investments; 2) a corresponding increase in the cost of these programs; 3) a reduction in the training supplied to our workforce; 4) a reduction of our over-all capability; 5) slowing the acquisition process, and (6) increasing the financial risk to the taxpayers.

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Information Services (AIT)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$301,200**	**717**	**9**	**644**
Adjustments to Base	**+$839**			**+34**
Internal Transfer				
Annualized FY 2014 Pay Raise	+175			
FERS Contribution Increase	+710			
Annualization of FY 2014 Hiring				+40
FY 2015 Pay Raise	+729			
Hiring Restrictions	-775			-6
Other Changes	**-$9**			
WCF Adjustments	-9			
FY 2015 Request	**$302,030**	**717**	**9**	**678**

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Detailed Justification for –Information Services (AIT)

What Do I Need To Know Before Reading This Justification?

In FY 2012, AIT centralized all Information Technology (IT) functions in a single shared services organization (ITSSO) within AFN as part of its transformation of IT units spread across 11 FAA Lines of Business and Staff Offices. The ITSSO developed a 3-Year IT Strategy (FY 2013 – FY 2015) with goals, objectives and initiatives mapped to the Functional Organizational model, and IT mission, vision, operational principles and guiding values. During FY 2013 and in preparation for this realignment, AIT conducted individual Knowledge, Skills, Abilities and Interests (KASI) Assessments of all IT managers and employees across the agency. The results were then used as part of the organizational design process to help match the skills and interests/preferences of IT employees to positions within the new ITSS organization. Not only did this transformation consolidate agency-wide IT services under a single umbrella, but it also reduced redundant functions while maintaining operational excellence by ensuring the right IT professional with the right skills set is in the right role. In 2014 the ITSSO will complete implementation of its Transition plan' creating a customer driven service organization that is enterprise-centric and more efficient in its service delivery. FAA anticipates a continuing IT organizational evolution in FY 2015 necessary to provide additional efficiencies. Key initiatives and mandates that the organization must deliver include those emerging from the Open Government directive, such as: 1) cloud computing; 2) Enterprise Architecture alignment in both the National Airspace (NAS) and non-NAS environments; 3) continuing consolidation of data centers; 4) widespread deployment and use of mobile devices and increasing access to FAA data and information; 5) more effective and efficient IT solution delivery; and, 6) continued information system security protection and response by our Cyber Security Management Center (CSMC) and consolidated Information System Security (ISS) personnel.

What Is The Request And What Will We Get For The Funds?

FY 2015 – Information Services (AIT)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Information Services (AIT)	$85,855	$301,200	$302,030	+$830

The FY 2015 budget request $302,030,000 including 717 FTPs, 9 OTFTP, with 678 FTEs will support all staff and funds for the ITSSO. Base funds cover federal staff, contract IT services, purchase and maintenance costs for hardware and software technology and IT (non-NAS) infrastructure operations in Headquarters, Centers, Regions and Lines of Business field facilities. This FY 2015 request includes an increase of $175,000 to annualize the FY 2014 pay raise, $710,000 for an anticipated increase in the agency's FERS contribution, and $729,000 for the FY 2015 pay raise. The request includes a decrease of -$9,000 in anticipated Department of Transportation Working Capital Fund (WCF) charges, and -$775,000 in Hiring Restrictions. The WCF projected bill is $2,985,804 excluding fee-for-services printing and conference center usage. Funding to develop new business applications are requested by the sponsoring FAA Lines of Business (LOB) and or Staff Offices.

The ITSSO is an enterprise program that provides comprehensive, critical IT support and services to the entire FAA. The funding will allow the ITSSO to provide high-quality IT services that support FAA's LOB and Staff Office operations. The request funds identification and provisioning of innovative solutions for internal customers to cost-effectively modernize their existing technology base. It will also fund the automation of business processes that will drive further efficiencies and support the new normal in government of doing more with less.

In addition, this funding will be used to implement a master data management strategy, implement an enterprise work tracking system, grow our IT talent, manage IT assets more effectively, further our use of cloud computing, develop stronger IT governance practices, support consolidated help desk services, improve mobile access to data and services, continue the reduction of redundant applications, improve overall continuity of operations, expand business intelligence capabilities and services, and complete data center consolidation efforts.

The following chart shows the normalized budget for the FAA ITSSO:

Fiscal Year	IT Shared Services Budget
2013	$ 298,962
2014	$ 301,200
2015	$ 302,030

The goals of the ITSSO are:

- **Innovation** – Foster a culture of outside the box thinking (imaginative - innovative – creative - progressive – unconventional – forward), where IT employees are expected to implement game changing IT solutions that result in customer benefit realization.

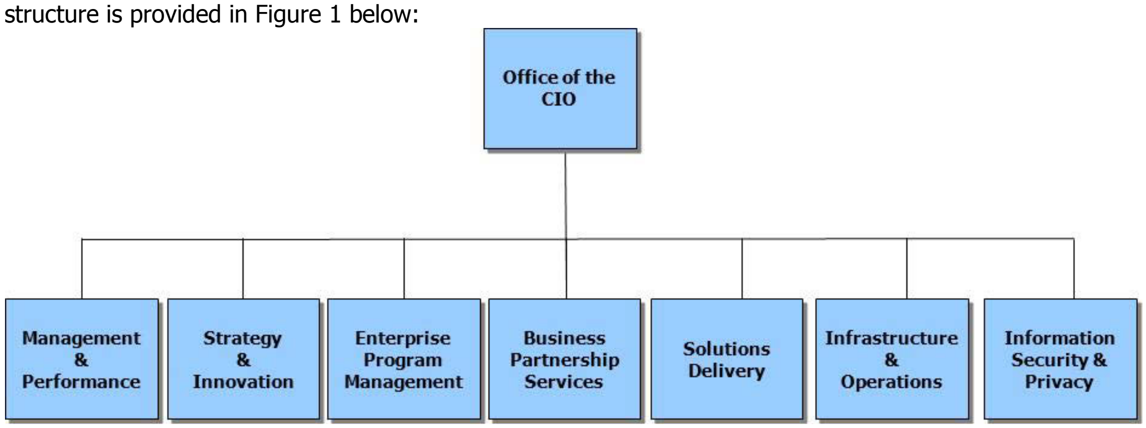
- **Customer Focus –** Treat every customer with respect and courtesy, carry an unwavering commitment to go the extra mile, and excel at customer service. Know our customers and engage them early and often as business partners to achieve the mission of the FAA. Proactively improve our products and services through an understanding of how IT can support mission performance.

- **Operational Excellence** – Provide consistent and reliable IT products and services that are continuously improved and optimized. Adopt, adapt and apply new technology to fit FAA business needs. Continually increase the effectiveness, efficiency and convenience of IT product and service delivery.

- **Organizational Excellence** – Establish and maintain a high-performing organization of highly capable, collaborative IT managers and practitioners that enables everyone to reach their full potential. Encourage learning and innovation via a culture of mutual respect, emphasizing the development of skills by sharing experiences. Attract and retain talent by encouraging professional development to foster career progression.

What Is This Program?

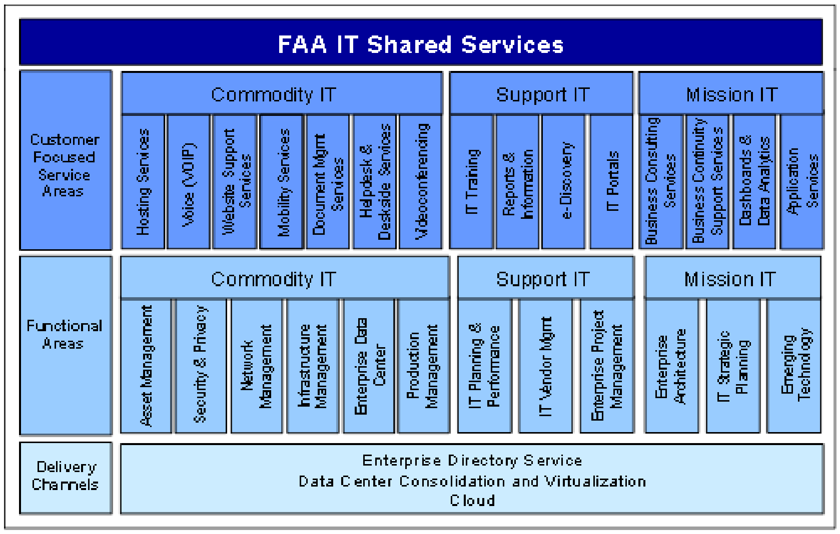
In FY 2014, the ITSSO organization will continue to be fully defined and implemented. In FY 2015, the ITSSO will be the single IT service provider to all organizations within the FAA. The ITSSO organizational structure is provided in Figure 1 below:



The ITSSO delivers IT shared services via three categories: Mission, Commodity and Support Services. The FAA Shared Services model is aligned with OMB's Shared Services Concept Overview as shown in Figure 2, mapping the initial FAA IT Portfolio of Services and supporting IT functions to the three OMB categories of IT services. In FY 2013, the ITSSO achieved an aggressive $36 million cost reduction in IT spending. As we continue to realize cost efficiencies and savings, we will reinvest savings into mission IT services allowing IT to increase its contribution toward the FAA's overall aviation mission.

We have intentionally differentiated customer-focused IT services and functions within the FAA. Some services span all categories, as the service varies according to the needs of the organization. For instance, a portion of application services are considered "mission" as the activity requires in-depth and unique needs for the business unit's mission. A portion of this service area is also considered "commodity IT" when the application requirements and development activity can be applied to needs across business units.

This chart indicates our distribution of services between Commodity, Support and Mission Services. As the ITSSO continues to evolve, this distribution may, naturally, adjust as services are consolidated and transitioned.



The transition to ITSSO requires the transformation of IT delivery channels. We will leverage Open Government initiatives such as cloud and enterprise directory service development to support increased levels of efficiency and quality of service to our customers. For example, our Enterprise Messaging Service (EMS) will be enabled by cloud infrastructure technology allowing our customers enhanced access to email and collaboration capabilities while delivering the service more efficiently.

We focus on improving collaboration, increasing remote and mobile access capabilities, delivering new applications with quality and speed, advancing business intelligence solutions, and increasing the use of video teleconferencing. We provide IT consulting services to the LOBs and Staff Offices and improve customer training services.

Since the FAA ITSSO organization is new, we have summarized below the functions of the top level organization. In addition we have aligned our top level programs and anticipated FY 2015 accomplishments to the three categories of IT services.

FY 2015 Anticipated Accomplishments:

Mission IT	
Strategy & Innovation IT Strategy • Enterprise Architecture • Agency IT Standards • Evaluation of New and Emerging Technologies	• Establish the FAA Master Data Management program • Develop a Five-Year IT Strategy and three-year strategic plan • Deliver at least two new cutting edge technology capabilities • Establish a "Think Tank" of cross cutting teams to explore new technologies
Business Partnership Service • Customer Engagement • Collect, Analyze and Coordinate Business Needs • Business Partnership Management • Training Services • Service Desk	• ITSSO is at the business planning "Table" as a collaborative customer-oriented partner • Market the value proposition of IT to better leverage existing capabilities and drive down costs • A fully implemented Customer Relationship Management Tool that provides efficiencies in solution delivery

• Desk side Services	• Improved customer communications and engagement leading to higher customer satisfaction • Meet agency performance metrics for service desk and deskside services
Solutions Delivery • Application Development • Information Delivery	• Achieve or improve cost and schedule targets • Implement new Collaboration Services including social networking • Implement Enterprise Content Management and Business Intelligence Services • Reduce email support costs post-cloud-based messaging services (SharePoint, MS 365) implementation • Continue implementation of mobile services that provide access to timely, useful, accurate, and actionable information anywhere, anytime, via any device
Commodity IT	
Information Security & Privacy (IS&P) • IT Security Policies and Governance; • Privacy Management; • Security Compliance (FISMA and C&A); • Mitigation of Security Issues; and • Security Operations	• No cybersecurity events occur that significantly disable or degrade FAA mission critical services • All mandatory statutory requirements for IT system authorizations and continuous monitoring met • All high and moderate system risk vulnerabilities due in FY 2015 closed • Unnecessary Social Security Number use eliminated
Infrastructure & Operations • Maintain Operational Environments (backbone, networks, systems, data centers, cloud) • Recovery Operations • Client Devices and Configuration Standards • Mass Storage • Backup Services	• Operate data centers, local and wide area networks at 99% uptime • Complete full implementation of an enterprise cloud solution • All IT continuity of operations plans tested • Implement enterprise-wide backup and recovery services • Implement standard client configuration enterprise wide
Support IT	
Enterprise Program Management • Program Management and Oversight • Implement Solution Delivery Life Cycle (SDLC) • Manage and Address IT Risk • Establish Standards	• Continue to improve and publish standards and guidelines for program management • Provide coaching and mentoring services to project managers • Fully use IT Portfolio Management across the ITSSO to rationalize and optimize the FAA application and solutions portfolio
Management & Performance Define and Measure ITSSO performance • Manage and Coordinate IT Audits • Hire IT Talent	• Improve IT policies, capital planning and investment control plans and assist the Agency in meeting its goal of no less than 10% variance of baseline budget for major system investments • Continue to reduce redundancy, duplication and unit costs of service delivery • Implement an independent verification & validation process • Implement a comprehensive records management plan for the FAA • Improve consistency in response to external audits • Implement a quality improvement program

Why Is This Particular Program Necessary?

IT is one of the three key components of all FAA programs along with process and people. IT provides the collection, generation, communication, analysis, management, and protection of information. IT is an

essential service which provides critical data accurately, securely, quickly, and efficiently. This service is the cornerstone to the success of programs such as Open Government, and is a component of all major, forward-looking initiatives. FAA could not operate without IT. From day-to-day regulatory and Airports grant operations on desktop computers, to eGov, weather tracking and reporting, safety inspections and enforcement in the field, cyber security, and risk analysis tools; IT touches every aspect of the FAA.
By FY 2015 the transition from nine decentralized IT groups to a shared service, ITSSO, will be complete. FAA will be reaping the benefits of centralized, standardized, improved IT processes. ITSSO will facilitate FAA in meeting the goals of OMB's 25 Point Implementation Plan and to satisfy the Federal Information Technology Shared Services Strategy. The activities conducted to date and continuing into FY 2015 will also enhance the FAA's ability to:

- Complete alignment with the evolving Federal Enterprise Architecture
- Broaden application of cloud solutions by focusing priorities on enterprise-wide cloud IT initiatives
- Comply with presidential directives on digital government in the areas of mobility, security, and online resources.

How Do You Know The Program Works?

The ITSSO is on course to enable the FAA to achieve significant improvements in the effectiveness and efficiency of service delivery, cost savings, and rapid deployment of new services. In FY 2013, the ITSSO achieved an aggressive $36 million cost reduction in IT spending. It is leveraging access to centralized expertise and infrastructure. It is enabling economies-of-scale within each IT function. Processes are being standardized and redundancies eliminated. There is a higher degree of transparency and accountability.
To ensure program success the FAA has incorporated the following best practices to establish measures and evolve performance standards with real and measurable improvements:

<u>Talent and Strengths-Based Staffing Model</u>
All Federal IT managers and staff have provided their competencies according to the IT functional model and percentages of time working in those functional areas. This enables ITSSO to estimate levels of effort required in each functional area and determine existing surpluses and gaps. Staff and managers also provided detailed personal skill area inventories including expertise levels. Results reveal that many skills map to multiple competencies. All IT employees have provided the top three functional model areas in which they would prefer to work aiding in optimal initial placement. Employee priorities, together with management and employee feedback, enable ITSSO to staff to the talents and strengths of personnel. The data enables trade-offs of higher skill level with lower level of effort. Evidence from Gallup and others show that using strength-oriented staffing practices increase productivity and decrease cycle time. By FY 2015 we will be realizing these benefits as a result of proper employee placement with the ITSSO.

<u>Service Level Agreements</u>
In order to ensure that IT services are meeting internal users' needs, the program has implemented Service Level Agreements (SLAs) that define expectations, roles and responsibilities, service level outcomes, performance metrics, and financial and staffing commitments. The SLAs provide clear, concise, and measurable descriptions of the technology services delivered by the program, and include specific performance measures, targets, and service commitments for the IT services procured and provided. Business Partners have specified what services they need, and expect the ITSSO to take responsibility for meeting those requirements. The ITSSO will have its performance evaluated objectively as SLAs establish measurable criteria.

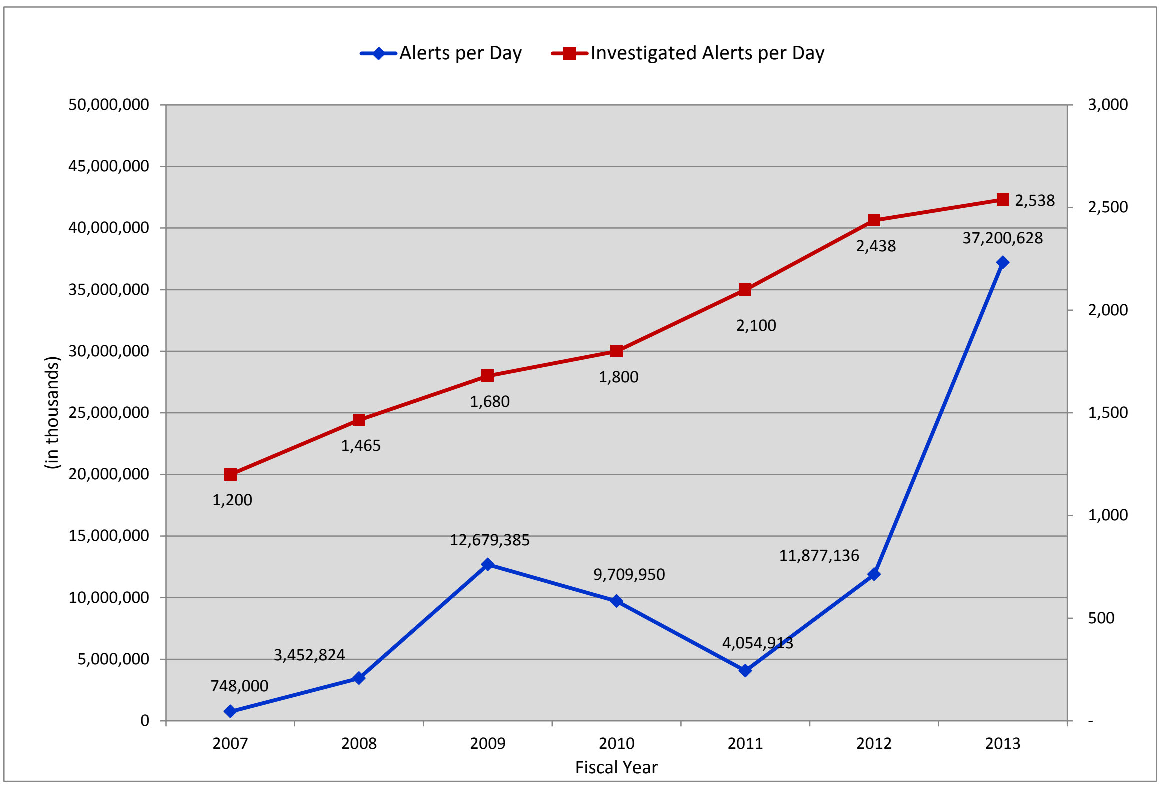
<u>Establishing Baseline and Evolving Performance Standards</u>
The SLAs establish IT performance baselines as standards. ITSSO is committed to evolve IT product and service performance standards to be comparable to or exceed industry standard performance over the next few years. Annual adjustments will allow the SLAs to be living, mutually agreed upon documents that provide objective measures of ITSSO improvement and inputs to plan for the FAA's evolving IT requirements.

<u>FAA IT Enterprise Program Management Office (IT EPMO)</u>
The FAA has implemented IT enterprise program and project management guidance, and identified program and project managers who undergo regular training to ensure continual improvement. We are coordinating

effective communication, implementing standardization, and establishing a formal IT portfolio management process. The IT EPMO is maturing, and by FY 2015 will be managing risk at an enterprise level. The IT EPMO is responsible for SLA oversight and enforcement, and, in turn, will be responsible to external governing boards.

<u>ITSSO Performance Metrics</u>
The ITSSO has established performance metrics for some key service delivery areas. These metrics include: service desk response time and quality, infrastructure availability, PIV card usage, reduced sign on, degraded performance security events, and customer satisfaction. ITSSO will establish and use appropriate performance metrics for each primary and secondary functional group to demonstrate objective achievement annually and improvement across time. These metrics will track efficiency and effectiveness gains, enable identification of additional cost savings and help to improve customer satisfaction.

<u>CyberSecurity Management Center (CSMC)</u>
The CyberSecurity Management Center (CSMC) has effectively tested a shared services model over the past six years. During that time, the CSMC has successfully consolidated cybersecurity services for multiple agencies via a closely monitored, cost effective approach to achieve its mission of "No cyber security events that disable or degrade IT systems" while lowering overall and per-capita program costs. This has been accomplished by an increasing use of services such as rolling vulnerability scans to protect systems that face a greater number of increasingly sophisticated attacks. The chart below indicates the increasing number of alerts to which the CSMC has responded. Note the "investigated alerts" line that shows an upward trend from 2007 through 2013. Also note that in FY 2013 the large spike in alerts per day is due to an increase in ATO host alerts (Windows events), the addition of ATO's software devices that collect alerts, and the addition of all of ARC's systems into the CSMC ArcSight software. Results provided a more complete set of data for FAA.



The FAA has incorporated the best practices of the CSMC and similar public and private industry leaders to implement a rigorous performance-based framework to test, monitor, and adapt the IT Shared Services program to achieve measurable cost efficiencies and program effectiveness.

FAA and Other Government and Private Shared Services Transformations:

The FAA is applying successful approaches and learning from the challenges of previous Government and private sector shared services transformations with the intent of achieving improvements in efficiency and quality of service. ITSSO is building upon lessons learned and benefits achieved from the Finance and Acquisition Shared Service transformations in FY 2012.

Why Do We Want/Need To Fund The Program At The Requested Level?

FAA requires requested operational funds to continue the newly implemented ITSSO operations, to begin the process and outcome improvements identified and designed in FY 2014, and to continue identifying and implementing effective and efficient improvements. Investments in ITSSO in FY 2013 and FY 2014 will continue to increase IT efficiency and quality of service in FY 2015.

Efficiency investments to be continued in FY 2015 include: IT systems consolidation (eliminating redundant and overlapping systems), IT contract consolidation, an enterprise approach to software license consolidation, increased use of video conferencing to sustain reduced travel costs, improved performance from optimized staff allocation in accordance with talents and strengths, reduced costs from consolidation of asset and inventory systems, reduced costs from better energy management, and improved process efficiencies from deliberate, collaborative IT process improvement projects.

New initiatives to increase IT efficiency include implementing:

- A Master Data Management strategy to guide long term system/service and security architecture, reduce master data sources, support the mobility strategy by identifying and making accessible data and information that the public wants, and support enterprise content management including records management;
- Focused innovation efforts to develop IT to-be enterprise architecture components; implementing economy of scale IT services; and rapid, effective transition to use emerging technologies that will improve FAA business results while reducing their cost and cycle time;
- Service quality improvements to customers including: 1) enhanced business partnering processes that initiate dialogs about potential technology improvements; and, 2) improved information security from providing standardized, higher quality, and economy-of-scale common controls, processes and cyber security staffing; and
- Improving capabilities of the IT workforce, building on FY 2014 management and staff optimization assignments and hiring practices. In FY 2015, IT practitioners will be provided clear career paths and improved access to coaching, mentorship, focused role-specific skills acquisition events, and peer learning opportunities.

The FAA is committed to IT transformation success and has reinforced this commitment in continuing FAA senior leadership communications. The future of the ITSSO is dependent on this commitment from cultural as well as funding perspectives. Without appropriate funding of the ITSSO program, the FAA may not be able to achieve long-term cost savings and service quality improvements.

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Regions and Center Operations (ARC)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$297,862**	**582**	**9**	**561**
Adjustments to Base	**+$794**			**-21**
Internal Transfer				
Annualized FY 2014 Pay Raise	+127			
FERS Contribution Increase	+710			
Annualization of FY 2014 Hiring				-17
FY 2015 Pay Raise	+484			
Hiring Restrictions	-527			-4
Other Changes	**+$289**			
WCF Adjustments	+289			
FY 2015 Request	**$298,945**	**582**	**9**	**540**

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Detailed Justification for –Regions and Center Operations (ARC)

What Do I Need To Know Before Reading This Justification?

ARC provides ongoing regional facility and emergency operations, training, logistics support, and other critical services to both internal and external customers for the FAA. FAA real property management, logistics/material management, and personal property management functions are now consolidated and fully aligned under ARC. The Deputy Assistant Administrator for Regions and Center Operations has the role and responsibility of Property Management Officer for FAA as currently defined in FAA Order 4600.27A "Personal Property Management."

What Is The Request And What Will We Get For The Funds?

FY 2015 – Regions and Center Operations (ARC)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Regions and Center Operations (ARC)	$313,617	$297,862	$298,945	+$1,083

For FY 2015, $298,945,000, 579 FTPs, and 540 FTEs are requested for FAA's Deputy Assistant Administrator for Regions and Center Operations. The request provides for salaries and benefits, annualized pay, and other adjustments. The request includes an increase adjustment of $288,693 in anticipated Department of Transportation Working Capital Fund (WCF) charges. The WCF projected bill is $6,242,838 excluding fee-for-services printing and conference center usage.

Function	Functional Description	Key Actions
Facilities	Oversee and manage infrastructure operation and maintenance programs in Washington, DC, regional office facilities, and the MMAC	• Maintain a safe, secure, professional, and environmentally compliant work environment for FAA employees, contractors and tenant organizations.
Regional Operations Centers	Operate Regional/Center Operations Centers (ROCs)	• Provide 24/7, immediate command, control, and communications for all incidents related to National Airspace System (NAS) continuity.
Real Estate / Material Management / Personal Property	Provide real estate, material, and personal property management	• Manage a portfolio of real property assets exceeding $9 billion; • Manage FAA personal property assets valued at $11.4 billion from capitalization to disposal; and • Provide policy and oversight as the FAA Property Management Officer.
Horizontal Integration	Provide integration services for FAA-wide projects to address congestion and flight delays	• Identify and coordinate expert resources within the Agency; • Ensure successful, on-time completion of large-scale aviation projects; and • Ensure compliance with Federal and State legislation, identify political impacts, recommend strategies for conflict resolution, manage FAA communications / expectations among aviation organizations, and develop collaborative internal and external partnerships.

Function	Functional Description	Key Actions
Logistics	Provide parts and logistics services in support of the National Airspace System (NAS).	• Repair, modify, and overhaul quality products to meet NAS requirements; and • Manage all National Stock Numbers for NAS equipment from point of acquisition or repair through to customer use and return.
Training	Provide technical training at the FAA Academy for safety-related occupations.	The Academy has 306 Classroom/Labs to provide Resident training for approximately 1,700 scheduled classes which trains 20,000 students each year including Air Traffic Control (ATC) new hires. Student Customer Satisfaction each year averages 95% favorability rate.
Information Technology / Financial Services	Conduct financial operations and system support at MMAC	• Provide financial services processing and reporting of financial information, including accounting data, for FAA, DOT, and other federal government agencies.
Acquisition	Conduct MMAC acquisition activities	• Acquire service and construction contracts for NAS customers valued at approximately $1 billion annually.

What Is This Program?

As an integral part of AFN, the Office of the Deputy Assistant Administrator for Regions and Center Operations (ARC) provides critical business and aviation leadership, integration, and other services to internal and external customers.

ARC offices are located at the Washington headquarters, each of the nine regions, and the MMAC in Oklahoma City, Oklahoma, and we are responsible for:

- Overseeing and managing infrastructure operation and maintenance programs in Washington, D.C., nine regional office facilities, and the MMAC;
- Operating Regional/Center Operations Centers that provide around-the-clock, immediate command, control, and communications for all incidents related to NAS continuity;
- Conducting acquisition, real estate, material management activities, and identifying excess real property assets that are candidates for disposal, termination, replacement, renovation, or transfer;
- Managing payments on all General Services Administration (GSA), FAA Office of Security and Hazardous Materials (ASH), FAA Office of Aviation Safety (AVS) leases, including rent, operational costs, taxes, utilities, and guard services;
- Providing the architecture and design technical support to all HQ and Regional administrative facility projects. This office provides project management, architecture and design review, engineering, and oversight, including the Southwest Regional Office scheduled for completion in FY 2016, and the Northwest Mountain Regional Office scheduled for completion in FY 2017. These prospectus projects will consolidate space used to house approximately 3,300 employees;
- Providing personal property policy and guidance as the Property Management Officer;
- Serving as the Agency focal point for the Chicago O'Hare International Airport Modernization Program;
- Providing national leadership for the Air Tour Management Plan (ATMP) program and supporting environmental streamlining efforts and noise issues;
- Providing parts and logistics services in support of the National Airspace System (NAS);
- Conducting introductory resident training for all Air Traffic Control (ATC) new hires and follow-on courses at the FAA Academy consistent with the ATC Workforce Plan;
- Conducting financial operations and system support for FAA, the DOT, and other Federal Government agencies through the Enterprise Service Center; and
- Delivering technical training, and related support services for the agency and other aviation organizations.

We provide mission support to all DOT goals, specifically those supporting Organizational Excellence. ARC plays a critical role in FAA's overall emergency preparedness by coordinating programs and exercises aimed at increasing emergency response readiness and capability. The ROCs are 24/7 information and communications hubs that provide voice and data dissemination necessary to direct management and operation of the NAS. ROCs and Cornerstone Regional Operations Centers (C-ROCs) coordinate communications response for aircraft accidents, emergencies, missing aircraft, hijackings, security threats, facility and system outages, airport closures, severe weather impacts, earthquakes, and public information requests and complaints.

ARC facility and real estate offices are responsible for the acquisition of leases and operations and maintenance of 150+ administrative facilities that house all Lines of Business--safety, legal, contracting, human resource, operational, and regional personnel--throughout the NAS. The operation and maintenance of these facilities include rent and lease contracting, program oversight, guard services, utilities, environmental monitoring and occupational safety and compliance audits, sustainability (greening) efforts, emergency training and coordination, and ongoing repairs and renovations.

ARC is responsible for maintaining the DOT-wide real property asset portfolio and all data associated with more than 60,000 buildings, structures, and land parcels encompassing over 26 million square feet of space.

Regional Administrators and their staffs represent the Agency in regional contacts with military services, aviation industry, government agencies, aviation organizations, elected officials, educational institutions, and civic and private groups. The Regional Administrators serve as the local corporate representatives for the FAA Administrator. Along with their staff, they are responsible for communicating with FAA's internal and external customers, disseminating information, and answering inquiries. ARC works closely with state and local aviation organizations, both public and private, on aviation topics of mutual interest and promotes aviation careers through relationships with educational institutions.

The Regional Administrators and Center Directors serve as the senior Agency aviation officials in the regions/centers, providing cross-functional oversight and integration for the Agency, as well as leadership for the Lines of Business support programs. ARC ensures Horizontal Integration for large-scale aviation projects that reduce congestion and flight delays. Our personnel provide leadership and coordination for teams from various FAA lines of business and external stakeholders on projects such as the New York Area Program Integration (LaGuardia, John F Kennedy International and Newark Liberty International airports), O'Hare Modernization Program, Philadelphia International Airport Capacity Enhancement Program, and Houston Airspace Expansion Plan. All of these projects directly relate to NextGen initiatives that will reduce flight delays and congestion in the National Airspace System.

The FAA Academy at the MMAC in Oklahoma City is the primary provider of technical training for the Agency and is the largest training facility within the DOT. The FAA Academy delivers training and related support services to the Agency and other aviation organizations, both domestic and international.

Anticipated FY 2015 Accomplishments

Function	Anticipated FY 2015 Accomplishments
Facilities	• Integrate environmental, occupational safety and health requirements, minimize pollution and waste, conserve natural resources, and prevent injury and illness while at work through utilization of a Quality Management System with management reviews and internal and external audits.
Regional Operations Centers	• Conduct two successful 8-hour national C-ROC/ROC simultaneous transfer of operations exercises with all regions to maintain and enhance emergency preparedness; and • Conduct yearly test transferring DOT Crisis Management Center (CMC) system to the DOT alternate site as the Southern Region's C-ROC transfers its operations to another operations center.
Real Estate Management and Acquisition/ Material	• Ensure that all FAA employees engaged in real estate are trained in the latest real estate law and policies throughout the real property

Function	Anticipated FY 2015 Accomplishments
Management	lifecycle; • Realize savings of the annual real property lease and purchase costs through improved business processes; • Develop and deliver corporate materiel and personal property training to ensure competency of Logistics Management Specialists; • Standardize the knowledge and skills required to serve as a Personal Property Custodian or Delegate within the agency; • Complete 95 percent of the annual real property inventory target and report to DOT; and • Improve contract cycle time and quality of contracting office support • Deploy FAA's Utility Management Program Office Pilot to 1.) collect and manage utility information, 2.) improve utility contracting execution (e.g., reduce billing errors, acquire competitive rates), and 3.) provide actual consumption data to respective lines of business (LOBs) to manage the performance and evaluate future projects. The first year is expected to result in ~2-3% utility savings and ~1-2% each year after, if utility information is consistently benchmarked and managed.
Training	• Conduct 100 percent of planned, programmed, and funded ATO Technical Training courses (100 percent of Air Traffic initial qualification); and • Ensure ATO/AVS training continues to meet FAA requirements and is NAS-compliant
Information Technology / Financial Services at MMAC	• Manage overhead costs through establishment of targets and monitoring; • Improve service provision through timely mitigation of audit findings focusing on strengthening processes and closing process gaps; and • Maintain 99.5 percent availability for IT systems as defined in service level agreements with customers.
Logistics	• Increase cumulative fill rate for stocked items (expendable items and repaired items); • Ensure full implementation of commercial-off-the-shelf software solution and integration with existing business applications; and • Use root cause analysis, trending, and action plan tools to decrease defective parts while improving quality of assets provided to technicians.

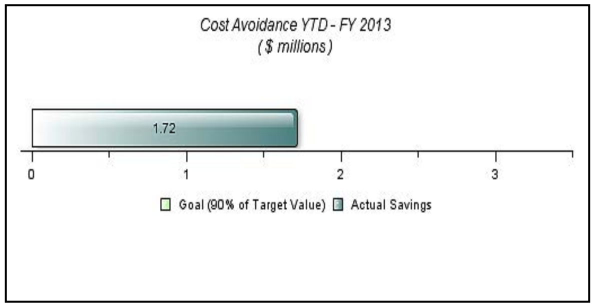
Why is this Particular Program Necessary?

We provide a variety of real estate and personal property management services in support of the FAA. As part of the shared services realignment, personal property, government furnished equipment, and logistics/material functions were consolidated under ARC from multiple organizations in order to gain efficiencies and reduce redundancies.

We also have lead responsibility for the Federal Real Property Asset Management throughout the life cycle process. ARC maintains the Department-wide inventory of real property and the data and performance measures associated with more than 60,000 buildings, structures, and land parcels. Federal real property is tracked in FAA's Real Estate Management Program, which also is the repository for DOT's entire real property inventory. We have made steady progress in disposing of assets that are surplus, in poor condition, or are under-utilized. Since 2006, these efforts have resulted in the removal of more than $495 million of real property assets from the FAA portfolio and have reduced the Agency's operation and maintenance costs by more than $71 million.

REMS Inventory

	FAA	Non-FAA	Total
Land	7,004	17	**7,021**
Buildings	10,968	444	**11,412**
Structures	42,765	91	**42,856**
Total	**60,737**	**552**	**61,289**



As part of our real property management responsibilities, we establish service level agreements with our customers. This includes funding administrative space leases within each of the nine regions administered by the GSA and field facilities for the Agency's Office of Aviation Safety (AVS) and Office of Security and Hazardous Materials Safety (ASH) organizations creating an economy of scale.

Our facilities management staffs provide administrative and operational support for FAA employees at Headquarters and at the regional level. These facilities, located throughout the nation, house approximately 20,000 personnel in 5,226,429 square feet. Although designated as administrative space, these facilities are for personnel that directly support NAS safety and operations. There are 49 GSA leases in 18 states and the District of Columbia and 130 direct leases across the nine regions for safety, security, and airports personnel.

ARC support provides for monitoring all GSA building operations activities; managing the nationwide rent, personal property, and government furnished property programs; and managing the motor vehicle program, parking, and transit benefits. We also manage the Agency's mail and printing program, the graphics department, the National Wireless Program, and the design and construction of all space occupied by the FAA. Additionally, ARC is responsible for the safety and well-being of FAA employees by providing building security, emergency evacuation plans, and monitoring and addressing safety and environmental issues in the buildings. Equally important, our management oversees the maintenance customer service desk, janitorial requirements, building repairs, and maintenance. The goal is to provide efficient, multifaceted facilities management services that are innovative, environmentally responsive, and cost effective in support of FAA's mission and goals.

For example, in FY 2013 we ensured that all Real Estate Contracting Officers, Realty Specialist and employees identified to support Real Property, receive training in accordance with AMS requirements. FAA recognizes the austere budget environment and is supportive of OMB's Memorandum "Freeze the Footprint" to reduce the Federal footprint to manage total square footage usage and spending. We have implemented space standards across the agency to gain efficiencies, minimize our occupancy and overall costs. The FAA has planned several consolidations over the next two fiscal years, which will provide the agency with cost savings. The lease consolidations include:

- Dallas/Fort Worth Safety Office into the Western Pacific Regional Office in March 2013 with an annual savings of $2.7 million.
- The National Flight Simulator Program Office into the Southern Regional Office in May 2013 for annual savings of $336,000.
- Lexington Flight Standards District Office into the New England Regional Office in June 2013 for annual savings of $396,000.
- LAX Basin and System Support Center (SSC) leases to be consolidated into the Western Pacific Regional Office for annual savings of $336,000 and $414,000 in FY 2013 and FY 2014 respectively.
- New York Airports District Office into the Eastern Regional Office in December 2014 for annual savings of $172,000.
- Multiple LOBs in the Alaska Mod G Annex into the Alaska Regional Office in August 2014 for annual savings of $428,000.

We are currently in process with similar consolidations in our Northwest, New England and Southern regions and are working collaboratively with GSA on a Client Portfolio Plan to identify additional areas for increased efficiencies, consolidation and savings.

There are two major Regional Office consolidations in process:

- The new Southwest Regional Office building located in Fort Worth, TX is scheduled for completion and occupancy in FY 2016. The consolidation of multiple buildings into the Regional Office improves the space utilizations from almost 180 square feet per person to less than 150 square feet per person for 1,600+ FAA personnel in all lines of business.
- Additionally, the Northwest Mountain Regional Office building prospectus project is underway and the facility is scheduled for occupancy in FY 2017. The consolidation of five leases into the new facility improves the space utilization rate significantly.

The FAA Logistics Center (FAALC), located at MMAC, is the primary provider for parts and logistics services in support of the NAS. The FAALC manages the central NAS inventory warehouses and distribution facilities for FAA, providing routine and emergency logistics products and services to over 8,000 FAA customers at 42,000 facilities and 28,000 sites, as well as to the Department of Defense (Air Force, Navy, and Army), Department of Homeland Security (Customs and Border Protection), state agencies, and foreign countries. The FAALC provides core logistics support functions to the NAS, including:

- Supply chain management, for approximately 62,000 National Stock Numbers (NSNs), with a net operational inventory value of $580 million;
- Centralized depot-level overhaul, maintenance and repair of NAS equipment, and on-site overhaul and maintenance for certain large systems such as towers and radar arrays;
- Storage and distribution management of NAS assets with 725,000 square foot of centralized warehouse space;
- Depot-level engineering support; and
- Agency focal point for depot-level integrated logistics planning and implementation for NAS acquisition programs.

Air traffic control systems use the products managed and repaired by the FAALC to ensure the safe and effective movement of aircraft through the NAS. The Agency is continuously seeking to improve its core logistics support functions, striving to reduce NAS asset delivery times and improve repair item quality. Business management improvements and cost efficiencies will be achieved at the MMAC by replacing the primary automation system that supports FAALC service operations, the Logistics Inventory System (LIS). Expanding and improving system capabilities and performance will reduce operating costs by right-sizing the Agency's spares inventory, better managing depot throughput, and increasing visibility into vendor and parts performance. The FAALC is taking the lead in applying 2-D barcode technology to improve NAS asset visibility and tracking throughout the supply chain. Life-cycle logistics support is critical to the efficient, effective, and safe operation of the NAS. As the Agency moves toward NextGen technology, a fully-integrated logistics support approach is vital to ensure operational efficiency well into the future.

How Do You Know The Program Works?

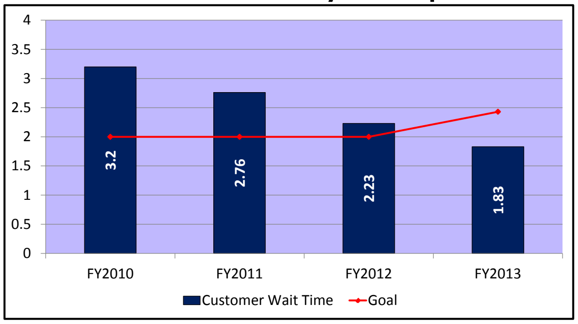
A number of key performance measures are used to determine if projects are achieving their objectives. Improvement projects are prioritized and selected based on their potential contribution to our objectives. Customer satisfaction surveys are routinely distributed and gathered for feedback, and we continue to act upon that feedback always looking for ways to proactively address our customers' mission needs. Several industry best practices provide a framework for monitoring process performance. Hundreds of process measures are captured and reviewed for trends to assess effectiveness. Quarterly management reviews are held to ensure policy and management systems remain suitable, adequate, and effective. Our challenge will be to maintain quality, service, schedule, and performance while managing an increasing workload with fewer resources.

FAA Logistics Center - NAS Logistics Support Function

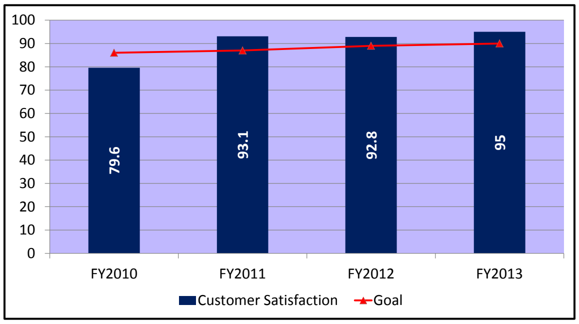
The FAA Logistics Center provides Supply Chain Management activities for the FAA's National Airspace System (NAS), DoD (Common systems support), Customs and Border Protection Mobile and Fixed Tower Surveillance Systems, as well as 26 foreign countries. Activities include centralized Distribution/Storage of assets, maintenance/repair/overhaul of systems, and specialized field site services for large electro mechanical installations, radome repair/painting, and tower inspection/repair.

The Logistics Center continuously measures operational performance through a variety of weekly and monthly performance and financial reviews. Performance targets are established prior to the beginning of each fiscal year and monitored continuously throughout. Action plans and activities are developed in association with those reviews to maintain and improve the efficiency and cost effectiveness of Logistics Center operations. Below are two of the key operational metrics through FY 2013:

Customer Wait Time on Priority One Requisitions:



Customer Satisfaction Index:



<u>Enterprise Services Center (ESC) Function</u>

Operational Metrics:

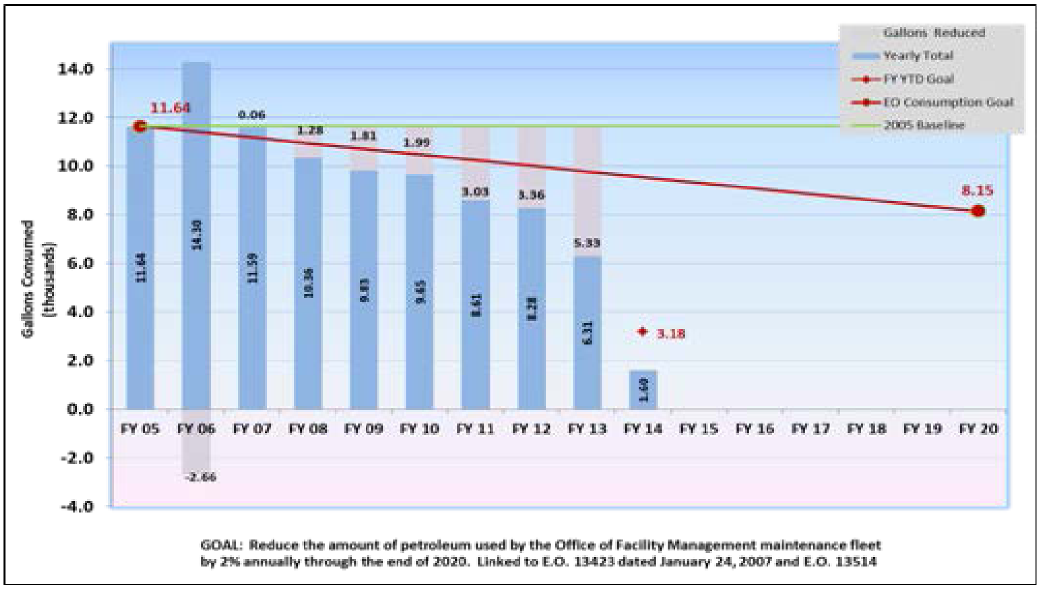
The ESC has exceeded key operational metrics for the first six months of FY 2013. Metrics include:

- 98% of year-to-date commercial payments are paid within 30 days of receipt
- 97% of travelers are reimbursed within 8 calendar days of receipt of proper documentation by the accounting office
- Delinquent Accounts Receivable from the public >180 calendar days are <=0.15% of the total balance
- Overall system availability during core business hours of 99.5%

Reduction in Petroleum Consumption:

To meet the goals specified in E.O. 13423 and 13514, the MMAC has achieved reductions in the amount of petroleum used by the facility maintenance fleet each year since FY 2005.

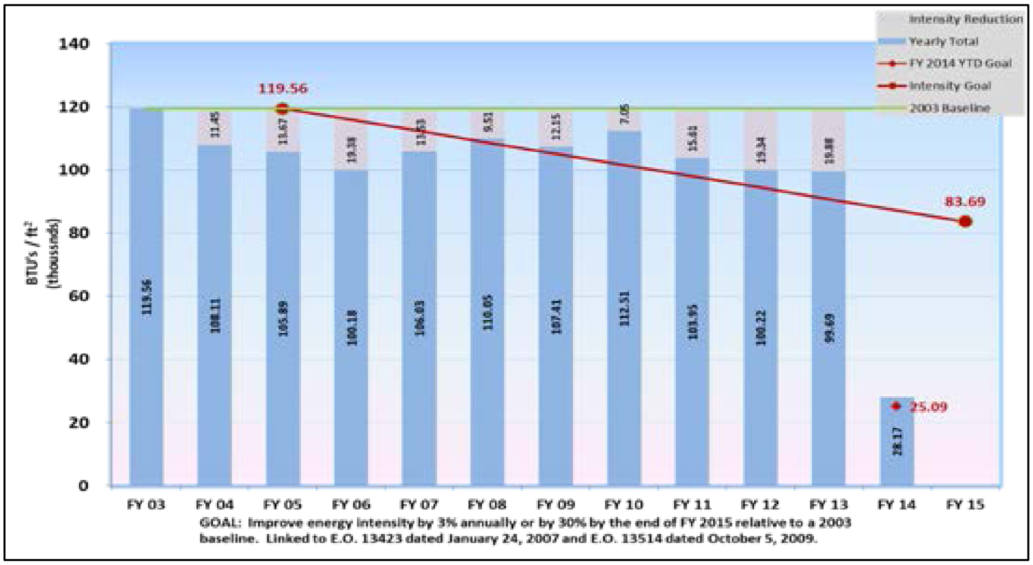
MMAC Petroleum Consumption
FY 2005-FY 2020



Energy Conservation:

Executive Order 13514 requires federal agencies to reduce energy consumption by 30% through the end of FY 2015, as compared to energy consumption in FY 2003. In FY 2013 this equates to a target reduction of 24%. Since FY 2003, MMAC has achieved significant reductions in energy consumption.

MMAC Energy Intensity
FY 2003-FY 2015



Why Do We Want/Need To Fund The Program At The Requested Level?

Executive branch departments and agencies are required to establish clear goals and objectives to promote the efficient and economical use of America's real property assets and to assure management accountability for improving Federal real property management. The FAA has the lead responsibility for the DOT, and within the FAA, ARC leads the Federal Real Property Asset Management initiative. ARC maintains the Department-wide inventory of real property and the data and performance measures associated with more than 60,000 buildings, structures, and land parcels. Federal real property is tracked in FAA's Real Estate Management Program (REMP) which also is the repository for DOT's entire real property inventory. Assets that are surplus, are not mission critical, are in poor condition, are under-utilized, and/or reflect high annual operation and maintenance costs are considered candidates for disposition. Between FY 2006 and FY 2013, the Agency has disposed of more than 15,000 real property assets with an equivalent replacement value of $495 million and has reduced the Agency's operation and maintenance costs by more than $71 million. Savings resulting from the disposition of property have been applied toward updates, upgrades, repairs, and renovations of current assets. Funding reductions would jeopardize this effort's ongoing success.

ARC is also responsible for leading and integrating logistics initiatives and real property management in support of FAA and DOT. ARC's facility management responsibilities include planning, programming, policies, and processes associated with Washington DC Metropolitan Area FAA buildings and structures including building security, parking management, and space and property management. ARC is also responsible for funding administrative space leases within each of the nine regions administered by the GSA, in addition to field facilities for the Agency. Most of the leases contain early termination penalties and escalation clauses placing additional financial pressure on the Agency.

ARC's role as the Horizontal Integrator provides the ability to move swiftly within the FAA's larger vertically integrated business units to identify and coordinate expert resources within the Agency to move large-scale aviation projects forward and facilitate communications across multiple government branches or with external stakeholders. This includes working cross-functionally and developing solutions to remove project roadblocks, ensuring compliance with Federal and State legislation, identifying political impacts, recommending strategies for conflict resolution, managing FAA communications/expectations among aviation organizations, and developing collaborative internal and external partnerships.

The request of $298 million supports $235 million in rental costs and operating expenses for existing space and leases and funding for on-board personnel expenses. The balance of our request funds training, mail and printing services throughout the regions and Headquarters, and payments to the DOT working capital fund.

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Explanation of Funding Changes

	Dollars ($000)	FTE
Finance and Management	**+$2,585**	**+24**
Overview: For FY 2015, the Assistant Administrator for Finance and Management (AFN) requests $765,047,000 and 1,682 FTE to meet its mission. The FY 2015 request level reflects funding for adjustments to base and other adjustments.		
Adjustments to Base	**+$2,305**	**+24**
FY 2015 Pay Raise: This increase is required to provide for costs associated with base salary increases. (January to September) resulting from the proposed government-wide pay raise. The factor used is (0.75) of 1.0 percent.	+1,674	
Annualization of the FY 2014 Pay Raise: This increase is required to provide for the remaining quarter of the FY 2014 government-wide pay raise of 1.0 percent. The factor used is (0.25) of 1.0 percent.	+424	
FERS Contribution Increase: OMB Circular A-11 has increased the agency's contribution rates to the FERS retirement system. This increase in cost to the FAA represents the increased rates for both Air Traffic Controllers and other agency employees.	+2,004	
Annualization of FY 2014 Hiring: This increase in FTE's is required to cover the increased staff hired during FY 2014 but were on board for only a portion of the year. No funding is necessary for the additional FTE's since the added cost is offset by the savings due to the new hires having a lower payroll cost than the staff they are replacing.		+38
Restricted Hiring: It may be necessary to slow down hiring during FY 2015 if the planned hiring for FY 2014 is achieved. The restricted hiring will mean that we may not meet the staffing levels called for in the Air Traffic Controller and Safety Workforce Plans.	-1,797	-14
Other Changes	**+$280**	
Working Capital Fund: This cost adjustment is requested to support the Department of Transportation's (DOT) Working Capital Fund (WCF) profile. These adjustments are being made to best align each office's resources within their expected WCF costs.	+280	

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NEXTGEN (ANG)

NextGen and Operations Planning (ANG)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$59,696**	**201**	**7**	**191**
Adjustments to Base	**+$77**			**+14**
Internal Transfer	-148			
Annualized FY 2014 Pay Raise	+50			
FERS Contribution Increase	+193			
Annualization of FY 2014 Hiring				+15
FY 2015 Pay Raise	+163			
Hiring Restrictions	-181			-1
Base Transfers	**+316**			
Technical Center Guard Services	+316			
FY 2015 Request	**$60,089**	**201**	**7**	**205**

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Executive Summary: NextGen and Operations Planning (ANG)

What Do I Need To Know Before Reading This Justification?

On September 19, 2011 Congress approved FAA's request to create the Next Generation Air Transportation System (NextGen) Organization and move associated personnel and resources from the Air Traffic Organization (ATO) to the NextGen Organization.

What Is The Request And What Will We Get For The Funds?

The Office of the Assistant Administrator for NextGen requests $60,089,000 and 201 FTP / 205 FTE in FY 2015 to further the successful transition to NextGen.

What Is This Program?

Realizing the future vision of aviation through integrated strategies and solutions that achieve national and international goals encapsulates the mission of the ANG organization. The organization champions the evolution of NextGen through program management, enterprise system engineering, and technical integration expertise. The William J. Hughes Technical Center (WJHTC) is FAA's national scientific test base for the research, development, test, and evaluation of air transportation systems. The research, engineering, testing and prototype development conducted by WJHTC staff helps shape the future of our Nation's air transportation system and make NextGen a reality.

Why Is This Particular Program Necessary?

Managing program performance and resource utilization, analyzing and measuring implementation benefits and testing new NAS capabilities are all essential elements of a successful transformative program. Program benefits assessment and resource management elements perform continuous analyses to support optimal NextGen resource investment decisions. The WJHTC is the FAA's institution for the research, development, test, and evaluation of air transportation systems. As the Agency's Federal Laboratory it is the principal source for conducting NextGen research, test, and evaluation. The anticipated benefits of NextGen cannot be realized without the comprehensive research conducted at the WJHTC.

How Do You Know The Program Works?

The successful research, development, testing and evaluation leading to deployment of NextGen systems and capabilities is one measure that demonstrates that this program works. Other measures include Research and Development accomplishments indicated in the R&D Annual Review document published with the National Aviation Research Plan (NARP), 24x7x365 second level support of the National Airspace System (NAS), and Technology transfer of research to industry and academia via Cooperative Research and Development Agreements and Grants.

Why Do We Want/Need To Fund The Program At The Requested Level?

Nearly 41 percent of ANG's Operations budget is for payroll. The requested FY 2015 level for Operations funding covers the salaries of personnel assigned to NextGen. In addition, annual operations and maintenance costs for WJHTC are approximately $26,342,000 or 43 percent of ANG's operations budget. Non-pay costs are primarily for management of WJHTC properties that provide the necessary technical platforms for research, development, and testing of NextGen programs, as well as the around the clock operational support to En Route, Terminal, and other Air Traffic Control (ATC) facilities throughout the nation.

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Detailed Justification for – NextGen (ANG)

What Do I Need To Know Before Reading This Justification?

On September 19, 2011 Congress approved FAA's request to create the Next Generation Air Transportation System (NextGen) Organization and move associated personnel and resources from the Air Traffic Organization (ATO) to the NextGen Organization.

What Is The Request And What Will We Get For The Funds?

FY 2015 – NextGen and Operations Planning (ANG)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
NextGen and Operations Planning	$56,989	$59,696	$60,089	+$393

*FY 2014 includes below threshold funding adjustments

The NextGen Organization requests $60,089,000 and 201 FTP / 205 FTE to further the successful transition to NextGen. This funding profile reflects the following adjustments:

- Base adjustments for pay inflation and hiring restrictions (+$225,000).
- Base transfer to NextGen for the William J. Hughes Technical Center (WJHTC) Security Guard Contract (+$316,000 non-pay) from ATO-Technical Operations (AJW).
- Internal Transfer from NextGen (-$148,000) to Office of Commercial Space Transportation (AST).
- In FY 2014 Congress moved the Joint Planning and Development Office (JPDO) from the Research, Engineering and Development (R,E&D) account into the Operations account. For FY 2014, ANG was funded at the requested level, and included absorbing all funding for the personnel and the activities of the JPDO, resulting in an increase of 11 FTEs and FTPs. For FY 2015, ANG would continue to absorb the personnel costs associated with the JPDO, while some of the interagency collaboration activities would be addressed through funding in F&E Activity 4.

FY 2015 anticipated key outcomes:

- Continued NextGen Program Performance measurement and benefits analyses.
- Development and coordination of next issue of the NextGen Implementation Plan.
- Provide the technical platform for research in aircraft safety (fire, structural, unmanned aircraft systems, etc.), airport technologies (safety, capacity), human factors, and weather.
- Provide laboratory systems for:
  - Conducting integrated concept evaluations, modeling and simulations, and test and evaluation for all NextGen technologies in the National Airspace System (NAS).
  - 24x7x365 field support for all operational systems within the NAS.
- Provide analytical studies and related safety monitoring services in support of separation reductions in U.S. sovereign airspace, international airspace where FAA has delegated authority to provide air traffic services, and international airspace where the U.S. and its citizens have safety-related interests.
- Conduct the bi-annual review of the Performance of Reduced Vertical Separation Minimum Operations (RVSM) in North America (U.S., Canada, and Mexico) compared to International Civil Aviation Organization (ICAO) Recommended Requirements.
- Conduct maintenance and operations of independent performance based monitoring for Altimetry System Error (ASE), a key component to the implementation of RVSM.
- Provide facility operations and maintenance, environmental management and maintenance, and engineering support for all facilities located at the WJHTC.
- Safeguard both employees and campus infrastructure by ensuring compliance with environmental laws, policies, directives, and initiatives.

What Is This Program?

Realizing the future vision of aviation through integrated strategies and solutions that achieve national and international goals encapsulates the mission of the ANG organization. The organization champions the evolution of NextGen through program management, enterprise system engineering, and technical integration expertise. The William J. Hughes Technical Center (WJHTC) is FAA's national scientific test base for the research, development, test, and evaluation of air transportation systems. The research, testing and prototype development conducted by WJHTC staff helps shape the future of our Nation's air transportation system and make NextGen a reality.

The WJHTC owns and operates approximately 1.6 million square feet of test and evaluation facilities, NAS field support facilities, research and development facilities, administrative facilities and numerous project test sites. These sites and facilities provide the necessary technical platforms for research, development, and testing of NextGen programs as well as the around the clock operational support to En Route, Terminal, and other Air Traffic Control (ATC) facilities throughout the nation. Annual operations and maintenance costs for WJHTC are approximately $26,342,000 or 43 percent of ANG's operations budget.

This Program maintains facilities and support services for all properties at the William J. Hughes Technical Center including land, buildings and infrastructure. These facilities support:

- Providing operational test and evaluation, including flight testing, of all FAA systems prior to implementation in the NAS.
- Providing world class laboratories for research, engineering, development, test, evaluation, and maintenance of air navigation, air traffic management, and future air transportation system capabilities.
- Developing long-range innovative aviation systems and concepts, development of new air traffic control equipment and software, and modification of existing systems and procedures.
- Conducting, coordinating, and supporting domestic and international research and development of aviation-related products and services.
- Characterizing performance of current system and effects of proposed NextGen changes on pilots, controllers, aircraft, and related system components.
- Addressing and meeting the rapidly changing needs of the aviation industry by introducing innovative concepts and technologies in the air traffic system through extensive work in evaluations, concept development, and demonstrations in a real-time environment.

NextGen supports the Department of Transportation's (DOT) Economic Competitiveness Goal: Promote transportation policies and investments that bring lasting and equitable economic benefits to the Nation and its citizens.

Why Is This Particular Program Necessary?

NextGen is our evolutionary blueprint for modernizing air transportation with revolutionary technologies. It represents a wide-ranging transformation of the entire NAS to meet future demand and support the economic viability of aviation, while improving safety and protecting the environment.

Aviation sustains millions of jobs each year and accounts for more than 5 percent of the gross domestic product. Aviation enables the economic benefits of tourism, shipping and travel for business or pleasure. Airports provide economic impact to large and small communities across this country. Continued economic growth in the aviation industry is supported through the ongoing implementation of NextGen technologies, policies and procedures.

Through a continuous roll-out of improvements and upgrades, NextGen builds the capability to more precisely and efficiently guide and track air traffic, while saving fuel and reducing noise and pollution. NextGen is better for our environment, and better for our economy.

We estimate NextGen improvements will reduce delays 41 percent by 2020, compared to what would happen were planned NextGen improvements not implemented. These delay reductions will provide an estimated $38 billion in cumulative benefits through 2020. NextGen delay reductions are in addition to any reduction from future runway construction or expansion. We estimate 16 million metric tons in cumulative reductions of carbon dioxide emissions through 2020. For the same period, we estimate 1.6 billion gallons in cumulative reductions of fuel use.

Managing program performance and resource utilization, analyzing and measuring implementation benefits and testing new NAS capabilities are all essential elements of a successful transformative program. Program benefits assessment and resource management elements perform continuous analyses to support optimal NextGen resource investment decisions. The WJHTC is the FAA's institution for the research, development, test, and evaluation of air transportation systems. As the Agency's Federal Laboratory it is the principal source for conducting NextGen research, test, and evaluation. The anticipated benefits of NextGen cannot be realized without the comprehensive research conducted at the WJHTC.

How Do You Know The Program Works?

In June 2013, the Office of Assistant Administrator for NextGen published the NextGen Implementation Plan which can be found at:
(http://www.faa.gov/nextgen/implementation/media/NextGen_Implementation_Plan_2013.pdf) This annual update provides an overview of the FAA's ongoing transition to NextGen and how it continues to transform the NAS, describing key benefits to airports, the environment, and international air transportation, and highlights critical milestones that have been achieved in this transition to NextGen. It also includes the status of transformational and implementation NextGen programs, as well as a comprehensive listing of the projects underway in FY 2014.

As a response to this natural evolution and the RTCA Task Force 5 report, the facilities and equipment budget has been realigned to make the line-of-sight clearer across all NextGen communications and plans. This moves the budget into the same structure as the publicly published NGIP, so stakeholders can transparently track the funding while also seeing when certain capabilities will be deployed and operational. It also eliminates duplicative structures within FAA that were created to continually crosswalk budget "solution sets" to implementation "portfolios".

Conducting test and evaluation for NextGen capabilities and systems is the primary mission of the WJHTC. The successful research, development, testing and evaluation leading to deployment of NextGen systems and capabilities is one measure that demonstrates that this program works. The deployment of several NextGen transformational programs is ongoing:

- ADS-B represents the move from a ground-based radar system to one based on a global positioning system. To date, ADS-B has been implemented in South Florida, Louisville, Philadelphia, the Gulf of Mexico, and Juneau.
- System Wide Information Management Segment 1 is in implementation with its second segment in the investment phase.
- Collaborative Air Traffic Management, Work Package 3, is also in implementation and will continue to improve the management of operations when there is disruption, especially due to weather.
- The initial phase of DataComm is in implementation which means that as the time for the flight approaches, the flight crew will receive the final flight path agreement as a data message. Data communications will provide pre-departure clearances that allow for amendments to flight plans.
- The latest implementation program, Optimization of Airspace and Procedures in the Metroplex (OAPM)/Performance Based Navigation, is bringing new, near-term benefits by leveraging the increasing navigational capability of today's modern aircraft to fly more efficiently.

Other measures indicating this program works are:

- Research and Development accomplishments indicated in the R&D Annual Review document published with the National Aviation Research Plan (NARP).
- 24x7x365 second level support of the NAS.
- Technology transfer of research to industry and academia via Cooperative Research and Development Agreements and Grants.

Why Do We Want/Need To Fund The Program At The Requested Level?

Nearly 41 percent of ANG's Operations budget is for payroll. The requested FY 2015 level for Operations funding covers the salaries of personnel assigned to NextGen. Non-pay costs are primarily for management of facilities and properties located at the WJHTC and include operation and maintenance support services, custodial, security, and utilities. These facilities sustain the necessary technical platforms for research, development, and testing of NextGen programs as well as the around the clock operational support to En Route, Terminal, and other Air Traffic Control (ATC) facilities throughout the nation.

Without the requested level of funding, NextGen staffing will be impacted and non-pay reductions will be necessary resulting in the erosion of our physical infrastructure and WJHTC's ability to complete its mission.

Explanation of Funding Changes

	Dollars ($000)	FTE
NextGen	**+$393**	**+14**
Overview: For FY 2015, the Office of the Assistant Administrator for NextGen requests $60,089,000 and 205 FTEs to meet its mission to realize the future vision of aviation by providing integrated strategies and solutions that achieve national and international goals.		
Adjustments to Base	**+$77**	**+14**
FY 2015 Pay Raise: This increase is required to provide for costs associated with base salary increases. (January to September) resulting from the proposed government-wide pay raise. The factor used is (0.75) of 1.0 percent.	+163	
Annualization of the FY 2014 Pay Raise: This increase is required to provide for the remaining quarter of the FY 2014 government-wide pay raise of 1.0 percent. The factor used is (0.25) of 1.0 percent.	+50	
FERS Contribution Increase: OMB Circular A-11 has increased the agency's contribution rates to the FERS retirement system. This increase in cost to the FAA represents the increased rates for both Air Traffic Controllers and other agency employees.	+193	
Annualization of FY 2014 Hiring: This increase in FTE's is required to cover the increased staff hired during FY 2014 but were on board for only a portion of the year. No funding is necessary for the additional FTE's since the added cost is offset by the savings due to the new hires having a lower payroll cost than the staff they are replacing.		+15
Restricted Hiring: It may be necessary to slow down hiring during FY 2015 if the planned hiring for FY 2014 is achieved. The restricted hiring will mean that we may not meet the staffing levels called for in the Air Traffic Controller and Safety Workforce Plans.	-181	-1
FY 2014 Internal Adjustments: This action completes the movement of staff and funding between ANG and AST, which was partially accomplished during FY 2014 execution.	-148	
Base Transfers	**+$316**	
Tech Center Guard Services: This base transfer request is to move funding from Air Traffic Organization (ATO/AJW) to NextGen (ANG) to support the additional requirements to the security guard contract. Costs are associated with conducting x-ray screening at the William J. Hughes Technical Center (WJHTC) Security Operations Center, and due to the size of the perimeter fence, provide more frequent patrols of the fence line; transfer with funding $316K and no staffing.	+316	

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STAFF OFFICES

Staff Offices
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$296,366**	**1,578**	**56**	**1,461**
Adjustments to Base	**+$1,944**			**+50**
Internal Transfer				
Annualized FY 2014 Pay Raise	+353			
FERS Contribution Increase	+1,700			
Annualization of FY 2014 Hiring				+62
FY 2015 Pay Raise	+1,437			
Hiring Restrictions	-1,546			-12
Other Changes	**-$603**			
WCF Adjustments	-603			
Base Transfers	**-$1,560**	**-5**		**-5**
Staffing Resources Reassignment		+1		+1
Technical Center Guard Services				
Occupational Safety and Health Workplace Inspections	-1,560	-6		-6
FY 2015 Request	**$296,147**	**1,573**	**56**	**1,506**

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Executive Summary: **Staff Offices**

What Is The Request And What Will We Get For The Funds?

The request of $296,147,000 and 1,506 FTEs allows FAA Staff Offices to provide executive leadership, policy and planning, legal counsel, security services, and other administrative services in support of FAA's mission. The request includes base funding of $296,366,000, pay and non-pay adjustments resulting in a net decrease of $219,000.

What Is The Program?

The Staff Offices of FAA include the Office of the Administrator, Chief Counsel and seven assistant administrators who provide mission support services to the four lines of business, including legal counsel, economic trend analysis, diversity leadership, government and industry liaisons, communications, public relations and human resources management. A brief description of staff offices are outlined as follows:

- The Office of Audit and Evaluation performs audit and investigative review functions primarily for internal safety disclosures and concerns, including the FAA Whistleblower Protection Program.
- The Office of Civil Rights advises, represents, and assists the FAA Administrator on civil rights and equal opportunity matters.
- The Office of Government and Industry Affairs serves as the Administrator's principal adviser and representative on matters concerning relationships with the Congress, aviation industry groups, and other governmental organizations, developing and reviewing plans and strategies involving these groups to enhance aviation safety.
- The Office of Communications is responsible for the policy, direction, and management of the agency's communications programs for the news media and FAA's employees nationwide.
- The Human Resources Management organization provides human resource services to all operating lines of business and staff offices (LOB/SOs) at the headquarters and to all the FAA regions including the two centers and overseas.
- The Office of Policy, International Affairs, and Environment serves as the principle advisor to the Administrator on international matters.
- The Office of Security & Hazardous Materials Safety develops and implements policy to protect FAA employees, contractors, facilities, and assets.

Why Is This Particular Program Necessary?

Staff Offices provide services and resources necessary for the operations of our business. Without these services, lines of business would not have the resources needed to meet their goals. From performing mission-critical services to receiving guidance and counsel on regulatory or legal issues, or managing annual appropriations, Staff Offices make a significant contribution to the mission of FAA.

How Do You Know The Program Works?

Through the leadership of the Administrator, FAA successfully manages the most complex and safest aviation system in the world. By executing their mission responsibilities and providing management, leadership, and oversight, the FAA's Staff Offices have contributed to the overall success of the FAA.

Why Do We Want/Need To Fund The Program At The Requested Level?

Reductions below the requested level would hinder our ability to provide key support services. Our request is the funding needed to continue supporting Agency lines of business.

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Office of the Administrator (AOA)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$4,017**	**20**	**4**	**23**
Adjustments to Base	**+$32**			
Internal Transfer				
Annualized FY 2014 Pay Raise	+6			
FERS Contribution Increase	+30			
Annualization of FY 2014 Hiring				+1
FY 2015 Pay Raise	+21			
Hiring Restrictions	-25			
FY 2015 Request	**$4,049**	**20**	**4**	**24**

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Detailed Justification for – Office of the Administrator (AOA)

What Is The Request And What Will We Get For The Funds?

FY 2015– Office of the Administrator
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Office of the Administrator	$3,799	$4,017	$4,049	+$32

In FY 2015, the Administrator requests $4,049,000 and 24 FTE to meet its mission. This increase consists of basic pay and other adjustments. Throughout FY 2015, AOA will continue to lead FAA toward achieving the agency's performance goals and targets.

What Is This Program?

The office of the Administrator and Deputy Administrator leads the agency in its mission to provide the safest, most efficient aerospace in the world. This office leads the overall planning, direction, coordination, and control of agency programs, and represents FAA in its relations with the Department of Transportation, the White House, the Congress, other agencies, the aviation community, and the general public.

Why Is This Particular Program Necessary?

In leading FAA, the Administrator oversees the Agency's employees in maintaining, operating, and overseeing the largest and most complex aviation system in the world. The agency determines the regulatory and operational standards for the United States, and effectively sets the benchmark for aviation safety around the world

How Do You Know The Program Works?

The FAA has a strong track record of achieving the vast majority of the agency's performance goals and targets.

Why Do We Want/Need To Fund The Program At The Requested Level?

The requested funding level essentially maintains the status quo and only includes pay adjustments. There are no discretionary increases in the FY 2015 budget request.

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Office of Audit and Evaluation (AAE)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$3,200**	**20**	**0**	**20**
Adjustments to Base	**+$27**			
Internal Transfer				
Annualized FY 2014 Pay Raise	+6			
FERS Contribution Increase	+23			
Annualization of FY 2014 Hiring				
FY 2015 Pay Raise	+19			
Hiring Restrictions	-21			
FY 2015 Request	**$3,227**	**20**	**0**	**20**

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Detailed Justification for – Office of Audit and Evaluation (AAE)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Audit and Evaluation (AAE)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Office of Audit and Evaluation	$2,837	$3,200	$3,227	+$27

In FY 2015, the Office of Audit and Evaluation requests $3,227,000 and 20 FTE to meet its mission. This increase provides for costs associated with base salary pay.

The mission of the office primarily and directly supports the Departmental goal of increased safety, but also supports in a more generalized way the goal of building and enhancing our high performance work place. The FY 2015 funding will support the operation and management of consolidated safety hotlines and provide a centralized focus for internally and externally generated safety-related complaints, critical audits and investigations. Additionally, the Office provides an impartial agency venue for investigation and early resolution of safety disclosure.

What Is This Program?

The Office of Audit and Evaluation has two primary functions; safety audit and investigation review and analysis; and hotline operations and reporting. The audit and analysis staff perform audit and investigative review functions primarily for internal safety disclosures and concerns, including the FAA Whistleblower Protection Program. It is also coordinates and evaluates for completeness FAA responses to DOT- OIG, GAO and OSC generated audits, investigations and evaluations. The second function is a reporting and data function that provides for analysis of hotline submissions, coordination of AAE investigations, and reviews for completeness investigations conducted by appropriate FAA organizations. The Office also operates and manages several administrative and safety hotlines. While AAE coordinates and provides independent quality control evaluations of certain investigations conducted by the lines of business, the Office does not determine the technical merits of safety-related issues or make recommendations for resolution of particular safety-related cases. Such determinations remain the ultimate responsibility of the appropriate safety office.

The direct beneficiaries of AAE's services are the agency and the flying public. AAE embodies FAA's commitment to a vibrant and evolving internal safety culture based on continuous review, evaluation, objective analysis and measured change. AAE provides agency employees and external stakeholders with an independent and highly visible forum to openly, safely and constructively raise, address and resolve safety complaints, concerns or whistleblower contributions. Some of AAE's critical supporting activities include:

- Operating and managing the agency's hotline system, including the Safety Hotline, the Administrator's Hotline, and other programs that offer employees and others avenues to report safety-related and other concerns and make safety contributions.
- Coordinating and providing independent quality control evaluations of certain investigations conducted by the lines of business and analyzes data from a broad range of sources.
- Serving as primary interface and maintain a continuous liaison with GAO, OSC, and the DOT OIG investigations/audit staffs concerning safety-related investigations.
- Recording, tracking, reviewing, and confirming implementation of FAA responses to DOT OIG, OSC, and GAO audits and investigations that are under the purview of AAE.
- Managing the Whistleblower Protection Program established under 49 U.S.C. § 42121.
- Analyze data from the Safety Hotline, the Administrator's Hotline, and Whistleblower contributions to identify trends.
- Serving as an alternative point of contact for receipt of safety-related contributions or allegations of retaliation against whistleblowers in general.

- Conducting initial reviews of contributions and investigations received, including an immediate assessment (in consultation with appropriate parties), and review responses for accuracy, thoroughness and internal consistency of handling.
- Assessing and reviewing investigations and resolutions of matters that come under its purview for fairness, impartiality and conformance with established processes; providing guidance to lines of business and staff office on how to conduct investigations thoroughly and impartially.
- Serving as a new venue to receive disclosures from FAA employees or former employees, certificate holders, related to possible violation of the an FAA regulation or order, acts or omissions that pose a high level of risk to aviation safety, or gross misconduct of agency employees involving a matter of aviation safety.

Anticipated FY 2015 accomplishments include:

- Complete an analysis of FY 2014 hotline data and whistleblower contributions by the end of the first quarter and prepare a report on significant items for the Administrator by the end of the second quarter.
- Monitor milestones so that 75 percent of corrective actions developed by agency offices in response to internal or external audits and investigations are met.
- Improve timeliness for FAA responses to GAO, OIG and OSC audits and investigations such that 90 percent are delivered in accordance with established schedules.
- Improve access portals for hotline submissions to provide more usable information and efficient processes for contributions and ensure that 90 percent of call-ins receive a "call-back" within 10 business days.
- Increase agency awareness of AAE's services and successfully provide a fair and impartial venue for investigation and early resolution of safety disclosures so that OSC investigations of FAA employee whistleblower disclosures are reduced by 20 percent over FY 2014.

Why Is This Particular Program Necessary?

Since its establishment in 2008, the AAE Office has become a vital and effective organization productively addressing and resolving safety-related whistleblower disclosures and employee workplace conflicts. Significantly, the visibility and accomplishments of the AAE Office have generated a critical awareness and recognition that employees can bring their safety sensitive disclosures to an internal organization and have them objectively reviewed by an unbiased entity.

AAE clearly demonstrates FAA's commitment to creating a strong internal safety culture firmly anchored in a robust, responsive, and formalized process for addressing safety issues raised by employees, conducting internal reviews, ensuring corrective action and protecting employees who report safety concerns. Although other organizations could be tasked to address such safety matters, an independent organization evokes the highest level of integrity and objectivity. Both are critical to the effectiveness of AAE.

The need for such an office within FAA was echoed in a Department of Transportation Inspector General's recommendation. In its June 30, 2008, report, *Review of FAA's Safety Oversight of Airlines and Use of Regulatory Partnership Programs*, the Inspector General recommended that the FAA "establish an independent organization (that reports directly to the FAA Administrator or Deputy Administrator) to investigate safety issues identified by FAA employees."

How Do You Know The Program Works?

AAE was established as an independent organization during the first quarter of FY 2012. At that time it received its first full complement of staff and designated funding. While AAE had previously established itself as a viable forum for raising and addressing internal safety concerns, it is now positioned to start developing standards to measure its successes. Currently, the success of the program can be gauged by its ability to timely process hotline matters, complete investigations, validate the completeness of agency responses to identified safety concerns, and ensure agency compliance with corrective actions. Also, there has been a significant increase in hotline submissions and referrals by OIG and OSC.

Why Do We Want/Need To Fund The Program At The Requested Level?

Congress directed that FAA realign AAE as an independent organization reporting to the Administrator and provided for a defined staffing and funding level. AAE enhances agency accountability for internally identified safety concerns by providing an independent, vital and effective mechanism for addressing and resolving safety-related employee disclosures, whistleblower contributions and employee workplace conflicts. Reductions to the requested funding level would significantly reduce its effectiveness and disrupt the progress the Office has made in generating awareness and recognition that employees can bring their safety sensitive disclosures to an internal entity and have them reviewed in an objective and non-threatening forum. The safety benefits of an effective internal reporting program are well-accepted. A disruption or reduction in funding would limit AAE's progress in developing this critical safety tool.

As a result of the enactment, on February 14, 2012, of the FAA Modernization and Reform Act of 2012 (Public Law 112-95), which formally establishes the creation of AAE. AAE's investigatory activities have increased dramatically. To keep pace with the increased activity from this unfunded mandate, AAE is mandated to consolidate all FAA hotlines. Below is a brief history of each hotline and its function.

On August 3, 1984, the Administrator established the Administrator's Hotline to provide FAA employees with high-level management attention for concerns that were not being resolved by established administrative processes. On June 13, 1985, the Administrator established the consumer Hotline for consumers with questions about FAA services. On November 4, 1994, as part of the agency's streamlining efforts, FAA consolidated the Administrator's and Consumer Hotline programs into the Hotline Operations Program.

- **Administrator Hotline Information System (AHIS)** – system of record for information reported or referred to the Administrator's hotline which was established in 1994. AHIS was developed using FoxPro with a ColdFusion front end. In FY 2012, AHIS was moved to the ATO environment. In FY 2013 as a result of sequestration, the contract individual that identified to provide AHIS support was let go. There is currently a limited search capability and several canned reports (only 1 of which is actually used on a regular basis). There is also currently no way to track supporting documentation provided by the reporting individual in the system or to assign hotlines for action or information through the system. There is also no connectivity between AHIS and ASHIS.

On July 1, 1985, the Administrator established the Aviation Safety Hotline Program as part of DOT's goal of promoting aviation safety. The purpose of this hotline was to provide a means for persons with knowledge of unsafe aviation situations, improper record keeping, or safety violations to report these without fear of recrimination.

- **Aviation Safety Hotline Information System (ASHIS)** – system of recorded for information reported or referred to the Aviation Safety hotline which was established in 1985. As of FY 2012, AVS support of this system is limited to hosting this application in the AVS domain and limited technical support provided by AQS employees. ASHIS was last updated in FY 2012 to provide limited corrections/bug fixes and a few minor enhancements to the FY 2010 release. The latest version of ASHIS is MOSS/SharePoint application.

In addition to the MOSS/SharePoint application, hotline analysts are required to use Avery, a Lotus Notes database, to send hotlines out for action or info as there is no workflow capability provided with the MOSS/SharePoint application. A significant number of reports to the Aviation Safety hotline are received electronically. Currently, all electronic submissions must be manually copied into ASHIS as there is no capability of having submissions received directly into ASHIS. In addition, both the searching and reporting capabilities for this application are severely limited to the point of being virtually unusable. There is also no connectivity between AHIS and ASHIS.

On December 8, 2008, the FAA established the Office of Audit and Evaluation to provide a centralized focus for safety-related contributions and other audits and investigations related to Whistleblower retaliation. Among its year-one achievements, the AAE Office brought the Administrator's Hotline and OIG/GAO Audit

Liaison functions under its purview and began the process of aligning the Aviation Safety Hotline, Safety Issues Reporting System (SIRS), and Whistleblower Protection Program with AAE goals and objectives.

- The **Whistleblower Protection** program which covers Air 21 is a lotus notes database that is currently supported by AVS.

In 2012, AAE made the decision to discontinue the SIRS as a separate hotline based on lack of use and duplication with the Administrator and Safety hotlines.

With the various hotlines that came under the purview of AAE also came several antiquated automated systems with little or no system documentation. In addition to the lack of system documentation, there was also no technical support in place for the Administrator's Hotline beyond system hosting and the occasional server restart.

Up until FY 2012, AVS provided limited technical support of the ASHIS as well as the SIRS and the Whistleblower Protection Program.

For the past two years, AAE has searched for a low cost consolidated application to receive, track, route, report, and efficiently manage their multiple hotline/complaint responsibility for the agency. Individuals contacting the hotline include FAA employees as well as members of the general public.

Both AHIS and ASHIS are designated as Privacy Systems. Information about the systems is currently documented in DOT SORN 845.

This requested increase will allow AAE to better manage as well as report on safety issues/concerns reported through the hotlines and/or referred by DOT and the Office of Special Counsel. If these hotlines systems are not consolidated and technologically advanced, AAE will be significantly limited in its ability to ensure the availability, integrity, and confidentiality of the data and services it provides. Additionally, it will also affect AAE's ability to effectively analyze hotline data and identify trends affecting aviation safety.

Office of Civil Rights (ACR)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$11,868**	**80**	**4**	**81**
Adjustments to Base	**+$72**			**-1**
Internal Transfer				
Annualized FY 2014 Pay Raise	+16			
FERS Contribution Increase	+61			
Annualization of FY 2014 Hiring				
FY 2015 Pay Raise	+58			
Hiring Restrictions	-63			-1
FY 2015 Request	**$11,940**	**80**	**4**	**80**

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Detailed Justification for – Office of Civil Rights (ACR)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Office of Civil Rights
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Office of Civil Rights	$10,093	$11,868	$11,940	+$72

The request of $11,940,000 and 80 FTE supports the FAA's Office of Civil Rights. ACR takes actions that challenge, assist, and support our customers to create an environment where all are able to contribute meaningfully to the mission. Additionally, ACR advises, represents, and assists the FAA Administrator on civil rights, diversity, and equal opportunity matters.

Funding in the FY 2015 request will allow us to meet these milestones:

- Assist agency efforts to become more effective with a stronger, more knowledgeable, more accountable leadership and a better prepared, better trained, diverse workforce in the area of EEO.
- Assist in the prevention of discrimination through the implementation of agency-wide EEO policies, practices, and procedures.
- Continue our efforts on the EEO Action Committee, which meets on a quarterly basis to identify innovative recommendations regarding EEO and diversity within the FAA workplace.
- Implement a Model EEO Program that stresses the prevention of discrimination before it occurs.
- Take proactive measures to provide EEO training to agency managers and employees.
- Increase the effectiveness of the EEO Outreach Program to minority groups with lower than expected employment rates in the agency.
- Assist agency efforts to address discrimination by addressing EEO complaints through the National Intake Unit, EEO counseling, and EEO consultation services.
- Provide oversight regarding civil rights laws and regulations by administering the agency's Internal Civil Rights and the External Civil Rights (Airports) Programs.

Anticipated outputs/outcomes:

- Develop the annual EEO Plan in conjunction with FAA lines of business and staff offices (LOB/SO) to identify and eliminate EEO barriers and agency deficiencies.
- Conduct evaluations to ensure that organizations are complying with EEO mandates.
- Establish standardized processes for EEO training design, evaluation, and delivery
- Deliver high quality EEO training sessions utilizing available technology.
- Augment agency recruitment efforts by reaching out to groups with lower than expected rates by attending career fairs and events tailored to targeted groups.
- Identify the best practices for the four focus areas of Leadership Commitment, Human Capital, Agency Communication, and Supplier/Diversity by consulting with federal agencies and private industry entities that have been recognized as top leaders in diversity.
- Ensure the highest level of EEO pre-complaint processing services by establishing an EEO Counselor Certification Program to increase subject matter proficiency for all full-time EEO Counselors.
- Issue revised ADA and Title VI Orders that will set forth the standards and operating procedures for FAA enforcement.
- Establish training programs to improve the travel experience for all people but especially those underserved, underrepresented, and historically underutilized.

What Is This Program?

The Office of Civil Rights supports the DOT Strategic Plan's Aviation Access and Workplace of Choice initiatives, providing services that develop a diverse and collaborative workforce. We advise, represent, and assist the FAA Administrator on civil rights and equal opportunity matters that ensure the elimination of unlawful discrimination on the basis of race, color, national origin, sex, age, religion, creed, sexual orientation, and individuals with disabilities in federally operated and federally assisted transportation programs. Further, we work to ensure a positive working environment in the FAA by valuing, using, and managing the differences that individuals bring to the workplace.

The Office of Civil Rights works in conjunction with FAA managers to ensure EEO awareness and adherence to EEO policies and guidelines. FAA employees are trained in respectful and equitable treatment of one another. Every FAA organization, in turn, plays a role in the implementation of an effective EEO program where individuals are treated with equity and respect regardless of differences.

The Civil Rights Program's key activities include:

- Conducting Disadvantaged Business Enterprise (DBE) compliance reviews and ensures that small and disadvantaged business enterprises are able to compete with larger companies for airport construction projects and concessions.
- Adjudicating external complaints from the public and other customers.
- Managing and ensuring compliance with Title VI, Limited English Proficiency (LEP), Environmental Justice (EJ) and other civil rights policy and regulations at airports
- Improving the timeliness of processing EEO pre-complaints unless the employee agrees to an extension or alternative dispute resolution is engaged.
- Ensuring airport compliance with the American Disabilities Act.
- Conducting trend analysis to determine if there is any evidence of disparate treatment of applicants or employees based on race, sex, national origin, or other protected categories.
- Managing the National Federal Women's Program, Hispanic Employment Program and the People with Disabilities Program to ensure equal opportunity.
- Ensuring strong leadership and a well-trained, efficient workforce to enhance ACR's ability to provide a full complement of EEO services for customers as well as increase the efficiency of ACR services through the use of information technology.
- Ensuring an EEO discrimination process that can process 100 percent of the allegations and inquiries regarding EEO complaints by having adequate counseling, mediation and consulting services.
- Managing the FAA EEO Pre-Complaint Process and ensure that the process is administered in accordance to policy and regulations by reviewing reports of investigations, providing consultation, and overseeing the alternative dispute resolution process.
- Providing leadership, policy and direction on EEO to the agency in the area of the alternate dispute resolution program and through EEO evaluations.

Anticipated accomplishments include:

- Provide consultations and training to 200 airport sponsors on the DBE program, Title VI of the Civil Rights Act of 1964, LEP, EJ, ADA, Section 504 of the Rehabilitation Act of 1973, and on other civil rights policies and regulations affecting airports. Maintain an online FAA DBE-connect system to allow DBEs to find relevant airport opportunities, and allow airports to find certified DBEs in areas of work needed to support their DBE goals. In order to increase the diversity in DBE participation, ACR will enhance the system with job opportunity and training functions.
- Ensure compliance with ADA/Section 504, Title VI, and Environmental Justice regulations by conducting a minimum of 20 reviews and consultations at various airports throughout the nation.
- Establish a partnership with at least two external organizations to enrich and market EEO efforts in various minority communities.
- Establish at least five educational partnership initiatives with colleges/universities, technical schools, and/or high schools as an outreach tool to build the FAA workforce of the future.
- Conduct a mission critical occupation barrier analyses and collaborate with the LOB/SO to provide recommendations and actions for improvement with regard to the barriers identified. ACR will also work toward eliminating a minimum of two agency deficiencies identified in the agency self-assessment to ensure compliance with Management Directive 715.
- Visit 20 FAA facilities to offer EEO consultations, conduct training, and address workplace issues from managers and employees, the goal being to further establish FAA as a workplace of choice.
- Manage an EEO Discrimination Pre-Complaint Program that can process 100 percent of the allegations and inquiries regarding EEO complaints through counseling, mediation, and consulting services.

Why Is This Particular Program Necessary?

The FAA Office of Civil Rights (ACR) provides leadership and direction with regard to civil rights, diversity, and equal opportunity matters. Internally, the ACR mission is to aid in the prevention of unlawful discrimination on the basis of race, color, national origin, sex, age, religion, sexual orientation, and individuals with disabilities employed by the FAA. There are four major internal programs; EEO complaint services and Alternative Dispute Resolution services; Model EEO Program; EEO Outreach; and EEO Training.

Externally, the ACR mission is to provide airport oversight with regard to civil rights laws and regulations. ACR works to ensure that all beneficiaries of federally assisted transportation programs are offered equal opportunity for participation and are free from discrimination. There are three major external programs; Disability Airport Compliance; Airport Non-discrimination Compliance; and Disadvantaged Business Enterprise (DBE) Compliance. It includes airport compliance with the Americans with Disabilities Act, Title VI, Limited English Proficiency, Environmental Justice and other civil rights regulations.

Some of the yearly measurable benefits to our customers and beneficiaries include:

- Address all EEO complaints in a timely and professional manner.
- Provide quality EEO training to 8 percent of the FAA workforce to reduce EEO complaints.
- Execute a National External Training Conference for approximately 200 people to address civil rights obligations and requirements

The FAA Office of Civil Rights has oversight of internal and external EEO policy, which if not properly funded or staffed, could cause serious dissatisfaction in the workplace. If FAA personnel are not properly trained on EEO matters and complaints are not addressed in a timely and effective way, there is a further risk of losing quality employees to other agencies that place an emphasis on EEO and diversity.

Without the requested level of funding, ACR will be ill-equipped to successfully execute our mission and support DOT's Workplace of Choice initiative. ACR needs adequate resources to further promote diversity and EEO within the agency and to improve employee morale for years to come.

How Do You Know The Program Works?

Over the past several years, ACR has made significant progress in numerous areas including:

- Conducted the barrier analysis of the Phase 1 Air Traffic Controller (ATC) occupation to determine why the demographics of the newly hired ATC continue to indicate a lower than expected participation rate for minority groups.
- Provided EEO training to 6,107 personnel or 12.8 percent of the work force and launched the No Fear training to meet OPM requirements.
- Issued Directive 1400.8 after two years in the coordination process.
- Successfully conducted the 2nd Annual EEO Awareness Day, with the Acting Administrator signing an FAA Proclamation and recording a message for employees.
- Attended 105 Outreach Events and collected over 5,700 signatures from potential applicants. Additionally ACR participated in 8 high school and middle school outreach events and activities, reaching over 700 students.
- The EEOC Action Committee was restructured to operate as an entity that will produce tangible outcomes and products. This approach will integrate several EEO initiatives under the Committee, whose members will serve as the leads and be the primary liaisons for each line of business and staff offices.
- Consulted with 306 airport grant recipients on developing DBE goal methodologies under Part 26. ACR consulted with 65 airport sponsors on developing concession programs under Part 23. Additionally, ACR conducted seven (7) onsite reviews at primary airports.
- Developed a Best Practices Tool for airports to assist in overseeing their own DBE/ACDBE programs. The DOORs and e-dbe were enhanced.

- Sponsored a joint DBE, ADA and Title 7 Conference in Washington DC for customers and stakeholders.
- Completed a comprehensive Title VI Tool Kit for airport sponsors and implemented Title VI MOU and Checklist, in partnership between the Office of Civil Rights and the Airports Division ensure minority populations are not adversely impacted by the projects.
- Conducted quarterly briefings on how to hire people with targeted disabilities through the Workforce Recruitment Program. Provided training to managers and supervisors on how to recruit, hire, accommodate, and interact with people with disabilities and achieved an efficiency rate of 90.81% of processing reasonable accommodation requests in under 25 business days or less.
- ACR continues to market and provide awareness to all FAA employees on the agency's EEO principles by: leading marketing campaigns to promote ACR programs and services; maintaining FAA managers and supervisor updated with the latest information through the Civil Rights Bulletin; and conducting the annual National EEO Awareness Day celebration.

Why Do We Want/Need To Fund The Program At The Requested Level?

The FAA Office of Civil Rights is committed to providing a workplace that promotes equal opportunity, is free of harassment, and is an environment where employees can focus on productivity, not conflict. ACR will be needed for advice, guidance, and problem-solving as the agency moves forward with this initiative. The funding that is requested will allow ACR to provide a well-trained, well-informed staff to assist FAA management with EEO matters.

ACR has received nominal increases in most fiscal years. The minimal budgetary increases have covered annual inflation and pay increases. Given the current budgetary environment, ACR is planning for minimal increases for the next several fiscal years to help offset inflation and potential pay increases.

Over the past several years, ACR has taken a very proactive approach to conflict management. Alternative dispute resolution is a means for employees and managers to resolve disputes before they become formal EEO complaints. Formal complaints cost the agency numerous resources in terms of employee productivity as well as funding. ACR will continue this proactive approach with the funds requested and increase the savings realized by the agency.

In order to do an effective job of marketing the use of ADR to employees and managers and to reduce the number of formal complaints in FY 2015, we need a major campaign of face-to-face training as well as a presence at major organizational conferences and meetings around the country reaching all levels within the FAA. We need to increase the use of media such as ATN broadcasts, teleconferencing, and brochures to educate managers and staff on the innovative techniques that are available to resolve workplace disputes. It is also imperative to have highly trained Civil Rights personnel who are able to conduct mediations around the country for difficult and highly visible cases. The use of ADR/mediation will result in dispute resolution in the early stages thus reducing the number of formal EEO complaints. This will be a tremendous cost savings to the FAA. ACR with the assistance of an Economist from the Office of Aviation Policy and Planning conducted a study on Labor Costs for Processing an EEO Complaint. The study concluded that the labor cost associated with a successful ADR at the informal stage is less costly than the labor cost associated with a formal complaint. By enhancing the ADR program, FAA management will gain an increased knowledge of the mediation process and the associated increase in participation will equate to agency-wide cost savings. Using the figures from the study, the labor costs associated with a formal complaint can run as high as $18,300 per case while the labor costs associated with a successful mediation top out at approximately $5,000. Successful mediations represent a more than 70 percent cost savings per case to the FAA.

As mentioned above, ACR has shifted our focus from just processing EEO complaints to becoming involved in true conflict resolution and training. Without adequate funding, ACR will not be able to train and provide skilled mediators to resolve workplace issues. The result will be additional monetary costs to the agency if disputes are not settled before becoming formal complaints. Additionally, morale could suffer if FAA employees are not adequately trained on EEO issues.

In order to effectively perform barrier analysis to eliminate barriers to employment for minorities, women and people with disabilities and conduct successful outreach, ACR must have sufficient staff to perform these functions. ACR must conduct barrier analysis with regard to merit promotion, awards, and training to determine if there are barriers in these areas. In addition, FAA must identify where applicants are failing in the hiring process e.g. testing, medical, security, interview, etc. If adequate funding is not provided, we will have to decrease our barrier analysis efforts, possibly resulting in little or no change to the FAA demographics.

Other potential results of not funding the program at the requested level include:

- Congress and EEOC will continue to view our EEO efforts as ineffective.
- EEO Complaints will continue to rise.
- ADR will not be viewed as an effective tool for resolving complaints.
- Barriers to EEO will continue to go unnoticed.
- Reducing the amount of resources devoted to EEO Outreach activities potentially sending a negative message to women, minorities, and people with disabilities and causing a decrease in the diversity of the FAA applicant pool.

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Government and Industry Affairs (AGI)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$1,530**	**10**		**10**
Adjustments to Base	**+$11**			
Internal Transfer				
Annualized FY 2014 Pay Raise	+2			
FERS Contribution Increase	+9			
Annualization of FY 2014 Hiring				
FY 2015 Pay Raise	+9			
Hiring Restrictions	-9			
FY 2015 Request	**$1,541**	**10**		**10**

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Detailed Justification for – Government and Industry Affairs (AGI)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Government and Industry Affairs
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Government and Industry Affairs	$1,490	$1,530	$1,541	+$11

The FY 2015 budget request of $1,541,000 and 10 FTEs will support the Office of Government and Industry Affairs program. The following core activities represent the FY 2015 budget request:

- Communicate to Congress on behalf of the Administrator and management board.
- Enhance AGI's daily interaction with LOB and SO, and senior management officials by proactively soliciting LOB and SO information sharing in order to improve communication on areas of interest or concern to Congress.
- Inform key members of Congress and their staff on FAA safety policies and initiatives.
- Manage the Reports to Congress program, and function as the agency's Report to Congress liaison with congressional authorizing and appropriations staffs to clarify definitions of congressional intent. Also manage the coordination process between FAA, OST, and OMB, and encourage timely LOB and SO responses to targeted deadlines.
- Assist in preparing agency officials for congressional meetings and briefings.
- Work in coordination with AGC on congressional hearings.
- Provide OST Governmental Affairs with factual, concise, and complete information from significant AGI congressional contacts and activities.
- Serve as focal point for congressional follow-up on written agency responses.
- Foster strong partnerships with key industry stakeholders.
- Meet with aviation industry representatives to strengthen industry relationships.
- Communicate the administration's position on key aviation issues.

What Is This Program?

The Office of Government and Industry Affairs (AGI) serves as the Administrator's principal adviser and representative on matters concerning relationships with the Congress, aviation industry groups, and other governmental organizations. In concert with other agency organizations, AGI develops and reviews various plans and strategies involving these groups enhancing the promotion of aviation safety. These activities are conducted in close coordination and consultation with the Assistant Secretary for Governmental Affairs.

Why Is This Particular Program Necessary?

AGI represents the first impression and indeed, sometimes the only contact members of Congress and their staffs have with FAA. This customer-oriented office, small by comparison to most other FAA organizations, works directly for the Administrator and is the principal linkage between the agency and the legislative branch of government.

AGI works with other staff organizations to coordinate and present FAA's legislative message. AGI works with other organizations within FAA to facilitate their relations with Congress. AGI consistently monitors and gauges the interest and needs of the Members and leadership on Capitol Hill. This relationship also extends to coordinating our legislative initiatives and responses with the Department of Transportation.

This vigorous outreach is not limited to Congress. AGI also serves as liaison with the aviation industry, from manufacturers to carriers, and with other aviation related organizations. Additionally, AGI serves as the principal point of contact for state and local governments.

How Do You Know The Program Works?

AGI engages and fosters productive relationships with key members of Congress and Congressional Committees of jurisdiction to further awareness about and manage expectations surrounding FAA's principal mission—safety.

While we seek the resources to continue to improve the quality, timeliness, and usefulness of our core business functions, we know the program works through several indicators:

- Serves as FAA's focal point to coordinate agency actions relating to Congressional oversight of FAA programs;
- Manages the Reports to Congress program within the FAA. Serves as the FAA Reports Control Officer and is responsible for providing the DOT Congressional Reports Officer all information to disseminate to Congress and interested parties; approximately 13 reports were submitted to Congress in FY 2012;
- Coordinates with Departmental officials to ensure consistency in furthering policies relating to Congressional and intergovernmental relations issues;
- Keeps FAA Associate Administrators and the offices and services informed of Congressional and public concerns which may influence their operational responsibility;
- Coordinates all incoming Congressional Correspondence; and Congressional Hearings and Briefings;
- Ensures witnesses are well-prepared to answer questions at hearings

AGI solicits information from program offices within the Agency to better understand and communicate potential areas of interest or concern to the United States Congress. AGI strives for inter-agency coordination by providing Congress with timely and quality responses to all Congressional inquiries (i.e., briefings, calls, outreach events, etc.).

The work of this office enables the Administrator, Deputy Administrator, and Associate Administrators to effectively interact and communicate the policies and positions of the FAA before the United States Congress. Our established congressional relations are vital to advancing the aviation priorities of the Agency, Department, and the Administration.

Why Do We Want/Need To Fund The Program At The Requested Level?

FAA needs to have one office whose mission it is to provide high quality, timely communications to Congress. When we communicate well, the FAA gets heard. It is essential that public policy gets debated on its merits so that the best outcomes can result. Without this office, too much of the debate would be consumed by process instead of policy.

Office of Communications (AOC)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$6,003**	**34**	**1**	**32**
Adjustments to Base	**+$53**			**+2**
Internal Transfer				
Annualized FY 2014 Pay Raise	+8			
FERS Contribution Increase	+50			
Annualization of FY 2014 Hiring				+2
FY 2015 Pay Raise	+36			
Hiring Restrictions	-41			
FY 2015 Request	**$6,056**	**34**	**1**	**34**

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Detailed Justification for -- Office of Communications (AOC)

What Is The Request And What Will We Get For The Funds?

**FY 2015 - Office of Communications (AOC)
($000)**

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Office of Communications	$5,852	$6,003	$6,056	+$53

This request is for $6,056,000 and 34 FTEs to support AOC's critical outreach to news media, FAA-licensed individuals, the flying public, and the FAA's more than 47,000-member workforce. AOC works with news media and stakeholders to provide the public with accurate, timely, useful and important information about the agency's goals, policies, activities and operations. AOC serves as the internal voice of the FAA, providing employees with daily, weekly, and periodic communication vehicles and news programs.

AOC manages an agency-wide employee collaboration program that enables employees to share ideas, participate in conversations, and support the FAA's safety mission through online communities that enable innovation and collaboration. AOC also oversees the FAA branding program, multimedia (broadcast and video) services and all web content for the agency at large.

Our funding in FY 2015 will continue to focus on the following Key Outputs and Outcomes:

- Increase awareness and understanding of FAA safety, NextGen initiatives and National Airspace System efficiency and capacity enhancements through press conferences, media briefings, roundtables, direct outreach to reporters, press releases, websites, social media, and other communication channels.
- Increase awareness of the FAA's role as a world leader on aviation issues.
- Use multiple communications channels to promote key FAA safety initiatives (e.g. child safety, laser awareness, runway safety, etc).
- Respond to media calls about safety and other issues within 24 hours with accurate information and ensure the delivery of urgent, time sensitive information to key audiences.
- Continue improvements to FAA websites to increase online customer satisfaction.
- Ensure the efficient online delivery of aviation safety related regulatory documents including flight safety, airworthiness directives, and pilot and aircraft licensure.
- Support open government initiatives to make data available, improve online services, and increase collaboration with citizens, stakeholders and other government agencies.
- Improve frequently asked questions knowledge base to help public website customers find answers to common questions via a web self-service interface.
- Use external social media channels to engage with and educate the flying public and aviation industry professionals about key FAA safety initiatives (e.g. FAA official Facebook, Twitter, YouTube properties).
- Use new media technologies to extend the FAA's reach to delivery aviation safety information to targeted pubic audience.
- Increase employee understanding of agency programs and activities.
- Lead the DOT/FAA Idea Hub program to leverage employee ideas to help accomplish the FAA mission, make the organization a better place to work, and improve morale through engagement.
- Use a variety of internal communications vehicles to increase employee understanding of agency strategic goals, programs and activities. Obtain feedback that helps the FAA meet those goals.

What Is This Program?

The Office of Communications (AOC) is responsible for the policy, direction, and management of the agency's communications programs for the news media and FAA's employees nationwide. The Office of Communications is both the external and internal spokesperson for the FAA. The AOC mission is to disseminate accurate and timely aviation and aviation-related information affecting FAA licensed individuals, employees, and the flying public.

Media Relations
AOC works closely with FAA's lines of business and staff offices to provide timely, accurate information on FAA programs and activities under FAA's five strategic goals. AOC advises all agency officials on communication strategy and prepare them for media interviews and other public appearances. Office activities also support the Department of Transportation (DOT) goal of Organizational Excellence by facilitating clear, timely, consistent, and inclusive communications. AOC also coordinates the activities of the regional and center public affairs officers.

Employee Communications
AOC coordinates with the agency's lines of business and staff offices to provide more than 47,000 FAA employees with pertinent, accurate, and timely information on agency programs and activities. In addition, through FAA employee websites, AOC provides information and resources employees need to do their jobs. Through agency-wide employee engagement programs, AOC enable employees to share ideas, participate in conversations, collaborate together and support the FAA's safety mission through online communities that increase innovation, efficiency, and productivity. AOC manages the FAA's internal and external websites as well as internal web-based publications, social media platforms, video, audio and information-sharing programs. The FAA's external web pages inform FAA-licensed individuals and the flying public on issues involving aviation and aviation-related programs. Together these websites receive more than four million visits per month.

Anticipated Accomplishments Include:

- Increase positive coverage of FAA safety programs, NextGen initiatives, National Airspace System efficiency and capacity enhancements and reinforce FAA's role as a world leader on aviation issues.
- Ensure that at least seven articles, news stories or editorials appear in national publications or television coverage that positively highlights agency safety initiatives.
- Ensure that at least seven articles, news stories or editorials on NextGen appear in national publications or television coverage that positively highlights agency technology or procedural advances that will enable NextGen.
- Ensure at least four articles, news stories or editorials on separate topics appear in national publications or television coverage that positively highlight agency international leadership initiatives and when appropriate, communicate the FAA's role as a world leader on aviation issues in responses to day-to-day media inquiries.
- Ensure rapid response to media requests and provide critical information to the public in the event of an aviation emergency.
- Provide monthly web traffic, satisfaction, and usage reports including social media for FAA.gov and Employees.FAA.gov visitor usage, email subscriptions, and downloads.
- Achieve an average ACSI customer satisfaction score of 73 or better on the FAA public website for FY 2013 and FY 2014.
- Deliver more than 6 million FAA safety and regulatory documents online instead distributing in print.
- Publish daily broadcast email messages to employees that promote FAA programs and HR information as well as raise awareness of coverage of FAA in the press.
- Welcome more than 4 million visitors to FAA public and employee websites every month.
- Launch mobile device optimized FAA public website.
- Publish more than 250 employee news articles in Focus FAA that increase employee understanding of agency programs and activities.
- Receive more than 500 comments from employees on employee ideas to improve the FAA.
- Promote at least 10 FAA leadership messages to the workforce.
- Provide audio/visual support for more than five FAA/DOT employee town hall events.
- Answer 98 percent of questions received through the FAA Frequently Asked Questions knowledge database on the FAA public website.
- Reach a total external social media audience of at least 300,000 on child restraint system safety awareness and an audience of at least 500,000 on the dangers of pointing lasers at airplanes.

Why Is This Particular Program Necessary?

The Office of Communications, as FAA's internal and external voice, is responsible for the policy, direction, and management of the agency's communications programs for the news media, FAA employees nationwide as well as the flying public and key stakeholders. These programs and services are vital to AOC's mission to drive communications in support of the FAA and the DOT.

AOC coordinates with lines of business and staff offices to provide employees with pertinent, accurate, and timely information on agency programs and activities using audio/video services, a web-based employee newsletter and other communication channels.

Benefits of these communication services - With more than 47,000 employees working in offices and in the field, around the country and abroad – the FAA intranet, employee news, daily broadcast, and audio/video production services are a vital part of ensuring employees are connected with the vision, mission and values of the agency. These vital communications vehicles ensure that employees get information about everything from HR benefits to changes in programs that may directly impact them. Strong internal communications generate a more engaged, productive, and loyal workforce. AOC measures the benefits of these programs through the direct feedback received from employees on a regular basis and measures effectiveness through the number of visits to the news sites and video products as well as the online engagement that these products is generate.

Readership and engagement have increased significantly through these communications channels. Employees have come to expect the information that AOC delivers via these services. Other offices have come to expect the communications services that AOC provides for them which help convey important information about the agency programs they are responsible for.

How Do You Know The Program Works?

AOC has a variety of tools that help it ensure that FAA communications are effective. Consistent high survey feedback from users indicates that AOC is meeting its goal to provide information that is readily available, timely, accurate, and is understandable by the traveling public. AOC's corporate web management program has increased its annual American Customer Satisfaction Survey (ASCI) score from a 66 to a 73 in the last three years. This puts the FAA above the Federal Government average and well above the regulatory agency average.

An internal communications e-newsletter called Focus FAA receives more than 60,000 visits per month, has high readership and enables robust employee interaction. AOC also monitors the number of visits and time spent reading newsletter content and audio video content. AOC receives positive feedback and a high-level of response via online feedback channels for these publications. AOC also holds frequent media training sessions for FAA Leadership and takes advantage of new media technologies to deliver its message to a wide-range of audiences.

Why Do We Want/Need To Fund The Program At The Requested Level?

In the last year, there were over 5 million regulatory documents downloads from FAA.gov related to pre-flight safety procedures and planning, airmen/aircraft certification, aircraft mechanical records, airport safety regulations, and accident/incident data. This AOC-led delivery of critical safety information to the right person at the right time in the right method is at the very core of FAA's mission to ensure safety in flight for citizens.

Requirements are growing - over the last year; AOC has received a 300 percent increase in demand for secure access to critical aviation safety information via mobile devices. FAA employees, external stakeholders and the flying public expect unprecedented access to information from the FAA and more interaction about that information. AOC must continue to accurately and in a timely fashion provide critical information about FAA operations, safety oversight, efficiency initiatives and other programs to the media, employees and the flying public, to effectively accomplish the FAA's mission.

AOC will use this funding to:

- Continue to accommodate the growth of FAA.gov Mobile and MyFAA Mobile to deliver more essential services and content for citizens and employees on small screen platforms.
- Improve "findability" of regulatory documents, online services and content by using a multi-faceted approach to searching for, navigating through, and locating information.
- "Open FAA Data" - standardize data to increase internal and external access to high value, machine readable datasets and applications to deliver more value to consumers of FAA content.
- Make improvements and upgrades to address web-based security and privacy.
- Implement new approaches to optimize the user experience via multiple types of mobile devices.

As a result, airline pilots, mechanics, the flying public, and FAA employees will continue to benefit from access to critical aviation safety and operational information.

Office of the Chief Counsel (AGC)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$44,190**	**233**	**9**	**235**
Adjustments to Base	**+$371**			**0**
Internal Transfer				
Annualized FY 2014 Pay Raise	+60			
FERS Contribution Increase	+316			
Annualization of FY 2014 Hiring				+2
FY 2015 Pay Raise	+264			
Hiring Restrictions	-269			-2
Other Changes	**+$211**			
WCF Adjustments	+211			
Base Transfers		**+1**		**+1**
Staffing Resources Reassignment		+1		+1
FY 2015 Request	**$44,772**	**234**	**9**	**236**

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Detailed Justification for – Office of Chief Counsel (AGC)

What Is The Request And What Will We Get For The Funds?

**FY 2015– Chief Counsel
($000)**

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Chief Counsel	$44,473	$44,190	$44,772	+$582

The Office of the Chief Counsel requests $44,772,000 and 236 FTEs to enable AGC to provide necessary legal services to the FAA. This request reflects a transfer of one position and FTE with no associated funding from the ATO, AJV-3 Organization to AGC. The request includes an increase adjustment of $211,000 in anticipated Department of Transportation Working Capital Fund (WCF) charges. The WCF projected bill is $802,554, excluding fee-for-services printing and conference center usage. This funding will go towards ensuring the FAA meets its mission obligations consistent with legal requirements and that agency action and employees are vigorously represented in administrative and judicial forums. The request will be deployed in a manner calculated to best provide timely and responsive legal services in support of FAA's most critical program responsibilities.

Funding at the FY 2015 requested level will provide necessary legal services, including representation, in support of significant FAA program responsibilities and functions. Among the more significant are:

- Rulemaking, including critical safety rules and regulatory aspects of NextGen.
- Enforcement of safety regulations.
- Acquisition of operational safety systems and equipment, including acquisition aspects of NextGen development, and compliance with commercial and fiscal requirements.
- Airports capacity enhancement and grants, environmental streamlining for airport projects, and environmental aspects of NextGen development.
- Personnel and labor matters.
- Key international agreements harmonization of safety requirements and safety assessments.
- International technical assistance agreements and safety assessments.
- Dispute resolution services and/or administrative adjudication of acquisition related disputes, and administration of the Civil Penalty Program; representation of agency interests and choice of actions before United States federal courts and various administrative forums, including the National Transportation Safety Board (NTSB), the Merit Systems Protection Board, and the EEO Commission.

In order to advance the DOT goals of achieving the next level of safety, maximizing access to the aviation system, advancing global collaboration and building and enhancing our high performance workforce, the Office of the Chief Counsel, based on critical agency priorities and requirements, will assess and prioritize the following key outputs and outcomes in FY 2015:

- Send 85 percent of significant critical safety rules approved by the Rulemaking Council to DOT within 90 days of the planned date and issue 85 percent of the non-significant rules approved by the Council within 90 days of the scheduled date.
- Provide regulated community with timely guidance in responses to public requests for interpretations of FAA regulations by responding to 60 percent of requests for interpretation within 120 days of receipt and provide timely legal review of grants and denials of exemptions generally within 30 days of receipt for 80 percent of the exemptions submitted.
- Prosecute enforcement actions timely and efficiently in support of agency safety activities by taking the first legal action on 80 percent of the number of cases received during 12 months; timely conducting 50 percent of informal conferences within 90 days of receipt of a respondent's request and 75 percent within 180 days; avoid case backlog such that the percentage ratio of cases completed is at least 60 percent of the number of cases received.
- Provide representational legal services on all phases of tort litigation, investigations, claim processing and monitor and report on the agency's contingent liability.

- Provide timely draft civil penalty appeal decisions to the FAA Administrator by completing draft decisions in 60 percent of appeals within 180 days of the receipt of the last brief.
- Analyze capacity and congestion policy implications of NextGen near-term and mid-term improvements as required by program offices and provide legal drafting, analysis, and technical assistance in support of Agency initiatives to increase throughput at core airports.
- Conduct timely review of NEPA documents consistent with goals to facilitate implementation of NextGen and other Destination 2025 priorities by completing legal review of preliminary EISs for airport projects as necessary to meet schedules. Consistent with section 213 of the FAA Modernization and Reform Act of 2012, complete review within 30 calendar days of receipt of technically adequate and complete environmental assessments for OAPM projects and other proposed RNAV/RNP procedures.
- Complete legal sufficiency review of substantially complete draft Part 16 Final Agency Decisions within two weeks.
- Provide legal advice needed to avoid unanticipated cost growth on major system acquisitions such that 90 percent are within 10 percent variance of their current base-lined total budget estimate at completion (BAC); provide special focus and dedicate staff to facilitate agency initial operating capability (IOC) of ERAM functionality within 10 percent variance of current program baseline.
- Review all acquisition documents on average within 10 calendar days of receipt.
- Provide agency specific subject matter and advocacy training for entry level attorneys to strengthen our resources and build for the future. Provide an independent internal venue for adjudicating and deciding procurement and acquisition-related disputes, as well as, collaborative dispute avoidance and early resolution services to the Agency and its private sector contractors.
- Draft and negotiate international agreements as required by the agency on safety oversight, air traffic, airworthiness, technical assistance and other aviation issues; prepare agency position on matters before the International Civil Aviation Organization (ICAO); and provide legal guidance on registration and recordation of property rights in aircraft.
- Serve as legal counsel to the Crisis Response Working Group and Crisis Response Steering Group established for the purpose of responding to potentially hostile threat situations, natural or man-made disasters or crisis.
- Meet all EEOC, MSPB, and federal courts employment case deadlines.
- Actively support improvements in agency employment practices by participating in work groups designed to address employment and personnel issues.
- Provide general legal services in support of the Freedom of Information Act, Privacy Act, and Government Ethics.

What Is This Program?

The Office of the Chief Counsel provides mission critical legal support services across each of the Department of Transportation (DOT) goal areas. Within FAA, AGC is both a key partner to each line of business and staff office and an integral contributor to the success of every major agency program and function. Across every line of business and every agency program, AGC provides legal advice, reviews agency action for legal sufficiency and conformity, represents agency interests in various administrative and court forums, defends agency choice of action, and enhances risk management by proactively seeking to identify and mitigate risk. In addition, AGC is responsible for two distinct internal FAA adjudicative functions: the Office of Dispute Resolution for Acquisition serves as the Administrator's adjudicatory body in acquisition-related matters and provides alternative dispute resolution services; and, a discrete unit within the office supports the FAA's civil penalty adjudication function by serving as a confidential advisor to the FAA Administrator in his capacity as the Civil Penalty Program decision-maker.

AGC principle legal practice areas provide services in support of DOT goals in the following manner: 1) Enhancing Safety, through its activity in regulatory enforcement, rulemaking, acquisition and commercial law, aircraft and other tort litigation, and the Office of Audit and Evaluation; 2) maximizing Economic Competitiveness through its rulemaking activity, environmental legal services, airport legal services which support airport expansion and capacity, and acquisition of technologies that support increased capacity and efficiency; advancing global collaboration through international activity and harmonization of safety rules) enhancing Livable Communities and ensuring Environmental Sustainability through its rulemaking activity and environmental legal services; and) building Organizational Excellence by enhancing our high performing workforce, supporting numerous agency-wide strategic initiatives, and providing legal services in support of agency administrative functions including employment and labor law, ethics counsel, FOIA and Privacy Act services and legislative services.

The direct beneficiaries of our services are the agency organizations that have operational and programmatic responsibility for carrying out FAA's mission, and by extension, the goals of the Department of Transportation. More significantly, the flying public is the overarching beneficiary of increased safety and a modern and efficient air transportation system. AGC is a key partner supporting the agency's success in all of our various program areas. Our critical supporting activities include:

- Ensuring FAA's rules meet legal standards, assisting the agency in completing critical safety rules on schedule, and providing regulatory interpretations to internal staff, agency officials and member of the public.
- Prosecuting all manner of enforcement cases referred by the Flight Standards Service, Aircraft Certification Service, the Office of Aerospace Medicine, the Office of Security and Hazardous Materials, the Office of Airports and the Office of Commercial Space Transportation.
- Representing the FAA on safety matters before the NTSB, the FAA Decision-maker and the Federal courts.
- Advising agency employees and management during aircraft accident investigations and defending the agency in associated litigation; evaluating tort claims; assisting Department of Justice in defending wrongful death, personal injury and property damage lawsuits.
- Advising the FAA Administrator, in his capacity as decision-maker on cases appealed from decisions issued by Administrative Law Judges.
- Advising program offices on the legal and environmental implications of programs that enhance airport and airspace capacity and defending the agency's choice of action.
- Providing legal advice, litigation support, policy and regulatory guidance, and legal sufficiency reviews related to environmental review of airport capacity and capacity-related projects, administration of the airport improvement program, funding of runway expansion and safety projects, redesign of the airspace surrounding airports in major metropolitan areas and streamlined environmental review and compliance.
- Providing acquisition and commercial law expertise to assist clients in acquiring safety and capacity enhancing equipment and services.
- Ensuring legal sufficiency on all high value agency procurement activities; advising on grants, cooperative agreements, and other transaction agreements; and representing FAA in acquisition related litigation and disputes.
- Providing fiscal and commercial law services needed to support the agency's information security requirements, export control compliance, bankruptcy cases, antitrust issues, real estate activity and appropriations matters.
- Representing the agency before various administrative and federal courts on personnel, labor, civil rights and equal employment opportunity matters.
- Counseling how to minimize the legal risks relating to employment decisions and policy.
- Providing an administrative adjudicatory body in acquisition-related matters and ensuring acquisition conflicts are resolved through alternative dispute resolution processes or are promptly adjudicated.

Anticipated FY 2015 accomplishments include:

- Supporting timely and efficient agency rulemaking activities by submitting to DOT 80 percent of significant ("A") rules approved by the Rulemaking Council within 90 days of the scheduled date and issuing 80 percent of certain non-significant rules approved by the Rulemaking Council within 90 days of the scheduled date.
- Responding to 60 percent of public requests for interpretations of regulations within 120 days of receipt.
- Prioritizing and efficiently prosecuting legal enforcement cases by taking the first legal action on 80 percent of cases received during a 12 month period; monitoring and reducing the backlog of enforcement actions by maintaining a prescribed ratio of cases closed to cases received; conducting 50 percent of informal conferences in legal enforcement actions within 90 days of receipt of the respondent's request; and streamlining the coordination and approval of significant enforcement actions.
- Completing legal review of all procurement documents within 10 days and ensuring that key procurements remain within a prescribed tolerance in terms of funding and schedule.

- Providing legal services relating to drafting and negotiation of international agreements and on safety oversight, air traffic airworthiness, technical assistance, and other aviation related areas.

Why Is This Particular Program Necessary?

AGC provides critical legal support to each and every key function and critical program within FAA's mission. Legal services are necessary to ensure: agency actions are consistent with legal requirements and within legal authorities; that government interests are vigorously advocated, represented and defended; and that government personnel is fairly represented and able to carry on the agency's mission; and, that program and decisions risks are soundly evaluated, assessed and mitigated where appropriate. The legal office both defends agency choice of action, as well as agency employees, and vigorously prosecutes regulatory violations that imperil safety. AGC is the singular authorized source of legal advice and review for the entire agency.

AGC's principal legal practice areas are integrally linked to the success of FAA's mission. AGC directly supports the agency's safety mission by: timely and efficiently prosecuting violations of the federal aviation regulations, as well as, providing legal support of voluntary compliance programs; ensuring that critical safety rules are both legally sufficient and completed timely; providing timely and accurate agency responses to public requests for interpretations of the regulations; assisting in FAA accident investigation activities; and vigorously representing the agency and agency personnel in air crash and other tort litigation. In support of economic competitiveness and enhancing access to aviation, AGC plays a significant role by providing critical legal advice so that program milestones are maintained and, providing legal sufficiency reviews and advice to bolster and sustain program office actions regarding the environmental implications of runway expansions, terminal improvements, and redesign of the national airspace. Our environmental legal work also supports the related goals of ensuring livable communities and enhancing environmental sustainability. Further, AGC legal advice, risk management expertise, and sufficiency reviews in the acquisition and commercial law practice areas are essential to development, acquisition and deployment of the safety and capacity enhancing equipment and technology needed to support the national airspace system. AGC advice and risk management efforts assisted the agency in keeping major acquisitions within acquisition cost and schedule baselines in most cases. Moreover, AGC supports the agency efforts pertaining to global collaboration by developing the agency position on international law issues and supporting FAA international aviation efforts. Finally, in support of the overall goal of organizational excellence and enhancing our high performance workplace, AGC provides advice and guidance to key agency officials on personnel, labor law, and civil rights matters and the various general law disciplines applicable to all federal agencies.

AGC's most visible contributions can be found in our timely and efficient support of safety and access:

- Complete 85 percent of critical safety rules within 90 days of DOT scheduled due date.
- Over 60 percent of public requests for interpretations are provided within 120 days.
- Regulatory exemptions are usually acted upon in 30 days.
- Legal enforcement cases are prosecuted such that initial legal action is taken on 80 percent of cases filed during a 12 month period, 75 percent of informal conferences are held within 180 days of request and caseload is monitored to avoid a backlog.
- Major acquisitions systems that support the safe and efficient air transportation system are completed within striking distance of their cost and schedule baseline over 80 percent time and contract document are cleared through the legal office within 10 days.

How Do You Know The Program Works?

AGC is a support organization that contributes to the overall success of FAA programs and functions that reside with the various lines of business and staff offices with programmatic responsibility. AGC is not a program in the traditional sense and our contribution cannot be assessed through a single measure. Rather AGC contributes on many fronts to many programs to ensure overall that FAA actions are consistent with legal requirements, risks are defined and managed to the extent practicable, and the interests of the government and the flying public are strongly represented.

The multi-faceted contribution made by AGC is apparent in the NextGen program. NextGen is the future of air transportation, designed to promote efficiencies in air transportation, promote safety, and reduce costs to carriers. Our acquisition attorneys provide key support in the development, acquisition, and deployment of satellite base systems and technologies. The rulemaking attorneys play a critical role in establishing regulatory requirements and certification of new avionics equipment. The environmental attorneys are critical to ensuring environmental assessments are timely completed for new systems and airspace redesigns. The employment lawyers have a significant role in addressing the staffing and labor implications of a system where air traffic is managed rather than controlled. There is no single measure to assess AGC's contribution to the NextGen program, but the contribution is significant. The same is true for the many FAA programs and functions that AGC supports.

While there is no single or overall measure to assess the legal program, it merits saying that over the years AGC has consistently met the specific performance measures for its key practice areas. Moreover, AGC has been a proactive and efficient partner significantly contributing to FAA's consistent success in meeting its programmatic and safety goals.

Why Do We Want/Need To Fund The Program At The Requested Level?

AGC's funding level is primarily consumed by personnel costs and our staffing level drives our service level. Reductions to the requested funding level would significantly affect our delivery of services and would have a compounding effect on the vast array of program offices that require legal services to meet agency mission critical programs and strategic initiatives. Essentially, every mission critical program and/or initiative requires, either by law, congressional mandate, agency policy and/or sound business judgment, a legal office sign off or review for legal sufficiency at prescribed stages. Any reduction to AGC's requested funding and FTE level will likely result in a bottleneck for the delivery of legal services for efficient completion of agency programs. A decline in the ability to provide timely legal services would ultimately slow down FAA response time to regulatory issues, enforcement cases, and litigation and personnel cases and have an overall impact of the safety of the aviation community.

A reduction in funding could also impair the agency ability to vigorously defend tort and personnel cases, thereby significantly increasing the government's exposure to loss. AGC litigation losses consistently have been small compared to its potential tort liability. Similarly, pending class action employment cases carry an exceeding large potential liability, but AGC attorneys have successfully defended the cases to date.

A reduction or disruption in AGC's ability to deliver timely legal services likely would impair efforts to accelerate development and implementation of the NextGen Air Traffic Control System and related safety enhancements, and would interfere with initiatives related to maintaining scheduled progress of environmental reviews for airport development projects and airspace redesign efforts. If these programs are delayed due to a bottleneck in AGC, the safety and efficiency improvements these programs hold for the traveling public will be similarly delayed.

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Office of Policy, International Affairs, and Environment (APL)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$33,396**	**136**	**7**	**132**
Adjustments to Base	**+$183**			**+7**
Internal Transfer				
Annualized FY 2014 Pay Raise	+34			
FERS Contribution Increase	+175			
Annualization of FY 2014 Hiring				+8
FY 2015 Pay Raise	+142			
Hiring Restrictions	-168			-1
FY 2015 Request	**$33,579**	**136**	**7**	**139**

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Detailed Justification for – Office of Policy, International Affairs, and Environment (APL)

What is the Request and What Will We Get for the Funds?

FY 2015 – Office of Policy, International Affairs, and Environment ($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted*	FY 2015 Request	Change FY 2015 – FY 2014
Policy, International Affairs, and Environment	$33,361	$33,396	$33,579	+$183

*FY 2014 includes below threshold funding adjustments

The FY 2015 budget request of $33,579,000 and 139 FTEs allows FAA to identify, develop and implement the domestic and international policy and environmental goals of the agency. This funding is for personnel compensation and benefits and other objects that support program activities including program travel, training, communications, support services requirements, contract support, and supplies and equipment to support continuing operations.

Funding in FY 2015 will support the following key outputs and outcomes:

Policy and Plans

- Identify and initiate resolution of policy issues associated with NextGen implementation that cut across traditional FAA lines-of-business and offices.
- As required by law, complete economic analyses of agency rulemaking and regulatory projects, provide criteria and performance analysis of FAA investments in aviation infrastructure, update guidance materials for economic evaluation and investment, and evaluate airport benefit-cost analyses and competition plans.
- Implement congestion management solutions for the New York area while continually updating projections on which metropolitan areas will have the greatest impact on total system delays.
- Develop and publish the annual FAA aerospace activity forecast and terminal area forecasts by March of each year.
- Support and advise the Air Traffic Organization in developing efficiency metrics and analyzing system delays, and tracking overall system performance.
- Work with the Administration, Congress, and stakeholders to develop and implement FAA reauthorization legislation and to develop and analyze forecasts of Aviation Trust Fund revenues and expenditures at least twice a year.
- Develop and manage a continuous, end-to-end strategic planning and performance process for the agency to include transparent reporting of performance outcomes via multiple web-based initiatives.

International Affairs

- Enhance aviation safety through the promotion of proven safety programs and procedures with civil aviation authorities, regional organizations, industry and other stakeholders.
- Promote global interoperability by supporting research, validation and implementation of new concepts, systems, and procedures through maximizing resources to assist key countries and regional organizations to implement interoperable ATM technologies and procedures. Provide global strategic analysis and assist with policy development on international aviation issues.
- Advance efforts to reduce aviation's environmental footprint.

Environment and Energy

- Support activities to reduce aviation's environmental impacts, including reducing the number of people exposed to significant aircraft noise, health impacts associated with aviation emissions, and aviation's carbon dioxide (CO_2) emissions.
- Support activities to improve aviation fuel efficiency and augment the use of sustainable aviation fuels.

- Continue activities to support NextGen infrastructure and FAA Greening Initiative.
- Implement policy for application of environmental analysis tools for screening and compliance needs.
- Explore implications for potential revision of the threshold for community noise levels.
- Implement FAA's revised National Environmental Policy Act (NEPA) implementation order 1050.F. Includes training and guidance to representatives across LOBs/SOs to facilitate FAA-wide implementation.
- Develop and coordinate policies, methods and guidance materials necessary for implementing the aircraft noise certification regulations and compliance oversight.
- Provide policy and guidance support for aircraft engine emissions certification.
- Coordinate tracking and reporting of FAA's environmental sustainability performance.
- Review, refine and implement NextGen environmental policy.
- Support activities to achieve U.S. environmental and energy objectives at ICAO.

What Is This Program?

APL supports the Department of Transportation's (DOT) goals of Economic Competitiveness and Environmental Sustainability through multiple programs and projects designed to reduce aircraft noise and aviation emissions, minimize their impacts as well as increase fuel efficiency and to foster the continued development of competent civil aviation authorities worldwide to meet international standards. APL provides U.S. leadership on reducing global aviation's carbon footprint and working with the International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP) and international partners exploring options for a new carbon dioxide emissions standard for aircraft. As more Americans travel worldwide, the development of competent civil aviation authorities has become a cornerstone for providing technical assistance, building capacity and transferring technologies for public benefit.

All APL offices support FAA and DOT Organizational Excellence strategic goals, ensuring continuously-improving, secure, efficient, and transparent exchanges of critical information, organizational performance management including performance reporting, and maximizing output/outcome oriented efficient planning and business processes.

APL serves multiple international functions: principal advisor to the Administrator on international matters; management of agency international outreach, cooperation, and technical exchanges with a view to enhanced safety, capacity, and sustainability; development and coordination of international civil aviation policies and positions; provision of support to the U.S. Mission at the International Civil Aviation Organization; and technical assistance (over 1,500 cooperative agreements with 150 countries).

DOT and FAA participate in international standards setting and harmonization activities in transportation and engage in implementing programs that provide technical assistance for transportation capacity building to developing countries. DOT and FAA are engaged in advancing U.S. transportation policy and advocating worldwide adoption of harmonized standards and global technical regulations by participating in bilateral and regional forums or international organizations at the ministerial and working levels.

The FAA is also very active in working with ICAO, the International Air Transport Association (IATA), the Joint Planning and Development Office (JPDO) and international partners to develop global and domestic standards, recommended practices and guidance materials that support implementation of harmonized aviation policies and programs such as NextGen and NextGen Technologies, and in setting global aircraft noise and engine emissions standards.

As FAA's policy office, APL is responsible for developing broad-based, novel, and crosscutting policy initiatives. The office works to identify, develop, and resolve policy issues related to increased safety, greater capacity, maintaining international leadership, and sustainability of the global and domestic civil aerospace system in an environmentally sound manner. This work requires outreach to domestic and international customers and stakeholders, extensive research and development efforts, data collection and analysis, economic analysis, and policy development. APL also provides leadership to the agency's strategic policy and planning efforts, coordinates the agency's reauthorization before Congress, and is responsible for national aviation policies and strategies in the environment and energy arenas, including aviation activity forecasts, economic analyses, aircraft noise and emissions analyses and mitigation, environmental policy, and aviation insurance.

In the area of environment, APL is responsible for improving environmental protection and addressing energy and sustainability needs. APL is responsible for developing broad based approaches and coordinating agency responses to limit and reduce future aviation environmental impacts to levels that protect public health and welfare, ensure energy availability, and enhance sustainability of FAA operations. This work requires addressing environment, energy, and sustainability issues that will influence the future capacity and flexibility of the national airspace system (NAS), aircraft noise, air quality, global climate effects, energy availability and efficiency, water quality and sustainability of FAA operations.

The organization consists of the following offices:

Aviation Policy and Plans improves the FAA's effectiveness with strategic planning and management; makes coordinated and well-informed policy decisions for crosscutting and novel civil aerospace issues using independent economic, quantitative and qualitative analysis, information and tools; and positions the FAA for the future by identifying, researching, and projecting emerging issues and trends.
International Affairs is responsible for coordinating all of FAA's international efforts and advancing the nation's longstanding leadership on the international front including engaging in dialogue with counterparts across the world.
Environment and **Energy** is responsible for developing, recommending, coordinating, and implementing national and international standards, policy and guidance, research and technology goals, and analytical capabilities on aviation environmental and energy matters.

The base budget request covers the following:

- Leading FAA's strategic planning effort that will impact NextGen implementation, future airport congestion and system delays, the ability of agency rulemaking to address future risks, and development of more robust forecasting products.
- Collaborating globally to advance harmonization of aviation standards and practices through representation in key international bodies and providing training and technical assistance around the world.
- Leading or facilitating agency reauthorization efforts to include developing reauthorization proposals and implementing enacted reauthorization initiatives.
- Aviation environment and energy policy, programs, and operational activities to:
  - Reduce aircraft noise.
  - Reduce aviation emissions and climate impacts.
  - Improve National Airspace System energy efficiency and develop sustainable alternative aviation fuels.
  - Integrate environmental considerations into NextGen through Environmental Management System Approach and National Environmental Policy Act compliance.
- Supporting FAA's strategic sustainability through cross cutting coordination and performance tracking activities.

Anticipated accomplishments for Policy, International Affairs, and Environment include:

<u>Policy and Plans</u>

- Identifying and initiating resolution of novel and crosscutting NextGen policy issues as well as analyzing capacity and congestion policy implications of NextGen near and mid-term improvements. Working across the agency to incorporate NextGen metrics and performance measures in the agency's strategic and business planning.
- Providing timely economic analysis to enable the agency to send critical safety rules to the Office of the Secretary of Transportation within 90 days of the planned date.
- Implementing congestion management solutions for congested areas including the New York area with analysis of proposed infrastructure projects for air traffic and airport improvements.
- Leading development of agency reauthorization proposals, facilitating implementation of FAA reauthorization statutory provisions, and developing and analyzing forecasts of the Aviation Trust Fund.

- Supporting the Administrator by staffing the Management Advisory Council and other similar advisory bodies as directed by Congress.

International Affairs

- Providing services to support safety oversight activities in all regions and through ICAO, enhancing the capabilities of CAAs around the world.
- Supporting implementation of NextGen interoperable technologies and procedures working with other air traffic systems and regional efforts.
- Fostering partnerships to maximize resources available to assist key countries and regional organizations to implement interoperable ATM technologies and procedures.
- Presenting the U.S. position on aviation environmental issues and encouraging the adoption of U.S. aviation-related environmental policies and practices, including the development and deployment of sustainable alternative fuels for aviation.
- Managing the agreements process. Prepare, negotiate, manage, and conclude international agreements for the FAA.
- Advancing FAA policies and programs to international counterparts and industry around the world.
- Promoting aviation leadership development in all regions.
- Coordinating FAA-wide efforts to support U.S. aims regarding ICAO global safety, efficiency, and environmental initiatives and programs.
- Serving as the Secretariat of the Interagency Group on International Aviation.

Environment and Energy

- Providing implementation guidance on the use of the Aviation Environmental Design Tool (AEDT) for demonstrating environmental compliance.
- Conducting research and analysis and explore options for potential revisions in community noise threshold levels.
- Coordinating the U.S. positions to ICAO on more stringent aircraft noise and new aircraft CO_2 emissions standards.
- Developing policies, methods and guidance materials for implementing the aircraft noise certification regulations and compliance oversight.
- Supporting international activities to address aviation emissions influence on climate, through ICAO and other venues.
- Developing and providing training and guidance to LOBs/SOs on FAA Order 1050.1F to improve our efficiency for meeting NEPA requirements and support NextGen implementation.
- Coordinating an update to FAA's annual Strategic Sustainability Performance Plan and Greenhouse Gas Sustainability Data Report.
- Tracking and reporting on FAA's sustainability performance.
- Assessing NAS-wide environmental performance for exposure to significant noise and improved fuel efficiency.

Beneficiaries

As the number of international passengers and aviation activities across the globe increase every year, it becomes even more important for the U.S. to continue to be the gold standard for aviation safety. To make this happen, FAA builds partnerships and shares knowledge to create a safe, seamless, and efficient global aviation system. Our premise is simple: national boundary lines should not be impediments to safety. The global aviation system moves more than 7.7 million people and more than 130 thousand tons of cargo to their destinations every day. APL collaborates with our domestic and international partners to improve aviation safety, efficiency and the environment. The American traveling public and industry—and many others around the world—benefit from the work we do.

The aviation industry benefits because lower impacts reduce environmental constraints on aviation operation and growth. Improvements in fuel burn and energy efficiency improve emissions, including greenhouse gas emissions, reduce the economic burden imposed by high fuel costs, and contribute to U.S. energy conservation. Advancing sustainable alternative aviation fuels contributes to energy independence, which also benefits the public at large.

Work on critical safety rules directly contributes to aviation safety, which benefits the general public and the aviation industry. Economic analyses of investments helps ensure the best return to the taxpayers and flying public. The public and industry also benefit from APL's work to identify and resolve crosscutting policy issues affecting NextGen implementation. Improving and reducing delays will also benefit system congestion, the flying public, operators, and the U.S. economy in general, as air transportation can be operated more reliably and efficiently.

Role of partners in implementing this program

APL works closely with other Federal agencies on national and international policy, environmental and energy issues, as well as with industry partners, other civil aviation authorities, academia, non-governmental organizations, and community representatives. Our organization is also very active in working with ICAO, IATA, the JPDO, and international partners in supporting the implementation of global and domestic standards and recommended practices as well as guidance materials that support implementation of harmonized aviation policies and programs such as NextGen, by ICAO members worldwide and in setting global aircraft noise and emissions standards.

Why Is This Particular Program Necessary?

APL is responsible for leading the agency's domestic and international policy initiatives and strategic planning, facilitating reauthorization, and advancing an environmentally sustainable aviation system. APL plays a key role in ensuring agency policies, forecasts, programs, and assistance support and improve national and international civil aviation, and that the U.S. continues to operate the world's safest and most efficient aviation system with adequate capacity and environmental integrity, and retains its leadership role around the world. We ensure agency decisions are based on sound science and solid analysis and that we consider the views and needs of the many varied interests of stakeholders. Our work translates into a truly global and environmentally sustainable aviation system while meeting the needs of the U.S. aviation community.

Environmental and energy concerns are rising. Aircraft noise and emissions, including greenhouse gases, will grow and constrain the mobility and flexibility of NextGen unless they are adequately mitigated. Increased aviation noise and emissions would also undermine U.S. domestic and international environmental interests. Reducing aviation's environmental footprint will allow the achievement of both U.S. air transportation goals and environmental protection for improved public health and welfare. Measurable benefits and outcomes include:

- Reductions of significant aviation noise and air quality impacts below current levels, notwithstanding aviation growth.
- Limitations of the impact of aircraft CO_2 emissions on the global climate by achieving carbon neutral growth by 2020, compared to 2005 levels.
- Improvements in NAS energy efficiency by 2 percent annually, and development and deployment of sustainable alternative aviation fuels.
- Improvements in the environmental and energy performance of global aviation, including reducing greenhouse gases by applying an aircraft CO_2 standard and other measures.
- Integration of environmental and energy goals and targets into NextGen and FAA facilities through an Environmental Management System Approach and Greening Initiatives.

The U.S. has a tradition of global leadership in aviation. Our office works directly with ICAO and other international bodies to further global harmonization of aviation standards and practices focusing on economics, forecasting, environment, and technical assistance. The U.S. is the largest contributor of technical and financial support to ICAO, in which authorities from 190 countries participate. We lead international discussions on economic principles impacting how U.S. carriers operate around the world. We play a key role in the development of international aviation forecasts used by many of ICAO's member states. We continue to be a driver in setting global environmental standards and practices through our leadership role in ICAO's Committee on Aviation Environmental Protection and other international bodies. Our office facilitates direct or indirect technical assistance to 150 countries around the world to help them improve their aviation systems. APL leads the expansion and coordination of all aspects of global outreach for the NextGen activities within FAA and around the world to harmonize standards and recommended practices for new technologies, enhanced procedures, safety and airport requirements, as well as environmental considerations.

Whether we are referring to regulatory oversight, the development of air commerce, the development and deployment of new technologies, or advancing aviation related environmental initiatives, we are ultimately concerned with promoting the safety, efficiency, and environmental integrity of U.S. aviation interests worldwide. Any failures or lapses in implementation of these programs will adversely impact U.S. interests domestically and abroad.

Our collaboration with other countries fulfills the President's commitment to bilateral and multilateral cooperation and maintains a robust international program which is too extensive and important to be omitted. When we promote U.S. best practices to further global transportation safety, we not only promote compliance with international safety standards but also foster multimode transportation practices that advance our mutual interest in a lasting economic recovery and a clean energy future.

How Do You Know The Program Works?

The measures of program effectiveness for the agency are laid out in the FAA and DOT Strategic Plans, as well as in individual business plans for each organization. This office directly influences how agency goals, targets, and initiatives are set in each, and directly influences the agency's success in meeting them through our direct support in the specific program areas. We literally work across the agency and provide the necessary "honest broker" aspect to policy decisions that impact everything the agency does.

This office has been instrumental in the agency's success in five DOT goal areas – Safety, State of Good Repair, Livable Communities, Environmental Sustainability, and Organizational Excellence and is instrumental in many aspects of NextGen implementation. These include its work in policy, forecasting, metrics, environmental, and international. Our programs in economic analysis, forecasting, and environmental modeling are recognized as contributors and standard-bearers with ICAO and technical workgroups through publishing and speaking at critical forums.

<u>APL Targets</u> – APL maintains four specific planning targets. These include:

- Noise Exposure: Improve aviation noise exposure to the U.S. population exposed to significant aircraft noise around airports) from 307,420 persons in 2011 by at least 2 percent per year to less than 328,000 persons in 2016.
- Aviation Fuel Efficiency: Improve National Airspace System (NAS) energy efficiency (fuel burned per distance flown) by at least by 2 percent per year, from 4.24 teragrams per billions of kilometers (Tg/Bkm) in 2010 to 3.73 Tg/Bkm in 2016.
- Forty percent of all commercial aircraft from the top 25 aviation states are using fully interoperable NextGen technologies and capabilities by 2018.
- States representing 85 percent of international activity are taking actions to contribute to ICAO's 2 percent global annual fuel efficiency improvement goal by 2018.

Additional indicators of our success include:

- Implementation of FAA's Sustainability Policy and Strategic Sustainable Performance Plan in collaboration with LOBs/SOs.
- Reported FAA's energy management performance to DOT.
- Developed and provided NEPA policy and guidance to facilitate efficient environmental analysis of NextGen actions.
- Completing the Annual Aviation Commercial and General Aviation Forecast and ensuing conference.
- Conducting a successful Commercial Aviation Alternative Fuels Initiative (CAAFI) international conference
- Working directly with multiple international and domestic governing bodies including ICAO, IATA, and JPDO to formalize and foster Green Aviation Practices.

- Supporting the approval of the first jet biofuel specification, working through the Commercial Aviation Alternative Fuels Initiative.
- Continuing the development of a certification framework for aircraft CO_2 emissions.
- Delivering cost-benefit analyses on FAA safety and operational rulemakings, enabling the agency to meet its scheduled delivery dates to OST while supporting Congressional rulemaking mandates.
- Establishing the initial stages of FAA policies on financial and operational incentives for NextGen avionics equipage.
- Promoting runway safety activities in all regions and through ICAO.
- Providing services to support safety oversight activities in all regions and through ICAO, enhancing the capabilities of CAAs around the world.
- Providing aviation safety development assistance activities to the civil aviation authorities in Iraq and Afghanistan, through the Department of Transportation (DOT) Office of the Transportation Attaché (OTA).
- Assisting regional safety oversight organizations to build their capacities.
- Facilitating ongoing and developed new programs within the regions to enhance aviation safety and efficiency programs and policies.
- Working with the European Commission and European Agencies to expand cooperation under the existing Agreements.
- Assisting ICAO member states understand and implement processes that will improve compliance with the new Continuous Monitoring Approach program.
- Managing U.S. preparations for the evolution to Continuous Monitoring Approach program.
- Facilitating AVS efforts to establish or expand Bilateral Aviation Safety Agreements (BASAs) and IPs.
- Promoting regulatory oversight and operational roles for U.S.-registered aircraft operating outside the U.S.
- Working in partnership with ICAO, the Single European Sky Air Traffic Management Research (SESAR) Joint Undertaking, and the other international partners to further develop and promote ICAO's Aviation System Block Upgrade initiative.
- Engaging with international partners to coordinate and promote U.S. positions in support of ICAO's 12th Air Navigation Conference.
- Providing in-country air navigation safety projects through joint FAA-CAA cooperation including regional groups.
- Jointly identifying, coordinating, and implementing cooperative efforts with ATO.
- Working with U.S. industry, TDA, and other development organizations to encourage adoption of interoperable technologies and procedures in all regions.
- Promoting NextGen concepts, technologies, and procedures to other States through conferences, and coordinated outreach.
- Encouraging ICAO Contracting States to develop and submit action plans to ICAO in support of the aspirational goal of 2 percent global fuel efficiency improvement per year.

Why Do We Want/Need To Fund The Program At The Requested Level?

To achieve agency performance goals, we will depend on the maximization of resources through the leveraging of partnerships, technology, and expertise. We will continue to strive to meet the demands and requirements placed by the Administration and the Department in connection with various domestic and international initiatives. Reductions to the requested level will negatively impact NextGen implementation, the continued leadership of the United States in international aviation, advancement of critical environmental programs, and our ability to influence aviation policy both domestically and internationally.

Any reductions to APL's funding will have the following impact:

- It will limit our efforts on the Greening Initiative and energy conservation to focus on meeting only critical OMB and CEQ requirements, rather than all OMB/CEQ requirements and DOT's sustainability goals.
- We would be unable to develop and release refined policies and guidance that are critical to meeting NEPA regulatory requirements.
- We would reduce our economic and policy efforts to find the most cost effective safety and operational regulations and policies.

- We would be unable to provide timely economic analyses as required by statute.
- We would be unable to properly assess NAS-wide aviation environmental performance
- A reduction in participation in ICAO environmental standard-setting and technical work, hindering our ability to provide U.S. leadership to harmonized worldwide environmental aviation standards.
- We would need to reduce our level of support to the aircraft certification offices (AVS) in implementing aircraft noise regulations, including reduced levels of oversight on compliance by applicants.
- A reduction in participation in ICAO runway safety programs around the world. Improving runway safety around the world is a key component of the FAA's goal to reduce the worldwide accident rate by 10 percent. Reducing our efforts in this area will hinder our ability to reach this goal.
- A decrease effort to promote NextGen adoption internationally. Decreasing NextGen adoption efforts works against our goal to have 40 percent of the fleets of top 25 most active states using NextGen-compatible technologies.
- Reduced initiatives to assist countries in developing aviation environmental capacities. Reducing our international environmental mitigation and capacity-building efforts will impact the likelihood of success in getting ICAO states representing 85 percent of international aviation emissions to develop action plans to meet global ICAO environmental goals.

Human Resources Management (AHR)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$103,490**	**563**	**31**	**507**
Adjustments to Base	**+$548**			**+32**
Internal Transfer				
Annualized FY 2014 Pay Raise	+105			
FERS Contribution Increase	+472			
Annualization of FY 2014 Hiring				+36
FY 2015 Pay Raise	+442			
Hiring Restrictions	-471			-4
Other Changes	**-$1,283**			
WCF Adjustments	-1,283			
Base Transfers	**-$1,560**	**-6**		**-6**
Occupational Safety and Health Workplace Inspections	-1,560	-6		-6
FY 2015 Request	**$101,195**	**557**	**31**	**533**

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Detailed Justification for - Office of Human Resource Management (AHR)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Office of Human Resource Management (AHR)
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Human Resource Management	$93,687	$103,490	$101,195	-$2,295

The FY 2015 budget request of $101,195,000 and 533 FTEs will support the Office of Human Resource Management program. This request provides for salaries and benefits as well as estimated non-pay AHR activities including implementing and maintaining the comprehensive policies, procedures and systems necessary for managing FAA's most important asset: its people.

The request includes a decrease of $1,283,000 in anticipated Department of Transportation Working Capital Fund (WCF) charges. The AHR Working Capital Fund projected bill is now $21,814,886, except fee-for-services printing and conference center usage. Also, this request includes a base transfer of six FTEs and $1,560,000 to support the agency's corporate policy, oversight, contract support, reporting and liaison program functions and systems for FAA Occupational Safety and Health (OSH) Program to the Air Traffic Organization (ATO), and Pay Inflation/Hiring restriction adjustments of $548,000.

Funding at the requested level allows FAA to provide functional support to innovative, flexible and efficient personnel systems designed to acquire, develop and retain talented employees. The FAA workforce is the backbone of the agency's success in providing the safest, most efficient aerospace system in the world.

The AHR request covers our daily work in providing human resource services to the more than 47,000 FAA employees. We support five high priority objectives: hiring reform, human capital management, leadership development, employee engagement and labor management relations. AHR plans to continue implementing the current Administration's flagship personnel policy reform initiative. We continue to fund the strategic management of human capital, which helps FAA ensure it has the skilled workforce needed to transform to NextGen. In FY 2015, we will continue implementing leadership development programs to build a new generation of leaders and employees to achieve FAA's mission. We will develop and implement a series of immediate and long-term strategies to improve the engagement, commitment and satisfaction of FAA's workforce, which is a significant factor in enabling the Department of Transportation to advance the multi-modal transportation system of the future. Lastly, AHR will implement a corporate strategy that fosters effective, positive and collaborative labor management relations.

Funding in FY 2015 will support the following outputs:

- Ensuring the agency rates in the top 25 percent of places to work in the federal government by employees.
- Streamlining hiring practices to achieve the performance target set by DOT in meeting OPM's 80-day hiring standard.

Funding in FY 2015 will result in the following outcomes:

- Implementation of President Obama's hiring reform agenda. Social networking tools will be used to identify, connect and recruit top talent. Our streamlined end-to-end hiring process will allow us to select high-quality candidates efficiently and quickly, and comply with OPM's 80-day hiring model.
- Transition FAA successfully to NextGen. Effecting this transition will involve a systematic approach to getting the right number of people with the right skills, experience and competencies in the right jobs at the right time. AHR evaluates and identifies changes to the qualification requirements for air traffic controllers in the emerging NextGen system.
- Increased leadership competence within FAA. The development of our executive corps is grounded in creating a culture of accountability and making FAA more effective while the Senior Leadership

Development Program enhances the pipeline of highly qualified FAA senior managers who can fill projected executive vacancies.
- Becoming an employer of choice. DOT and FAA consider improving the linkage of employee performance to strategic goals a critical step in improving employee satisfaction, reducing turnover and attracting a high performance workforce.
- Improved FAA's corporate labor-management relationships. AHR will provide advice and guidance to all FAA managers and labor relations practitioners about collaboration efforts and techniques as well as offer training that include approaches to building trust, effective communications and interest-based problem-solving techniques.

What Is This Program?

The Office of Human Resources Management supports the DOT Strategic Plan goal of Organizational Excellence, specifically contributing toward initiatives that result in a diverse and collaborative DOT workforce outcome. The AHR budget request funds salaries and benefits, contractor support, and administrative activities to support staff located in FAA headquarters and 11 regional offices and centers throughout the United States. We manage a complex network of policies, programs, and systems designed to address all issues related to people such as compensation, hiring, performance management, safety, wellness, benefits, and training. Compensation alone requires skill in navigating the intricacies of 28 collective bargaining agreements.

Anticipated FY 2014 accomplishments include:

- Providing corporate agency guidance and consultation as necessary to monitor and assess agency Employee Engagement Action Plan implementation.
- Providing oversight for ongoing workforce planning and annual plan updates by providing workforce data, updated guidance/requirements, tools and consultation to Lines of Business and Staff Offices.
- Managing the operation and maintenance within FAA of personnel and payroll automated processing by the Federal Personnel and Payroll System, and expanding and enhancing the Selections within Faster Times automated suite to all mission-critical positions and those positions that cross organizational lines, i.e., finance, budget, human resources, and information technology.
- Providing day to day operational support and services to FAA managers on compensation, staffing, labor and employee relations, workers' compensation programs, employee assistance program, benefits, awards, training and human resources automation.
- Managing oversight and compliance of all bargaining with FAA unions. AHR will monitor and ensure compliance of all bargaining with FAA unions in accordance with FAA Order 3710.18, Internal Coordination Requirements for Negotiating Term and Mid-Term Agreements with FAA Unions, and the Federal Service Labor-Management Statute.

The services AHR provides to FAA lines of business and staff offices include:

- Giving guidance on strategically managing FAA's human capital by analyzing and interpreting results of employee surveys, improving workforce planning processes, conducting competency assessments and skill gap analyses for mission critical occupations.
- Administering the broad array of employee relations programs related to conduct, benefits and work-life issues.
- Managing the relationships between FAA and its unions, representing the agency in all national and headquarters negotiations, unfair labor practices proceedings and arbitrations.
- Defining requirements, setting quality standards and monitoring the effectiveness of corporate training, and addressing the training and development needs of the full range of FAA employees.
- Fostering a workplace free of harassment and inappropriate behavior by investigating and adjudicating allegations of employee misconduct.
- Overseeing and managing automation systems regarding time collection, labor reporting, personnel and payroll for every agency employee while meeting all information systems security requirements.

Why Is This Particular Program Necessary?

Congress challenged FAA to meet the demanding productivity, service and efficiency expectations of the public and the aviation industry by designing and implementing independent human resources and acquisition systems. They later amended that authority to require FAA follow the Federal Service Labor-Relations Statute with exception to impasse proceedings. Congress was clear that FAA's Personnel Management System would replace the former Title 5 system that governs most Federal agencies. The FAA Personnel Management System is an FAA-wide system. The FAA HR system by law, definition, rule, order and practice includes recruitment and placement, employee benefits, employee relations, labor relations, compensation, performance management, HR information systems, and the necessary policies that support the HR operational function. AHR's mandated responsibilities impact all FAA employees across all lines of business and staff offices, bargaining/non-bargaining units and geographic areas. Without the men and women of FAA, the agency cannot achieve its mission to provide a safe, efficient aerospace system for the American public. AHR is the office that manages the comprehensive system of policies, procedures and systems necessary for acquiring, developing, and retaining the right people for the right job at the right time.

Within FAA, AHR oversees and manages automation systems regarding time collection, labor reporting, personnel and payroll for every agency employee. Using an iterative approach enables efficient and cost-effective delivery of services and supports our hiring reform effort.

One of the key challenges facing FAA is building the workforce of the future to meet the transition to NextGen. Effecting this transition will involve a systematic approach to getting the right number of people with the right skills, experience and competencies in the right jobs at the right time. AHR evaluates and identifies changes to the qualification requirements for air traffic controllers in the emerging NextGen system. Workforce planning for mission critical and key occupations will benefit FAA managers as they make staffing decisions to achieve program goals based on a rigorous analysis of their organization's work, workforce and expected technological advances. AHR will supply workforce demographics and employment data, facilitating the identification of issues such as growing retirement eligibility and anticipated turnover. AHR will provide tools for identifying competencies needed in the future and solution analyses on recruiting, reassigning, retaining and retraining employees. State-of-the-art recruitment and marketing programs will be implemented to attract high performing and highly qualified candidates. The flying public will benefit from a better prepared, trained and safer workforce.

Another challenge is building leadership competence within FAA. AHR manages and delivers programs that build leadership capabilities, support professional development and promote continuous learning at executive, manager and employee levels. The development of our executive corps is grounded in creating a culture of accountability and making FAA more effective. Development activities feature the new Forum for Executive Excellence and on-boarding activities, as well as participation in agency and government-wide executive seminars on topical issues and current events. The Senior Leadership Development Program (SLDP) is a powerful and prestigious developmental program that provides the FAA a systematic approach to executive level succession planning and development that balances agency-wide priorities with succession needs of participating Lines of Business (LOBs) and Staff Office (SOs). The program is specifically designed to enhance the quality of FAA senior managers who, together with external candidates, could meet the projected executive level requirements identified through succession planning and establish a pipeline of highly qualified FAA senior managers who can fill projected executive vacancies. Participants complete a structured development program consisting of mandatory core components and other developmental activities. These activities are responsive to individual career goals and objectives identified in the individual's development plan. Mandatory core components include: Structured assessment activities and multi-rater feedback, professional coaching, mentoring with an FAA executive advisor, developing a personal Individual Development Plan (IDP), attending program workshops designed to build proficiency in key competency areas, completing an external executive education course, completing 90 – 120 days of developmental assignments, and participating in three program workshops which are designed to build proficiency in key competency areas. Our Program for Emerging Leaders (PEL), offers high potential non-supervisory employees opportunities over an 18-month period for assessment, mentoring, formal online and classroom training, and developmental assignments. Building stronger leadership within the agency helps

FAA achieve strategic goals and manage people and resources effectively while driving continuous improvement.

Becoming an employer of choice is a high priority objective for DOT and FAA. The Employee Engagement Steering Committee, spearheaded by AHR, is charged with implementing strategies to get employees excited about working for FAA and strengthening their commitment to the mission and shared values of the agency. AHR will update managerial and executive development and training to reflect emerging challenges and deliver activities designed to make the leadership team more visible to the workforce. Using the on-boarding process for new hires will build employees' affiliation and strengthen engagement and commitment to FAA and accelerate the time-to-productivity for new hires. AHR will market the value of using work plans to supplement generic performance standards, providing another opportunity to establish clear performance expectations and provide feedback and coaching. DOT and FAA consider linking employee performance to strategic goals a critical step in improving employee satisfaction, reducing turnover and attracting a high performance workforce.

AHR will implement FAA's corporate labor-management engagement plan. Transitioning to NextGen will pose challenges that, if not effectively managed, will result in strained labor-management relationships throughout FAA. AHR will provide advice and guidance to all FAA managers and labor relations practitioners about collaboration efforts and techniques as well as offer training that include approaches to building trust, effective communications and interest-based problem-solving techniques.

How Do You Know The Program Works?

Every two years we are audited by OPM to ensure our personnel system is a merit-based, legally defensible system. We were successful in FY 2011 in meeting all auditable requirements. Building on the success of the executive and senior leadership programs, AHR continues to expand FAA efforts to tap into the potential of our full performance, non-supervisory employees who seek managerial positions. Since its inception, 1,375 applications have been submitted for the Program for Emerging Leaders and of those, 434 participants received placement into eight PEL cohorts and 71 participants have received promotions to frontline managers. Additionally, over the past two years we have conducted a needs analysis and redesigned key managerial development courses which focused specifically on the front/first line managers in the FAA. Results and trends of the employee Viewpoint survey indicate a steady and significant positive increase in the ratings of immediate supervisors which, in 2012 exceed the results when compared to the rest of the government.

Anticipating a retirement bubble and addressing competition for attracting a skilled workforce, the FAA adopted the challenge of the Administration's end-to-end hiring initiative. Measuring hiring time remains a critical step in improving the efficiency in our hiring process. AHR has met the Department of Transportation's FY 2011 performance target of filling external hires within 120 days.

AHR is a significant contributor to the FAA's cost control effort. For the past three years, AHR has realized a cost avoidance of $38,700,000 through resolution of workers' compensation claims. In FY 2010, the cost avoidance was $20,800,000; in FY 2011 it was $9,700,000; and in FY 2012 it was $8,200,000. Because we have the subject matter experts, the FAA is in the process of undertaking management of all Workers' Compensation payments for the Department of Transportation. This transfer of responsibility will help the entire Department of Transportation realize a cost avoidance in the future.

Why Do We Want/Need To Fund The Program At The Requested Level?

Funding at the requested level is critical to continue providing basic personnel services to all FAA employees. Since FY 2011, the cost of receiving electronic leave and earnings statements through Employee Express doubled. Also, we received a 20% increase in the interface with USAJOBS. While AHR continues to absorb these rising costs, if this trend continues, we will be unable to meet future demands with stagnant funding.

Deeper cuts would result in losing our ability to maintain our employee engagement effort, which is critical to hiring and retaining the talent we need to manage the air transportation system of the future. We would be constrained in identifying skill sets and assess competencies (the first steps in developing career paths) as we prepare to hire the NextGen workforce.

We would reduce our participation in recruiting events, limiting our ability to support DOT and FAA's goals of maintaining a diverse workforce, and hiring veterans and persons with targeted disabilities. Also, we would be unable to develop and update information used for different types of recruiting media, limiting FAA's ability to reach candidates of all ages and hire the right person for the right job at the right time. As more federal employees become eligible to retire in FY 2015, the competition for talent will increase and the time to fill positions will lengthen.

Although employees look for ways to balance the increasing demands of work and personal time, we would reduce access to the online health and wellness program now available to every FAA employee and the suite of online services that assists employees with issues such as geriatric care and legal and financial concerns. With reduced funding, we would be unable to implement enhancements to AVIATOR, the FAA's online application system, to include the FAA's interface with USAJOBS. Also, although supporting the President's hiring reform agenda is mandated, we are reviewing which IT solutions may have to be deferred for improvements such as maintaining centralized pools of applicants for mission critical occupations.

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Office of Security and Hazardous Materials Safety (ASH)
($000)

	Dollars	FTP	OTFTP	FTE
FY 2014 Enacted	**$88,672**	**482**		**421**
Adjustments to Base	**+$647**			**+9**
Internal Transfer				
Annualized FY 2014 Pay Raise	+116			
FERS Contribution Increase	+564			
Annualization of FY 2014 Hiring				+13
FY 2015 Pay Raise	+446			
Hiring Restrictions	-479			-4
Other Changes	**-$469**			
WCF Adjustments	+469			
FY 2015 Request	**$89,788**	**482**		**430**

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Detailed Justification for – Security and Hazardous Materials Safety (ASH)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Security and Hazardous Materials Safety
($000)

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Change FY 2015 – FY 2014
Security and Hazardous Materials Safety	$87,903	$88,672	$89,788	+$1,116

The FY 2015 request for the Office of Security and Hazardous Materials Safety (ASH) programs is $89,788,000 and 430 FTEs. This will allow ASH to meet its core safety and security inspection/investigative mission requirements. The request includes increases for annualizing the FY 2014 pay raise (+$116,000), increased Agency contribution to the FERS retirement system (+$564,000), FY 2015 pay raise (+$446,000), a decrease associated with hiring restrictions (-$479,000) and an increase for anticipated Department of Transportation Working Capital Fund (WCF) charges (+$469,000). The WCF projected bill is $6,076,896 excluding fee-for-services printing and conference center usage.

Funding in the FY 2015 request will allow us to meet these milestones:

- Continue a Safety Management System (SMS) oversight program that provides the Hazardous Materials Safety Program with resources to conduct some Part 121 air carrier surveillance activities in coordination with FAA Office of Aviation Safety certificate management teams and conduct safety risk analysis of some Part 135 air carriers according to SMS principles.
- Provide safety regulatory oversight of shippers, air carriers and repair stations in accordance with the Hazardous Materials Regulations (49 C.F.R. Parts 171-180), hazardous materials-related requirements in 14 C.F.R. and the International Civil Aviation Organization (ICAO) Technical Instructions, and provide outreach to the flying public.
- Continue global safety oversight activities including support of State CAA's and International Safety Organizations for air transportation.
- Continue studies with FAA's Office of Aviation Research (Tech Center) and external professional testing organizations to test select critical commodities such as lithium batteries and packaging to identify potential regulatory changes and develop and coordinate guidance useful for setting national policy and industry standards.
- Support the Facility Security Management Program and the Personnel Security Program that protect critical FAA infrastructure and personnel in the National Airspace System (NAS).
- Use the Personal Identity Verification (PIV) card to authenticate persons attempting to access FAA facilities, as required by Presidential Directive HSPD-12 and OMB Memo M-11-11.
- Maintain emergency operations network capability and ensure continued situational awareness of daily and emergency events. The planned capabilities include fully integrating the Washington Operations Control Center (WOCC) and Regional Operations Centers (ROC) with the emergency notification system.
- Support the minimum communications requirements for Executive Department and Agency headquarters and continuity alternate operating facilities that support the continuation of the National Essential Functions (NEFs).
- Provide a fully operational 24/7 Intelligence Watch supporting the WOCC and the Air Traffic Security Coordinators who manage the Domestic Events Network.
- Continue the initial development of a Counterintelligence program for FAA Lines of Business and decision-makers.
- Provide support and assistance to federal, state, local, territorial, and tribal law enforcement agencies that investigate and interdict illicit use of aircraft in narcotics, weapons, and human trafficking, as well as respond to the dramatic increase in attacks on aircraft using lasers.
- Support Office of Audit and Evaluation (AAE) investigations as staffing permits.
- Support Flight Standards by conducting investigative responses to laser incidents as staffing permits.

- Complete agreements to obtain Federal and State prison information to compare against the Airman Registry, identify matches and recommend enforcement action as appropriate.
- Enhance security, improve access and increase efficiency.
- Support protection of the FAA from foreign-based cyber-espionage and computer network exploitation (CNE) attacks which threaten FAA information and data networks.
- Develop and provide workforce engagement activities such as counterintelligence training and awareness of foreign intelligence threats/vulnerabilities.
- Provide continuous analysis and sharing of cyber threat intelligence with the Cyber Security Management Center (CSMC), National Security Staff (NSS) and interagency partners.

Anticipated outputs/outcomes:

- Support the continuation of the SMS oversight program that will provide the Hazardous Materials Safety Program with resources to participate in air carrier surveillance activities in coordination with FAA Office of Aviation Safety certificate management teams.
- Provide notifications on over 6,000 significant aviation events.
- Provide outreach through letters to over 15,000 airline passengers found with suspected hazardous materials during airline passenger screening, in keeping with increased air travel. For example, from FY 2011 to FY 2012, there was an increase of 9.4 percent in the number of airline passengers found with suspected hazardous materials.
- Process over 6,800 background investigations and 8,400 fingerprint checks for FAA employees and contractors.
- Conduct no fewer than 350 FAA facility inspections and assessments.
- Provide FAA subject matter expertise and analysis to more than 1,000 daily Intelligence Community secure video teleconferences on an annual basis.
- Deploy the Emergency Response Vehicle (ERV) to no fewer than 3 pre-planned National Special Events. (Emergency response/crisis deployments are not included in this figure.)
- Test and train all emergency response personnel with communication responsibilities on the satellite telephone emergency network (STEN). Current system consists of 171 satellite phones.
- Increased facility and IT security via the use of the PIV card.
- Provide a level of service commensurate with 100 percent of the targets of internal security work plan activities.
- Issue approximately 20,000 PIV cards to new employees and contractors, or to renew expired ones.
- Enable 100 percent of issued PIV cards for use within FAA facilities and information systems.
- Provide 12,000 teleconferences per year for Executives, Lines of Business and Staff Offices.
- Provide Classified Telecommunications services to Executives, Lines of Business and Staff Offices.
- Provide Service Rendered Telecommunication (SRT) services to Lines of Business and Staff Offices.
- Investigate over 4,000 Laser events.
- Conduct over 90 Enforcement Investigations regarding airmen convicted of drug related offenses.
- Conduct over 25 Office of Audit and Evaluation (AAE) related investigations.
- Provide cyber threat intelligence to FAA network defenders and system owners.

What Is This Program?

The Office of Security and Hazardous Materials Safety's (ASH) mission is to ensure aviation safety, support national security, and promote an efficient airspace system through the development and administration of policies and programs. ASH develops and implements policy to protect FAA employees, contractors, information, facilities, and assets; provides crisis management support, supports the national security responsibilities of the FAA and protects the flying public through the safe air transport of hazardous materials. The specific ASH programs that this request supports are:

The FAA's Hazardous Materials Safety Program (HMSP) is establishing an air carrier oversight process that will rely heavily on Safety Management System (SMS) and certificate management principles to increase safety and efficiency. These processes reflect AVS's Flight Standards Service (AFS) air carrier oversight system and will utilize many of the same systems to ensure collaboration and efficiency. In FY 2015, this approach to oversight will continue to be standardized by the HMSP and applied to FAR 121 air carrier oversight.

Safety Whistleblower Investigations. Section 334 of the FAA Reauthorization Act of 2012 established the Aviation Whistleblower Investigation Office, also known as the Office of Audit and Evaluation (AAE). Currently, AAE support draws ASH investigative resources away from other investigations that also have required timeframes for completion, such as Accountability Board, Department of Transportation Office of Inspector General Hotline complaints, certificate actions taken against airman involved in drug activities, etc.

Laser Investigations. In recognition of the substantial safety risk posed, Section 311 of the FAA Reauthorization Act of 2012 established a prohibition against aiming a laser pointer at an aircraft and made it a criminal offense punishable under Chapter 2 of Title 18 USC. ASH conducts investigative responses to laser incidents in support of regulatory action by FAA Flight Standards.

Prison Match Cases. ASH is working to complete agreements to obtain Federal and State prison information to compare against the Airman Registry, identify matches, and recommend enforcement action, as appropriate. This activity supports both the FAA goal of denying NAS access to individuals convicted of certain drug-related crimes and the mission of Office of National Drug Control Policy (ONDCP).

FAA Defensive Counterintelligence Program (DCIP). The FAA workforce is responsible for making significant certification, regulatory, and other major decisions that could directly affect the economic prospects of a foreign country's civil aviation industry. Therefore, FAA employees, information, and data networks are prime targets for exploitation by a potential foreign adversary seeking an economic advantage through the surreptitious acquisition of sensitive FAA information and data through espionage and cyber-attacks. The FAA DCIP program provides a defense mechanism against these threats.

FAA Insider Threat Detection and Mitigation Program (ITDMP). Once fully established, the ITDMP will cover the entire enterprise providing insider threat monitoring and security evaluation of the FAA workforce. The requirements associated with this program are significant and security criteria necessitate position separation from other intelligence staff members.

FAA Emergency Preparedness, Response and Continuity of Operations. ASH is responsible for developing policies, plans and procedures to ensure FAA's ability to respond during incidents ranging from natural disasters to terrorist attacks and pandemic influenza. ASH coordinates FAA response activities and provides situation reporting to Agency and DOT leadership. ASH manages the FAA Continuity of Operations program and Agency participation in national-level exercise planning, conduct and evaluation, as well as administering FAA HQ Government Emergency Telecommunication Service (GETS) and Wireless Priority Service (WPS) programs.

Command and Control Communications (C3). ASH provides both emergency and routine communications capabilities. These communications capabilities ensure the FAA can support its essential functions and allow senior leadership to collaborate and make policy and operational decisions under all circumstances.

The **Current Intelligence and Threat Evaluation Watch (CITE Watch)** is FAA's 24/7 intelligence lead on all security threats. It supports the security and safety of the NAS, and the safety of U.S. civil air operations, worldwide.

The **Facility Security Management Program** protects FAA critical infrastructure, personnel, assets, property, and facilities.

The **Information Security Program** protects classified national security information, national security systems, and sensitive unclassified information.

The **Communications Security (COMSEC) and Technical Surveillance Countermeasures (TSCM) programs** protect communications and national security systems that transmit classified national security or other especially sensitive information during communications and use. These programs neutralize specific clandestine penetration technologies used by hostile elements to get unauthorized access to classified and sensitive unclassified information.

The **Personnel Security Program** supports both the determination that individuals may be granted access to classified national security information and the determination that individuals are suitable for employment by the FAA. This, in turn, promotes the safety and security of personnel in the workplace, promotes organizational effectiveness and supports the security of mission critical FAA operational activities.

The **Contractor and Industrial Security Program** manages investigation, processing and adjudication of contract employees, to decide their suitability to work on FAA contracts, and to carry out the National Industrial Security Program.

The **Identification Media Program** ensures the integrity and security of FAA Identification Media carried by all FAA employees and contractors and is lead element in the HSPD-12 program under which FAA is participating in the government-wide upgrade and standardization of the processes and procedures used to vet all employees and contractors and the automation of ID media using smart card technology to improve government efficiently, protection of Personally Identifiable Information (PII).

Anticipated accomplishments include:

- Further integrating SMS and certificate management principles into the FAA Hazardous Materials Safety Program's oversight of FAR Part 121 air carriers, and coordinating with FAA's Office of Aviation Safety on surveillance of these air carriers' activities that are related to the air transportation of hazardous materials.
- Conducting national surveillance of air carriers, shippers, and aviation repair stations to assess and enforce regulations through coordination with other transportation modes and other agencies.
- Conducting global safety oversight activities in high risk and developing national air space routes for the transportation of hazardous materials to include lithium batteries that are believed to have contributed to three catastrophic cargo aircraft accidents.
- Continuing to support global activities and initiatives related to the safe transportation of hazardous material by air through ICAO, IATA and other international bodies.
- Educating domestic and international passengers on the safety ramifications of transporting undeclared hazardous materials in baggage through the use of the internet and social media, in coordination with industry stakeholders and other agencies.
- Partnering with other agencies such as Customs & Border Patrol, and with other Department modes, to capitalize on technology to gain data and information for quantitative and qualitative analysis of trends useful for targeting compliance, enforcement and outreach activities.
- Ensuring FAA executives and continuity personnel have priority access on landlines and cellular phones by managing the Government Emergency Telephone Service cards and the Wireless Priority Service programs.
- Ensuring FAA executives and Lines of Business have real-time access to and analysis of intelligence and threat information during crisis and security incidents.
- Conducting counterintelligence awareness briefings for all FAA employees and targeted travel pre-briefings for executives and employees traveling to high-threat locations.
- Revoking or suspending certificates of airmen convicted of drug related offenses.
- Taking enforcement action against individuals who shine lasers at aircraft.
- Ensuring timely investigations are conducted in support of the AAE mission.
- Appropriately and expeditiously analyzing and sharing intelligence information regarding cyber threats to FAA data and networks.
- Supporting the Facility Security Management Program and the Personnel Security Program implementation that protect critical FAA infrastructure and personnel in the NAS.
- Developing standards and programmatic safeguards and controls over for protection of classified national security and sensitive unclassified information from loss, compromise or unauthorized disclosure.
- Processing background investigations and fingerprint checks for FAA employees and contractors.
- Conducting FAA facility inspections and assessments.
- Issuing PIV cards to new employees and contractors, or renewing expired ones.
- Enabling 100 percent of issued PIV cards for use within FAA facilities and information systems.

Why Is This Particular Program Necessary?

We develop and implement policy to protect FAA employees, contractors, facilities, information and assets, provide crisis management support, ensure availability of continuity of operations/continuity of government facilities and communications, support the national security responsibilities of the FAA and protect the flying public. Any failures or lapses in implementation of these programs directly impact the safety and security of the NAS and FAA's ability to execute its functions as one of the key components of our country's transportation infrastructure.

The FAA's Hazardous Materials Safety Program (HMSP): As a result of the transition to an air carrier oversight process that will rely heavily on Safety Management System (SMS), new components to air carrier safety inspections will be added to the HMSP's current oversight program. This will improve HMSP's understanding of the design of air carriers' systems, allow HMSP hazmat specialists to conduct surveillance based on non-regulatory risk precursors to non-compliance, as well as understand the relationship between an air carrier's hazardous materials safety program and other safety issues where oversight responsibilities reside exclusively with AFS.

For example, ICAO, IATA, and the Department of Transportation (DOT) (subject to the rulemaking process) are amending complex regulations governing the transport of lithium batteries by air. As a result, all air carriers will be required to change their systems for accepting, loading, transporting, and communicating to the pilot-in-command about the location/quantity of lithium battery shipments previously excepted from most regulations. The close relationship of lithium batteries to issues involving cabin safety, passenger disability regulations, training, and the transport of air carrier equipment (COMAT) will require the attention of the entire certificate management team, including FAA's hazmat specialists, to ensure a safe and smooth transition.

Safety Whistleblower Investigations, Laser Investigations, and Prison Match Cases: New and expanded investigative requirements in 2011 and 2012 resulted in a dramatic increase in ASH's investigative workload that continues to trend upward. These investigative requirements, identified in FAA Order 1100.167A (Whistleblower) and AFS Notice 8900.155 (Laser), resulted from Congressional mandates codified in the FAA Reauthorization Act of 2012. FAA also supports the ONDCP and promotes the safety of the NAS by denying NAS access to individuals who have been convicted of certain drug-related crimes but may have been previously unknown to the Agency. The Federal/State Prison Match Programs have expanded records access, enabling ASH to identify and take regulatory action against these airmen, which directly reduces the safety risk to the flying public and those operating in the NAS.

The requirements identified above in support of AAE, AFS, and Prison Match investigations are in addition to the work accomplished by the 48 ASH Special Agents who, in FY 2013, conducted 29,760 investigative actions, including:

- 609 administrative investigations (employee, contractor, applicant, unknown subject, former, and non-employee).
- 3,766 regulatory investigations. *Of those 464 were DUI/DWI investigations.*
- 4,044 laser incidents to determine whether or not a Subject was identified of those 109 subjects were identified from 86 incidents and the information was passed to AFS for regulatory action.
- 4,384 responses to requests from law enforcement and other agencies for information/assistance regarding 10,527 airmen/aircraft.
- 895 Ramp Inspections consisting of visual inspections of 10,814 aircraft.

FAA Defensive Counterintelligence Program (DCIP): Recent White House National Security Staff engagement with ASH, as well as other significant liaison with U.S. Intelligence, Defense and Federal law enforcement agencies, underscores the real and growing need to protect the U.S. aerospace sector and other civil aviation technologies from loss to foreign entities through economic espionage and industrial trade theft. Recent testimony by the Director of National Intelligence stated that cyber threats are the number one global threat to the U.S. in 2013, superseding terrorism. The establishment of the counterintelligence programs in non-intelligence/non-defense Executive Branch agencies like the FAA is a recent requirement. The amount of threat information clearly indicates foreign governments worldwide are conducting and increasing their intelligence collection efforts against regulatory and critical infrastructure-related agencies like the FAA. The FAA currently has an experienced but very small cadre of personnel who are establishing a defensive counterintelligence capability. Full development of the DCIP is vital in order to protect the FAA workforce, info, and systems from foreign intelligence collection and cyber-espionage operations.

FAA Insider Threat Detection and Mitigation Program (ITDMP): EO 13587, signed October 7, 2011, and Presidential Memorandum "*National Insider Threat Policy and Minimum Standards for Executive Branch Insider Threat Programs",* dated November 21, 2012, require all Executive Branch departments and agencies to establish a program to detect and mitigate insider threats. The FAA's nascent ITDMP is designed to protect the FAA from malicious activity including an active shooter situation, employee fraud, and the unauthorized release of classified information by a trusted employee with access privileges for selfish motives. In addition to damaging national security and/or the U.S. economy, any of these events, should they occur and get disclosed to the general public, are very harmful to the reputation of the FAA and can jeopardize the faith and confidence of the air traveling public.

FAA Emergency Preparedness, Response and Continuity of Operations: This program is necessary to ensure the National Airspace System (NAS), a national critical infrastructure operated by the FAA, can continue to function during significant incidents, and enable support to incident response and recovery, consistent with requirements in the National Response Framework. Continuity of Operations, required by Homeland Security Presidential Directive 20 / National Security Presidential Directive 51, ensures the FAA's ability to maintain and operate the NAS under all circumstances, without interruption, even when FAA personnel and facilities are impacted by the incident. National level exercises, with interagency and other partners, prepare the Agency to effectively coordinate and operate across the range of potential incidents.

Command and Control Communications (C3): This program enables the FAA and other Federal agencies to exchange and collaborate information both, classified and unclassified, to promote national security and Agency mission essential functions. The C3 program also supports the Washington Operations Center Complex and modernizes several "continuity of operations" sites, which ensures FAA executives command and communications during times of crisis.

The Current Intelligence and Threat Evaluation Watch (CITE Watch) provides intelligence support to the Washington Operations Center/Domestic Events Network (WOC/DEN) through threat identification, warning and assessment, and liaison with Intelligence Community, Law Enforcement and Department of Defense agencies. The CITE Watch is focused on supporting the security and safety of the NAS operations, and the safety of U.S. civil air operations, worldwide. It is FAA's focal point for TSA's Secure Flight Program and U.S. air operators in reporting threats to flight safety in international locations. The CITE Watch evaluates both classified intelligence and open source reporting, and provides tailored intelligence support to FAA leadership, WOC /DEN, FAA Regions and the Crisis Response Working Group/Crisis Response Steering Group (CRWG/CRSG) during aviation security/safety incidents and threats. It also supports National Special Security Events (NSSE), FAA's air traffic security programs, ASH security investigations and FAA personnel operating in high threat environments (e.g., Afghanistan).

How Do You Know The Program Works?

It has been made abundantly clear in the last several years that there is an absence of security and safety measures in the aftermath of incidents and disasters. However, there are positive measures of the success of the ASH program. ASH has consistently met our projected targets for success each year as well as required cost efficiency and program effectiveness measures. We adhere to all regulations and laws pertaining to our work and ensure this through our internal auditing.

The FAA's Hazardous Materials Safety Program (HMSP): The HMSP's robust oversight and enforcement program serves as means to identify non-compliance and mitigate potential risks to aviation safety. The effectiveness of this program is evidenced by the fact that there have been no known fatalities due to the air shipment of hazardous materials on passenger aircraft within the United States since the ValuJet crash of May 1996, in spite of increased air travel and cargo volumes.

Safety Whistleblower Investigations: ASH has initiated over 800 investigative actions in support of AAE safety investigations during the past 30 months, devoting over 3,500 man-hours.

Laser Investigations: ASH Special Agents have conducted over 9,448 investigative responses to laser incidents by contacting law enforcement agencies to gather necessary information/police records for AFS initiation of regulatory action when a perpetrator is identified and since June 2011 has expended over 10,774 man-hours.

Prison Match Cases: In FY 2013, ASH opened 94 enforcement investigations, and expended over 2,820 man-hours. This number is expected to increase. The investigative activities noted above in support of AAE and AFS are over and above the routine investigations workload accomplished by the 48 ASH Special Agents who, in FY 2013, conducted over 29,760 other investigative actions including: 609 administrative investigations (including employee/contractor misconduct), 3,766 regulatory investigations and 4,384 responses to request from law enforcement and other agencies for information/assistance regarding 10,527 airman/aircraft.

FAA Defensive Counterintelligence Program (DCIP): The DCIP will further demonstrate its effectiveness when FAA employees worldwide are made aware of foreign intelligence threats to U.S. civil aviation and aerospace sectors and appropriate protective and defensive measures are taken by them and reported back to the DCIP. Further, increased frequency and quality of counterintelligence information shared by the U.S. Intelligence Community and other incidents of engagement by the USIC and Federal Law Enforcement agencies with the FAA DCIP will indicate program's liaison success within the Counterintelligence Community.

FAA Insider Threat Detection and Mitigation Program (ITDMP): ITDMP success is achieved when active monitoring, and comprehensive investigative and protective activities occur and any insider threat is adequately mitigated while protecting employee privacy and information in accordance with policy and law.

FAA Emergency Preparedness, Response and Continuity of Operations: Success is gauged through response in real-world incidents, such as was seen in Hurricane Sandy in 2012, by the timeliness and quality of FAA response, coordination, and reporting, through the entire incident cycle, to maintain the NAS and contribute FAA capabilities to national incident response and recovery.

Command and Control Communications (C3): The program performs annual, quarterly, and monthly exercises to ensure that communications systems are functioning properly.

The Current Intelligence and Threat Evaluation Watch (CITE Watch) is the leader for the FAA and the Department of Transportation in providing timely indications and warnings of threats and security event information that impacts the NAS, U.S. flying public, air operators and crews, and FAA personnel worldwide. It coordinates several thousand notifications from the TSA and Terrorist Screening Center in support of Secure Flight Program in order to protect the NAS. It has participated in nearly 1,000 secure video conferences with IC/LE agencies, and has worked with USG interagency partners in developing Notice-to-Airmen (NOTAM) and International Flight information Manual (IFIM) warnings for U.S operators and airmen operating in foreign hostile environments.

Why Do We Want/Need To Fund The Program At The Requested Level?

Any reduction to our request will have a negative impact on our ability to meet our critical safety and security mission requirements. The requested funding level is needed to maintain base level Security and Hazardous Materials Inspection Programs that protect FAA personnel, systems, information and facilities and to promote the safety of the flying public. At the requested level we will maintain minimal mission capability for the following activities:

The FAA's Hazardous Materials Safety Program (HMSP): FAA's Hazardous Materials Safety Program may not be able to further implement SMS oversight of all Part 121 air carriers, and risks that are associated with the air transportation of hazardous materials by those carriers will not be integrated into the certificate management teams' safety risk management process for Part 121 air carriers. Resources requested for

FAA's Hazardous Materials Safety Program (HMSP) would enable the HMSP to further integrate Safety Management System (SMS) principles into its oversight of air transportation of hazardous materials by FAR Part 121 air carriers in order to reduce safety risks in the NAS. With this funding, the HMSP would be able to conduct Safety Management System oversight of the 81 FAR Part 121 air carriers beyond those that are currently in the field test. The HMSP's goal in implementing an SMS approach to oversight of air transportation of hazardous materials is to manage resources in a risk-based, data driven manner.

An SMS approach to air carrier oversight is also critical because half of the 4.5 billion lithium ion cells produced every year are transported by aircraft. Almost all of these high risk and increasingly energy dense commodities are manufactured and shipped out of Asia, where the FAA does not have authority to conduct shipper inspections. This means the HMSP must have the FTEs and the skills set to assess the design and suitability the of operator systems. In other words, the training and procedures used by U.S. air carriers in accepting and handling HazMat overseas is one area the HMSP can address this risk and enhance safety. Given then risk profile of lithium batteries, and in the absence of risk mitigation, the FAA Technical Center predicts approximately four freighter aircraft accidents in the next 10 years as a result of lithium ion batteries alone. This report did not study the risk from metal batteries, or the implications for passenger aircraft.

Safety Whistleblower Investigations, Laser Investigations, and Prison Match Cases: An assessment of ASH's current investigative case load shows inadequate manpower and funding to meet the current needs and timelines required, while demands for investigative support in all three areas continue to trend upward. Inadequate resources will require difficult choices such as selectively choosing which investigations to conduct and when to conduct them, resulting in increased risk to the safety of the NAS, as well as diminished or slowed investigative support to other Lines of Business (LOBs) or Staff Offices (SOs).

FAA Defensive Counterintelligence Program (DCIP) and FAA Insider Threat Detection and Mitigation Program (ITDMP): The FAA and its workforce, information, and data networks will remain at considerable risk to cyber compromise and economic espionage perpetrated by foreign actors and malicious insiders. The FAA plays a critical role on a global scale in civil aviation, and recent activity directed against the FAA by a foreign entity shows that FAA is not immune from foreign intelligence collection operations, cyber network intrusion operations, and intense public and Congressional scrutiny. The nascent DCIP and ITDMP will develop slowly with no additional personnel or financial resources.

Command and Control Communications (C3): At the current funding level we will be able to maintain minimum required emergency communications in the event of a crisis and meet national security mandates.

The Current Intelligence and Threat Evaluation Watch (CITE Watch): The CITE Watch will continue to provide intelligence support to the Washington Operations Center/Domestic Events Network (WOC/DEN) through treat identification, warning and assessment, and continue to act as a liaison with the Intelligence Community, Law Enforcement and Department of Defense agencies. It will also continue to provide support to CRWG/CRSG, and to U.S. operators and airmen who have been given the CITE Watch as the point contact for reporting security events. It will evaluate both classified intelligence and open source reporting. It will continue to provide tailored intelligence support to the FAA, DOT and U.S. Departments and Agencies of emerging threats to the Homeland.

Reductions to the requested level would force ASH to consider the following actions:

- Hazardous Material Safety Program would limit the ability to expand the oversight of Part 121 air carriers under a risk-based SMS and would also limit safety oversight of the hazardous material transportation of air carriers, shippers and repair stations, and other regulated parties associated with the safe transportation of hazardous material. This would limit our ability to determine operational compliance with safety regulations, training requirements and programs. The continued research and development of aircraft systems to provide safe transportation conditions for lithium battery transportation by air would be significantly reduced or eliminated.
- A redundancy would continue to exist as AFS and the HMSP utilize different databases, procedures, and business practices.
- An assessment of ASH's current investigative case load shows inadequate manpower and funding to meet the current needs and timelines required, while demands for investigative support in all three areas for which ASH is seeking an increase, continue to trend upward. Inadequate resources will

require difficult choices such as selectively choosing which investigations to conduct and when to conduct them, resulting in increased risk to the safety of the NAS, as well as diminished or slowed investigative support to other LOBs/SOs.

- A failure to meet requirements of Executive Order 13587 and the White House's National Insider Threat Program Policy requiring all Federal departments and agencies to establish and operate an Insider Threat Program to detect and mitigate malicious and harmful acts by trusted employees which could do harm to national security if persons intentionally or improperly use or release information to foreign powers. Likewise, if employees are not educated on the counterintelligence threat to FAA data and networks, they could unwittingly provide access or information to foreign powers' intelligence services, which could harm national and economic security of the U.S. as well as cause our U.S partners, stakeholders and the flying public to lose confidence in FAA data integrity and/or protection.
- Directly impacts the agency's ability to safeguard FAA facilities and personnel. Reduce FAA's ability to achieve cost savings from facility operations, impede the ability to meet physical access targets for Federal Identity Credential and Access Management (FICAM), and put overall NAS and agency operations at increased risk.
- Directly impacts the agency's ability to meet hiring goals and timelines. It also impacts the safety and security of the NAS due to the degradation of the agency's ability to ensure only suitable personnel are and remain employed, thus increasing the security risk to the agency.
- Curtail the inspection and assessment of all areas that store, handle, and/or process Classified National Security Information, Communications Security, Export Controlled Information and Sensitive/Controlled Unclassified Information to determine compliance with FAA Orders 1600.2, 1600.8, 1600.75, other applicable FAA or Federal directives and National Security Agency /United States Air Force directives.

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Explanation of Funding Changes

	Dollars ($000)	FTE
Staff Offices	**-$219**	**+45**
Overview: For FY 2015, the Staff Offices Assistant Administrators request $296,147,000 and 1,506 FTE to meet their respective missions. The FY 2015 request level reflects adjustments to base, base transfers and other changes.		
Adjustments to Base	**+$1,944**	**+50**
FY 2015 Pay Raise: This increase is required to provide for costs associated with base salary increases. (January to September) resulting from the proposed government-wide pay raise. The factor used is (0.75) of 1.0 percent.	+1,437	
Annualization of the FY 2014 Pay Raise: This increase is required to provide for the remaining quarter of the FY 2014 government-wide pay raise of 1.0 percent. The factor used is (0.25) of 1.0 percent.	+353	
FERS Contribution Increase: OMB Circular A-11 has increased the agency's contribution rates to the FERS retirement system. This increase in cost to the FAA represents the increased rates for both Air Traffic Controllers and other agency employees.	+1,700	
Annualization of FY 2014 Hiring: This increase in FTE's is required to cover the increased staff hired during FY 2014 but were on board for only a portion of the year. No funding is necessary for the additional FTE's since the added cost is offset by the savings due to the new hires having a lower payroll cost than the staff they are replacing.		+62
Restricted Hiring: It may be necessary to slow down hiring during FY 2015 if the planned hiring for FY 2014 is achieved. The restricted hiring will mean that we may not meet the staffing levels called for in the Air Traffic Controller and Safety Workforce Plans.	-1,546	-12
Other Changes	**-$603**	
Working Capital Fund: This cost adjustment is requested to support the Department of Transportation's (DOT) Working Capital Fund (WCF) profile. These adjustments are being made to best align each office's resources within their expected WCF costs.	-603	
Base Transfers	**-$1,560**	**-5**
Staffing Reassignment: This base transfer consists of 1 FTE staff support from Air Traffic Organization (ATO/AJV) to the Office of Chief Counsel (AGC); transfer with no funding.		+1
Occupational Safety and Health (OSH) Workplace Inspections: This base transfer request from the Office of Human Resources (AHR) agrees to transfer the agency's corporate policy, oversight, reporting and liaison program functions and systems for FAA Occupational Safety and Health (OSH) Program to the Air Traffic Organization (ATO/AJW-23). AHR agrees to provide six FTE positions to the ATO, Technical Operations AJW-23 organization, and to pay the associated salary costs for those positions. Funding for the PC&B will continue to be the responsibility of AHR until such time as the AHR and ATO budgets can be revised to accommodate the OSH Program base budget transfer.	-1,560	-6

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3B. FACILITIES & EQUIPMENT

FACILITIES AND EQUIPMENT
(AIRPORT AND AIRWAY TRUST FUND)

For necessary expenses, not otherwise provided for, for acquisition, establishment, technical support services, improvement by contract or purchase, and hire of national airspace systems and experimental facilities and equipment, as authorized under part A of subtitle VII of title 49, United States Code, including initial acquisition of necessary sites by lease or grant; engineering and service testing, including construction of test facilities and acquisition of necessary sites by lease or grant; construction and furnishing of quarters and related accommodations for officers and employees of the Federal Aviation Administration stationed at remote localities where such accommodations are not available; and the purchase, lease, or transfer of aircraft from funds available under this heading, including aircraft for aviation regulation and certification; to be derived from the Airport and Airway Trust Fund, $2,603,700,000, of which $463,000,000 shall remain available until September 30, 2015, and $2,140,700,000 shall remain available until September 30, 2017: Provided, That there may be credited to this appropriation funds received from States, counties, municipalities, other public authorities, and private sources, for expenses incurred in the establishment, improvement, and modernization of national airspace systems: Provided further, That upon initial submission to the Congress of the fiscal year 2016 President's budget, the Secretary of Transportation shall transmit to the Congress a comprehensive capital investment plan for the Federal Aviation Administration which includes funding for each budget line item for fiscal years 2016 through 2020, with total funding for each year of the plan constrained to the funding targets for those years as estimated and approved by the Office of Management and Budget.

Program and Financing
(in millions of dollars)

Identification code: 69-8107-0-7-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Obligations by program activity:			
	Direct program:			
0001	Engineering, development, test and evaluation	428	425	270
0002	Procurement and modernization of (ATC) facilities and equipment	1,510	1,289	1,488
0003	Procurement and modernization of non-ATC facilities and equipment	146	168	159
0004	Mission support	227	195	216
0005	Personnel and related expenses	455	450	463
0006	Hurricane Sandy	14	14	1
0100	Subtotal, direct program	2,780	2,541	2,597
0799	Total Direct obligations	2,780	2,541	2,597
0801	Reimbursable program	83	79	78
0900	Total new obligations	2,863	2,620	2,675
	Budgetary resources available for obligation:			
1000	Unobligated balance brought forward, Oct 1	1,163	1,091	1,113
1001	Discretionary unobligated balance brought forward, Oct 1	1,163	. . . .	. . . . .
1021	Recoveries of prior year unpaid obligations	75	. . . . .	. . . . .
1050	Unobligated balance	1,238	1,091	1,113
	New budget authority (gross), detail:			
	Discretionary:			
1101	Appropriation (special or trust fund)	2,761	2,600	2,604
1132	Appropriations temporarily reduced	-144	. . . . .	. . . . .
1160	Appropriation, discretionary (total)	2,617	2,600	2,604
	Spending authority from offsetting collections:			
1700	Collected	86	42	42
1701	Change in uncollected payment, Federal sources	22	. . . . .	. . . . .
1723	New and/or unobligated balance of spending authority from offsetting collections temporarily reduced	-3	. . . . .	. . . . .
1750	Spending auth from offsetting collections, disc (total)	105	42	42
1900	Budget authority (total)	2,722	2,642	2,646
1930	Total budgetary resources available	3,960	3,733	3,759
	Memorandum (non –add) entries:			
1940	Unobligated balance expiring	-6	. . . . .	. . . . .
1941	Unexpired Unobligated balance, end of year	1,091	1,113	1,084
1950	Other balances withdrawn and returned to unappropriated receipts	44	. . . . .	. . . . .
1951	Unobligated balance expiring	6	. . . . .	. . . . .
1952	Expired Unobligated balance, start of year	103	78	78
1953	Expired Unobligated balance, end of year	72	78	78
1954	Unobligated balance canceling	44	. . . . .	. . . . .
	Change in obligated balances:			
3000	Unpaid obligations, brought forward, Oct 1	1,942	1,862	1,724
3010	Obligations incurred, unexpired accounts	2,863	2,620	2,675
3011	Obligations incurred, expired accounts	7	. . . . .	. . . . .
3020	Outlays (gross)	-2,849	-2,758	-2,734
3040	Recoveries of prior year unpaid obligations, unexpired	-75	. . . . .	. . . . .
3041	Recoveries of prior year unpaid obligations, expired	-26	. . . . .	. . . . .
3050	Unpaid obligations, end of year	1,862	1,724	1,665
3060	Uncollected pymts, Fed sources, brought forward, Oct 1	-81	-87	-87
3070	Change in uncollected pymts, Fed sources, unexpired	-22	. . . . .	. . . . .

Identification code: 69-8107-0-7-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
3071	Change in uncollected pymts, Fed sources, expired	16	. . . . .	. . . . .
3090	Uncollected pymts, Fed sources, end of year	-87	-87	-87
3100	Obligated balance, start of year	1,861	1,775	1,637
3200	Obligated balance, end of year	1,775	1,637	1,578
	Budget Authority and outlays, net:			
4000	Budget authority, gross	2,722	2,642	2,646
4010	Outlays from new discretionary authority	1,001	1,126	1,134
4011	Outlays from discretionary balances	1,845	1,632	1,600
4020	Outlays, gross (total)	2,846	2,758	2,734
	Offsets:			
	Against gross budget authority and outlays:			
	Offsetting collections (collected) from:			
4030	Federal sources	-42	-15	-15
4033	Non-Federal sources	-54	-27	-27
4040	Offsets against gross budget authority and outlays (total)	-96	-42	-42
	Additional offsets against gross budget authority only:			
4050	Change in uncollected pymts, Fed sources, unexpired	-22	. . . . .	. . . . .
4052	Offsetting collections credited to expired accounts	10	. . . . .	. . . . .
4060	Additional offsets against budget authority only (total)	-12	. . . . .	. . . . .
4070	Budget authority, net (discretionary)	2,614	2,600	2,604
4080	Outlay, net (discretionary)	2,750	2,716	2,692
	Mandatory:			
	Outlays, gross:			
4101	Outlays from mandatory balances	3	. . . . .	. . . . .
4180	Budget authority, net (total)	2,614	2,600	2,604
4190	Outlay, net (total)	2,753	2,716	2,692

Memorandum (non-add) entries:				
5090	Unavailable balance, SOY: Offsetting collections	. . . ..	3	3
5091	Unavailable balance, EOY: Offsetting collections	3	3	3

Funding in this account provides for the deployment of communications, navigation, surveillance, and related capabilities within the National Airspace System (NAS). This includes funding for several activities of the Next Generation Air Transportation System, a joint effort between the Department of Transportation, the National Aeronautics and Space Administration, and the Departments of Defense, Homeland Security, and Commerce to improve the safety, capacity, security, and environmental performance of the NAS. The funding request supports the Federal Aviation Administration's comprehensive plan for modernizing, maintaining, and improving air traffic control and airway facilities services.

Object Classification
(in millions of dollars)

Identification code: 69-8107-0-7-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Direct obligations:			
	Personnel compensation:			
1111	Full-time permanent	307	303	314
1113	Other than full-time permanent	2	2	2
1115	Other personnel compensation	9	9	9
1119	Total personnel compensation	318	314	325
1121	Civilian personnel benefits	89	85	88
1130	Benefits for former personnel	1	. . . . .	. . . . .
1210	Travel and transportation of persons	36	41	39

Identification code: 69-8107-0-7-402	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
1220 Transportation of things	2	2	2
1232 Rental payments to others	39	30	28
1233 Communications, utilities, and miscellaneous charges	23	24	26
1251 Advisory and assistance services	1,722	1,495	1,485
1252 Other services from non-federal sources	114	109	114
1253 Other goods and services from federal sources	50	56	62
1254 Operation and maintenance of facilities	55	61	68
1255 Research and development contracts	3	1	1
1257 Operation and maintenance of equipments	59	58	59
1260 Supplies and materials	20	16	17
1310 Equipment	148	165	186
1320 Land and structures	92	82	96
1410 Grants, subsidies, and contributions	5	2	1
1443 Interest and dividends	4	....	....
1990 Direct obligations	2,780	2,541	2,597
1990 Reimbursable obligations	83	79	78
9999 Total new obligations	2,863	2,620	2,675

Employment Summary

Identification code: 69-8107-0-7-402	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
1001 Direct civilian full-time equivalent employment	2,733	2,670	2,733
2001 Reimbursable civilian full-time equivalent employment	62	62	62

EXHIBIT III-1

FACILITIES and EQUIPMENT
SUMMARY BY PROGRAM ACTIVITY
Appropriations, Obligations Limitations, and Exempt Obligations
($000)

	FY 2013 Actual*	FY 2014 Enacted	FY 2015 Request	Change FY 2014-2015
Engineering, Development, Test and Evaluation	412,815	347,195	170,937	(176,258)
Air Traffic Control Facilities and Equipment	1,338,150	1,437,390	1,585,683	148,293
Non-Air Traffic Control Facilities and Equipment	159,046	146,800	158,280	11,480
Facilities and Equipment Mission Support	227,731	218,365	225,800	7,435
Personnel and Related Expenses	455,955	450,250	463,000	12,750
Hurricane Sandy Emergency Supplemental	28,500	0	0	0
Total	**2,622,197**	**2,600,000**	**2,603,700**	**3,700**
FTEs				
Direct	2,733	2,670	2,733	63
Reimbursable	62	62	62	0

Includes transfer from the AIP grants program as authorized in P.L. 113-9, Reducing Flight Delays Act of 2013.

Program and Performance Statement

This account provides funds for programs that improve operational efficiency, constrain costs, modernize automation and communication technology and systems, and deal with aging facilities. Particular emphasis is placed on en route and terminal air traffic control, satellite navigation and landing systems, and communications.

Funding is organized within the following activity areas of FAA:

Activity 1: Engineering, development, test and evaluation;

Activity 2: Procurement and modernization of air traffic control facilities and equipment; procurement and modernization on non-air traffic control facilities and equipment;

Activity 3: Procurement and modernization of non-Air Traffic Control facilities and equipment;

Activity 4: Facilities and equipment mission support; and

Activity 5: Personnel and Related Expenses.

EXHIBIT III-1a

FACILITIES and EQUIPMENT
SUMMARY ANALYSIS OF CHANGE FROM FY 2014 TO FY 2015
Appropriations, Obligations Limitations, and Exempt Obligations
($000)

Item	Change from FY 2014 to FY 2015 ($)	Change from FY 2014 to FY 2015 (FTE)
FY 2014 Base	**$2,600,000**	**2,670**
Administrative Adjustments to Base:		
Annualization of FY 2014 FTE	7,382	63
Annualization of FY 2014 Pay Raise	1,055	
FERS Increase	3,342	
FY 2015 Pay Raise	2,988	
Subtotal, Adjustments to Base	**$14,767**	**63**
New and Expanded Programs:		
Engineering, Development, Test and Evaluation	(176,258)	
Air Traffic Control Facilities and Equipment	148,293	
Non-Air Traffic Control Facilities and Equipment	11,480	
Facilities and Equipment Mission Support	7,435	
Personnel and Related Expenses	(2,017)	
Subtotal New or Expanded Programs	**($11,067)**	
FY 2015 Request	**$2,603,700**	**2,733**

2B09	NAS Facilities OSHA and Environmental Standards Compliance	$43,501,000	146
2B10	Airport Surveillance Radar (ASR-9) Service Life Extension Program (SLEP)	$13,600,000	149
2B11	Terminal Digital Radar (ASR-11) Technology Refresh and Mobile Airport Surveillance Radar (MASR)	$21,100,000	151
2B12	Runway Status Lights (RWSL)	$41,710,000	154
2B13	National Airspace System Voice Switch (NVS)	$20,550,000	156
2B14	Integrated Display System (IDS)	$16,917,000	158
2B15	Remote Monitoring and Logging System (RMLS)	$3,930,000	160
2B16	Mode S Service Life Extension Program (SLEP)	$8,100,000	163
2B17	Surveillance Interface Modernization (SIM)	$4,000,000	166
2B18	Voice Recorder Replacement Program (VRRP)	$1,000,000	168
2B19	Precision Runway Monitoring Alternate (PRMA)	$1,000,000	170
2B20	Integrated Terminal Weather System (ITWS) Technology Refresh	$4,400,000	172
	c. Flight Service Programs		
2C01	Automated Surface Observing System (ASOS)	$8,000,000	174
2C02	Future Flight Service Program (FFSP)	$1,000,000	176
2C03	Alaska Flight Service Facilities Modernization (AFSFM)	$2,800,000	178
2C04	Weather Camera Program	$200,000	180
	d. Landing and Navigational Aids Program		
2D01	VHF Omnidirectional Radio Range (VOR) with Distance Measuring Equipment (DME)	$8,300,000	182
2D02	Instrument Landing System (ILS) – Establish/Expand	$7,000,000	185
2D03	Wide Area Augmentation System (WAAS) for GPS	$103,600,000	187
2D04	Runway Visual Range (RVR) and Enhanced Low Visibility Operations (ELVO)	$6,000,000	191
2D05	Approach Lighting System Improvement Program (ALSIP)	$3,000,000	194
2D06	Distance Measuring Equipment (DME)	$3,000,000	196
2D07	Visual Navaids – Establish/Expand	$2,000,000	198
2D08	Instrument Flight Procedures Automation (IFPA)	$2,400,000	200
2D09	Navigation and Landing Aids – Service Life Extension Program (SLEP)	$3,000,000	202
2D10	VASI Replacement – Replace with Precision Approach Indicator	$5,000,000	204
2D11	Global Positioning System (GPS) Civil Requirements	$27,000,000	206
2D12	Runway Safety Areas – Navigational Mitigation	$35,000,000	209
	e. Other ATC Facilities Programs		
2E01	Fuel Storage Tank Replacement and Management	$15,500,000	212
2E02	Unstaffed Infrastructure Sustainment	$32,300,000	215
2E03	Aircraft Related Equipment Program	$9,000,000	217
2E04	Airport Cable Loop Systems – Sustained Support	$5,000,000	220
2E05	Alaskan Satellite Telecommunications Infrastructure (ASTI)	$11,400,000	222
2E06	Facilities Decommissioning	$5,700,000	225
2E07	Electrical Power System – Sustain/Support	$102,000,000	227
2E08	Emergency Management and Compliance (EMC)	$1,000,000	231
	Total, Activity 2	**$1,585,683,000**	

Activity 3, Procurement and Modernization of Non-Air Traffic Control Facilities and Equipment

a. Support Programs

3A01	Hazardous Materials Management	$22,000,000	236
3A02	Aviation Safety Analysis System (ASAS)	$11,900,000	238
3A03	Logistics Support System and Facilities (LSSF)	$8,000,000	241
3A04	National Air Space Recovery Communications (RCOM)	$12,000,000	244

Executive Summary – Facilities and Equipment (F&E), Activity 1

What Is The Request And What Will We Get For The Funds?

As NextGen has progressed over the last several years, more programs have transitioned into the implementation phase. NextGen's concept development and pre-implementation work is now building off of the programs in the implementation phase, so it is important that the pre-implementation activities align very closely with the intended end products. This alignment will help to more easily integrate capabilities and functionalities for the user community. As a response to this natural evolution towards implementation and to address RTCA Task Force 5 recommendations, NextGen planning documents shifted to implementation portfolios in the NextGen Segment Implementation Plan (NSIP), and the NextGen Implementation Plan (NGIP) in 2010 however, the budget line items have remained in the old structure.

The FY 2015 budget submission has been realigned to make the line-of-sight clearer across all NextGen communications and plans. This means that the budget is being requested in the same structure as the publicly NextGen Implementation Plan, so stakeholders can transparently track the funding while also seeing when certain capabilities will be deployed and operational. It also eliminates duplicative structures within FAA that were created to continually crosswalk budget solution sets to implementation portfolios.

This realignment has predominantly affected the NextGen projects under F&E Activity 1 by refocusing what were previously referred to as the "solution sets" into "portfolios" that are structured around implementation activities. Table 1 below shows the conversion of the Budget structure from the FY 2014 Enacted Budget Line Items that are in the old Solution Set structure (left column) to the new FY 2015 Implementation Portfolio Structure (top line of the matirix). The funding for the BLIs is plotted across the table and aligns with both structures. Table 2, is a comparability adjustment of what the FY 2013 and FY 2014 enacted levels would have been if it was organized by implementation portfolios. Please note that the decrease in the funding request in the new BLIs is not because of the realignment to portfolios. FAA's Capital Investment Plan shows that this is a one-year low for the pre-implementation portfolios to focus limited resources on implementation programs that will yield benefits more immediately.

FAA is focusing these resources on implementation activities in FY 2015 to respond to a NextGen Advisory Committee (NAC) recommendation to deliver as many readily available benefits as possible in the near-term. FAA's investment in pre-implementation activities in 2015 is also consistent with NAC's recommendations for prioritizing NextGen.

Table 1: FY 2014-FY 2015 Portfolio Crosswalk
($000)

FY 2014 Solution Set Line Item Title	FY 2014 Enacted	FY 2015 Request										
		Sep Mgmt	TFDM	On Demand	Envir	IMRO	NAS Infr	NextGen Support	PBN	CATMT	TBFM	Safety
System Demand Infrastructure Development	20,000			3,000								
System Development	58,076				2,500		4,980	4,000				5,700
Trajectory Based Operations	15,988	5,000					2,500					
Reduce Weather Impact	2,729											
High Density/Arrivals/ Departures	5,484											
Collaborative ATM	20,251			3,000					1,000	10,200		
Flexible Terminals and Airports	12,923	3,000				3,500	6,000					
System Network Facilities	5,094							9,000				
Performance Based Nav/RNAV/RNP	32,200								24,500			
Collaborative ATM Technologies	28,200									3,291		
Time Based Flow Mgmt	10,500										21,000	
Tower Flt Data Manager	19,250		38,808									
Aviation Safety Information Analysis and Sharing	15,000											13,000
ADS-B In Applications – Flt Interval Mgmt		5,000										
Table 2 FY15 totals		13,000	38,808	6,000	2,500	3,500	13,480	13,000	25,500	13,491	21,000	18,700

Table 2: NextGen Budget Restructuring Comparability Adjustments
($000)

NextGen Program Comparability Adjustment	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request
NextGen - Separation Management Portfolio	$16,774	$20,328	$13,000
NextGen - Improved Surface/TFDM Portfolio	$41,661	$23,139	$38,808
NextGen - On Demand NAS Portfolio	$11,573	$8,500	$6,000
NextGen - Environment Portfolio	$7,360	$9,443	$2,500
NextGen - Improved Multiple Runway Operations Portfolio	$9,023	$9,000	$3,500
NextGen - NAS Infrastructure Portfolio	$42,705	$25,504	$13,480
NextGen – Support Portfolio	$30,137	$25,094	$13,000
NextGen - System Safety Management Portfolio	$20,811	$22,555	$18,700
Performance Based Navigation and Metroplex Portfolio	$42,640	$34,451	$25,500
Collaborative Air Traffic Management (CATMT) Portfolio	$32,620	$28,200	$13,491
Tactical Flow Time Based Flow Management (TBFM)	$12,225	$10,500	$21,000
Cross Agency NextGen Management			$2,000
Total NextGen Portfolios/Solution Set Comparability	$267,529	$216,714	$170,979

The Facilities and Equipment (F&E) Activity 1 program requests $170,937,000 for FY 2015, a decrease of $176,258,553 (51 percent) below our enacted FY 2014 level. Of the $170,937,000 requested for FY 2015, $115,788,000 is requested to continue multiple basic and applied research efforts in support of future Next Generation Air Transportation System (NextGen) technologies and concepts. Included as a component of the NextGen applied research efforts are funds for the NextGen Integration and Evaluation Capability Laboratory and the Florida Testbed which are both physically located at the William J. Hughes Technical Center (WJHTC) at Atlantic City, New Jersey. These labs fall under a new portfolio known as NextGen Support and are a restructuring of the System Network Facilities BLI. The remaining $55,149,000 is requested to support basic research activities under the Advanced Technology Development and Prototyping (ATDP) program and to sustain the facility and infrastructure at the WJHTC.

Key outputs and outcomes expected to be achieved in budget year with the requested resources:

- Funding will continue development and implementation of Precision Based Navigation (PBN) procedures, while ensuring safety.

- Optimization of Airspace and Procedures in the Metroplex (OAPM) design work will occur at Memphis, Cleveland/Detroit, Chicago, and Boston. Begin OAPM pre-implementation and evaluation activities at South/Central Florida, Chicago, Cleveland, Detroit, and Phoenix.
- Pre-Implementation activities in support of a Final Investment Decision (FID) for a new enhancement for ADS-B will be underway.
- The requested funding will also support the completion of Investment Analysis (IA) activities for Terminal Flight Data Manager (TFDM) and the establishment of a baselined program.
- The Environmental Program will develop a report on demonstrations of Continuous Lower Energy, Emissions, and Noise (CLEEN) Flight Management System (FMS)/Air Traffic Management (ATM) related aircraft technologies.

What Is This Program?

Activity 1 includes pre-acquisition NextGen F&E programs, continuing basic research programs, and laboratory support for the Technical Center. Activity 1 programs support the initial design, engineering, development, test and evaluation activities associated with producing end-product systems, technologies, and capabilities for the National Airspace System (NAS). This includes the development of operational concepts and proof-of-concept systems and equipment and their demonstration in the laboratory and limited operational settings. Funding supports initial research through early development to concept demonstration, but ends prior to an investment decision for production and implementation across the NAS.

These efforts contribute to the following DOT Strategic Goals:

- Safety: Reduction in transportation related injuries and fatalities
- Economic Competitiveness: Maximum economic returns on transportation policies and investments
- Organizational Excellence: Diverse and collaborative DOT workforce

Why Is This Particular Program Necessary?

Activity 1 programs are undertaken to validate operational concepts and proof-of-concept systems and equipment prior to making decisions about moving forward on capital investments that will be deployed across the NAS. This means defining operational requirements are defined and completing system engineering. Activity 1 also includes maintenance and upgrades of the laboratories and other infrastructure at the FAA Technical Center. Investment in these programs is made with the ultimate goal of modernizing and sustaining the NAS.

Some of the basic and applied research performed under Activity 1 includes:

- Technology research to prevent future runway incursions
- Airspace analysis for complementing F&E programs
- Various development projects needed to transition to the next level of F&E development
- Pre-implementation studies, requirements documentation, and initial investment analysis

How Do You Know The Program Works?

The objective of performing these activities is to support capital investment decision–making. Based on private sector and federal procurement best practices, FAA has learned that performing these activities helps to make better investment decisions and reduces risk in the acquisition phase of the system life cycle. To this end, FAA uses industry-benchmarked program management practices and processes. We also comply with guidelines outlined in the Project Management Body of Knowledge (PMBOK).

Efforts under Activity 1 show positive outcomes as individual projects reach maturity and are transferred to Activities 2 through 4 in the F&E Budget. Systems are fielded as a result of efforts at the Tech Center, and programs are slated for cancellation as a result of analysis during the pre-acquisition and research work.

Why Do We Want / Need To Fund The Program At The Requested Level?

FAA would prioritize any reductions to Activity 1 programs at the overall F&E account level. Long-term NextGen investments would be deferred to minimize risks to near-term NextGen deliverables. In addition, we would reduce other, non–NextGen investments in a manner that enables sustainment of ATC safety and capacity at levels expected by the public, the military and other stakeholders.

Detailed Justification for - 1A01 Advanced Technology Development and Prototyping

What Is The Request And What Will We Get For The Funds?

FY 2015 – Advanced Technology Development and Prototyping
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Advanced Technology Development and Prototype	$30,421	$32,000	$29,900	-$2,100

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Runway Incursion Reduction Program (RIRP)	---	$3,500.0
B. System Capacity, Planning and Improvements	---	6,000.0
C. Operations Concept Validation and Infrastructure Evolution	---	4,000.0
D. Major Airspace Redesign	---	5,000.0
E. Strategy and Evaluation	---	1,000.0
F. Dynamic Capital Planning	---	2,500.0
G. Unified Contracting System (UCS)	---	5,800.0
H. Operational Analysis and Reporting System (OARS)	---	1,000.0
I. Next Generation Surveillance and Weather Radar Capability (NSWRC)	---	300.0
J. In Service Engineering	---	800.0
Total	Various	$29,900.0

For FY 2015, a total of $29,900,000 is requested for the activities shown above.

The FAA's mission is to provide the safest and most efficient aerospace system in the world. As the leading authority in the international aerospace community, FAA is responsive to the dynamic nature of customer needs and economic conditions. A key element of this mission is the safe and efficient use of airspace. To accomplish this mission, FAA's Advanced Technology Development and Prototyping program develops and validates technology and systems that support air traffic services. These initiatives support the goals, strategies, and initiatives of the agency's Destination 2025 vision, which captures the ideal future that FAA strives toward, and promotes the requirements associated with the evolving air traffic system architecture and improvements in airport safety and capacity.

What Is This Program?

A. Runway Incursion Reduction Program (RIRP)

The Runway Incursion Reduction Program (RIRP) will continue research, development, and operational evaluation of technologies to increase runway safety. Consistent with standing National Transportation Safety Board (NTSB) recommendations and initiatives identified in FAA Destination 2025, research emphasis will remain on technologies that provide for direct safety indications and alerts to pilots and aircrews at large airports as well as those that can be applied cost effectively at small to medium airports.

The program will test alternative airport surface detection technology and the application of these technologies for pilot, controller, and vehicle operator situational awareness tools. Current initiatives include

Low Cost Ground Surveillance (LCGS) Pilot sites, Runway Safety Assessment (RSA) studies and Enhanced Final Approach Runway Occupancy Signal (eFAROS) for high density airports. When appropriate, investment analyses will be performed to support acquisition and implementation of selected solutions.

The requested funding will support delivery of performance targets outlined in the FAA Destination 2025 and ATO Safety Business Plan. Specifically, the funds will support:

- The development of artifacts and documents required to initiate and support the acquisition of eFAROS into the Acquisition Management System (AMS)
- The development of annual technical and operational evaluation reports for the existing eFAROS prototype systems
- The LCGS equipment removal and site restoration at the LCGS prototype test sites.
- The evaluation of alternative low-cost runway incursion detection and prevention systems

Key Outputs:

- Develop documentation such as the Business Case Analysis Report (BCAR) required for an eFAROS Investment Analysis Readiness Decision (IARD) in support of terminal PMO
- Develop annual technical and operational evaluation report of eFAROS units at all prototype locations
- Complete report on testing of safety logic enhancements to Runway Incursion (RI) detection and prevention products
- Publish initial Project Plan for evaluation of new initiative identified for Runway Incursion (RI) detection and prevention

Key Outcome**:** The above Key Outputs result in Reduced Runway Incursions, which supports the Destination 2025 Goal of reducing aviation risk through all phases of flight (gate-to-gate).

B. System Capacity, Planning, and Improvements

The System Capacity, Planning, and Improvements program provides data and analyses on NAS operations to FAA executives and managers to help them identify deficiencies and develop proposals to improve NAS performance. This work includes:

- Airport modeling and analysis using actual data collected from ATC systems in the field to determine the value of potential improvements in airspace or airfield modifications of the Performance Data Analysis and Reporting System (PDARS) which is a fully integrated performance measurement tool designed to help the FAA improve the NAS by tracking the daily operations of the Air Traffic Control (ATC) system and their environmental impacts. System capability upgrades will include enhanced consolidated gate-to-gate measurement and analysis capability. The PDARS also provides operational data to baseline the measurement and analysis of NextGen capability improvements.
- Development of new Agency level metrics to enhance management awareness of, and response to, system performance.
- Sponsor operations research to evaluate concepts to improve future NAS performance in support of the FAA's Strategic Plan goals in Science, Technology, Engineering and Math (STEM) strategic initiative
- The benchmarking of ATO performance with other Air Navigation Service Provider (ANSP) to support joint projects done as part of ICAO, Civil Air Navigation Services Organization (CANSO) or Aerospace Transportation Advisory Group (ATAG) work plans. These efforts are performed to respond to inquiries on global flight efficiency performance targets for ATM or more general inquiries on the overall flight inefficiency that may be attributed to ATM.
- This program enables collaboration with international organizations to produce ICAO and CANSO documents on recommended practices for measuring operational performance; delivery of annual operational performance benchmark reports with EUROCONTROL under Annex 2, and delivery of joint operational performance analysis with EUROCONTROL under Annex 2.
- Analyze capacity and performance improvements over the North Atlantic as the FAA chair of the ICAO North Atlantic Economic and Financial Group.

This program also sponsors NAS performance and airport capacity studies where experts from the FAA, academia, and industry collaborate to analyze and develop recommendations for improving capacity and system efficiency, and reducing delays at specific airports. It has the added capability of using its performance measurement systems and operations research to quantify the efficiency of the NAS and form the basis of proposals for overall system improvements.

C. Operations Concept Validation and Infrastructure Evolution

Developing operational concepts is an Office of Management and Budget (OMB) recommended first step in developing an Enterprise Architecture. This program develops and validates operational concepts that are key to the Air Traffic Organization's (ATO) modernization programs and the Next Generation Air Transportation System (NextGen). This work includes developing and maintaining detailed second level concepts that support validation and requirements development. Second level concepts identify the personnel and functional changes necessary for the ATO to provide customer service in ways that increase productivity and reduce net cost. Recent work includes developing second level concepts for En Route, Traffic Flow Management (TFM), NextGen Towers, and Integrated Arrival and Departure Operations. This information helps the aviation community anticipate what changes are needed in aircraft equipment in order to operate with the new technology being implemented in the NAS and develop new procedures.

The Operational Concept efforts look at the changing roles and responsibilities of the Air Traffic workforce and the design of Advanced Facilities to derive the associated functional requirements imposed on the NAS infrastructure. Concept development includes preparing system specifications, roles and responsibilities, procedures, training, and certification requirements. These development and validation activities support NAS modernization through:

- Concept/scenario development
- Concept validation
- Simulation and analysis
- System design
- Metric development
- Modeling

D. Major Airspace Redesign

This program supports increased efficiency by funding the physical changes in facilities necessary to accommodate airspace redesign. Redesign projects will take on increased emphasis at both the national and regional levels to ensure that FAA is able to effectively manage the projected growth in demand at FAA facilities and airports.

Implementation of airspace redesign efforts frequently results in changes in the number and shape of operational positions or sectors, including changes to sector, area or facility boundaries. Transition to a new configuration after airspace redesign is implemented requires changes in the supporting infrastructure. These infrastructure changes can include communication modifications such as changes in frequencies, connectivity of radio site to the control facility, controller-to-controller connectivity; surveillance infrastructure modifications to ensure proper radar coverage; automation modifications to the host data processing or flight data processing; inter-facility transmission modifications; additional consoles and communications backup needs; and modifications to the facility power and cabling.

E. Strategy and Evaluation

The FAA's Office of Systems Analysis and Modeling is responsible for developing and maintaining mathematical models of the NAS, and using these models to help guide NextGen investments. FAA's modeling suite includes models of varying scope, from systems dynamics models of the entire air transportation system to detailed airport surface models. Several of these models are obsolete and cannot support the analysis of advanced Air Traffic Management (ATM) concepts.

The Office of Systems Analysis and Modeling has been leveraging past modeling investments to develop new fast-time computer simulation models to help guide National Airspace System (NAS) modernization programs. Specifically, the Strategy and Evaluation program will develop two new computer models to rectify modeling shortfalls and better support other organizations within FAA with analytical needs.

At the enterprise-level (representing the entire air transportation system), a system-wide model is being developed to replace the existing 1980s-era model. A new system-wide model is required to analyze advanced ATM concepts and aid with NextGen program trade-off studies, investment analyses, and NAS performance analyses. The new model will support the entire NextGen Organization, the FAA's Program Management Office (PMO), Office of Performance Analysis, Office of Investment Planning and Analysis, and Office of Environmental and Energy. Additionally, FAA and National Aeronautics and Space Administration (NASA) contractors and the academic community will use the model. An initial version of this model, known as System-Wide Analysis Capability (SWAC), has been delivered to FAA and is already being used to support benefits analyses of NextGen investments. The model is also being used by various Program Offices in the NextGen Organization and the PMO to support investment decision-making.

To effectively perform analyses at specific airport locations, a new airport capacity model, known as ADSIM+, is being developed for use in analyzing new airport capacity-related projects. This model will facilitate rapid analysis of airport improvements, demand changes, and ATM technology insertions. In addition to being used by the Office of Systems Analysis and Modeling, the model will be used by the Office of Performance Analysis for runway capacity studies, the Office of Investment Planning and Analysis for investment analyses, and the FAA's Office of Airports. The model will also be used by aviation consultants and the academic community, and provide a de facto standard for airport capacity analyses.

This effort supports the DOT Strategic Goals of Economic Competitiveness and Environmental Sustainability. These models will help us to evaluate existing airport capacity levels (ADSIM+), and set investment and infrastructure priorities and policies and direct Airport Improvement Program funding to enhance capacity where economically justified (SWAC). Furthermore, these models will help us set investment and infrastructure priorities to support NextGen energy and environmental goals.

F. Dynamic Capital Planning

The Dynamic Capital Planning tools will allow ATO to make optimal decisions based on best business practices and provide verification that aggressive approval thresholds have been implemented and that disciplined management of capital programs is being carried out. The requirements analysis for selecting Dynamic Capital planning tools is being evaluated and includes tools to address the following focus areas: determining quantitative economic value and internal benefits validation for capital projects; milestone tracking and schedule modeling; performance measurement; auditing and trend analysis; earned value monitoring through program life cycle; field implementation planning; and post implementation analysis for corporate lessons learned results.

The project will allow the initial procurement of financial analysis tools and consultant support to allow a better evaluation of programs through all phases of the acquisition life cycle.

G. Unified Contracting System (UCS)

The Unified Contracting System (UCS) will provide full contract lifecycle capabilities by automating contract formulation and execution (pre-award planning, solicitation, negotiation, award, administration and closeouts). UCS will provide validated and timely procurement data, electronic storage and retrieval of contractual documents, and management information reports. Fully operational UCS will automate all FAA procurements in accordance with the Acquisition Management System (AMS) and guidance in the FAA Acquisition Support Tool (FAST) and provide an end-to-end electronic contracting system to produce, route, manage, store, and retrieve the roughly 50,000 contractual documents that are produced yearly by the FAA.

UCS will provide an integrated and automated procurement process in place of the largely manual processes. The UCS application will greatly improve the sharing of procurement and contact information through its integration with the document management, email system, other FAA legacy and external systems. UCS will facilitate alignment with agency business goals and enforce enterprise standards and processes to minimize costs.

UCS will also enable users and management access to reporting on status, allocation of effort, task durations, and other user and management measurements. UCS will be built upon a foundation consisting of AMS, the ATO's Business Process Management Suite (BPMS) standard, the FAA's enterprise document management tool (Documentum) or other FAA-approved document management system.

The UCS Program is being implemented in several modules. In FY 2013, the FAA's first official electronic document storage system (eDocS) for contracts was deployed. In FY 2014 the UCS Program is planning the deployment of the Purchase Card Processing System 2nd Generation and will initiate the development of two other modules (Contract Writing and the Automation of Procurement Processes (APP) version 1.

H. Operational Analysis and Reporting System (OARS)

The Air Traffic Organization's (ATO) Operational Analysis and Reporting System (OARS) provides a prognostic approach in identifying National Airspace System (NAS) wide trends and managing emerging risks before they result in accidents or incidents. This initiative delivers a suite of analytical capabilities and user interfaces not currently available to achieve the next level of safety required to support the introduction of Next Generation Air Transportation System (NextGen) technologies, operational concepts, and procedures into the NAS.

In order to identify emerging risks, the ATO collects and analyzes safety data and then uses the results of these analyses to make data-driven decisions on how to best mitigate the identified hazards. OARS is a central platform for data distribution, fusion from multiple locations, and warehousing. The OARS (1) Directly supports the ATO Safety core business functions by integrating all ATO domains to identify, create, standardize and disseminate safety data throughout ATO and external organizations; and (2) Integrates with operational NAS systems to ensure that the information required to successfully implement the Safety Management System (SMS) is readily available, not only for component-level safety assessments, but also for an integrated system of systems approach.

Anticipated Accomplishment is to achieve a JRC Initial Investment Decision in second quarter FY 2015 and begin preparation for Final Investment Decision, scheduled for second quarter of FY 2016.

I. Next Generation Surveillance and Weather Radar Capability (NSWRC)

The Federal Aviation Administration (FAA) currently operates several models of Airport Surveillance Radars (ASR-8, ASR-9 (with and without Weather Systems Processor), and ASR-11) and Terminal Doppler Weather Radars (TDWR) for aircraft surveillance and weather detection. The FAA also operates and maintains the long range Air Route Surveillance Radars (ARSR-1, ARSR-2, ARSR-3, ARSR-4, and FPS-20 series) for the Department of Defense (DOD), which is used for en route aircraft surveillance and weather detection. The National Oceanic and Atmospheric Administration (NOAA) currently operates the Next Generation Weather Radars (NEXRAD) for weather detection. The technology of the majority of these systems is over 20 years old and in some cases over 40 years old, and most of these systems have exceeded their service life. Ongoing technology refreshes and Service Life Extension Programs (SLEP) may keep these radars operating in the near-term; however, as the demands of the National Airspace System (NAS) increase it is becoming increasingly clear that the present fleet of radars will not be capable of delivering the required functionality in the future.

Also, the definitions of a SLEP and a technology refresh do not allow functionality to be added to existing systems. Shortfalls that will be addressed by the NSWRC include:

- Limited ability to detect and track Unmanned Aircraft Vehicles (UAV) and other non-cooperative aircraft
- Reduced ability to detect and track aircraft and weather in the presence of ground clutter, such as wind farm interference
- Insufficient temporal and spatial resolution of weather data to meet NextGen weather requirements
- Inability to independently determine aircraft altitude for terminal surveillance
- Increasing Operations and Maintenance (O&M) costs from more frequent mechanical failures across multiple radar types and models
- Inability to track or collect weather data that falls into radar coverage gaps
- Inability to effectively discriminate between different types of airborne targets (aircraft, birds, balloons, hang gliders, etc.)
- Inability to effectively discriminate between different types of hydrometeors (rain, ice, sleet, hail, etc.)

The Next Generation Surveillance and Weather Radar Capability (NSWRC) is intended to provide a cost-effective replacement for legacy surveillance and weather radars required to support the FAA transformation of the nation's aviation system by 2025. Specifically, the initial capability to be provided by NSWRC would include primary terminal aircraft and weather surveillance including:

- Improved accuracy and detection with altitude determination
- Weather detection and characterization
- UAV detection
- Wind turbine interference mitigation

This program plans to acquire and deploy approximately 230 FAA radar systems with a 5 - 7 year development period and a 15 year deployment period via a multi-segmented program baseline. The funding for the acquisition and implementation of the Long Range Radars and the NEXRADs will be provided by the Department of Defense/Department of Homeland Security and the National Weather Service, if these organizations agree to participate in the procurement. Discussions with the DoD/DHS and Weather Service are ongoing and it is envisioned that the external funding will be included in the program via an Interagency Agreement coinciding with future baseline segments.

NSWRC completed the Concept Requirements Definition Readiness (CRDR) in December 2012; and is on track for an Investment Analysis Readiness Decision (IARD) by December 2014; Initial Investment Decision (IID) by 2016; and Final Investment Decision (FID) by 2017.

J. In-Service Engineering

In-service engineering allows for immediate response to emerging technology solutions. Funding is requested for ongoing engineering support of all prototyping efforts.

DOT Strategic Goals – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

A. Runway Incursion Reduction Program (RIRP)

Runway Incursions are a leading safety concern of the FAA and this project helps to identify solutions that will help prevent them.

Currently, the equipment removal and site restoration of the Low Cost Ground Surveillance prototype sites are funded under RIRP, along with the documentation to prepare the eFAROS project for Investment Analysis. The LCGS sites are: Reno, Nevada; Long Beach, California; Manchester, New Hampshire; and San Jose, California. The eFAROS sites are Dallas Fort-Worth, Texas which is installed and undergoing operational evaluation and Boston, Massachusetts which is due to commence operational evaluation testing in the third quarter of FY 2014.

RIRP is focused on the prototyping and operational evaluation of emerging technologies designed to reduce the risk of runway incursions, thereby allowing the FAA to reduce risks associated with the acquisition of these new technologies into the NAS; while at the same time allowing the FAA to continue to meet the Destination 2025 Goal of maintaining the rate of Runway Incursions at or below 20 per 1,000 events through FY 2018.

B. System Capacity, Planning, and Improvements

The data reporting attained from this Program is used extensively to satisfy external reporting requirements and to develop new metrics to enhance management awareness of, and response to, system performance. This program is critical to upgrade PDARS to keep pace with NAS modernization to include NETCENTRIC capabilities and other advance surveillance and automation capabilities. These upgrades and improvements are critical to further refine the models and metrics used to manage and enhance the performance of the NAS.
This program will facilitate the modeling and analysis of new runways, airfield improvements, air traffic procedures, and other technological implementations to improve airport capacity and system efficiency. Study Teams evaluate alternatives for increasing capacity at specific airports that are experiencing or are

projected to experience significant flight delays. Capacity studies provide recommendations and solution sets for improving airspace and airport capacity. This program supports the Optimization of Airspace and Procedures in the Metroplex as the PDARS system is critical to baselining, development, and post implementation analysis. In addition the data provided by PDARS is used extensively in the associated Environmental Assessments.

This program is necessary to provide the data and analytical capabilities required to complete cost benefit analysis and determine NextGen Operational Improvements made in the NAS.

This program is also used to provide quick response data and analysis to support Safety Event Responses including Aircraft accidents, incidents, and hotline action items. This program provides critical data and analysis capabilities that support the determination of causal factors and mitigation actions. Additionally this program provides data and analysis to support the decision making process for implementing new rules, requirements, and procedures. The data is further used to support Safety Risk Management Documentation.

This program also sponsors operational research to evaluate concepts to improve the future NAS performance in support of the FAA's Strategic Plan goals in Science, Technology, Engineering, and Math (STEM) via the Center of Excellence in Aviation Operations Research (NEXTOR II).

Lastly, this program enables the FAA to meet commitments with the European commission on joint analysis on a Memorandum of Agreement on Collaboration on ATM Performance Metrics. This program provides the agency's principal interface for international performance benchmarking, metrics, and economic analysis.

C. Operations Concept Validation and Infrastructure Evolution

The FAA is proceeding with NAS modernization based on the NextGen Operational Concept for 2025. Concept development and validation is necessary to investigate specific concept elements, and to drive out operational and technical requirements and implications for human factors, training and procedures. This project assesses the interaction of changing roles and responsibilities of NAS service providers and pilots, airspace changes, procedural changes and new mechanized systems for distributing weather, traffic and other flight related information. Also, this project tests the assumptions behind common situational awareness and distributed information processing.

D. Major Airspace Redesign

Airspace Redesign is the FAA initiative that ensures all airspace related efficiency benefits facilitated by the Major Airspace Program, facility changes and automation improvements are achieved. Major Airspace Redesign serves as one of the FAA's primary efforts to modernize the nation's airspace. The purpose of this national initiative is to review, redesign and restructure airspace. Modernization of airspace through the Major Airspace Redesign Program is characterized by the migration from constrained ground based navigation to the freedom of a Required Navigation Performance (RNP) based system.

Airspace redesign efforts seek to optimize Terminal, En Route and Oceanic airspace by redesigning airspace associated with the New York/New Jersey/Philadelphia (NY/NJ/PHL), project. F&E funding is planned for NY/NJ/PHL national integration efforts of the program office. The Major Airspace Redesign Program will continue to provide engineering, analytical and technical support to this major airspace redesign effort.

E. Strategy and Evaluation

High-level improvements to the NAS have been proposed, with some initiatives already progressing through testing and evaluation, as reflected in the NextGen Concept of Operations and NextGen Segment Implementation Plan (NSIP). These are complex and expensive improvements to the NAS (for both the Federal Government and airspace operators). However, the FAA currently lacks capable tools to effectively evaluate these proposed ATM and airport infrastructure enhancements at the NAS-wide (i.e., enterprise) level as well as at specific airport locations.
At the NAS-wide level, FAA lacks tools to evaluate the system-wide impacts of improved traffic flow management, surface management, Trajectory-Based Flow Management (TBFM), and the overall effectiveness of NextGen modernization initiatives. As an example, Performance-Based Navigation designs

for the Metroplex are expected to yield efficiency and capacity gains. However, the FAA lacks a tool to effectively quantify, track, and project these operational benefits. The system-wide model being developed under this program will help to address these shortfalls.

In addition, various airport improvement initiatives have been progressing in the NAS, in conjunction with implementation of various NextGen capabilities. Thus, a change in a location in the NAS is likely to result in an impact to other NAS locations. However, none of the current models has the ability to analyze the complex interactions, interdependencies, and impacts of multiple proximate airports. The new airport capacity model being developed under this program will address this shortfall.

The fast-time computer models being developed in the Strategy and Evaluation program are used to aid in cost-benefit analysis and trade-off studies of future changes to the NAS. Together, these tools will support FAA senior leadership in making timely, effective, and informed decisions regarding investments, resource allocation, and rulemaking, and help to justify these decisions to internal and external stakeholders.

F. Dynamic Capital Planning

The current Planning tool is obsolete, unsupported and in a state of potential system failure. There is no current real-time FAA F&E database to meet FAA managerial requirements. The various FAA Service Units do not follow the same standardized business processes for identifying and tracking requirements. Currently, FAA financial systems are not standardized in the same language and formats. Also it produces several different reports and the terminology is not standardized.

G. Unified Contracting System (UCS)

By replacing manual, paper-based methods and document storage, UCS will improve FAA's ability to effectively support the volume and complexity of upcoming FAA procurements, particularly for NextGen and continuing NAS sustainment. The primary quantitative benefit is the replacement of the FAA's current contracting system, PRISM, which has high operations and maintenance costs. It is estimated the UCS will be able to replace PRISM by the beginning of FY 2016. Operating costs for UCS are estimated to be over $2 million per year less than the operating costs for PRISM, while adding additional functionality and process efficiencies.

In addition, automating the FAA's contracting system will ensure proper transaction approval, complete and viable records retention and effective reconciliation of financial information, thus allowing FAA to increase purchase card usage which has historically been a goal the FAA shied away from due to the lack of oversight within the current system. Increasing purchase card usage is estimated to generate over $3 million per year in additional rebates. Not only will these combined quantitative benefits offset the 10 year lifecycle cost of UCS, through the implementation of UCS the FAA will achieve an $8 million net benefit.

Due to the manual nature of the FAA's procurement processes, any benefits related to automating the procurement process, improving accuracy or time cycles, amelioration of legal risk, or increasing visibility into the procurement process is very difficult to quantify. Because concrete measurement data of the FAA's procurement processes are not available, many UCS benefits will be intangible and thus difficult to measure and quantify, but are important and real qualitative benefits.

H. Operational Analysis and Reporting System (OARS)

Safety-related data analysis today is mostly shared through manual processes, often having to re-enter data that exist in stand-alone systems separated by "air gaps" (not networked) versus a centralized data point. This leads to delays and inaccurate results for safety decision makers (i.e. Air Traffic Organization Management, Aviation Safety, and Field Managers) that rely on that information to make crucial safety decisions.

The OARS will provide data-centric integrated approach for ATO safety. In addition, a continual increase in safety data analysis is anticipated as we move towards new technologies within the NAS resulting from the NextGen initiatives.

I. Next Generation Surveillance and Weather Radar Capability (NSWRC)

The majority of legacy systems have been deployed for decades and have reached or exceeded their predicted service life. Service Life Extension Programs (SLEPs) and Technology Refresh programs to extend the operational life and address obsolescence issues are being implemented on some of these systems. While these individual system specific SLEP and Technology Refresh programs may ensure reliable operation for several more years, it may not be the most cost effective way to sustain an existing capability long term and is not the best choice for introducing performance improvements to improve surveillance and reduce life cycle costs in order to meet NextGen requirements in support of Destination 2025. The capability to be provided by NSWRC would include primary terminal radar aircraft surveillance including altitude determination, weather detection and characterization, backup surveillance of aircraft broadcasting position information (Automatic Dependent Surveillance-Broadcast (ADS-B)), UAV detection, wind turbine interference mitigation, as well as Air Defense and Homeland Security roles.

How Do You Know The Program Works?

A. Runway Incursion Reduction Program (RIRP)

The demonstration, evaluation and transition of mature runway safety technologies have proven to reduce the incidence of high-hazard (Category A/B) incursions and ultimately reduce the risk of a runway collision. Early development, testing and maturation of viable technologies result in reduced technical, cost and acquisition schedule risk, with early delivery of runway safety benefits.

According to a recent DOT Inspector General (IG) audit, initial operational evaluations of prototype Runway Status Lights (RWSL) technology have yielded a reduction in runway incursions of up to 70 percent at the test runways. Additionally, prototype RWSL systems have been credited with 11 "saves" during their operational evaluation period.

RIRP success is measured by the completion of the goals identified in the Research Management Plan (RMP) for each prototype activity. Initiatives that successfully complete all the RMP Goals identified are then presented as candidates for acquisition, or presented for Airport Improvement Program (AIP)-funding eligibility. Production RWSL systems are being installed at 17 different airports throughout the NAS.

B. System Capacity, Planning, and Improvements

As a result of the data and analysis resulting from this program the FAA has satisfied and improved external reporting. New metrics developed and reliant on this program have facilitated management awareness and response to system performance.

This program has facilitated the capacity modeling and analysis of new runways, airfield improvements, air traffic procedures, and other technological implementations to improve airport capacity and system efficiency. Study Teams have relied on this program to support evaluation of alternatives for increasing capacity at specific airports that are experiencing or are projected to experience significant flight delays. Capacity studies have relied on this program to support the identification of the operational benefits and delay-reduction cost savings of capacity enhancement alternatives. Program outputs include: flight operational data for use in performance analysis; system safety, delay, flexibility, predictability, and user access performance measures on a daily basis; and travel times within geometric areas and for route segments (arrival fix to runway, runway to departure fix, etc.). Output also includes methodologies and prototypes for measuring the benefits of airport, airspace, and procedural enhancements.

This program has supported the Optimization of Airspace and Procedures in the Metroplex as the PDARS system is critical to baselining, development, and post implementation analysis. In addition the data provided by PDARS is used extensively in the associated Environmental Assessments.
This program has successfully provided quantitative data required to complete the cost benefit analysis. It is currently supporting the framework for determining NextGen Operational Improvements made in the NAS.

The PDARS program has provided quick response data and analysis to support Safety Event Responses including Aircraft accidents, incidents, and hotline action items. This program provided critical data and analysis capabilities that supported the determination of causal factors and mitigation actions in numerous cases. Additionally this program provided data and analysis to support the decision making process for implementing new rules, requirements, and procedures. The data was further used to support Safety Risk Management Documentation.

PDARS is the Air Traffic Control System Command Center's (ATCSCC) primary tool for accessing radar data and provides an objective tool for operational planning, assessment and support of flow management initiatives. Integration of PDARS with Airport Surface Detection Equipment (ASDE-X); Out, Off, On, and In time (OOOI) data; restrictions data; and playbook scenarios will help to reduce ground delays. These enhancements, which encompass the final phase of PDARS development and are an ATO community requirement, are critical for analyzing surface operations and baselining NAS performance. PDARS is a well-accepted and often used tool at all major ATC facilities. The impact will be realized on assessments of such issues as wake turbulence mitigation, New Large Aircraft (NLA), Very Light Jets (VLJs), reduced separation criteria, and alternative flow management methods.

This program demonstrates success by the generation of actionable studies from the partner universities, and by the large number of STEM graduate degrees funded by the research, resulting in improved human capital in the aviation industry, academia, and government. Improved operational metrics and analysis lead to management actions which result in significant operational improvements

In addition, this program enabled the FAA to meet commitments with the European Commission on joint performance analysis as part of a Memorandum of Agreement on Collaboration on Air Traffic Management Performance Metrics. This joint work facilitates the development of new operational measures to improve FAA performance.

C. Operations Concept Validation and Infrastructure Evolution

This program uses a variety of validation techniques to explore, develop, and mature NAS operational concepts. The program undertakes research, study, and analysis to explore new opportunities for service delivery, solve problems with current operations, and define high level operational and performance requirements. The ATDP Operational Concept Validation program is doing the early concept research for advanced operational concepts to ensure they are well understood and are based on valid assumptions. Concepts such as High Altitude Airspace and Integrated Arrival Departure Airspace were researched and validated under this Program prior to transition to NextGen Pre-Implementation Programs to ensure the operational impacts were well understood.

D. Major Airspace Redesign

The Mission Support Services' Major Airspace Redesign program facilitates air traffic airspace redesign to improve traffic flow, enhance safety, and increase the efficiency of the National Airspace System. Major Airspace Redesign delivered the Chicago Airspace Project Stage 3 in alignment with the O'Hare Modernization Program. On October 17, 2013, Chicago O'Hare International Airport commissioned new Runway 10C/28C and the airspace design changes essential to achieve the capacity and efficiency gains of the new runway were ready. This was a multi-year effort involving numerous facilities and lines of business. Major Airspace Redesign was additionally able to accelerate the implementation schedule by two months in support of a request from the Chicago Department of Aviation.

The Major Airspace Redesign program delivered stage 2 of the New York/New Jersey/Philadelphia (NY/NJ/PHL) Airspace Redesign (ARD). Stage 2 was implemented in two parts. In May 2011 stage 2a was implemented and the activity consisted of the New York Terminal Radar Approach Control (N90) integrating airspace to achieve efficiency gains through better internal coordination for aircraft closest to the airports. This was accomplished by re-aligning key positions in the control room. Also, the New York Air Route Traffic Control Center (ZNY) acquired radar data from eight radar sites to expand areas eligible for reduced separation from five nautical miles to three nautical miles. The final stage 2a implementation element, completed in October 2011, was the addition of a new departure route for the John F. Kennedy International Airport (JFK) enabling departures to reach optimal altitude more quickly and reduce airspace complexity; the addition of a new departure fix for all New York metropolitan area airports; and a new arrival route to the Dulles International Airport (IAD).

In May 2012, stage 2b was implemented that included the activation of new dispersal headings on the west and east departure flow at the Philadelphia International Airport (PHL). The headings, as per the Environmental Impact Statement/Record of Decision, are designed to increase departure efficiency and mitigate significant noise impact. Airspace design activities continue, and full implementation of the project is planned for December 2016.

E. Strategy and Evaluation

Initial versions of the functioning software have been delivered to the FAA and are being used to support various on-going analyses at the NAS-wide level as well as at target airports.

Initial versions of the functioning software have been delivered to the FAA and are being used to support various on-going analyses at the NAS-wide level as well as at target airports.

The capabilities of the new system-wide model (SWAC) are continually being improved, even while it is being used to support NextGen analyses. The model has been used to generate all publicly-released estimates of future NextGen benefits, including those in the 2009, 2010, 2011, 2012, and 2013 NextGen Implementation Plans. The model will continue to be used in support of the NextGen Implementation Plan, with the addition that realized benefits will be modeled, as well as future benefits of past investments, to help quantify the entire value of NextGen. SWAC has been and is being used to support benefits analyses of various NextGen Programs. For example, the model has been used in support of the business case analysis for the DataComm program for the En-Route Domain. It is currently being used to support benefit analysis of the Closely-Spaced Parallel Operations Program and the Greener Skies Program. It is also currently being used to support the Satellite and Broadcast Services (SBS) Program Office, and to perform various financial and operational incentive studies. Nonetheless, there are still significant limitations of the model, not least of which is its ability to simulate traffic flow management initiatives and to replicate the airspace system's response to highly disruptive convective weather. Future enhancements of SWAC will better address weather impacts to the NAS, allowing for a more realistic airspace system response to air traffic congestion caused by weather.

An initial version of the new airport capacity model ADSIM+ has been delivered to the FAA and is currently undergoing testing. The software is also being provided to "beta" testers for further evaluation. The FAA is currently using the software to model Atlanta Hartsfield International Airport in support of the "Established on RNP" procedure development effort. Additional improvements are also being developed and tested for future releases.

F. Dynamic Capital Planning

The improved data will:

- Lead to better decisions on program implementation, improvements in ATO's performance, and the resulting higher level of customer satisfaction
- Provide reliable data with an automated tracking and reporting system for F&E projects that will enable decision-makers to enhance the use of agency resources
- Will help keep major acquisition programs on schedule and within costs by maximizing limited resources linked to budget information and processes

These achievements will be reached by providing enhanced program/project management capabilities with cost accounting of F&E expenses to the FAA. Managers and engineers will have up-to-date reliable data on F&E projects through resource tracking program (RTP). Productivity is improved by more than 20 percent when we support a standardized project management process and have the application emulating current operating procedures.

G. Unified Contracting System (UCS)

The UCS Program Office has conducted two BPMS pilots (PCPS and eFAST Planning) a small-scale BPMS solution to assess user acceptance, operational efficacy, and overall business value of the BPMS platform before adopting the tool for a full-scale implementation of UCS. The UCS Pilots have enabled FAA to reduce overall risk in the full implementation of UCS using the BPMS:

- Verifying, in an FAA operational environment, that the BPMS platform meets FAA ATO IT requirements as outlined in the Enterprise BPMS Requirements Document
- Conducting a proof of concept that a BPMS can automate a typical procurement process (eFAST, PCPS)
- Providing a learning experience regarding approaches and methods for completing and managing the development
- Building standard, reusable components that form the foundation for ongoing development of UCS
- Establishing and testing interfaces between the BPMS with standard FAA systems

In addition to the UCS Pilots, the UCS program team completed and updated an FAA Systems Engineering Management-compliant risk analysis for the UCS program. A level of severity for the potential impact a risk may have on the project and a probability of occurrence were assigned to each risk in each category along with a mitigation strategy. Based on these criteria we assigned each risk to one of three categories: high risk, moderate risk, or low risk. Mitigation strategies and status are recorded in the right hand column to demonstrate that the program manages risks.

H. Operational Analysis and Reporting System (OARS)

OARS will significantly increase efficiency and provide an integrated approach for managing safety within the ATO organization. The OARS process will foster widespread sharing of safety-related data and information. The OARS program will provide a faster, thorough, and more consistent approach to FAA safety reporting for responding to external entities (i.e., GAO, Congress, DOT/IG, etc.). These reports need to be uniform across the organization, eliminating rework when multiple organizations conduct similar analyses but report differing information. Finally, data standardization, enhanced quality checks, and common analysis tools will ensure that reporting across the ATO is accurate, consistent, and will reduce the overall time and resources required to produce safety reports. Uniform and accurate information will enable users to have better information for decision making and that will reduce the likelihood of future accidents and incidents.

I. Next Generation Surveillance and Weather Radar Capability (NSWRC)

The NSWRC program is in the Planning and Investment Analysis phase and complete the Concept Requirements Definition Readiness (CRDR) in December 2012; and is on track for an Investment Analysis Readiness Decision (IARD) by December 2014; Initial Investment Decision (IID) by 2016; Final Investment Decision (FID) by 2017.

Why Do We Want/Need To Fund The Program At The Requested Level?

$29,900,000 is required to continue all activities within the Advanced Technology Development and Prototyping (ATDP) budget line item. A reduction to ATDP could significantly damage important milestones which have been established. A reduction could also slowdown progress of precursor programs or the effort of studying technical outcomes in the various solution sets.

Detailed Justification for - 1A02 NAS Improvement of System Support Laboratory

What Is The Request And What Will We Get For The Funds?

FY 2015 – NAS Improvement of System Support Laboratory
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
NAS Improvement of System Support Laboratory	$948	$1,000	$1,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Integration/Implementation of NAS Laboratory	---	$1,000.0

For FY 2015, $1,000,000 is requested for continued improvements to the laboratory systems and laboratory infrastructure in order to support National Airspace System (NAS) and NextGen programs. The FAA's centralized set of laboratories located at the William J Hughes Technical Center (WJHTC) provide the infrastructure for research, development, testing, and field support to FAA's Capital Investment Plan (CIP) programs. It is necessary to upgrade and improve the supporting laboratory infrastructure and equipment to maintain a laboratory platform capable of supporting these programs.

A Laboratory Master Plan, developed in 2010, identified over 150 improvement areas that should be performed over a 20 year period. The Laboratory Services Division reevaluates the priority list of projects annually to validate needs and review emerging and/or urgent projects which may take priority over planned improvements. Additionally, some improvement projects may be implemented sooner than originally planned because an opportunity existed that would generate short- and long-term savings. For example, a new lab installation is an opportunity to repair raised flooring.

The following is a list of projects that are slated for FY 2015:

- Raised Floor Replacement - $130,000
- Electrical Panelboard Replacements - $190,000
- CAC Unit Replacements - $180,000
- Laboratory Lighting Upgrades - $140,000
- Laboratory Signage Replacements - $75,000
- UPS Power Monitoring System Phase 2 - $285,000

What Is This Program?

The Technical Center's System Support Laboratory provides the environment to implement, test, and integrate new systems into the National Airspace System (NAS). Once accepted, the systems become part of the test bed and are used to provide support to the operational field sites over the life-cycle of the operational systems. To maintain a viable test bed, it is periodically necessary to upgrade and enhance those portions of the facilities that support the systems and form an integral part of the test bed.

The projects slated for FY 2015 address safety, infrastructure sustainment, and efficiency improvements. Upgrades to the raised flooring, laboratory signage, and laboratory lighting enhance the safety of the laboratories. Implementation of life-cycle planning and replacement of infrastructure components like electrical panelboards and CAC units, provide a sustainable laboratory environment. The implementation of power monitoring throughout the laboratories provides valuable information required to plan future projects that would reduce energy and maintenance costs while improving the reliability of the systems.

DOT Strategic Goal - Economic Competitiveness
- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The program improves FAA's centralized state-of-the-art laboratory environment supporting the implementation, testing, and integration of new NAS systems prior to their delivery to the various FAA field sites. A single, centralized support laboratory will eliminate the cost of establishing and maintaining multiple laboratories for each project, program, Service Unit, and Line of Business. The FAA's centralized set of laboratories located at the William J. Hughes Technical Center provides the infrastructure for research, development, testing, and field support to the FAA's Capital Investment Plan (CIP) programs. It is necessary to modify, upgrade, and reorganize the Laboratory infrastructure as CIP projects and their supporting systems are delivered, installed, and eventually removed. The Technical Center Laboratory infrastructure encompasses approximately 160,000 square feet in the main building and numerous outlying buildings and remote sites.

How Do You Know The Program Works?

The goal of this program is to modernize the equipment and infrastructure necessary for FAA's centralized NAS laboratory facilities so they operate safely, reliably and efficiently. Projects funded with this program, such as electrical system upgrades, installation of fire stops, electrical panel board replacements, uninterrupted power system upgrades, help to meet this goal. The 20-Year Laboratory Facility Master Plan developed in FY 2010 provides a framework for future NAS laboratory improvement projects. Upgrades are necessary to continue providing a safe and reliable laboratory environment for research, development, test, evaluation, and integration of NAS and NextGen systems.

Why Do We Want/Need To Fund The Program At The Requested Level?

$1,000,000 is required to continue improvements to the Laboratory systems and laboratory infrastructure that supports National Airspace System (NAS) programs. A reduction will limit work completed and delay the activity targets into FY 2016.

Detailed Justification for - 1A03 William J. Hughes Technical Center Facilities

What Is The Request And What Will We Get For The Funds?

FY 2015 – William J. Hughes Technical Center Facilities
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
William J. Hughes Technical Center Facilities	$10,898	$11,000	$12,049	+$1,049

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Laboratory Support Services – Engineering and Maintenance	---	$10,209.0
b. Licenses and Maintenance Agreements	---	1,366.0
c. Equipment Calibration and Repairs	---	284.0
d. Radar Lease Sites, Aircraft Fuel, Pilot Training	---	190.0
Total	1	$12,049.0

For FY 2015, $12,049,000 is requested for continued sustainment of FAA's laboratory test beds and will be used for hardware and software support, licensing fees, support services, and other costs associated with operating and maintaining these multi-user facilities. These laboratories include the En Route and Terminal test beds; Weather, Navigational, Scan Radar, and Automated Tracking sites; Communications switching equipment; Laboratory network; the Flight Program's set of Flying Laboratories; and Aircraft Simulation Systems such as the Target Generation Facility, Cockpit Simulation Facilityand the Human Factors Laboratory.

What Is This Program?

The FAA's centralized set of laboratories located at the William J. Hughes Technical Center provides the infrastructure for research, development, testing, and field support to FAA's Capital Investment Plan (CIP) programs. These laboratories provide around the clock operations support to En Route, Terminal, and other Air Traffic Control (ATC) facilities throughout the nation. It is necessary to sustain these laboratory systems in configurations and capabilities that match field sites that currently exist or are planned for the future. CIP programs and field sites depend on these laboratories to fulfill their mission.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The Technical Center laboratories are the only location where it is possible to realistically simulate the National Airspace System (NAS). These laboratories are essential to the FAA's efforts to transition the NAS to the Next Generation Air Transportation System (NextGen). Laboratory integration, test and evaluation activities result in procedures and systems that ensure a safe, secure, efficient, and seamless transition to NextGen. These activities require numerous test beds that can be configured to replicate desired field configuration and traffic scenario, thus providing stakeholders with an understanding of how upgraded systems will perform prior to operational deployment. These test beds serve a second and equally important role by providing direct field support for Operational NAS systems. Problems identified at various field locations are quickly transmitted to the appropriate laboratory where solutions can be developed and tested by second level engineering personnel. This keeps systems operational avoiding service degradation and costly interruptions.

How Do You Know The Program Works?

This program provides for the management and support of the Technical Center's NAS laboratories through systems engineering, configuration management, test bed maintenance and enhancement, laboratory scheduling, and computer operations. It also provides technical and engineering services for laboratory customers in support of research and development, system installations, and proof-of-concept studies. This includes advanced concepts exploration, human in-the-loop simulations, real time simulations, cockpit simulations, prototyping and flying laboratory support.

To ensure the highest quality services to the FAA's Capital Investment Plan (CIP) programs utilizing the Technical Center's NAS laboratories, a Quality Management System (QMS) was implemented to standardize laboratory procedures and processes. The International Organization for Standardization (ISO) standard is the vehicle to validate the efficacy of the QMS and to obtain certification. The FAA's Technical Center's NAS Laboratories continues to maintain its ISO 9001 2008 registration.

Why Do We Want / Need To Fund The Program At The Requested Level?

$12,049,000 is required to sustain FAA's laboratory test beds and will be used for hardware and software support, licensing fees, and other costs associated with operating and maintaining these multi-user facilities. A stable funding source obviates the need for each program office to establish and sustain the infrastructure needed to support their programs and fielded systems. This has been a proven method to sustain the NAS test beds and to minimize FAA costs. A reduction will result in the elimination of some support services that will have an impact on the FAA's CIP programs utilizing Technical Center's laboratories.

Detailed Justification for - 1A04 William J. Hughes Technical Center Infrastructure Sustainment

What Is The Request And What Will We Get For The Funds?

FY 2015 – William J. Hughes Technical Center Infrastructure Sustainment ($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
William J. Hughes Technical Center Infrastructure Sustainment	$7,582	$5,000	$12,200	+$7,200

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Building 316 Roof Replacement	---	$2,200.0
b. Replacement of Aerial Distribution Switches 1 and 2	---	2,000.0
c. Building 300 and 301 Fire Detection/Annunciation System Upgrades (Phase 2)	---	2,800.0
d. Building 316 Chiller Replacements (Two Chillers)	---	2,100.0
e. Mechanical Upgrades to Building 300	---	1,900.0
f. Upgrade Electrical Systems in Building 300 (Part 2)	---	600.0
g. Building 316 Electrical Substations Replacement (Design)	---	300.0
h. Roof Replacements at Two Facilities (Design)	---	300.0
Total	1	$12,200.0

For FY 2015, $12,200,000 of funding is requested for the continued sustainment of FAA's infrastructure at the William J Hughes Technical Center (WJHTC) to accomplish the following projects:

a. Building 316 Roof Replacement

$2,200,000 is requested to replace the roof on Building 316 (Advanced Automation Systems Laboratory). This project involves the replacement of approximately 72,000 square feet of roofing covering the entire building, over half of which protects critical electronic laboratories. The current roof system is a fully adhered Ethylene Propene Diene Monomer (EPDM) membrane system and is the building's original roof installed circa 1992. The roof system is out of warranty and is in poor condition. Numerous service calls for roof repair work (leaks) have been made within the last two years and maintenance crews are finding it increasingly difficult to maintain a weather tight building. This project will remove the entire existing roofing system and replace it with a new roofing and insulation system carrying a 20 year total system warranty. Removed materials will be recycled wherever possible. The new roof system will be designed to be environmentally friendly, reduce energy costs through improved insulation, and reduce maintenance expenses. In addition, upgrades and/or replacement of rooftop mounted lightning protection system components will be completed in conjunction with the roof replacement. FY 2013 funding has been enacted to support the costs associated with the design for this project.

b. Replacement of Aerial Distribution Switches 1 and 2

$2,000,000 is requested for a project that will replace Aerial Distribution Switches (ADSs) 1 and 2. This project involves the replacement of two 69,000 volt (69kV) ADSs. The electric power for the entire WJHTC is supplied via two 69kV overhead distribution sources originating at the local utility's substation. This utility (Atlantic City Electric or ACE) has two demarcation (connection) points upon entering the WJHTC property. These existing connection points are ADS-1 and ADS-2. ADS-1 is a pole mounted air-gap, manually controlled switch. ADS-2 is a structure mounted air-gap, manually controlled switch. Although both switches are operational they have surpassed their useful lives of 25 years. Both switches suffer mechanism problems and spare parts are difficult to find due to obsolescence. In certain electrical configurations the failure of either switch will cause a commercial power loss to the entire Center. Finally the outside air normally has high levels of humidity and salt content, since the WJHTC lies 4.8 miles from brackish water and 8.75 miles from the ocean.

An engineering evaluation determined that the most cost effective solution to guaranteeing power availability to the WJHTC would be to replace both switches with 69,000 volt circuit breakers that support automated monitoring, control and operation. The project would also include reconfiguration of the overhead electrical lines to accommodate the installation of an additional interconnection on the distribution system; expansion of the WJHTC's Power Monitoring and Control System to provide the autonomy, monitoring and metering; and the expansion of the fiber communications network from the Center's Main Electrical Substation to the new 69kV circuit breaker locations. Proper coordination with Atlantic City Electric would allow seamless 69kV source transition and enhance the redundancy provided by the two power sources.

These critical switches must be replaced since the mission of the Center has evolved into supporting critical NAS and NextGen systems and services. The switches as configured do not offer the reliability and maintainability required to achieve the power availability that such systems demand.

c. Building 300 and 301 Fire Detection/Annunciation System Upgrades (Phase 2)
$2,800,000 is request to fund Phase 2 of the Building 300 and 301 fire alarm system upgrades. The fire alarm systems in these facilities are Gamewell FCI 7200 fire alarm systems which were installed in the early 1990's. This product line has been discontinued and each is a legacy system that is no longer being manufactured or sold by Gamewell-FCI. This includes all system control panels, detectors and initiating devices, notification appliances, accessories, and power supplies. This means if any component of the system fails, there are no readily available replacement parts.

Our estimate is that we have enough spare parts to maintain Building 301's fire alarm system for the next two years. An inoperable fire alarm system necessitates evacuation of the building (over 300 employees) or instituting a 24 hour fire watch. Building 300 has the same type and age of fire alarm system and this building is also at risk. Plans would be to salvage working components during the FY 2014 construction of the Building 301 fire alarm system to use in Building 300, until the fire alarm system in Building 300 is replaced as part of the FY 2015 budget request.

The requested funding will facilitate the construction efforts required to replace the existing system and bring the system up to current code compliance. FY 2013 funding has been received to support the costs associated with the design for this project (Buildings 301 and 300).

d. Building 316 Chiller Replacement (Two Chillers)
$2,100,000 is requested to replace both of the 900 ton centrifugal refrigeration machines in Building 316, the Advanced Automation System Building. The 900 ton centrifugal refrigeration machines were installed in 1992. The machines provide chilled water for air conditioning to the Building 316 administrative offices and the Building 316 Test Bed Area, which serves as the NAS test area and supports NextGen, the Enterprise Data Center, Lab Net and Second Level NAS field support activities. This type of machine typically has a useful life (per American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standards) of 23 years.

In December of 2011, Trace Electrical Services and Testing, LLC was commissioned to test and evaluate the two refrigeration machines in accordance with NETA (International Electrical Testing Association) standards. This evaluation revealed that the 4,160 volt motors tested unsatisfactory, most likely due to a breakdown of the motor insulation system. This condition degrades the reliability and availability of the machine itself, and the Building 316 chilled water plant as a whole. Additionally, the machine uses R-123 refrigerant which is no longer preferred by industry. This necessitates using refrigerant when performing maintenance operations that is more expensive, as opposed to being able to use more readily available and environmentally friendly refrigerants.

As short term repairs are being accomplished, the intent of this project is to replace the existing machines in kind with new dual compressor/variable frequency drive machines complete with maximum modulation capability. This will enable a more precise matching of load versus equipment capacity than that which would be provided with a conventional single compressor refrigeration machine. The new machine will also be able to tolerate a lower incoming condenser water temperature, thereby more readily enabling use of an energy saving, free-cooling option. FY 2014 funding has been requested to support the project design costs.

e. Mechanical Upgrades to Building 300

$1,900,000 is requested to replace Heating, Ventilation and Air Conditioning (HVAC) equipment (specifically AC-10, AC-17 and Kitchen/Cafeteria HVAC equipment) in Building 300. This equipment services various portions of a building encompassing approximately 500,000 square feet. The equipment is original to the building (circa 1980). These pieces of equipment have all exceeded their respective useful lives. Due to the age of the equipment, maintenance has been difficult since, in some cases, parts are no longer available. The project also entails the removal and replacement of associated ductwork, piping, valves, controls and other sub-components associated with the installation of the upgraded equipment. Design for the project has already been completed (early 2011). Funding requested is for award of construction. Requested funding includes costs associated with providing temporary HVAC equipment during construction to keep the facility fully occupied and operational.

f. Upgrade Electrical Systems in Building 300 (Part 2)

$600,000 is requested to replace electrical equipment beyond their life cycle in the Technical Center's largest facility, Building 300. The building was constructed in 1980. The electrical equipment in this building, which includes but is not limited to switchboards, panel boards, automatic transfer switches, motor control centers, and transformers, are beyond their useful lives and are in need of replacement. Furthermore, much of the equipment was primarily from a manufacturer named Federal Pacific Electric Company (FPE). FPE has been out of business since 1988 which makes finding replacement parts for this equipment difficult and costly. The requested funding will support the replacement costs associated with this project. Part 1 funding was appropriated in FY 2013.

Construction of these projects will complete much needed electrical upgrades for the building resulting in increased system reliability, especially for those electrical systems servicing the laboratory portions of the facility. The new equipment will provide energy savings, reduced maintenance expenses, and improved reliability through the installation of modern, efficient equipment and updated controls. Deferring these system replacements will compound potential problems such as emergency replacement escalation costs, increased maintenance expenses, inconvenience to building occupants and potential delays in the execution.

Building 303 (Central Utilities Plant): This project involves the replacement of approximately 20,000 square feet of roofing at grade level. The current roof system is a 2-ply modified bitumen system which is out of warranty and is in poor condition. Numerous service calls for roof repair work (leaks) have been made of mission critical programs.

g. Building 316 Electrical Substations Replacement (Design)

$300,000 is requested for design services to replace the five substations in Building 316. The design will also include the reconfiguration of the primary building electrical distribution system from a serial configuration (one after another) to a radial scheme, thereby improving electrical reliability and facilitating partial building electrical shutdowns and preventative maintenance activities. Design will also include the provision of an electrical switch house and the inclusion of the new equipment into the Center's existing electrical Power Monitoring and Control System.

The American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) consider average transformer (and associated equipment) life to be 20 to 25 years. Existing transformers and equipment are circa 1990. Additionally the existing dry type transformers will be replaced with CAS coil (epoxy encapsulated electrical) cores which have a projected useful life of between thirty and fifty years. The new substations will have greater capacities, thus allowing for electrical system/equipment expansion, and will include self-healing networks, thereby enabling automatic electrical power restoration. Finally the substations will improve the reliability of electrical power to not only the Center but also the laboratory portion of Building 316.

h. Roof Replacements at Two Facilities (Design)

$300,000 is requested for design services to replace approximately 25,000 square feet of roofing on two facilities as follows:

Building 303 (Central Utilities Plant): This project involves the replacement of approximately 20,000 square feet of roofing at grade level. The current roof system is 2-ply modified bitumen system which is out of warranty and in poor condition. Numerous service calls for roof repair work (leakes) have been made within the last year, with several areas currently leaking on critical central heating, cooling and control equipment which service our largest on site laboratory facilities (i.e., Buildings 300 and 316). Repeated maintenance repairs have been unsuccessful in maintaining a weather tight building.

Building 211 (Engine Test Facility): This project involves the replacement of approximately 5,000 square feet of roofing. The current roof system dates back to 1984, when a new four ply built up roof was installed to replace the building's original (circa 1963) four ply built up roof. In an attempt to provide a weather tight roof, some portions of the roof were replaced in 2006, but a comprehensive replacement was never done. The current roof system is out of warranty and well beyond its useful life. A survey performed by an independent consultant in 2007 indicated the roofing system was in fair to poor condition and that the entire roofing system should be replaced.

These projects will remove the entire existing roofing system and replace it with new roofing and insulation systems carrying 20 year total system warranties. Other benefits are identical to those listed under the Building 316 Roof Replacement effort.

What Is This Program?

The WJHTC owns and operates test and evaluation facilities, research and development facilities, administrative and storage facilities, and numerous project test sites. The Technical Center must keep the Central Utilities Plant (CUP), utility distribution systems, and the building infrastructure in operating order. The WJHTC must also comply with International Building Codes, the National Fire Codes (NFC), the Americans with Disabilities Act (ADA) and current energy policies.

The 20-year Facility Master Plan, completed in July of 2008, was developed based upon the consultant's consideration of code compliance issues, equipment age, life expectancy, replacement part availability, and general condition for each system. Early years' proposed projects reflected the highest priority due to the significant issues of remediation, safety, code compliance and/or mission important issues. While the Master Plan is a useful tool, a working group within WJHTC Facilities annually identifies projects resulting from changes in equipment conditions and develops a re-prioritized list of projects based upon the master plan and these key projects, and those projects are identified in annual budget requests.

DOT Strategic Goal - Organizational Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

The William J. Hughes Technical Center (WJHTC) owns and operates approximately 1.6 million square feet of test and evaluation facilities, research and development facilities, administrative facilities and numerous project test sites. The value of the buildings and infrastructure is about $263.1 million. This value is considered to be extremely low and it does not include the environmental funding (in excess of $100 million), received via a national program, which has been expended to clean up hazardous sites on Center, replace aged and monitor new underground storage tanks and implement the Center's OSHA and Energy Programs. Additionally the value does not include the worth of the land itself, estimated to be approximately $3 million (FY 2003 figure). These facilities require an annual program of capital improvements and modernization. Example projects include: (1) replacing old heating, ventilation, and air-conditioning systems; (2) upgrading the electrical distribution systems; and (3) upgrading fire-suppression systems to current fire safety codes.

Infrastructure sustainment at the WJHTC will improve operational efficiency and effectiveness. This budget line item will also update facilities and facility support systems; and reduce energy consumption on a per square foot basis, thus supporting Executive Orders 13423 and 13514 concerning Federal Energy

Management. This Capital Investment Plan (CIP) program is the only available funding stream to sustain the 1.6 million square feet of space together with the required utility and roadway support systems.

The establishment of an infrastructure necessary for providing and sustaining a suitable, reliable environment (i.e. power, cooling, etc.) for the Technical Center's 24x7x365 operations enables the mission crucial systems hosted at the Technical Center such as Traffic Flow Management Production Center (TPC), FAA Telecommunications Infrastructure (FTI), Business Continuity Plan (BCP), and the Enterprise Date Centers that support FAA IT operations to provide increased capacity with enhanced reliability. In addition to these operational systems, the Technical Center must provide 24x7 support for current system monitoring capabilities such as Reduced Vertical Separation Minimum (RVSM), Wide Area Augmentation System (WAAS), and Automatic Dependent Surveillance Broadcast (ADS-B) and future systems such as System Wide Information Management (SWIM) as well as the continual second level support provided to operational NAS systems (ERAM, STARS, ATOP) so that they will perform in a proper environment and hence provide enhanced safety and reliability to the greater NAS/FAA system.

The Technical Center's infrastructure was not designed to provide 24x7x365 reliability and availability. The infrastructure has single points of failure, insufficient monitoring, is aging, and has limited remaining capacity to support these NAS/FAA systems. In order to meet current and future requirements the Technical Center needs to upgrade its current infrastructure or build an infrastructure that meets the availability/reliability requirements for these mission essential systems.

How Do You Know The Program Works?

The modifications have already begun and will continue to ensure the continued reliable operation of the WJHTC by replacing aged mechanical, electrical, and life safety equipment and required utility and other support systems before serious problems occur. The work will also improve life cycle infrastructure planning; update certain facilities, facility support systems and utility distribution systems; reduce energy consumption on a per square foot basis; and enable the Center to support changing FAA programs and missions. The program incorporates best business practices and adopts industry standards such as American Society of Heating, Refrigerating and Air-Conditioning Engineers, Incorporated (ASHRAE), National Electrical Code (NEC), National Electrical Manufacturers Association (NEMA), American National Standards Institute (ANSI) and Institute of Electronic and Electrical Engineers (IEEE).

Why Do We Want/Need To Fund The Program At The Requested Level?

$12,200,000 is required to complete the roof replacement at Building 316; replace Aerial Distribution Switches 1 and 2; upgrade fire detection/annunciation systems in Buildings 300 and 301 (Phase 2); replace both chillers in Building 316; upgrade mechanical systems in Building 300; upgrade electrical systems in Building 300 (Part 2); design the electrical substation replacements in Building 316; and design the roof replacements at two facilities.

Detailed Justification for - 1A05 NextGen - Separation Management Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – Separation Management Portfolio
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Separation Management Portfolio	$16,774*	$20,328*	$13,000	-$7,328

*indicates a comparability adjustment to prior budget structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. ADS-B In Applications – Pre Implementation Activities	---	$5,000.0
B. EnRoute Modern Procedures	---	5,000.0
C. Alternative Positioning Navigation and Timing (APNT)	---	3,000.0
Total	Various	$13,000.0

The Separation Management Portfolio, as described in the NextGen Implementation Plan, works to provide controllers with tools to manage aircraft in a mixed environment of varying navigation equipment and wake performance capabilities. The Separation Management Portfolio encompasses activites that were previously funded under the Trajectory Based Operations Solution Set. For FY 2015, FAA is requesting $13,000,000 to focus on the continuation of concept engineering and the development of the investment analysis products for Automatic Dependent Surveillance-Broadcast (ADS-B) In Applications, EnRouteModern Procedures, and Alternative Positioning Navigation and Timing (APTN).

A. ADS-B In Applications - Flight Interval Management

This program will develop Minimum Operational Performance Standards (MOPS) and operational requirements for flight deck interval management. The application will come in two phases: 1) Flight Deck Interval Management-Spacing (FIM-S), and 2) Designated Intervals. Spacing intervals will address no-closer-than and no-further away limits for aircraft in-trail, providing efficiency while maintaining safe separation spacing. Improved interval management will optimize spacing resulting in maximum utilization of system capacity. The anticipated FY 2015 accomplishments are as follows:

Pre-Implementation activities in support of Final Investment Decision (FID) for ADS-B (New enhancement for Surveillance Broadcasting System) include:

- Develop Interval Management Requirements document
- Develop MOPS document
- Develop Technical Standard Order (TSO) documentation
- Develop Significant Standards Differences (SSD) document

B. EnRoute Modern Procedures

Continue to develop En Route NextGen Mid-Term Baseline capabilities, which assist controllers in maintaining safe aircraft separation while optimizing use of airspace system capacity. FY 2015 areas of capability research and analysis include:

- Implementation of Airborne Re-Route (ABRR) include: Operational checkout of software upgrades for the En Route Automation Modernization (ERAM) and achieve IOC at Key Site
- Installation and checkout of ABRR Software at remaining 19 ARTCCs

C. Alternative Positioning Navigation and Timing (APNT)

The Alternative Positioning, Navigation, and Timing (APNT) program ensures that backup PNT services will be available to support flight operations to maintain safety, security, and minimize economic impacts from GPS outages within the National Airspace System (NAS). FY 2015 funding supports the Investment Analysis (IA) products in support of achieving an Initial Investment Decision (IID) by the fourth quarter of FY 2015 and include the Requirements Document, Business Case documentation, Implementation Strategy and Planning Document and documentation of potential candidate solutions.

What Is This Program?

This portfolio contains three pre-implementation activities in support of the Separation Management Portfolio. These include ADS-B In Applications – Flight Interval Management, EnRoute Modern Procedures, and Alternative Positioning Navigation and Timing.

A. ADS-B In Applications - Flight Interval Management

Automatic Dependent Surveillance – Broadcast (ADS-B) is an advanced surveillance technology that provides highly accurate and more comprehensive surveillance information via a broadcast communication link. As part of responding to Section 211 of the FAA Modernization and Reform Act of 2012, FAA is continuing to identify what ADS-B In technology would provide the greatest benefits to users. FAA requests this funding to complete the analysis for the equipment standards and build a business cases, including determining the whether there is a positive cost-benefit ratio, for the FIM investment.

B. EnRoute Modern Procedures

EnRoute Modern Procedures provides funding to implement Airborne Reroute Automation operationally available NAS wide in 2016. Airborne Reroute technology automates the processing in ERAM of Reroutes generated by Traffic Flow Management System (TFMS) after the aircraft is airborne. The process will minimize delays during Traffic Management Initiatives (TMI) and maximize airspace capacity.

Continue to develop En Route NextGen Mid-Term Baseline capabilities, which assist controllers in maintaining safe aircraft separation while optimizing use of the airspace system capacity. Activties to aid in this include:

- Implementation of Airborne Re-Routes (ABRR): Operational checkout of software and achievement of IOC at key site
- Installation and checkout of ABRR software

C. Alternative Positioning Navigation and Timing (APNT)

National Security Presidential Directive 39, U.S. Space-Based Position, Navigation, and Timing Policy, requires the Secretary of Transportation to: "In coordination with the Secretary of Homeland Security, develop, acquire, operate, and maintain backup position, navigation, and timing capabilities that can support critical transportation, homeland security, and other critical civil and commercial infrastructure applications within the United States, in the event of a disruption of the Global Positioning System or other space-based positioning, navigation, and timing services, consistent with Homeland Security Presidential Directive-7, Critical Infrastructure Identification, Prioritization, and Protection, dated December 17, 2003."

The APNT program ensures that backup PNT services will be available to support flight operations to maintain safety, security, and minimize economic impacts from GPS outages within the National Airspace System (NAS). APNT services will support the development of procedures fully enabled by:

- Area Navigation (RNAV)/Required Navigation Performance (RNP)

- Automatic Dependent Surveillance Broadcast (ADS-B)
- Trajectory Based Operations (TBO)
- Four Dimensional Trajectory (4DT) operations

DOT Strategic Goal - Economic Competitiveness
- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

A. ADS-B In Applications - Flight Interval Management

On January 1, 2020, when operating in the airspace designated in 14 CFR § 91.225 (outlined below) aircraft must be equipped with ADS-B Out avionics that meet the performance requirements of 14 CFR §91.227. Aircraft not complying with the requirements may be denied access to this airspace. The ADS-B In Application is not mandated but use of it will optimize spacing resulting in maximum utilization of system capacity. It is anticipated that by reducing the inter-arrival spacing, utilization of system capacity may be increased.

B. EnRoute Modern Procedures

As demand has grown, especially in the airspace surrounding and between major metropolitan areas, the current fixed airspace routings and large separations limit airspace capacity and tactical management of major flows. En route congestion has become a major constraint on the system, as the inflexibility of the system to airspace adjustments makes tactical flow, in the face of demand, congestion, or major weather disturbances, difficult. Due to the limitations in automated prediction capability and voice communication, separation standards remain fixed and conservative, which restricts capacity to the overall system. Modern Procedures includes a series of automation upgrades and improvements in the strategic En Route conflict probe (CP), the tactical conflict alert (CA), and display enhancements. Developing new automation CP and CA algorithms are on the critical path of many NextGen technologies, including the ABRR capabilities into ERAM are being funded in this budget request.

C. Alternative Positioning Navigation and Timing (APNT)

The APNT strategy is consistent with Destination 2025, the NextGen Implementation Plan and FAA Strategic Goals 1 and 2 for increased safety and capacity, respectfully. Pilots, dispatchers, and controllers will all be able to perform their functions using performance-based operations even if there is a GPS outage. Specifically, pilots will be able to utilize the availability of more precise aircraft position, navigation, and timing services during GPS outage. Current PNT services, consisting of conventional navigation (i.e. HF Omni-directional Range (VOR)) are not capable of providing the PNT necessary to serve as the backup for the RNAV capabilities required for NextGen's deploying capabilities. The NextGen APNT project will investigate the following three alternatives to provide a GPS backup: Enhanced Distance Measuring Equipment (DME), Wide Area Multilateration (WAM), and Pseudolites (PL).

How Do You Know The Program Works?

The Separation Management portfolio encompasses all of the airspace and airports within the NAS. Since its beginning, the portfolio has made great progress expediting the integration of Separation Management technologies within these domains. Below are examples of such successes and planned activities that have and will continue to improve the overall operations within the NAS.

B. EnRoute Modern Procedures

Separation Management automation is defined to include all ATC automation capabilities that assist controllers in maintaining safe aircraft separation while optimizing use of airspace system capacity. The following products were developed and support of these objectives:

- Developed the Separation Management Concept of Operations (CONOPS), describing the qualitative and quantitative system characteristics of Separation Management
- Completed Concepts of Use documents for the first phase of functional requirements, describing the capabilities and intended use of Separation Management. The first phase of requirements include capabilities such as Flight Management Computer Route Offset, System Assisted Coordination, Radar Associate Position, Conflict Probe at Radar Position, and Strip-less Non-Radar Operations
- Conduct a hardware demonstration and acceptance test, at the Walter J Hughes Technical Center (WJHTC), for ERAM Evaluation System (EES), anticipated to the primary tool for Separation Management functionality
- Develop Initial Functional Requirements for Separation Management concepts, determining the initial necessary requirements for new Separation Management technology
- Development and demonstration of D-Side Upgrade risk reduction prototypes, which will serve as a basis for the introduction of Separation Management enhancements at the D-Side position
- Development and independent evaluation of CA and CP algorithm improvement prototypes, improving the controller's ability to maintain safe separation of aircraft

C. Alternative Positioning Navigation and Timing (APNT)

The Alternative Positioning, Navigation, and Timing (APNT) program ensures that backup PNT services will be available to support flight operations to maintain safety, security, and minimize economic impacts from GPS outages within the National Airspace System (NAS).

- Complete artifacts towards achieving Investment Analysis Readiness Decision (IARD)
- Conduct feasibility studies for Optimize DME Network, Wide Area Multilateration Network, and Pseudolite Network
- Perform prototyping and demonstration of Optimized DME, Wide Area Multilateration Network, and Pseudolite
- Conduct analysis and complete reports to evaluate and identify NextGen alternative position, navigation, and timing shortfalls

Why Do We Want/Need To Fund The Program At The Requested Level?

FAA is requesting $13,000,000 to focus on the continuation of concept engineering and the development of the investment analysis products for Automatic Dependent Surveillance-Broadcast (ADS-B) In Applications, EnRoute Modern Procedures, and Alternative Positioning Navigation and Timing (APNT).

Detailed Justification for - 1A06 NextGen - Improved Surface/TFDM Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – Improved Surface/TFDM Portfolio
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Improved Surface/TFDM Portfolio	$41,661*	$23,139*	$38,808	+$15,669

*indicates a comparability adjustment to prior budget structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Terminal Flow Data Manager	---	38,808.0

The Improved Surface Operations Portfolio, as described in the NextGen Implementation Plan (NGIP), focuses on improved airport surveillance information and automation to support airport configuration management and runway assignments and enhanced cockpit displays to provide increased situational awarenss for controllers and pilots. For FY 2015, $38,808,000 is requested for completing key portfolio investment analysis activities, continue the deployment of initial surface management capabilities, and begin solution implementation by awarding a contract as part of the Terminal Flight Data Manager acquisition.

What Is This Program?

The NextGen Improved Surface portfolio spans programs that support requirements definition, system development and implementation of key Surface capabilities.

The Terminal Flight Data Manager (TFDM) program is an acquisition program that delivers NextGen decision support capabilities to tower air traffic controllers and FAA traffic managers with decision support capabilities that integrate flight, surveillance, and traffic management information. TFDM will provide an integrated approach to maximize the efficient collection, distribution, and update of data including flight information in the terminal area (airspace around an airport and airport surface data) and to improve access to information necessary for the safe and efficient control of air traffic. The use of Electronic Flight Data (EFD) will allow tower controllers to maintain an integrated view of the air traffic environment, improving their situational awareness of the airport operations. The decision support capabilities will also provide more efficient and safe airport operations, in particular management of airport surface traffic sequencing and scheduling. TFDM will automate the manual flight data processes to enable enhanced data sharing between the Tower ATC and the En Route ATC, Approach Control ATC, Traffic Flow Management (TFM), and Flight/Airline Operations domains.
The request will support the following key activities of TFDM:

- Complete Investment Analysis – Establish a Program Baseline at FID
- Award Prime Contractor/ Begin Solution Implementation and Related Activities
- Program Management/System Engineering
- Planning Test/Logistics/Implementation/2nd Level Engineering Support
- Planning of Operational Transition and Implementation

TFDM will support the FAA Strategic Goals outlined in the FAA Strategic Plan, in the following ways:

- Achieve Next Level of Safety by decreasing the management of air traffic through manual, paper coordination and increasing surface situational awareness to better manage the location of aircraft throughout the surface of the airport.
- Ensure that the FAA is a Workplace of Choice by promoting organizational excellence and efficiency through the replacement of electronic flights strips and the support of silent communication, which will improve workplace efficiency and comfort for Air Traffic Controllers.
- Deliver Aviation Access through Innovation by ensuring that the NAS stays in a State of Good Repair through the replacement or subsuming legacy systems into the TFDM system, as well as:
- Support Economic Competitiveness by providing airports and airlines with tools to decrease fuel consumption and increase surface and terminal airspace efficiencies and providing Livable Communities by decreasing the environmental impact of air travel on communities surrounding airports.
- Sustaining our Future Environmental Sustainability by providing tools to airlines to decrease their fuel consumption.
- Improve Global Performance through Collaboration by working in partnership with airlines, airport authorities, consumers, Air Traffic Controllers, and FAA to provide innovative and effective decision-making and workplace tools.

TFDM also continues to support the recommendations of the RTCA Task Force 5, the NextGen Advisory Council, and the Operational Capability Integration Plan (OCIP) by providing some early TFDM capabilities in the NAS, starting in FY 2014 and continuing into FY 2018, including deploying early capabilities through existing NAS systems. Improving surface operations and data sharing with the operators rated among tier 1 priorities for the NAC in their report "NextGen Priorities in a Budget Constrained Environment." Core TFDM will replace or enhance these capabilities significantly to meet stakeholder recommendations and agency commitments.

To support these agency-level goals, TFDM continues to set, monitor, meet, and report on its FAA Business Plan Builder goals and its own internal goals and metrics for the TFDM Program. In addition, continued coordination with the operational community and union works toward including buy-in and input from the end users.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

TFDM will be an automation system for the tower that will support air traffic controllers with more tactical and strategic decisions covering air traffic operations in the National Airspace System (NAS). The system will provide air traffic tower controllers with decision support capabilities, integrated flight, surveillance, and traffic management information. This will allow tower controllers to maintain an integrated view of the air traffic environment, improving their situational awareness of the airport operations.

A key component is the transition from paper flight strips to electronic flight data representation and exchange. This will facilitate flight data exchange between controllers within the tower facility, between Air Traffic Control facilities and between traffic flow management systems. This will also facilitate data exchange with aviation partners such as the airlines and flight operators to support collaborative decision making (which eliminates the necessity of physical exchange of flight data, reduces telephone exchange of data between facilities, and reduces manual re-entry of data among multiple ATC systems).

The capabilities provided by TFDM will deliver multiple NAS benefits, such as reduced surface delay, taxi time and fuel burn (with improved operational and environmental performance); better performance and airport capacity utilization during severe weather and other off-nominal conditions; improved usability and situational awareness and enhanced safety.

How Do You Know The Program Works?

The portfolio focuses on gaining efficient flow and the management aircraft on the surface at selected metroplex airports and the complex terminal airspaces within the NAS High density airports typically see higher demand for runway capacity, operate multiple runways, and have complex airspace and ground interactions in the arrival and departure phases of flight. Prototype and Human-In-The-Loop simulation activities related to this work have already been conducted to validate the TFDM concepts and to reduce risks during TFDM investment analysis. This work was funded through Next Generation Transportation System – Flexible Terminals and Airports Surface/Tower/Terminal Systems Engineering.

As of February 2014, TFDM is in the Investment Analysis (IA) Phase. During IA, the Program Office will identify various alternatives to provide the capabilities to meet the TFDM requirements, and program metrics and measurement criteria will be established to verify that the program delivers the benefits identified at establishment of the baseline. The FAA will select the most cost beneficial alternative for acquisition and implementation. The Program Office plans to complete the IA and receive approval in 2015 to begin acquisition design and development of the selected alternative. The TFDM system acquisition will include early user involvement activities and testing as well as a comprehensive test and provisioning program to verify the system operates properly in the NAS and is supportable through the life cycle.

Why Do We Want/Need To Fund The Program At The Requested Level?

For FY 2015, $38,808,000 is required to complete investment analysis leading to the establishment of a TFDM Program Baseline and initiate design/development activities for the TFDM Core capabilities. TFDM is a key ground infrastructure program for NextGen mid-term operations in the areas of flight planning; push back, taxi and departure; descent and approach; and landing, taxi and arrival. As shown in the implementation timeline in the NGIP, TFDM supports NextGen mid-term Improved Surface Operations as the primary contributor to the NextGen Operational Improvement (OI) 104209: Initial Surface Traffic Management.

Delay of implementation of TFDM due to a funding reduction will result a reduction of benefits and increase in overall costs. The deferment of the full scope of the defined TFDM Core capability will result in extending system design/development/implementation, thus resulting in additional software builds and test events. This will make the overall program more expensive, resulting in increased costs. Deferment of the full scope of defined TFDM Core capability corresponds to a delay in the benefits associated with those capabilities; including a potential deferment of integration of Time Based Flow Management and Traffic Flow Management System capabilities due to a reduction will result in a loss of traffic flow related benefits.

The NAS relies on several flight data management systems in Air Traffic Control Towers (ATCTs) to provide flight object data and traffic management tools in the terminal environment. Many of these systems (including Departure Sequencing Program, Airport Resource Management Tool, Electronic Flight Strips System and Surface Movement Advisor) will require modernization or replacement in order to continue to provide the current services through the years. In lieu of modernizing or replacing each of these systems/capabilities individually, it is necessary to develop an integrated Terminal Flight Data program that provides all of the data and tools currently available to controllers, as well as emerging capabilities such as departure metering, virtual queuing, runway load balancing, and EFD and slot management.

Finally, currently the NAS lacks understanding of actual Surface demand among FAA services. Thus, demand predictors are not driven by timely surface demand data, and lack integration with Flight Operator intent data. Since the demand in these areas will continue to grow and without the increased funding needed to support TFDM, the enhanced capabilities will not be available to meet the current shortfall or the increased demand indefinitely.

In summary, the FAA will not fill its identified shortfall, nor realize any of its planned Acquisition Program Milestones.

Detailed Justification for - 1A07 Next Gen – On Demand NAS Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – On Demand NAS Portfolio
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
On Demand NAS Portfolio	$11,573*	$8,500*	$6,000	-$2,500

*indicates a comparability adjustment to prior budget structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Flight Object	---	$3,000.0
B. International Harmonization Demonstration	---	3,000.0
Total	Various	$6,000.0

The On-Demand NAS Information Portfolio, as stated in the NGIP, ensures that airspace and aeronautical information is consistent across applications and locations and available to authorized subscribers and equipped aircraft. In FY 2015, the On Demand NAS portfolio requests $6,000,000 to support the continued development of the Flight Information Exchange Model (FIXM) standards and integrate Flight Object Exchange Service (FOXS). In addition, the International harmonization demonstration will promote collaboration with industry and international partners for utilization of flight object standards. These two i are pre-implementation stage and do not appear in the 2013 NGIP, but FAA will work to ensure priority areas are shown on the NGIP schedules moving forward.

A. Flight Object

NAS systems currently operate as separate entities servicing different flight domains (Preflight, Airport, Terminal, Enroute, and Oceanic). Similarly, International Air Navigation Service Providers (ANSPs) also operate as separate entities servicing their own airspace. Even though flight data may be found in multiple NAS systems, a unified, complete, accurate, up-to-date, and easily-accessible picture of any and all flights does not exist today. The primary goal of the Flight Object program is to develop an International data standard - Flight Information Exchange Model (FIXM). This data standard will support the exchange of flight information between systems across multiple domains (including both NAS and International systems).

- Development of the Flight Information Exchange Model (FIXM) standards v4.0
- Complete engineering and investment analysis in support of FOXS inclusion in TFMS WP4 FID

B. International Harmonization Demonstration

The purpose of this demonstration (Mini Global) is to continue to validate the Flight Object concept and the use of the Flight Information Exchange Model (FIXM) standard. This should allow information to be shared faster and more accurately between automation systems and operating personnel around the globe. There are many potential benefits to participants. The Mini-Global will promote international harmonization via data exchange with other international ANSPs, operators, and the aviation industry. It will assess the compatibility of partner ATM systems with respect to flight object standards and will identify both services and products meaningful to current and future operations. As with all information protocols, FIXM international standards evolved.

What Is This Program?

The On-Demand National Airspace System (NAS) Information portfolio will implement programs and processes to ensure that NAS and aeronautical information are consistent across applications and locations, and are available to authorized subscribers and equipped aircraft. Users will request NAS flight and aeronautical information when planning flights through services that will allow them to collaborate with ANSPs, resulting in improved flow management and efficient use of resources. In-flight Air Traffic Management (ATM) planning will be improved by making consistent data on constraints available to all NAS users. This effort encompasses the development of international standards for operational use of flight object (FIXM) and aeronautical information (AIXM).

A. Flight Object

The Flight Object will be the standard medium for capturing and sharing the most up-to-date information on any flight, and will serve as the single common reference for all system information about that flight. A Flight Object will be created for each proposed flight, and the Flight Object information will be updated throughout the entire time the flight progresses from gate to gate. The Flight Object will collect, manage and provide flight-specific data, such as aircraft identification, aircraft parameters, current flight plan information, operator preferences, flight capabilities, and security information. The Flight Object is not envisioned to include environment or weather information, since these are system-wide elements that affect multiple flights. The sum of information contained in the Flight Object will be much richer than today's flight data construct. FIXM is part of a family of information exchange models (including Aeronautical Information Exchange Model (AIXM) and Weather information Exchange Model (WXXM)) designed to cover the information needs of ATM. FIXM is an International data exchange standard, and it will receive annual incremental updates to add/delete/modify data elements as necessary.

The Flight Object Exchange Service (FOXS) is intended to be the service used by NAS and Non-NAS applications for capturing and sharing the most up-to-date information on any flight, and will serve as the authoritative source for all system information about that flight. The FOXS will create a flight object for each proposed flight, and the flight object information will be updated throughout the entire lifecycle as the flight progresses from gate to gate. The FOXS and authorized system clients will be able to create, modify, and delete flight object data and the FOXS service will manage, distribute, constitute, and reconstitute flight object data, to NAS and Non-NAS clients based upon event and time driven events. The FOXS managed flight object data will contain FIXM data and additional data than what is defined in the FIXM standard, but is not envisioned to include environment or weather information, since these are system-wide elements that affect multiple flights. The sum of information managed in the Flight Object by FOXS will be much richer than today's flight data and the FIXM construct.

From the ATM perspective, the FOXS contains information needed for planning system resources and ensuring safety of flight while providing the requested service to the extent possible in the dynamic ATC environment.

B. International Harmonization Demonstration

The demonstration is important for the US to work with the global community to lock down the international standards/protocols for which the FAA, DoD and NWS have made investments and have put into operations. Our investment and deployment of the US information systems (flight/flow, weather and aeronautical information) and the exchange standards/protocol need to be adopted in the global/international environment to preserve the investment in our information systems. The result and recommendations from this operational demonstration are being used to develop international harmonization of the flight information standards that will be incorporated into the latest version of FIXM.

Why Is This Particular Program Necessary?

The On Demand NAS Information portfolio provides flight planners, ANSP staff, and flight crews with consistent, complete, and easily processed information on changes of conditions in the NAS affecting safety, security, and efficiency.

The NAS today uses relatively blunt tools to manage demand and capacity imbalances. These tools do not share objectives for flights, nor do they have a common picture of the structure and status of the NAS. The On Demand NAS services provided by NextGen will provide flight operators the necessary information to plan and coordinate flights to the maximum extent possible. This portfolio strives to provide necessary information for flight planners to have common situational awareness of NAS airspace constraints which optimizes interaction between pilots, controllers, and ANSP.

The International Harmonization demonstration provides a vehicle to test concepts and leverage individual transformational program and project technology to create multi-domain cohesive demonstration. This demonstration supports the collaboration between public/private industry partners, Air Navigation Service Providers, customers, and operators in the evaluation of technology. This addresses and meets the rapidly changing needs of the aviation industry, by introducing innovative concepts and technologies in the air traffic system.

How Do You Know The Program Works?

The On Demand NAS portfolio encompasses information sharing within the NAS. The work supporting this portfolio has made great progress expediting the integration of new technologies within these domains. Below are examples of such successes and planned activities that have and will continue to improve the overall operations within the NAS by fiscal year 2015.

- Aircraft Access to SWIM (AAtS) Demonstration – The agency vision for data communication to the flight deck utilizes DataComm for safety, command, and control data while using AAtS for strategic collaboration and situational awareness. This demonstration which includes industry partners NetJets and Virgin America was designed to validate the feasibility and exhibit the benefits of providing operational, weather, and regulatory data to pilots in flight using a Class II Electronic Flight Bag (EFB) display and a commercial data to communicate information provided by the FAA SWIM network.
- The demonstration was conducted with live operational flights using with commercial carriers and business jet partners. Results from initial AAtS demonstrations led to (1) the establishment and recognition of an AAtS link in the global aviation community, (2) the establishment of guidance documents for AAtS to support RTCA SC-206 (AIS and MET datalink) and AEEC 830 (Air Ground Information Exchange), and (3) data collection to support agency regulatory organization in establishment of regulation and certification for information to the EFB.
- Mini Global Demonstration – Advances in digital communication throughout the world have necessitated the establishment of information exchange standards to ensure interoperability. ICAO led the development of the Information Management (IM) roadmap, which was endorsed at the 2012 Air Navigation Conference (ANC 12). The IM roadmap lays a path to interoperability and is the establishment and adoption of the flight, aeronautical, and weather exchange standards. This demonstration, due to international dependencies included an expanded number of partners including AirServices Australia, Japan's JCAB, NAVCANADA, Lockheed, Harris, Boeing, and SESAR. The demonstration showcased the use of the latest standards enabling information exchange between operators flying across FIRs and ANSP's. It included sharing of information and security protocols to ensure uncompromised information sharing.
- Results from the demonstration (1) led to requirements for the next version of the exchange standards (AIXM, FIXM and WXXM), (2) affected functional requirements for next upgrade of the security infrastructure, (3) and were reported out at the ICAO demonstration assembly.
- FIXM and AIXM Standards development – Supporting, if not leading, the global harmonization and standardization of Information Exchange Model via internal and external collaboration meetings with the appropriate Communities of Practices (CoPs) and international standards organizations (e.g. ICAO, IATA), and relevant related workshops. Develop the data standards for flight object and aeronautical information exchange. This includes the FIXM v3.0 and AIXM v5.5. Lead member on the FIXM

configuration control board (CCB) representing the United States. Leading an international panel of information providers and consumers in the planning of, and subsequently hosting of the annual Air Transportation Information Exchange Conference (which includes the AIXM and FIXM information exchange models and their extensions).

Why Do We Want / Need To Fund The Program At The Requested Level?

$6,000,000 is required to continue execution of work within the NextGen On Demand NAS Portfolio. The FY 2015 work continues the development of the Flight Information Exchange Model (FIXM) standards, starts the integration of Flight Object Exchange Service (FOXS), and continues to validate the Flight Object concept and the use of the Flight Information Exchange Model (FIXM) standard with international partners.

Detailed Justification for - 1A08 Next Gen – Environment Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – Environment Portfolio
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Environment Portfolio	$7,360*	$9,443*	$2,500	-$6,943

*indicates a comparability adjustment to prior budget structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Environmental Management System (EMS) and Advanced Noise and Emissions Reduction	---	$2,500.0

The Environment Portfolio, as stated in the NextGen Implementation Plan, describes enabling activities leading to the establishment of the NextGen Environmental Management System, the strategy for ensuring compliance with the National Environmental Policy Act, and technologies that support NextGen environmental goals. For FY 2015, $2,500,000 is requested to:

- Submit a report on development of the initial operational version of NextGen EMS framework.
- Advanced Noise and Emissions Reduction:
  - Develop a report on demonstrations of Continuous Lower Energy, Emissions, and Noise (CLEEN) Flight Management System (FMS)/Air Traffic Management (ATM) related aircraft technologies
  - Update report on assessments of NAS-wide environmental benefits of new aircraft technologies including those from the CLEEN program
  - Develop a report on assessments of environmentally and energy efficient gate-to-gate operational procedures
  - Develop a report on assessments of NAS-wide impacts of environmental standards and policy measures

In FY 2015, the efforts under this program will continue to focus on solution development to reduce aviation noise, emissions, and fuel burn thus helping to address the environmental and energy challenges facing aviation.

What Is This Program?

Unless managed effectively, environmental constraints could limit capacity growth and prevent full realization of NextGen. The NextGen Environment Portfolio program helps demonstrate and quantify system-wide environmental and energy performance and the benefits that are expected from mitigation solutions such as advanced aircraft technologies, efficient gate-to-gate operations, environmental standards, and policy measures. It will support development of an Environmental Management System to track and assess NAS-wide environmental performance and provide guidance on meeting aviation environmental goals. The efforts in this program will thus help in meeting the NextGen environmental goal to reduce system wide aviation environmental impacts in absolute terms notwithstanding the growth of aviation.

There are two environmental projects under this program.

NextGen Environmental Management System:
Solutions to achieve NextGen environmental goals must consider the effect of aviation noise and emissions on human health and welfare. The Environmental Management System (EMS) provides a framework to manage, mitigate and verify progress towards achieving the environmental goals. The EMS will employ well-developed and demonstrated environmental impacts metrics. The EMS approach will allow for the systematic examination of advanced options for noise, fuel burn, and emissions reduction to support sustainable growth in demand and mobility. Approaches will be developed and analyses conducted to track progress towards meeting emissions, noise and fuel burn efficiency goals.

Environment and Energy Advanced Noise and Emission Reduction:
Implementation of advanced aircraft (both engine and airframe) technologies, and improved environmental and energy efficient operational procedures are keys to reductions in significant environmental impacts while improving system energy efficiency. Policy options, environmental standards and market based measures also provide mitigation that will help meet environmental and energy efficiency goals. This program will focus on assessing the impacts of mitigation actions and provide guidance on potential adaptations needed in order to maximize benefits from the mitigation actions. This program interfaces with the CLEEN technologies program being pursued under the NextGen Environment and Energy Research and Development program.

DOT Strategic Goal - Environmental Sustainability

- Advance environmentally sustainable policies and investments that reduce carbon and other harmful emissions from transportation sources.

Why Is This Particular Program Necessary?

Despite the technological advancements achieved during the last 40 years, aircraft noise still affects people living near airports, and aircraft emissions continue to be an issue at local, regional, and global scales. The NextGen Environment Portfolio is focused on evaluating the environmental performance of the aviation system and developing solutions to mitigate the impacts of aviation on the environment such that we can achieve environmental protection that enables sustainable aviation growth. This program helps demonstrate and quantify system-wide environmental and energy consumption benefits expected from mitigation solutions in the form of advanced aircraft technologies that could lead to optimized trajectories for reduced environmental impact, efficient gate-to-gate operations and in the form of environmental standards, policy and market based measures. It will support development of environmental assessment capabilities and the NextGen Environmental Management System to track and assess environmental performance and provide guidance on additional solutions that could to meet aviation environmental and energy goals.

This program is necessary because we cannot realize the benefits of NextGen unless we address the constraints that are imposed by noise, air pollution, greenhouse gas emissions, and fuel consumption.

How Do You Know The Program Works?

The NextGen Environment Portfolio has had considerable success in advancing the development of noise and emissions reduction solutions, evaluating the environmental performance of the NAS, and in developing the NextGen Environmental Management System. Some of these successes are listed below.

In the area of solution development, the NextGen Environment Portfolio supports the CLEEN Program which has matured ATM-related technologies via ground and flight tests with some technologies already being planned for introduction into the fleet. This program has also supported the development of the N-Collaborative Control concept and its successful demonstrations at Boston Logan Airport. Based on these demonstrations, N-Collaborative Control is set for another demonstration at New York LaGuardia and it is also being examined for its possible integration into Surface Trajectory Based Operations Capabilities. Finally, this program has supported the evaluation of environmental standards. During the ICAO CAEP/9 meeting, which took place in 2013, analyses performed under the NextGen Environment Portfolio were used by the U.S. to inform its decision making about the forthcoming international carbon dioxide standard.

This program is helping to meet the NextGen Concept of Operations requirement to provide a mechanism for integrating environmental protection objectives into decision making. The efforts have been focused on ensuring the Aviation Environmental Design Tool (AEDT), the next generation environmental consequences modeling tool, is available for environmental assessment of the NAS. AEDT version 2a was released in March 2012 and is now the FAA's standard regional noise model replacing the Noise Integrated Routing System (NIRS). The first phase of integrating AEDT with NextGen air traffic models work has been completed with a guidance document being delivered to support operations and environmental modelers in integrating the two modeling domains.

The industry outreach done by the FAA for the NextGen Environmental Management System has identified a strong demand for a formalized mechanism for industry to collaborate and share information on environmental challenges. As a result, the FAA launched an industry/FAA collaborative development program which identified core aviation stakeholders (including representatives from air carriers, airports, manufacturers, and FAA) to work to develop a reward/recognition program that aims to help address complex aviation environmental challenges.

Why Do We Want/Need To Fund The Program At The Requested Level?

$2,500,000 is required for the NextGen Environment Portfolio. This funding level will support deployment of the NextGen Environmental Management system as well as analyses to project progress toward system wide environmental goals. It will also allow for limited efforts to mature ATM-related CLEEN technologies. The remaining funds will be used to assess the environmental benefit of environmental and energy efficient gate to gate operational procedures, aircraft technologies, and aircraft environmental standards.

Detailed Justification for - 1A09 Next Gen – Improved Multiple Runway Operations (IMRO)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Improved Multiple Runway Operations (IMRO)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Improved Multiple Runway Operations (IMRO)	$9,023*	$9,000*	$3,500	-$5,500

*Indicates a comparability adjustment to prior budgert structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Closely Spaced Parallel Runway Operations	---	$2,000.0
B. Wake Turbulence Mitigation for Arrivals	---	1,500.0
Total	Various	$3,500.0

The Improved Multiple Runway Operations Porftolio, as stated in the NextGen Implementation Plan (NGIP), improves runway access through the use of improved technology, updated standards, safety analysis, and modifications to air traffic monitoring tools and operating procedures that will enable more arrival and departure operations. This portfolio supports improving approach and departure operations to closely spaced, parallel, converging, and intersecting runways. For FY 2015, $3,500,000 is requested for use of improved technology, updated standards, safety analysis, and air traffic tools and operating procedures to enable more arrival and departure operations by work performed under the Wake Turbulence Mitigation for Arrivals (WTMA) and Closely Spaced Parallel Runway Operations (CSPO) projects. WTMA advances FAA's progress on the Improved Runway Parallel Runway Operations (Operation Improvement (OI) 102141) of the NGIP.

A. Closely Spaced Parallel Runway Operations (CSPO)

The CSPO project will enhance procedures that allow dependent operations to closely spaced parallel runways or converging approaches to runways closer than 2,500 feet, as well as supporting independent operations to parallel runways between 2,500 feet and 4,300 feet. Funding supports analysis and research to identify potential alternatives such as the application of existing and new technologies to current standards, reevaluation of the applicability of the blunder model assumptions and the use of the model on risk assessments, and the development of new standards to facilitate NextGen applications to include the following:

- Complete site-specific evaluation report for candidate site with the goal of performing fast-time simulations and collecting data via two data collection events (one in the lab and the other on-site)
- Complete enhancements and upgrades to the Modeling and Simulation Tool Suite
- Complete report analyzing and supporting the implementation of the 3,400 ft. stagger and 3,000 ft. offset approach standards
- Finalize Simplified Aircraft-Based Paired Approach (SAPA) Algorithm
- Perform Human-in-the-Loop (HITL) simulations for Paired Approach CAT I procedures

B. Wake Turbulence Mitigation for Arrivals (WTMA)

WTMA-Procedure (WTMA-P) allows reduced wake separations to be applied during instrument landing operations at airports that meet certain closely spaced parallel runway layout criteria. The procedures would be used by controllers in reducing wake separations imposed on aircraft following behind Boeing 757 or Heavy wake category aircraft when landing on an airports set of closely spaced parallel runways (runways less than 2,500 feet apart). The FY 2015 funding will support the operation evaluation of WTMA and requirements for implementation to include the following:

- Conduct airport specific analyses for application of WTMA-P at two additional locations
- Develop WTMA-P ATC procedures and training packages for the two airports
- Validate TAMR ATPA phase 2 adapted software for use at the TRACONS of the two additional airports

What Is This Program?

Desired National Airspace System (NAS) efficiency can only be achieved when the nation's runways are operating at maximum utilization rates, regardless of weather conditions. Enhanced runway access is needed to maximize the use of parallel, converging, and intersecting runways to improve overall capacity at the busiest airports. This will increase the efficiency and capacity of those runways, which in turn will reduce delays. For instance, simultaneous independent approaches to parallel runways spaced less than 4,300 feet apart (without high-update radar) is prohibited during less than Visual Meteorological Conditions (VMC). This is due to an increased risk of collision caused by the potential for an aircraft blundering from one of the approaches toward the aircraft on an adjacent, parallel approach. Throughput to converging and intersecting runways today typically falls short of maximum capacity even in VMC because of the difficulty in gauging relative distances between aircraft and the risk of balked landings.

A. Closely Spaced Parallel Runway Operations

Closely Spaced Parallel Operations (CSPO), which refers to the simultaneous approaches of aircraft pairs to airports with parallel and multiple parallel runways that are closely spaced (runways that are closer than 4,300 feet), has been implemented at several metroplex airports to meet the increased demand. Independent CSPO operations provide the maximum capacity increase while weather conditions are less than visual. But, if High Update Rate (HUR) surveillance is used in conjunction with CSPO, these operations can be used when the runway separation is 3,400 feet, or in some cases, 3,000 feet if one of the approaches is offset from the opposite parallel approach path. In comparison, separation standards for dependent runway operations (separation standards used for a single runway apply) can be used when runways are separated by 2,500 feet or less at a limited number of airports having approval for dependent staggered approaches under specific restrictions. Instrument Meteorological Conditions (IMC) can reduce the airport arrival rate for dependent runway operations by half since aircraft are scheduled on the assumption of good weather and cleared or released based upon current and forecasted weather. Delays and increase in aircraft operating costs are a result of dependent CSPO under IMC.

The CSPO program will provide increased arrival, departure and taxi operations to airports with closely spaced parallel runways in IMC. CSPO will develop the performance requirements that enable the implementation of innovative procedures, tools and/or controller/pilot aids that increase capacity at airports utilizing multiple independent and dependent operations. The research funded by this program is directed towards providing the aircrew with a monitoring capability that mimics the visual monitoring the aircrew uses to self-separate from other aircraft and obstacles, as allowed in VMC operations.

B. Wake Turbulence Mitigation for Arrivals

This program will evaluate air traffic control wake separation decision support tool capabilities and associated prototypes (e.g. ATPA) as possible enablers to safely meet the predicted NextGen demand for capacity to handle additional flights in the nation's air transportation system. If the capabilities demonstrated by the prototypes are evaluated to be beneficial and are incorporated into the terminal automation systems, more flights can be accommodated by existing airport runways and in the existing airspace due to safely reducing the required wake mitigation separations between aircraft. This program is taking the results of technology research and development and new wake separation concept modeling and simulation efforts and evaluating concept feasibility prototypes for flight safety and impact on the NAS capability for meeting the demand for more flights.

The WTMA capabilities, when implemented, will provide an economic boost to the nation's aviation system by restoring part of the airport landing capacity lost when an airport has to change its operation from visual approach operations to instrument approach operations and apply its attendant required wake mitigation separation minima between landing aircraft. High level analyses have indicated that the current air traffic control wake mitigation separations process, aided by technology, can be more capacity efficient while at the same time remaining safe. It is expected that the projects WTMA evaluation and requirements development products will allow a rapid integration of the WTMA capability into the NextGen era FAA automation platforms.

Why Is This Particular Program Necessary?

The IMRO portfolio enables the FAA to improve runway access through the use of improved technology, updated standards, safety analysis, and air traffic tools and operating procedures to enable more arrival and departure operations. Improving runway access will increase efficiency and capacity while reducing delays.

How Do You Know The Program Works?

The IMRO portfolio encompasses the majority of the terminal operation areas and airports within the NAS. CSPO and WTMA efforts will enable the implementation of new capacity enhancing procedures for terminal operations in less than visual conditions. Below are examples of key completed activities that support these procedural changes to improve the overall operations within the NAS.

A. Closely Spaced Parallel Runway Operations

- Analyzed WAAS operations data and simulation(s) using High Update Rate surveillance and RNAV/RNP providing insight into the possibility of reducing the lateral runway spacing
- Finalized the site-specific evaluation effort at Chicago O' Hare (ORD) and delivered a final report
- Acquired High Update Rate , Surveillance Data for future analysis with closely spaced parallel operations
- Developed departure concepts for paired aircraft
- Prepared engineering analysis based on fast-time simulations for triple approaches or operations using three closely spaced parallel runways
- Prepared documentation to revise dependent stagger distances from 1.5nm to 1.0nm for aircraft approaches
- Completed document analyzing Automatic Dependent Surveillance Broadcast (ADS-B) systems application to closely spaced parallel operations

B. Wake Turbulence Mitigation for Arrivals

- Initial feasibility evaluation of the WTMA procedure and supporting decision support tool has been completed using a terminal automation engineering prototyping support system
- A specific wake vortex data collection and analysis of Boeing 757 and heavy wake category aircraft was accomplished at SFO and JFK. The collected data has been used to define what reduction of wake separation could be achieved through the use of the WTMA procedure and supporting ATC decision support tool
- Developed procedures and associated safety analysis to enable use of WTMA by air traffic control at Philadelphia International Airport

Why Do We Want / Need To Fund The Program At The Requested Level?

$3,500,000 is required to continue the execution of work within the Improved Multiple Runway Operations Portfolio. The need for CSPO and WTMA funding at the requested level is to ensure the FAAs external commitments to RTCA Task Force 5 and tier 1 NextGen Advisory Committee (NAC) priorities.

Detailed Justification for - 1A10 Next Gen – NAS Infrastructure Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – NAS Infrastructure Portfolio
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
NAS Infrastructure Portfolio	$42,705*	$25,504*	$13,480	-$12,024

*indicates a comparability adjustment to prior budget structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Weather Observation Improvements	---	$1,500.0
B. Weather Forecast Improvements	---	1,000.0
C. Surface/Tower/Terminal Systems Engineering	---	5,000.0
D. NextGen Navigation Engineering	---	1,000.0
E. New Air Traffic Management (ATM) Requirements	---	4,980.0
Total	Various	$13,480.0

The NextGen NAS Infrastructure Portfolio provides cross-cutting research, development, and analysis of capabilities that have substantial cross-portfolio dependencies and/or legacy NAS Infrastructure cost-effective improvements. For FY 2015, $13,480,000 is requested for:

A. Weather Observation Improvements:
- Conduct operational and technical risk mitigation activities for capability improvements

B. Weather Forecast Improvements:
- Complete transition of an International Civil Aviation Organization (ICAO) compliant Quality Management System (QMS) process to the National Weather Service (NWS)
- Complete US position on ICAO draft Amendment 77 of Annex 3
- Complete ICAO Manual on Meteorological Support for ATM

C. Surface/Tower/Terminal Systems Engineering
- Develop draft AMS-required artifacts for Initial Investment Decision (IID) of the Terminal Work Package 1 (WP1) (e.g., Investment Plan, Requirements, Business Case)
- Complete concept validation activities to update Terminal WP1 AMS artifacts

D. NextGen Navigation Engineering:

- Develop White Paper on Alignment of Strategic and Tactical Issues Associated with NextGen Navigational Challenges

E. New Air Traffic Management (ATM) Requirements
- New Radar Requirements (Surveillance & Weather)
  - Develop high level requirements document for the Multifunction Phased Array Radar (MPAR)
  - Complete update to MPAR Cost Model
  - Information GovernanceGovernance, standard developments an dmediation

What Is This Program?

A. Weather Observation Improvements

This project will manage the evolution of the existing aviation weather observation sensor networks to one that possesses the optimal quantity and quality of ground, air, and space based sensors. A consistent and effective sensor network is fundamental to NextGen. Of primary focus is the surface weather sensor network in the terminal environment. Prior year work assessed the current sensor network capabilities and identified gaps. Technical studies are underway to identify methods to optimized existing ground-based legacy surface platforms, provide improved capability, and allow surface weather measurements to be more universally available. Improvements to the aviation weather-observation sensor network will be a collaborative effort between the FAA and other NextGen partners, including NOAA and the Department of Defense (DoD).

B. Weather Forecast Improvements

This project supports the need to improve ATM decision making during adverse weather conditions and to improve the use of weather forecast information in the transformed NAS. It includes concept development and evaluation for integration of weather information into ATM decision support processes and tools; identification of shortfalls and validation of ATM-Weather integration performance requirements; development of an ICAO compliant QMS for implementation by NWS; and harmonization of aviation weather requirements with the international community (e.g., ICAO, Single European SKY ATM Research (SESAR)). This work supports the implementation of operational capabilities throughout NextGen mid, and far terms.

C. Surface/Tower/Terminal Systems Engineering

This project supports the systems engineering related to separation automation in the Terminal/Tower/Surface domains and will refine and validate Terminal NextGen concepts for improving the efficiency of traffic flow in the terminal area. This program will reduce the risks inherent with introducing new technology and operational procedures using Systems Engineering analysis that examines the integrated use of techniques and equipment necessary to achieve these efficiencies. System engineering will consider the impact on the NAS architecture and the needed changes throughout the product development lifecycle for terminal systems. This project will create specific products for use by the Terminal Services organization as they develop the final system configuration.

Of primary focus is the identification of issues relative to the proposed TRACON automation capabilities as part of a Safety Risk Management activity. The program will refine the definition of proposed concepts and validate them as viable necessary additions to the NAS. Concept engineering activities include analysis, evaluation, and assessments to develop and mature concepts for changes to Terminal/TRACON automation as well as identifying procedure changes needed to support automation change within the TRACON domain. These activities will reduce technical risk, quantify benefits, support alternatives development, and identify safety concerns.

This project will enable operational improvements in the following portfolios: Separataion Management, Improved Multiple Runway Operations, Performance Based Navigation, Time-Based Flow Management, and On Demand NAS.

D. NextGen Navigation Engineering

This project supports increase capacity of the NAS by ensuring that navigation requirements and any potential issues are identified and resolved in two areas:

- Increase and improve use of area Navigation (RNAV) using Distance Measuring Equipment (DME) in the terminal domain: This work will allow expansion of NextGen RNAV benefits to all properly equipped aircraft by using the standalone DME to increase the volume of Class A and Class B airspace. This work addresses any DME infrastructure related issues required to enable PBN. The outcome of this work will result on updates to DME Standard for Usage and associated FAA orders.
- Enable flight operations to lower minimums than currently used for Low Visibility Operations (LVO): This work develop requirements for low visibility operations of less than 1200 feet horizontal visibility

- for landing and takeoff. The outcome of this work will support investment analysis activities for Enhanced Low Visibility Operations (ELVO) Phase III.

This project will enable operational improvements in the following portfolios: Performance Based Navigation, Time-Based Flow Management, Improved Approaches and Low-Visibility Operations, and Improved Surface Operations.

E. New Air Traffic Management (ATM) Requirements

This program identifies new opportunities to improve the efficiency and effectiveness of air traffic management. It supports the NextGen goal of expanding capacity by developing decision support tools that improve the strategic management of operations in the NAS. New ATM requirements will explore the following areas for opportunities:

<u>New Radar Requirements (Surveillance and Weather)</u>: The objective of this effort is to assess Phased-Array Radar (PAR) technology as a viable/affordable alternative that could provide for FAAs weather and surveillance radar needs. It will include identifying the technical challenges, defining requirements for multi-functionality, evaluating cost models, developing technology approaches and proposed solutions, and concept demonstration through modeling and prototyping. The outcome of this body of work will result in a Multi-Function PAR (MPAR) high-level requirements, cost model, and Concept of Operations. This effort will inform an FAA Investment Analysis Readiness Decision (IARD) in Calendar Year (CY) 2015, and Initial Investment Decision (IID) in CY 2016 and will provide the government a greater capability of defining specific requirements for a potential joint radar acquisition in CY 2017.

This work addresses infrastructure cost-effective improvements by assessing the feasibility of phased-array radar technology as replacement of terminal primary surveillance and weather radar.

Information Governance: This project addresses issues that arise when an agency moves from managing and sharing information in a legacy environment, which is controlled through a physical connection, into a network environment, which only requires a simple subscription. This research will identify the shortfalls in moving from data sharing to a network environment including governance and evaluation techniques, criteria for managing standards, and performance monitoring techniques and policies to ensure compliance. After this analysis is complete, the activities will shift to development and implementation of the required capabilities and governance. Information Governance is necessary to ensure the efficient use of FTI and SWIM as conduits of information.

Why Is This Particular Program Necessary?

A. Weather Observation Improvements

Most of the current sensor capabilities in the NAS are based on 1970s-80s technology and have been in the field since that time-period. While the current observation network performs adequately, it is becoming increasingly costly to maintain. Information collected from current sensor platforms is tied to specific missions and not openly available to support new, dynamic weather sensing or advanced forecasting applications. Optimization of today's aviation weather sensor network will not only save agency resources, will provide the opportunity for improved service, while enabling increase safety and capacity. For instance, the currently fielded observation network lacks the capability to resolve and identify many types of precipitation. Especially lacking is the ability to discern the type and intensity of frozen precipitation types. This significantly impacts the efficiency of winter weather and deicing operations. Optimized weather sensing capabilities will support improvements in aviation weather forecasts and alerts that monitor such hazards, enabling increase capacity and safety.

B. Weather Forecast Improvements

Today traffic managers and users must mentally integrate weather, traffic, and airspace information and their potential impact into their decision making. Rules for interpretation and use of today's weather products are generally based on the experience of the user. This results in inconsistent ATM decisions from user to user and/or decisions that are too large-scale or inflexible to respond effectively to dynamically changing weather conditions. Current key decision support tools have limited capabilities when ingesting weather information, thus reducing their effectiveness during adverse weather conditions. Weather Forecast Improvements will address these problems by developing and maturing concepts for ATM-weather integration, while ensuring interoperability in a global environment.

C. Surface/Tower/Terminal Systems Engineering

Terminal operations are a mix of IFR/VFR traffic with aircraft types ranging from airline transport to low-end general aviation. Depending on the traffic demand these Airports in these areas are towered and non-towered. In the future, many of these airports will experience higher traffic demand due to a migration of air traffic to smaller satellite airports in high population areas in the effort to avoid traffic congestion. In addition, there is renewed interest in personal transportation including the increase in personal aircraft for pleasure and business and the emergence of on-demand air taxi services utilizing very light jets (VLJs) and/or Personal Aircraft Vehicles (PAVs).

Inflexible airspace structures, reservations and routes have resulted in the inefficient use of airspace and the airports themselves. The continuing growth of aircraft air and ground movement is projected to exceed the capacity of the system, causing serious delays and gridlock. This requires the need for improved terminal area management.

D. NextGen Navigation Engineering

This work will allow expansion of NextGen RNAV benefits to properly equipped aircraft other than air carriers and high end business jets. This leads to a future where a greater number of operational aircraft can take advantage of RNAV beyond the major carriers. In addition this project provides systems engineering support for new and advanced NextGen navigational concepts. This effort will provide requirements development and an in-depth alignment of tactical and strategic goals, to avoid costly and time consuming issues by providing up front planning and coordination.

E. New Air Traffic Management (ATM) Requirements

This technology research develops requirements for new air traffic management systems to support NextGen measures and NextGen concepts and to determine if these new systems can achieve the targets for 2025; this work have led and do lead to new requirements and concepts that are being mature to enable improvements in areas such as new air traffic control procedures, separation standards and flexible airspace categories to increase throughput.

How Do You Know The Program Works?

A. Weather Observation Improvements

The combination of optimized weather observations, improved forecasts, and translation into direct airspace constraints, will allow users to identify the best routes to fly for their aircraft type, flight plan, and flying preferences, and for traffic flow management to optimize the airspace capacity given the weather constraints and demand.

Concepts for an optimized terminal sensor network were demonstrated in a laboratory environment and are currently being evaluated in the field at the Atlantic City International Airport to assess the technical and operational risk and identify risk mitigation activities. These demonstrations were successful and allowed for a prioritization of existing shortfalls with winter weather as the top priority. On going work supports the tech transfer into the NAS of mature R&D in the area of winter weather by defining requirements and a concept of operations for this capability.

B. Weather Forecast Improvements

Capacity will be enhanced through better integration of weather information in the operational decision making. The combination of optimized weather observations, improved forecasts, and translation into direct airspace constraints, will allow users to identify the best routes to fly for their aircraft type, flight plan and flying preferences, and for traffic flow management to optimize the airspace capacity given the weather constraints and demand. ATM-Weather integration needs and shortfall was completed, and one weather translation technique (i.e., Convective Weather Avoidance Model) was developed and tech transferred in support of TFMS (i.e., CATM WP2, CATM WP4).

C. Surface/Tower/Terminal Systems Engineering

The activities conducted in support of Terminal Work Package development will reduce technical risk, quantify benefits, support alternatives development, and identify safety concerns. Progress so far includes completion of the Shortfall Analysis and Concept of Use for the Terminal work package 1.

D. NextGen Navigation Engineering

Previous effort has resulted in enhancements to low visibility operations down to CAT II level (greater than or equal to 1200 feet RVR). This effort will address low visibility operations below 1200 RVR for landing, roll out, and initial taxi. This effort will also address any DME infrastructure issues to enable PBN, and have completed an initial review of potential governance changes required for stand-alone DME and new terminal airspace definition.

E. New Air Traffic Management (ATM) Requirements

- Establish an international standards for future communication (AeroMAC)
- Requirements for trajectory modeling developed for existing technology transitioned into the NAS
- Conduct demonstration and analysis of the MPAR alternative Backend architecture. Complete final report of the demonstration results
- Conduct demonstration and analysis of the MPAR alternative Antenna architecture. Deliver Concept of Operations and Requirements Document for Airborne SWIM

Why Do We Want/Need To Fund The Program At The Requested Level?

$13,480,000 is required to continue execution of work within the NAS Infrastructure Portfolio as follows:

- Weather Observation Improvements - Provide for system engineering directed at optimizing the terminal weather surface sensor network
- Weather Forecast Improvements - Meet ICAO recommendation by implementing a QMS process, and as the responsible agency for United States (US) meteorological decisions, prepare and coordinate the US position on ICAO Amendment 77 (2016)
- Surface/Tower/Terminal Systems Engineering - Enable the TRACON environment to keep pace with the continuing growth of air and ground aircraft movement which is projected to exceed the capacity of the current system. Exceeding capacity in the system will likely cause serious delays and gridlock. Terminal automation capabilities must evolve to support the mid-term concepts (Segment Bravo) for the Next Generation Air Transportation System and this funding will support the evolution

Detailed Justification for - 1A11 Next Gen – Support Portfolio at WJHTC

What Is The Request And What Will We Get For The Funds?

FY 2015 –Support Portfolio at WJHTC
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Support Portfolio at WJHTC	$30,137*	$25,094*	$13,000	-$12,094

*indicates a comparability adjustment to prior budget structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. NextGen Laboratories - WJHTC	---	$9,000.0
B. Operational Assessments - Performance	---	4,000.0
Total	Various	$13,000.0

This Porfolio is not directly in the NextGen Implementaiton Plan, but rather is an extract from The StakeHolder and Performance BLI. For FY 2015, $13,000,000 is requested for:

A. NextGen Laboratories at WJHTC

The NextGen Laboratories at WJHTC includes the NextGen Integration and Evaluation Capability Laboratory and the Florida Testbed.

NextGen Integration and Evaluation Capability Laboratory:
- Install upgrades and enhancements to NextGen Integration and Evaluation Capability (NIEC), which will further support new NextGen concepts and technology
- Integrate the Traffic Flow Management (TFM) Auxiliary Platform into the NIEC, a platform with the ability to manipulate TFM data onto the Traffic Situation Displays (TSDs)
- Integrate Traffic Management Advisor and Traffic-Based Flow Management (TBFM) data feeds with Distributed Environment for Simulation, Rapid Engineering, and Experimentation (DESIREE) and Target Generation Facility (TGF) at the NIEC laboratory, in order to receive and simulate data to evaluate NextGen technologies
- Provide support services for the NIEC infrastructure and computer systems required for human-in-the-loop simulations for NextGen System Implementation Plan portfolios
- Support operations, maintenance, and engineering

Florida Testbed:
- Establish Multi-Test Bed infrastructure to support real time Inter-Test Bed NextGen simulations and demonstrations
- Implement additional network security infrastructure and other core support services, including data archiving and playback, to support the growing demonstration, safety, and security needs that will be determined in consensus by FAA stakeholders through Test Bed governance and policies
- Leverage and connect to laboratories and other capabilities from industry partners
- Support Test Bed operations, maintenance, and outreach activities

B. Operational Assessments - Performance

- Update NextGen cost estimates, benefits estimates, and the overall NextGen business case
- Publish an updated NextGen Business Case document
- Evaluate the operational performance impacts of NextGen technologies and procedures, and publish an annual report
- Develop document assessing data requirements for display on the NextGen Performance Snapshots (NPS) website
- Maintain and update the NextGen Segment Implementation Plan to aid the planning and deployment of NextGen portfolio in the mid-term timeframe

What Is This Program?

A. NextGen Laboratories at WJHTC

NextGen Integration and Evaluation Capability (NIEC) Laboratory: The NIEC is a facility located at the William J. Hughes Technical Center (WJHTC) in Atlantic City, New Jersey. It serves as a research center to support the exploration, integration and evaluation of NextGen concepts through simulation activities. The NIEC provides a real-time, NextGen-capable environment that allows early evaluations, concept development, and demonstrations.

This program will continue to explore integration, development, and operations analysis capabilities. Systems will be integrated to support human-machine studies, and will measure and validate human performance, usability, workload and safety indications. The program will include the development and validation of prototypes and analysis capabilities, which will support the definition of NextGen requirements while researching possible solutions to challenges posed by integrating NextGen technology.

Florida Testbed: The NextGen Test Bed supports the integration of new and emerging technologies into the national airspace system through demonstrations, evaluations and testing. These activities cultivate government and industry partnerships through collaboration. One of the main purposes of the Test Bed is to provide an open-access location for industry users and vendors, so new capabilities can be more rapidly harnessed. The Test Bed will also support integrated tests and large-scale modeling and simulation.

During FY 2014, this Test Bed/Demonstration Site program will continue building upon the infrastructure and systems established in prior years. More specifically, the Florida NextGen Test Bed, located at the Daytona Beach International Airport (DAB) in Florida, will be enabled to interact with other key sites, including NASA NTX, located near the Dallas/Fort Worth Airport (DFW), and WJHTC located near Atlantic City, NJ.

B. Operational Assessments - Performance

The Operational Assessment project will support NextGen implementation by performing analyses in two areas: Systems Analysis and NextGen Performance Snapshots.

Systems Analysis will prepare quantitative estimates of the anticipated operational benefits of the NextGen capabilities, through the mid-term and for the entire investment life-cycle; cost estimates for the overall NextGen portfolio, to include aircraft equipage costs; an integrated business case for NextGen, combining the costs and benefits to determine the return on investment (for society at large as well as individual stakeholder groups); and quantitative assessments of the operational impacts of fielded NextGen components as they become available. NextGen is a complex set of technologies, processes, procedures, and policies, the execution of which is being managed by a large number of program offices from within the FAA. Each of these program offices will conduct detailed studies to support their specific activities, but, to coordinate these efforts, there must be an integrated assessment of the expected costs and benefits, and actual operational performance, of the connected activities included in these programs.

The NPS website was created to provide post-implementation performance information at 21 Metroplexes, as well as at selected airports and airspace. It is a reporting tool designed to show whether progress has been made at specific locations after the implementation of NextGen programs. Performance measurement is based on key variables (i.e. capacity, efficiency, predictability, access, safety and environment). The website responds to the concerns of the GAO to increase transparency and to show how the goals of the FAA (Expressed in Destination 2025) are aligned with actions and commitments listed in the NextGen Implementation Plan. NPS will show how operational increments implemented at specific locations, and eventually across the NAS, have contributed to improvement in key NAS operational performance areas once they are deployed.

Why Is This Particular Program Necessary?

Prior to the implementation of full-scale operational NextGen capabilities, the FAA requires environments for the design, development, integration, evaluation and demonstration of future NextGen concepts and technologies. These facilities provide a platform for new NextGen demonstrations to be quickly and efficiently conducted at an early stage without affecting NAS operations. This reduces risk and overall costs by enabling the FAA to evaluate the viability of new technologies at a safe location before making further investments and decisions on potential implementation in operations.

Performance Analysis will prepare quantitative estimates of the anticipated operational benefits of the NextGen portfolio, through the "mid-term" and for the entire investment life-cycle; cost estimates for the overall NextGen portfolio, to include aircraft equipage costs; an integrated business case for NextGen, combining the costs and benefits to determine the return on investment (for society at large as well as individual stakeholder groups); and quantitative assessments of the operational impacts of fielded NextGen components as they become available. While advanced concepts provides higher efficiency levels in air traffic control and identifies the new role for controllers as more responsibility shifts to the flight crew.

How Do You Know The Program Works?

A. NextGen Laboratories at WJHTC

NextGen Integration and Evaluation Capability Laboratory: Since its beginning, the NextGen labs have been a resource for expediting the integration of new technologies that make the aviation system better. This laboratory allows early evaluations, concept development, and/or demonstrations in a real-time environment without being encumbered by the present structure of the NAS. This project supports development and reconfiguration of a laboratory environment to assess NextGen technologies and concepts in an integrated environment.

Florida Test Bed: The program works because it has provided an environment for many NextGen early-stage tests to be conducted. Over nine NextGen demonstration activities across several NextGen portfolios have been conducted at the Florida NextGen Test Bed. These activities have produced data and initial results that show the feasibility of the concept or technology, helped identify potential benefits, and potentially helped refine concepts before making further investments and decisions on their eventual implementation in the NAS. In addition, through experience with conducting these demonstrations since its inception, the Test Bed has been able to increase capabilities, operations, and efficiencies for the benefit of future activities.

B. Operational Assessments - Performance

This project supports modeling and model enhancements which are necessary to understand and explain the environmental and monetary benefits of NextGen, both in the past and in the future. This is necessary to support informed decision-making, both internal to the FAA and externally for our stakeholders. The activities have supported the annual publication of the NextGen Implementation Plan with updated cost and benefits analysis. On the FAA website, it makes available the annual NextGen Performance Assessment and quarterly updates to NextGen Performance Snapshots (NPS) website to the public.

Why Do We Want / Need To Fund The Program At The Requested Level?

$13,000,000 is required to continue execution of work within the NextGen Support Portfolio. The NIEC and Florida NextGen Test Bed provide a robust platform where early-stage NextGen concepts can be integrated, demonstrated, and evaluated. Partnerships with industry are key to the mission of the FTB, where industry, airlines, cargo carriers, other Air Navigation Service Providers (ANSPs) and academia have the opportunity to work in a joint effort with the FAA to help advance NextGen technologies. The site provides the FAA and industry an agile environment for the rapid integration of new and emerging technologies, prototypes and applications into existing or planned NAS systems.

In addition, operational assessments support the transition to NextGen by providing comprehensive assessment of its systems performance. It also supports NextGen benefits modeling and cost benefit data collection efforts.

Detailed Justification for - 1A12 Next Gen – Performance Based Navigation (PBN) and Metroplex Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – Performance Based Navigation (PBN) and Metroplex Portfolio ($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Performance Based Navigation (PBN) and Metroplex Portfolio	$42,640*	$34,451*	$25,500	-$8,951

*indicates a comparability adjustment to prior budget structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Optimization of Airspace and Procedures in the Metroplexes (OAPM) and NextGen Safety (PBN)	---	$18,500.0
B. Navigation Procedures Implementation Plan (NAV LEAN)	---	6,000.0
C. Integrated National Airspace and Procedures Planning	---	1,000.0
Total	Various	$25,500.0

The Performance Based Navigation (PBN) and Metroplex Portfolio, as stated in the NextGen Implementation Plan, is addressing ways to leverage emerging technologies, such as satellite-based Area Navigation and Required Navigation Performance, to improve access and flexibility for point-to-point operations. This portfolio consists of three activity tasks: Optimization of Airspace and Procedures in the Metroplexes (OAPM) and NextGen Safety (PBN) in the implementation phase, Navigation Procedures Implementation Plan (NAV LEAN) in the implementation phase, and Integrated National Airspace and Procedures Planning in the pre-implementation phase. For FY 2015, $25,500,000 is requested to provide for the following:

- Complete analysis and studies, through established OAPM Study Team processes, at four Metroplex locations (e.g., Chicago, Memphis, Cleveland/Detroit, and Boston) focusing on expedited integrated PBN procedure development coupled with airspace design to optimize benefits
- Based on the output of the earlier analysis and study stage, begin OAPM design work at four Metroplex locations (Memphis, Cleveland/Detroit, Chicago, and Boston) Begin OAPM pre-implementation/evaluation activities at four Metroplex locations (South/Central Florida, Chicago, Cleveland/Detroit, and Phoenix)
- Establish standardized databases, software and data formats in support of the Navigation Procedures Implementation Plan (NAV Lean) initiative, which will accelerate OAPM projects and NextGen by improving efficiency and production time for all Instrument Flight Procedures (IFPs)
- Establish and implement a Web-based request and access portal as the fixed entry point for all IFP requests and/or inquiries
- Establish a systematic approach for NAS wide airspace procedure criteria development to support the "Best Equipped – Best Served (BEBS)" Concept of Operations
- Provide modeling, reports, safety studies and Document Change Proposals that maximize PBN/RNP benefits in the NAS

A. Optimization of Airspace and Procedures in the Metroplex (OAPM) and NextGen Safety (PBN)

Funds will be used for the Study Phase activities at four Metroplex locations (e.g., Chicago, Memphis, Cleveland/Detroit, and Boston) as well as Design, Implementation, and Post-Implementation activities planned for all 13 OAPM teams including the continued implementation of OAPM deliverables in the Metroplex that were recommended by the RTCA Task Force 5. In response to RTCA's recommendations and the NAC's prioritization list in 2013, funds will be used to conduct studies, to compile and assess data from select sites, perform environmental analyses, conduct human in the loop simulations, and provide performance metrics and assessments of the proposed and implemented procedures and airspace changes. Using the results of these studies and analyses, Design and Implementation Teams will integrate airspace and procedure design to optimize operations at select Metroplex sites based on the information provided by the studies. OAPM work also includes procedural design and implementation in the high altitude structure to improve Metroplex ingress/egress to and from a given site as well as efficiency between sites.
With optimized airspace and procedures, additional safety analysis will need to be performed. All changes to the National Airspace System (NAS) require safety analyses and documentation. Funding will be used to increase efficiency in the NAS by updating and developing guidance material such as Orders, Notices, and Advisory Circulars to optimize performance. The guidance material will provide industry and Aviation Safety (AVS) field offices information to safely implement/certify new technologies and develop more efficient flight procedures, improving safe operation within the NAS.

The funding will update standards to better accommodate modern aircraft capabilities. Funding will also be used to study and implement improvements to PBN separation standards for en route operations.

Additional analysis will look at new tools for improved operations such as advanced RNP. Funding in FY 2015 will continue to provide safety risk analysis and studies, flight simulation and data collection. Using the information from the data collection and analysis, updates to PBN instrument flight procedure criteria and guidance materials will begin, with estimated completion by 2015.

B. Navigation Procedures Implementation Plan (NAV Lean)

In response to an RTCA Next Generation (NextGen) Mid-Term implementation Task Force Report (TF-5) recommendation to identify and solve operational approval and certification issues that may impede adoption and acceleration of NextGen capabilities, the FAA initiated a cross-agency Navigation Procedures project to streamline policies and processes used to implement Instrument Flight Procedures (IFP). This initiative, headed by Aviation Safety (AVS) and the Air Traffic Organization (ATO), used the "Lean Management Process" to identify waste and to develop a set of detailed recommendations to improve and streamline the processes used for developing and implementing IFPs.

This Navigation Procedures Implementation Plan (NAV Lean) was published in June, 2011, and contained 21 recommendations to streamline the IFP development process. Full implementation of NAV Lean is estimated to be complete in 2015. Funding will consolidate/upgrade portions of NAV Lean involving the current databases that will support an authorized Web-based portal to manage all IFP requests as the entry point into a system for processing, tracking, and managing the IFP development life cycle.

Certain NAV Lean recommendations and specific activities that will be funded include:

- Recommendation 6: Provide access to, and mandate use of, a single set of data for all IFP providers
- Recommendation 7: Allow electronic transfer of data
- Recommendation 8: Standardize software and data formats
- Recommendation 18: Establish and implement a Web-based request and access portal as the fixed entry point for all IFP requests and/or inquiries

C. Integrated National Airspace Design and Procedure Planning

For the investment, this program would provide modeling, reports, safety studies and Document Change Proposals that maximize PBN/RNP benefits in the NAS as well as development to support the BEBS Concept of Operations. Development of new PBN elements will provide additional capacity, efficiency and access gains to those properly equipped to use the procedures. This effort will enhance requisite aircraft equipage for the FAA to realize the full cost saving potential of NextGen due to increased utilization of NextGen ATM tools and less mixed equipage complications.

What Is This Program?

A. Optimization of Airspace and Procedures in the Metroplex (OAPM)

The Airspace Optimization Group will integrate airspace design and associated activities, including traffic flow analysis and facilitated design and procedures optimization. This will lay the framework for accelerating PBN initiatives, taking a systems approach for airspace design and procedure implementation. Airspace and procedure integration provides an important systems view that: utilizes additional transition access/egress points not tied to ground-based navigation aids; considers concurrent development and implementation of arrivals and departures, ensuring an integrated approach to procedural optimization; decouples operations between primary and secondary/satellite airports serviced by complex terminal airspace; and develops high altitude routes through congested airspace better connecting major metropolitan areas. Implementation of RNAV and RNP routes and procedures will continue to address the RTCA Task Force 5 recommendations, maximizing benefits, and accelerating NextGen concepts.

Airspace redesign and procedure development will be accomplished with a Metroplex focus, targeting specific Metroplex areas that have been designated as high priority using quantitative and qualitative metrics. Results from Study Teams will be used to implement those improvements yielding the highest benefits and lead to design work that will include analyses and simulations, assessments of alternatives, and modeling of projected airspace and procedures benefits. The program integrates the safety requirements, through all phases of implementation, to ensure successful implementation.

B. Navigation Procedures Implementation Plan (NAV Lean)

NAV Lean will allow participants in the process to obtain up-to-date information concerning an IFP status, exchange information with other system users, and will provide an archive function and audit trail. This system will also serve as a gateway to the consolidated databases required for IFP design and development, applicable publications, and forms and templates. Consolidation and standardization of the databases will provide improved data integrity and improved process management. Use of this system will facilitate early screening of requests to ensure completeness and prioritization of requests, and will provide transparency for users. It will also promote and ensure that safety, airspace, operational approval, and environmental aspects are all considered early in the process. Use of this common portal will also facilitate the early recognition of potential requirements for new or modified criteria.

C. Integrated National Airspace Design and Procedure Planning

The objective of this program is to develop criteria for innovative Performance-Based Navigation (PBN) procedure elements. New elements will enhance the toolset for new PBN procedures to utilize advance aircraft navigation performance for fuel-efficient procedures in low-visibility conditions. This would also allow FAA to develop procedures for those aircraft with the navigational system accuracy and the flight performance to comply with traffic management efforts to maximize the use of airspace capacity.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments

Why Is This Particular Program Necessary?

Optimization of Airspace and Procedures facilitates an operationally integrated view of NextGen implementation. The OAPM will expedite delivery of key efficiencies for the nation's busiest metropolitan areas. OAPM will help to address the major operational issues faced in today's Metroplexes: flow congestion, inefficient routing and altitudes, airports in close geographical proximity, and other limiting factors such as environmental constraints. Through OAPM, we are implementing new routes and procedures that leverage emerging aircraft navigation capabilities, including PBN, and redesigning airspace to improve flight efficiency. The implementation of these procedures includes the safety oversight of the procedures themselves, and the approval of aircraft and operators to conduct these procedures.

NAV Lean Implementation of the future IFP process is expected to significantly reduce the average time required to implement IFPs and will position the FAA to meet the increased demand for instrument flight procedures that are the cornerstone for NextGen. Achieving this optimal future process and all of its benefits will require full implementation of all recommendations.

How Do You Know This Program Works?

A. Optimization of Airspace and Procedures in the Metroplex (OAPM)

In September of 2010, the FAA initiated two "prototype" study teams for the Washington, DC and North Texas metropolitan areas. Those prototype study teams were used to exercise the study team approach and provide lessons learned to be considered as the full initiative began in early 2011. Leveraging the study team approach at those two sites, the Optimization of Airspace and Procedures in the Metroplex initiative is expected to be a multi-year activity that will have addressed 13 Metroplex areas when completed. An expedited timeline has been implemented at the Houston Metroplex as part of the White House Infrastructure Jobs Initiative.A compressed schedule was supported with additional staffing resources and a streamlined approach for the permitting process and should result in an earlier implementation of these Performance Based Navigation (PBN) procedures and airspace changes when compared with the prototype Metroplexes resulting in the delivery of the associated benefits sooner than the baseline timeline. The lessons learned and best practices learned from the prototype and the Houston sites will be applied to the rest of the OAPM sites for their processes betterment. Additionally the positive reaction and high usage levels by the airline partners to the implementation of independent utility PBN procedures in the Washington Metroplex demonstrated the high desire and support of the Industry for this optimization initiative.

B. Navigation Procedures Implementation Plan (NAV Lean)

The abbreviated amendment process for RNAV STARs enabled by NAV Lean resulted in the amending of 35 sample procedures by April 2013. The abbreviated amendments took an average of 20 days to publish after submission to AeroNav Products compared to the standard 174 day process. Additionally, TARGETS reference software was validated for compliance with RNAV STAR design criteria and allows some procedures to go from the Flight Procedure Team (FPT) direct to Quality Assurance (QA), bypassing the standard 45 day Development Branch process. A key step towards approving TARGETS developed STAR output for electronic transfer of data to AeroNav Products procedure production database. As a result of the NAV Lean effort, guidance on preparing focused, concise and timely Environmental Assessments (EA) is also integrated into OAPM and other PBN projects, enabling expedited instrument flight procedure development.

C. Integrated NAS Design and Procedure Planning

- Complete efforts related to new criteria to expand the use of RNP in lower visibility
    - RNP Established to Simultaneous Independent Parallel runways (4,300 – 9,000 feet)
    - RNP Established to Simultaneous Independent Parallel Triple runways (5,000 feet+)
    - RNP Established to Simultaneous Independent Widely Spaced Parallel runways without Monitors (9,000 feet+)
- Initiate the development of the safety case and criteria for use of these procedures when the airport runways operation is in dependent mode
- RNP Established to Simultaneous Dependent Parallel runways (4,300 – 9,000 feet runways can be used as a dependent operation when the ATC FMA position is closed or high speed radar is unavailable)

Why Do We Want/Need To Fund The Program At The Requested Level?

$25,500,000 is required to fund key operational efforts that serve as the foundation of the transition to NextGen. Funding will allow for expedited development and implementation of PBN procedures, while ensuring safety. Funding for NAV Lean is imperative to fulfill expectations of FAA stakeholders.

Recommendations include a streamlined version of the current core process (request, design and development, approval, implementation and maintenance); auxiliary processes (Safety Management System (SMS), environmental and operational approval); and data base consolidation (inability to electronically transfer data efficiently). A reduction in the requested level of funding will delay the delivery of these necessary procedures, thereby slowing implementation of NextGen capabilities at a number of high-priority Metroplexes. It will also reduce the FAA's ability to process aircraft and operator applications to conduct PBN operations, resulting in application delays and deferred benefits.

Executive Summary – Facilities and Equipment, Activity 2

What Is The Request And What Will We Get For The Funds?

The Facilities and Equipment (F&E) Activity 2 program is requesting $1,585,683,000 for FY 2015, an increase of $148,293,390 above our requested FY 2014 level. The Activity 2 funding request is needed for the following programs:

- $578,362,000 is requested for NextGen technologies, tools, and systems;
- $1,007,321,000 is requested for legacy systems, buildings, infrastructure, and sustaining a safe infrastructure adequate for ATC services in the NAS.

The funding for Activity 2 programs and initiatives is used for modernization of air traffic control facilities, systems, and equipment. We support infrastructure upgrades, system replacements, and technology refresh at manned and unmanned facilities to sustain:

- Ground-based radar
- Communications
- Automation
- Navigation
- Landing
- Other ATC systems and support equipment

The FY 2015 Budget for Facilities and Equipment includes two main priority areas, which are predominantly funded in Activity 2. NextGen is a priority, but the second priority, which is unfortunately sometimes overlooked, is sustaining the current systems that NextGen is built on. FAA has a multi-billion maintenance backlog for 12 programs areas included in the NAS Sustainment Strategy. As outlined below, funding the programs in this strategy will improve and maintain the facility condition index ratings at FAA facilities that provide the backbone for the NAS, and by extension, the backbone of NextGen. FAA is seeking enough funding to finish completing new towers and TRACONs under construction, but it is not propsing any new towers in this Budget. Rather, FAA is focused on improving conditions at existing facilities and strengthening its analysis to ensure faciliites in most dire need of replacement are the ones that get new facilities. The NAS Sustainment Straetgy BLIs are showng in Table 1.

Table 1: NAS Sustainment Strategy

BLI	BLI Name	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request
2A05	ARTCC Building Improvements/Plant Improvements	40,751	45,160	63,700
2A08	Air Traffic Control En Route Radar Facilities Improvements	5,591	5,900	5,100
2B06	Terminal Air Traffic Control Facilities - Replace	64,900	69,000	29,800
2B07	ATCT/Terminal Radar Approach Control (TRACON) Facilities - Improve	20,364	48,229	45,040
2B09	NAS Facilities OSHA and Environmental Standards Compliance	24,640	21,000	43,501
2E01	Fuel Storage Tank Replacement and Monitoring	6,255	8,700	15,500

2E02	Unstaffed Infrastructure Sustainment	17,058	20,000	32,300
2E06	Facilities Decommissioning	4,738	6,500	5,700
2E07	Electrical Power Systems - Sustain/Support	68,897	68,075	102,000
2E08	Energy Management and Compliance (ECM)			1,000
3A01	Hazardous Materials Management	20,000	18,500	22,000
3A10	Mobile Assets Management Program	1,700	3,000	4,000
	Totals	**274,894**	**314,064**	**369,641**

NextGen also relies on the delivery of the key foundational programs by 2015. The Budget includes funding for the following NextGen Foundational Programs:

- Automatic Dependent Surveillance Broadcast (ADS-B) Baseline Services and Applications will continue utilizing performance based service fees for ADS-B infrastructure owned and operated by the prime contractor. Implementation continues for Airport Surface Surveillance Capability (ASSC) sites and NAS-wide deployment of Ground Interval Management – Spacing (GIM-s). The national deployment of over 630 stations will be complete in April 2014, and FY 2015 funds the service fees for ADS-B.
- ERAM - Funding is requested for the completion of the Core En Route Automation Modernization (ERAM) program in addition to funding for ERAM System Enhancements and Technology Refreshment that will introduce new capabilities under a NextGen Mid-Term acquisition baseline.
- TAMR – Key sites will be complete by 2015, and the FY 2015 Budget funding will be used to accomplish Operational Readiness (ORD) at Dallas and Initial Operating Capability (IOC) at a fifth site for Segment 1 and Initial Operating Capability (IOC) at five sites, site preparation activities at ten sites, installation of hardware at twelve sites, and the procurement of hardware for thirty systems for Segment 2.

The following NextGen program has been transitioned out of Activity 1 pre-implementaiton work and is requesting funding for the implementation phase for the first time in Activity 2:

- The Data Communications Program (DataComm) has transitioned to Activity 2 from Activity 1 in the FY 2015 Budget Submission. DataComm received the Final Investment Decision (FID) for Segment 1 - Phase 1: Tower Services, on May 30, 2012. FY 2015 funding will enable the initial deployment of the DataComm Network Service (DCNS) to the tower key sites. Deployment for Tower Data Link Service (TDLS) will take place and operational telecommunications links will be procured.

Additional key outputs that will be delivered with the requested in the Budget include:

- The NextGen Weather Processor (NWP) program will establish a common weather processing platform that will functionally replace the legacy FAA weather processor systems and host new capabilities and will allow for the decommissioning of the legacy systems. The funding requested will allow the program to begin solution development, complete a preliminary design review, and maintain convective weather prototype operations.
- Navigational and Landing Aids will fund more than 60 individual projects to complete work that has been initiated and will provide funding for 83 new procurements.
- Major focus of the WAAS program will be on the 5th GEO satellite payload development, upgrading the WAAS Telecommunications Subsystem (TCS) and operationally deploying the equipment. 100 WAAS procedures are planned for development and flight inspection in FY 2015.
- Funding is requested to address Runway Safety Area (RSA) projects of varying size and complexity that are identified for completion prior to December 31, 2018. The funding being requested will allow the procurement of NavAids systems and the completion of approximately 75 RSA improvements. RSA compliance provides a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and aircraft damage.

What Is This Program?

Activity 2 supports major systems acquisitions and facilities infrastructure programs in the implementation phase. These programs and initiatives fund the procurement and modernization of air traffic control facilities and equipment, including all funding related to the acquisition of air traffic control facilities, navigation and landing aids, surveillance equipment and facilities, automation systems, and communications systems and equipment. Activity 2 programs provide funding for control equipment and agency-owned aircraft that are used for flight inspections and other activities.

With this funding, we continue to ensure that current operational facilities and equipment deliver reliable and accurate services until investments in new technologies are ready to deliver the operational improvements needed for enhanced safety and future growth.

Over the past five years, FAA has met the following goals:
- Operational Availability for the nation's busiest airports
- Daily airport capacity
- Major acquisition system cost and schedule performance

Typical Activity 2 programs include:

- Upgrades to existing equipment
- Acquiring production systems to replace existing systems, extend serviceable life, or technically refresh system components
- Deploying systems for installation or transition to operational status
- Deploying new, satellite-based technologies such as Automatic Dependent Surveillance-Broadcast (ADS-B) and Wide Area Augmentation Systems (WAAS)
- Deploying communications infrastructure to provide surveillance and navigation services;
- Replacing or modernizing manned and unmanned ATC facilities
- Replacing or modernizing automation, communications, navigation, surveillance/weather infrastructure, systems, and equipment
- Decommissioning and disposal of the systems and facilities that have been replaced

Activity 2 efforts contribute to the following DOT Strategic Goals:

- Safety: Reduction in transportation-related injuries and fatalities
- Economic Competitiveness: Maximum economic returns on transportation policies and investments
- Environmental Sustainability: Reduced transportation-related pollution and impacts on ecosystems

Why Is This Particular Program Necessary?

These programs are necessary to modernize and sustain the NAS, as well as provide the foundational infrastructure, technologies, and capabilities required for the NextGen System. The demands for ATC services expected by the year 2020 will be constrained unless targeted investments in system upgrades and new technologies are implemented. At the same time, we must develop the standards, procedures, and safety protocols needed for implementing these investments.

Aviation is a major driver of our nation's economy, impacting all sectors of business and directly contributing $1.3 trillion and 11 million jobs to the U.S. economy. A vibrant aviation system, supported by a high-performance aviation infrastructure, increases capacity at our large metropolitan airports, improves access to small and remote communities, meets passenger demand for travel, supports a thriving tourist industry, and enables strong American business development.

How Do You Know The Program Works?

The procurement and modernization of the nation's air traffic control system was first highlighted in 1980 with the publication of the first NAS Modernization Plan. Since that time, we have replaced old technologies with new generation systems that perform required functions better and more efficiently. During this period, aviation services were extended to new, small and medium-sized localities through the expanded deployment of updated air traffic control technologies, equipment, and infrastructure at these locations. We have efficiently operated and maintained these services through increased funding in Activity 2 programs and initiatives.

We have met most of the cost and schedule goals for the programs within Activity 2. Lessons that were learned during the deployment of ERAM were applied to TAMR Phase 3 and prompted FAA adjustments in the areas of schedule formulation, testing processes, and user expectation management. Activity 2 programs also contribute to the success of other Flight Plan metrics, including runway incursion reduction, ATC system operational availability, and NAS on-time arrivals.

Why Do We Want / Need To Fund The Program At The Requested Level?

We are funding at the requested level to minimize risk to our near-term NextGen deliverables. In addition, we are funding other, non–NextGen investments at levels that enable us to sustain ATC safety and services expected by the public, the military and other stakeholders.

Detailed Justification for - 2A01 En Route Automation Modernization (ERAM)

What Is The Request And What Will We Get For The Funds?

FY 2014 – En Route Automation Modernization (ERAM)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
En Route Automation Modernization (ERAM)	$141,468	$66,800	$10,500	-$56,300

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
ERAM	---	$10,500.0

For FY 2015, a total of $10,500,000 is requested for ERAM activities.

The deployment for ERAM is to complete all site Initial Operating Capability (IOC) milestones by the end of FY 2014. Last site Operational Readiness Date (ORD) would occur in FY 2015. Through FY 2013, the ERAM program has achieved a total of 17 IOCs and 11 ORDs at Air Route Traffic Control Center (ARTCC) sites. The remaining three sites are targeted for IOC in FY 2014 and all sites will ORD by the second quarter of FY 2015.

During FY 2013 sequestration impacted the ERAM deployment. More significant than the F&E budget sequestration was the impact on the availability of operational personnel at the field facilities to test and deploy ERAM software releases. As a result, many operational milestones that were planned to be achieved during FY 2013 were deferred to FY 2014 and the overall waterfall deployment of ERAM was extended by approximately seven months.

The funding is required to support the identification, analysis, and development of software changes needed by each site and site implementation to complete the ERAM waterfall schedule. Planned implementation activity supports limited to extended air traffic operations and continuous operations to achieve site ORD. Specific activities include: system engineering analysis of all Problem Reports (PRs) and Change Requests (CRs) generated by the sites; prioritization of the PRs, CRs and allocation of the software fixes into software builds that will be incrementally developed, integrated and tested prior to release to the operational sites. The program continues to follow the processes, procedures, and governance described in the approved ERAM Improvement Plan.

What Is This Program?

The En Route Automation Modernization (ERAM) System replaces the 40-year-old En Route HOST Computer System used at 20 FAA air route traffic control centers around the country. This is the main computer system air traffic controllers use to guide airplanes flying at high altitudes. Air traffic control towers, terminal radar approach control facilities, the Air Traffic Control System Command Center, flight service stations, and other agencies such as the Department of Homeland Security and the Department of Defense, all connect to and use the information managed by the En Route HOST Computer System.

ERAM will serve as the infrastructure hub for future automation capabilities to be deployed from the NextGen portfolio. During FY 2012 and FY 2013 ERAM developed software functionality to support the upcoming IOCs of the Airborne ReRoute (ABRR) and Ground Interval Management – Spacing (GIM-S) capabilities. This software development was funded from those programs, outside of the ERAM CIP budget line. ABRR work is funded out of the Separation Management Portfolio (BLI 1A05). GIM-S is funded under ADS-B (BLI 2A13).

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The ERAM system is the foundation of the FAA air traffic control (ATC) environment. The system receives processes, coordinates, distributes, and tracks information on aircraft movement throughout the domestic and international airspace. The ERAM system is the key to the FAA's ability to implement new services, concepts, and traffic flows to users.

While the revised ERAM deployment will occur over FY 2011 - FY 2015, the program has installed and accepted the system hardware at all 20 ARTCCs.

How Do You Know The Program Works?

ARTCC	IOC Date	ORD Date	Status
Salt Lake City(ZLC)	18 June 2009	23 March 2012	ORD Complete
Seattle(ZSE)	17 Sept 2009	23 April 2012	ORD Complete
Denver (ZDV)	23 December 2011	19 December 2012	ORD Complete
Albuquerque (ZAB)	30 December 2011	27 December 2012	ORD Complete
Minneapolis (ZMP)	30 December 2011	04 January 2013	ORD Complete
Chicago (ZAU)	7 January 2012	15 March 2013	ORD Complete
Oakland (ZOA)	28 January 2012	24 September 2013	ORD Complete
Los Angeles (ZLA)	28 January 2012	18 March 2013	ORD Complete
Houston (ZHU)	14 April 2012	30 April 2013	ORD Complete
Kansas City (ZKC)	6 October 2012	4 April 2013	ORD Complete
Boston (ZBW)	28 October 2012		Continuous Operations
Indianapolis (ZID)	13 October 2012	28 August 2013	ORD Complete
New York (ZNY)	10 November 2012		Limited Operations
Cleveland (ZOB)	13 January 2013		Continuous Operations
Washington (ZDC)	23 February 2013		Limited Operations
Memphis (ZME)	2 March 2013		Continuous Operations
Fort Worth (ZFW)	14 September 2013		Continuous Operations
Miami (ZMA)	22 January 2014		Limited Operations

*Above information is current as of February 26, 2014.

The baseline ERAM system has been installed at all 20 CONUS ARTCC sites. Plans call for two additional sites to achieve initial operating capability (IOC) by the end of FY 2014, Atlanta (ZTL), and Jacksonville (ZJX). ORD at all 20 sites is planned to be completed by the end of the second quarter FY 2015.

Why Do We Want / Need To Fund The Program At The Requested Level?

The ERAM system is needed to replace the current HOST system and allows the FAA to continue to provide the high level of safe, reliable air traffic control services that the nation has come to expect; and also puts in place the infrastructure necessary to transition the NAS to NextGen. Additionally, the existing Host

Computer System hardware and software would have to be maintained long beyond its expected service life, which may impact the Agency's ability to provide the quality of existing air traffic control services to its users.

Detailed Justification for - 2A02 En Route Automation Modernization (ERAM) System Enhancements and Technology Refresh

What Is The Request And What Will We Get For The Funds?

FY 2015 – En Route Automation Modernization (ERAM) - System Enhancements and Technology Refresh
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
ERAM System Enhancements and Technology Refresh	$9,477	$35,000	$45,200	+$10,200

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks

	Locations/ Quantity	Estimated Cost ($000)
A. Segment 1 (ERAM System Enhancements and TR)		
a. Program Management	---	$4,000.0
b. System Engineering	---	3,000.0
c. Software Development	---	26,200.0
d. Hardware Prototyping	---	7,000.0
Total	Various	$40,200.0
B. Segment 2 (ERAM Sector and Oceanic Enhancements)		
a. Program Management	---	$1,500.0
b. System Engineering	---	200.0
c. Proposal Activities	---	1,000.0
d. Sector Enhancement Prototyping	---	2,300.0
Total	Various	$5,000.0

Background

The FAA's approach to enhancing the En Route environment is to introduce enhancements in two segments, the "ERAM System Enhancements and Technology Refresh" (segment 1) and the En Route Modernization" (segment 2). Each segment has its own investment analysis and decision timelines. The FAA achieved a Final Investment Decision for "ERAM System Enhancements and Technology Refresh" in September 2013. The FAA plans an Investment Analysis Readiness Decision in June 2014 and a Final Investment Decision in June 2015 for the next investment, called En Route Sector Enhancements.
The budget request for the ERAM System Enhancements and Technology Refresh excludes functionality necessary to complete the waterfall deployment of the core ERAM program, which was enacted in the Facilities and Equipment (F&E) appropriation in FY 2014 and prior years. The requested ERAM System Enhancements in this budget line item (BLI) provide enhancements and capabilities above and beyond core ERAM functionality. The System Enhancements address needs identified by users of ERAM after it was deployed and operational.

Funding for segment 1, "ERAM System Enhancements and Technology Refresh", will also support a Technology Refresh, because many of the ERAM components, which were procured in as early as 2006, require planning for long lead times for procurement and deployment to the NAS to address End of Life (EOL) and End of Service (EOS) issues associated with hardware and Commercial Off-the-Shelf (COTS) software, deployed during the original ERAM baseline.

FAA has transitioned focus from the narrowly defined D-Position Upgrade scope to "ERAM Sector Enhancements investment". This is because the anticipated scope of work under the program involves improvements in the en route environment, it is not restricted to the D-Position as the previous name implies.

A. ERAM System Enhancements and Technology Refresh

For FY 2015, $40,200,000 is requested for ERAM System Enhancements and Technology Refresh (Segment 1). This funding will be used for high priority enhancements identified during the core ERAM deployment and necessary technology refreshment.

B. ERAM Sector Enhancements

For FY 2015, $5,000,000 is requested for ERAM Sector Enhancements investment and enhancements to the Ocean 21 platform. The supporting activities for this investment include system engineering, system design, and prototyping.

ERAM Sector Enhancements investment will be a multi-year effort to improve the efficiency and effectiveness of En-Route operations by facilitating increased strategic and tactical cooperation between the Radar Controller position (R-Position) and the Radar Associate position (D-Position) with similar tool set, that may be tailored for either position. It will support enhancements throughout the en route environment to improve the delivery of air traffic services.

What Is This Program?

A. ERAM System Enhancements and Technology Refresh

The baseline ERAM program is scheduled for last site Operational Readiness Date (ORD) by the second quarter of 2015. The System Enhancements and Technology Refreshment (Segment 1) effort enhances the core ERAM system. System engineering activity to select high priority enhancements and technology refreshment started in FY 2013. Software development and equipment deployment for this Segment is planned to start in FY 2014, and activities will continue through FY 2017 (i.e. ERAM software release 5 and beyond).

B. ERAM Sector Enhancements

This activity provides software and hardware enhancements for the En Route environment to include oceanic operations. This program will improve trajectory modeling, enhance conflict probe processing, detection, interface, and accessibility, provide additional data management capabilities, and leverage ICAO 2012 Flight Plan data, among other improvements.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

A. ERAM System Enhancements and Technology Refresh

As air traffic levels and the need to allow more fuel efficient flight profiles increase, the Air Traffic Controllers' ability to maintain safe aircraft separation becomes a limiting factor, often resulting in the imposition of airspace structures and traffic restrictions that limit airspace capacity utilization. The ERAM System Enhancements and Technology Refresh effort (Segment 1) will improve the usability of the ERAM system to support air traffic management thus providing a more robust and capable platform.

The program will specifically focus on:

- High priority ERAM site system enhancements that are based on needs identified by ERAM users as they gain experience operating the system
- Qualification and purchase of ERAM hardware components identified as at or nearing end of life/end of service/end of maintenance

B. ERAM Sector Enhancements

Deficiencies in the aircraft trajectory modeler inhibit expanded use of trajectory-based capabilities in the en route environment. Additionally, improvements in conflict probe accuracy and availability are needed to enable NextGen capabilities and ensure effective separation management operations in a mixed equipment environment. Further, the increase in data available to controllers requires a more integrated and efficient means to depict and use this data. Finally, additional flight data will be capitalized upon to maximize trajectory accuracy and use.

How Do You Know The Program Works?

A. ERAM System Enhancements and Technology Refresh

The primary objective of this program is to improve the usability of the ERAM system based on user experience with the deployed system. Improvements in the efficiency and effectiveness of air traffic management and reduction in operational errors are expected outcomes of this investment. The program will establish specific measures to assess improvements in user experience upon completion of the September 2013 Final Investment Decision (FID). Similar to the core ERAM effort, the primary performance metrics are anticipated to be related to site operational and acceptance events such as IOCs and ORDs of the ERAM releases containing System Enhancements or Technology Refresh items.

B. ERAM Sector Enhancements

This activity will build upon the deployed systems to harness their full potential for operational effectiveness. Many of these capabilities have been prototyped in research and development under NextGen Solution Set Programs and proven to provide tangible positive operational results.

Why Do We Want/Need To Fund The Program At The Requested Level?

The core ERAM system will be operational at all 20 CONUS Air Route Traffic Control Centers (ARTCCs) by FY 2015. The ERAM System Enhancements and Technology Refresh program (Segment 1) is critically needed to increase user acceptance of the system by improving its usability. It will also refresh equipment that is in critical need of technology refresh. Lack of enhanced automation assistance in ERAM will impact the ability of Air Traffic personnel to handle traffic growth without increasing restrictions and delays.

The **ERAM Sector Enhancements** improve trajectory management to improve air traffic management efficiency and effectiveness and reduce the potential for operational errors. Additionally, the current ERAM and Ocean 21 infrastructure will not fully accommodate an interface and/or integration with other FAA Enterprise Architecture elements (Data Communications S1P2 Full Set of capabilities, Aeronautical Information Management, Tower Flight Data Manager, Traffic Flow Management, International, Oceanic, and Weather). This activity will address these NextGen priorities.

Detailed Justification for 2A03 En Route Communications Gateway (ECG)

What Is The Request And What Will We Get For The Funds?

FY 2015 – En Route Communications Gateway (ECG)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
En Route Communications Gateway (ECG)	$2,938	$2,200	$6,600	+$4,400

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Equipment Replacement and Program Support Services	---	$5,800.0
B. In-Service Engineering	---	800.0
Total	Various	$6,600.0

For FY 2015, $6,600,000 is requested to provide for the following:

A. Equipment Replacement and Program Support Services – Replace ECG Interface Processor, Magma Chassis, Intelligent Communications Adapter (ICA) cards and Random Access Plan Position Indicator (RAPPI) hardware

- The current ECG Interface Processor hardware is the Sun Fire 280R Server that has been at the end of service since January 2010. It needs to be replaced to accommodate new ICA cards that will use the newer Peripheral Component Interconnect Express (PCIe) bus standard
- Magma Chassis is an integral part of the ECG interface processors. It provides an extension to the Peripheral Component Interconnect (PCI) bus in the base interface processor unit, allowing for installation of additional interface cards. It needs to be replaced to accommodate the new ICA cards that will use the newer PCIe bus standard
- The Intelligent Communications Adapter (ICA) cards allow for connection of external interfaces such as from radar and weather systems to Host/ERAM through ECG. The current ICA cards are a custom build item with only enough spares to last until mid-way through 2015 at current failure rates. The RAPPI PCs are obsolete and in need of replacement
- Program Support services provides assistance with Operational Analysis (OA), Sustainment Technology Evolution Plan (STEP), Reliability Maintainability Availability (RMA) for the ECG Program, which help measure performance and cost of ECG operational assets against an established baseline and identify evolution opportunities, best alternatives, and the best solutions to maintaining and evolving the ECG technical baseline

B. In-Service Engineering provides immediate response to emerging technology solutions

What Is This Program?

The En Route Automation Programs provide automation infrastructure improvements at the 20 high-altitude centers in the continental U.S. Five interdependent projects comprise the program: En Route Communications Gateway (ECG); Host and Oceanic Computer System Replacement; En Route System Modifications; En Route Enhancements; and En Route Automation Modernization (ERAM). These automation systems provide the foundation for FAA's air traffic control system.

The ECG system, which replaced the aging Peripheral Adapter Module Replacement Item (PAMRI), is fully operational nationwide. The ECG system was procured using commercial-off-the-shelf (COTS) products. The performance gap is the short life-cycle associated with COTS products, which require more frequent technology refreshes. The ECG program allows the FAA to monitor, maintain, and evolve the ECG system to take advantage of technical advances.

The program office developed the ECG Sustainment and Technology Evolution Plan (STEP) to document the multi-year approach to maintaining the viability of the ECG system. This approach to sustainment and technical evolution combines purposeful, ongoing monitoring for obsolescence or evolution opportunities with proactive planning to identify the best alternatives and the best solutions to maintaining and evolving the ECG technical baseline.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

ECG replaced the aging PAMRI system. The benefits of ECG over PAMRI are improved efficiency, capacity, and safety by providing controllers with newer, faster, and more capable technology.

More importantly, ECG is necessary to provide the flight/surveillance data necessary for the new En Route Automation Modernization (ERAM) system in support of Air Traffic (AT) operations. ECG uses standardized interfaces and commercial operating systems that facilitate ERAM and allow the addition of EBUS as well as recently implemented interfaces with Flight Data Input/Output (FDIO), Surveillance and Broadcast Services (SBS)/Automated Dependence Surveillance – Broadcast (ADS-B) and system Wide-Area Multilateration (WAM) at Denver ARTCC (ZDV) without architectural changes to meet mission needs and strategic goals. ECG is easily upgraded to support emerging programs and adaptations.

How Do You Know The Program Works?

The ECG Operational Availability (OA) Report measures the performance of the ECG investment against an established set of cost, schedule, and performance parameters. The OA provides metrics associated with monitoring the fielded system performance. The results and recommendations of this report can benefit existing services provided by the ECG system as well as enhancing the capabilities of the ECG system to support emerging needs. The report covers all operationally fielded ECG systems, and spans the period from the first ECG site declaring Operational Readiness Demonstration (ORD) through March 31, 2013. This represents 1,436,184 hours of continuous ECG operation.

- The ECG system has experienced no operational outage to date, and as such has achieved an Operational Availability of 1
- Most Line Replaceable Units are experiencing failure rates well within their performance expectations

The ECG system is meeting and exceeding the benefits estimated in the ECG Investment Analysis Report and continues to be the Preferred Solution.

Why Do We Want/Need To Fund The Program At The Requested Level?

The current funding level is required to provide technology refresh and maintain the ECG systems to support integration of ERAM. A robust and operational ECG system is required to field ERAM and other future systems. If funded at less than the $6,600,000 level, the program office would be unable to sustain the listed hardware components.

Failures of the Magma Chassis extension to the Interface Processors can lead to possible loss of Surveillance and or Inter-facility data that is provided to the HOST and ERAM for air traffic control.

Detailed Justification for - 2A04 Next Generation Weather Radar (NEXRAD)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Next Generation Weather Radar (NEXRAD)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Next Generation Weather Radar (NEXRAD)	$3,127	$4,100	$7,100	+$3,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. NEXRAD Product Improvement (NPI)	---	$850.0
b. Procure Technology Refresh Hardware	---	210.0
c. Contract Support	---	750.0
d. Procure Radio Video Processor Replacement (SLEP)	---	3,530.0
e. Test/Implement Signal Processor Replacement (SLEP)	12	530.0
f. Initialize Facility SLEP Activities	---	500.0
g. Finalize In-Flight Icing Product Validation (MIT/LL)	---	730.0
Total	Various	$7,100.0

For FY 2015, $7,100,000 is requested to support National Weather Service's (NWS) NEXRAD Service Life Extension Program (SLEP) and technology refresh planning and procurement efforts. The FAA funding share for NEXRAD Product Improvement (NPI) is an annual requirement as established in the Tri-Agency Memorandum of Agreement (MOA) between the Department of Transportation (FAA), Department of Defense (USAF), and NWS.

The NEXRAD Service Life Extension Program (SLEP) received a Final Investment Decision (FID) on September 19, 2012.

What Is This Program?

NEXRAD is a long-range weather radar that detects, analyzes, and transmits weather information for use by the ATC System Command Center, en route, terminal and flight service facilities. NEXRAD products and services are processed by FAA's Weather and Radar Processor (WARP), Integrated Terminal Weather System (ITWS), and the Corridor Integrated Weather System (CIWS).

The Office of Management and Budget (OMB) directed NEXRAD to be a joint program between Departments of Transportation, Defense, and Commerce, with National Weather Service as the lead. It is supported under an MOA between these three agencies. The MOA was renewed in January 2012, for a period of 10 years. NEXRAD FAA requirements are documented in WSR-88D System Specification Document Number 2810000H, dated 25 April 2008.

Originally installed between 1990 and 1996 with an economic service life of twenty years, there are currently 160 operational NEXRAD systems in the United States and overseas, jointly operated and maintained by the Tri-Agency partners. By FY 2015 the average age of NEXRAD will have reached the end of its economic life. A major SLEP will be required to extend NEXRAD's service life to 2030, when it can be replaced by a newer technology, such as the Phased Array Radar.

The NEXRAD SLEP has four main purposes:

- Along with its Tri-Agency partners, the FAA will provide support for product improvements to the legacy NEXRAD program in accordance with the MOA. In addition to annual cost-share requirements for NPI Science Evolution and infrastructure support, the FAA will be required to fund its pro rata share of allocated technology refresh costs
- The FAA will contribute its pro rata share of the overall cost of the NEXRAD SLEP effort. NEXRAD's obsolete radar video processor will lose vendor support after 2015, and will be the first SLEP activity undertaken. The other radar components that need to be refurbished include the radar transmitter and the radar pedestal. These three SLEP activities will be managed by the Radar Operations Center (ROC), and managed by the NWS
- In support of SLEP, the FAA will refurbish NEXRAD physical facilities, which includes most of their towers, radomes, access roadways, and shelters. These SLEP projects will be managed by the NEXRAD Program Office, with coordination through the Service Areas (Western (11 NEXRAD sites) and Eastern (one NEXRAD site))
- The FAA will continue to invest in FAA-specific algorithms that improve NEXRAD weather products for use in aviation applications. In parallel with the recently concluded acquisition of Dual Polarization technology for their NEXRAD platforms, the NEXRAD program has been developing algorithms that use Dual Polarization products to discern and display in real time, incidences of in-flight icing and hail

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

NEXRAD, a Tri-Agency program between DOT/FAA, the DOD/USAF, and DOC/NWS share developmental costs in proportion to the number of systems fielded by each agency. The FAA's NEXRAD SLEP will represent the vehicle by which the FAA contributes its share, and this program ensures that FAA dollars are applied wisely, and in a manner that maximizes the NEXRAD's benefit to the aviation community. The NWS is the lead agency responsible for the overall coordination of the development and implementation of the system upgrades. NEXRAD detects, processes, and distributes for display, hazardous and routine weather information.

The FAA owns and operates 12 NEXRADs, located in Alaska (seven), Hawaii (four), and Puerto Rico (one). Technical upgrades are necessary to enhance NEXRAD and provide air traffic control (ATC) with weather detection capabilities to improve safety by detecting and characterizing hazardous weather phenomena. NEXRAD will reach the end of its economic service life beginning in 2014, and will require a major SLEP if it is going to remain in operation until 2030, and beyond.

The FAA's NEXRAD SLEP program will provide the means to fund the FAA's share of the overall NEXRAD mission, and to ensure that FAA priorities are included in the planning for NEXRAD sustainment and improvement.

NEXRAD systems have increased aviation safety with the accurate and timely detection of hazardous aviation weather conditions. Weather related arrival and departure delays have been reduced, thus allowing aviation fuel consumption savings. While Dual Polarization technology, which provides a two dimensional view of precipitation, has been utilized in the commercial weather radar community for over 20 years, it is only now being introduced onto the NEXRAD platform. Dual Polarization will only provide incremental improvements in overall data quality over the present day NEXRAD but the introduction of the in-flight icing and hail detection algorithms will provide features that enhance aviation safety and detection of weather conditions while aircraft are aloft.

How Do You Know The Program Works?

NEXRAD has been successfully operating in the CONUS, and in the NAS, since 1996.

The Dual Polarization acquisition contract, which was managed by the NWS, employed an acquisition life-cycle approach that is much like the FAA's Acquisition Management System (AMS). Furthermore, contract performance is tracked through a rigorous Earned Value Management System (EVMS), which ensures effective tracking of contractor performance against the program's cost and schedule milestones. Although dual-polarization has been in operation for a short time, and deployments are still ongoing, anecdotal reports about the dramatic improvement in data quality have been received from every site that has been upgraded.

NEXRAD SLEP is predominately a hardware and facilities refurbishment program, which will be managed by the same organizations that have been maintaining NEXRAD over its first twenty years of life. Most of the equipment SLEP will be performed organically by the ROC, or let out to contractors who are intimately familiar with NEXRAD. The facility SLEP activities will be managed by the Service Areas, which are fully knowledgeable in the sustainment and refurbishment of NEXRAD's physical facilities.

Massachusetts Institute of Technology/Lincoln Laboratories (MIT/LL) has a long history of success in developing algorithms for the FAA's NEXRAD and TDWR programs, and preliminary results from their development work on other Dual Polarization radars shows considerable promise. MIT/LL's current development efforts are closely managed by the NEXRAD Program Office, utilizing the support services of senior subject matter experts, who ensure that these efforts are aligned with FAA's mission and primary goals.

Why Do We Want/Need To Fund The Program At The Requested Level?

$7,100,000 is required to fund the FAA's continuing commitment to NEXRAD sustainment and product improvement, in accordance with the Tri-Agency MOA. The MOA, originally implemented in 1980, was renewed in January 2012 for a 10-year period. The MOA, which is essentially a contract among the participating members of the Tri-Agency, was signed by the FAA's VP of Technical Operations.

A funding reduction will impact the NEXRAD Program Office's ability to continue the level of project oversight and subject matter expertise that has made the program work successfully to date. Reduced funding could threaten the FAA's ability to fulfill existing tri-agency requirements related to SLEP, technology refresh, and NEXRAD Product Improvement.

Detailed Justification for - 2A05 ARTCC Building Improvements/Plant Improvements

What Is The Request And What Will We Get For The Funds?

FY 2015 – ARTCC Building Improvements/Plant Improvements
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
ARTCC Building Improvements/Plant Improvements	$40,751	$45,160	$63,700	+$18,540

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. ARTCC Facility Modernization and Sustainment	---	$60,900.0
B. In-Service Engineering	---	2,800.0
Total	Various	$63,700.0

Air Route Traffic Control Center (ARTCC) modernization is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. For FY 2015, $60,900,000 is requested to continue Air Route Traffic Control Center (ARTCC) modernization and sustainment projects. Major construction projects will replace obsolete plant equipment and provide improved work areas. These projects will include asbestos abatement, replacement of mechanical/electrical systems, and the installation of fire detection and protection upgrades as well as interior architectural construction. All facilities will also receive smaller mission sustainment projects to mitigate the risk to operations associated with infrastructure failures. An additional $2,800,000 is requested for in-service engineering activities.

Specific mission critical and local sustain projects will also be accomplished at each facility to replace obsolete equipment and infrastructure in order to support the air traffic control mission, operation of the facility, and maintain the facility in an acceptable condition. En Route Facilities developed the FY 2015 and the out-year facility maintenance project prioritization using a methodology and approach consistent with the current Air Traffic Control Facilities (ATCF) project prioritization model. The FY 2015 budget was developed by the evaluation of critical facility factors including: direct operational requirements, safety factors, indirect operational requirements, FCI value per site, facility seismic factors. In addition, facility-specific operational requirements such as: employee safety, physical security, mission criticality, environmental requirements, and risk factors were important factors in determining which projects should be funded with the requested funding.

Major Modernization projects planned for FY 2015 include:

Construction
- Control Wing Basement (CWB)/Major Mechanical Systems (MMS)- Boston ARTCC and Albuquerque ARTCC
- Building Automation Controls System Replacement projects - Houston ARTCC and Albuquerque ARTCC
- Administration Wing Seismic Remediation - Anchorage ARTCC
- M-1 Room Build Out - Miami ARTCC
- M-1 Room Reconfiguration – Los Angeles ARTCC

Design
- CWB/MMS – Washington ARTCC, Los Angeles ARTCC, Atlanta ARTCC, Salt Lake ARTCC, Cleveland ARTCC, Oakland ARTCC. and Seattle ARTCC

- Building Automation Controls System Replacement – Cleveland ARTCC, Kansas City ARTCC, Oakland ARTCC, Indianapolis ARTCC, and Anchorage ARTCC.

Below is a brief description of the major modernization projects:

Control Wing Basement – CWB
This project renovates portions of the control wing basement. It primarily consists of replacing old and obsolete mechanical and electrical systems throughout the control wing necessary to support the NAS equipment located in these areas. Existing fire detection and suppression systems will be maintained, and modified as necessary. Architectural finishes will be maintained, and will be replaced as necessary to restore areas that have not been maintained/ restored when NAS systems have been previously removed. Structural and architectural upgrades will be provided to meet current building codes. Upon completion of this project, the space will continue to be in use to house NAS systems.

Major Mechanical
This project rebuilds or replaces the ARTCC chillers and cooling towers along with associated mechanical systems such as piping, pumps, fans, filters, and controls

Seismic Remediation
This project includes Seismic remediation which will bring the project areas up to current design standards. Work includes seismic bracings and attachment for equipment, ductwork, light fixtures, ceiling, as well all necessary demolition of existing building systems and finishes to conduct the structural upgrades, and restoration of those systems and finishes upon completion of the structural work

Mod 4 (Phase II) - M-1 Room Build-out
This project continues the renovation / modernization of the old operations control room begun under the Mod 4 Phase I M-1 Demo project. Where the Phase I project demolished and removed old obsolete systems and finishes, as well as abated asbestos and other hazardous materials located in the project area, Phase II prepares the space for administrative and operations support use, by installing necessary architectural finishes, along with the mechanical, electrical systems, fire detection and suppression systems, as well as structural and architectural upgrades necessary to meet current building code requirements. Upon completion of this project, the space is ready to be occupied and used by facility personnel.

Building Automation Controls System Replacements
This project replaces the existing Direct Digital Control Systems (DDCS) that monitors and controls the facility environmental systems, such as heating, ventilation, air conditioning equipment, chillers, cooling towers, pumps, air handlers, and computer room air conditioners, as well as monitoring water leak detection systems. The new "BACnet" replacement system will be an open communication standard protocol that was developed by ASHRAE, specifically for building automation and control networks. This project will provide standardization of Building Automation Control Systems at all FAA En Route Facilities.

What Is This Program?

This is a multi-year facility modernization and sustainment program that addresses physical plant requirements for the FAA's 21 ARTCC's as well as the Combined Center Radar Approach Control (CERAP) facilities at San Juan and Guam. These facilities were originally constructed approximately 50 years ago and expanded in phases since then. Much of the plant equipment within these buildings has exceeded its' life expectancy and must be replaced. This program replaces obsolete equipment and provides an efficient, reliable and safe work environment for en route air traffic control operations.

Generally, the ARTCCs are standard facilities, meaning that each location requires very similar modernization projects. The ARTCC Modernization Program is primarily composed of 14 standard projects that are implemented at all facilities. Currently nine of the 14 projects are complete. While the remaining four projects are not projected to be complete until the early 2020s, much of the equipment that was installed in the early phases of this program is beginning to reach its lifecycle. Funding at the requested level is required to address remaining projects and keep pace with an increasing amount of equipment replacements that will be required in the upcoming years to avoid impacts to air traffic control operations.

To provide the suitable amount of space and equipment necessary for operational needs, many of these standard projects have required significant hazardous materials remediation (e.g. asbestos, polychlorinated biphenyl (PCB) contaminated transformer oils, lead paint mold, etc.) as well as significant structural and architectural work. The work is also necessary in order to meet the various applicable building code and FAA standards in effect at the time each project is executed. The electrical and mechanical equipment installed during these projects has a typical life span of 15 to 20 years. Since this is an ongoing facility sustainment program, the equipment installed during these projects must eventually be replaced. For example, project 14, the CWB and MMS project, includes the replacement of mechanical equipment that has become obsolete since it was installed during projects 9 and 10, which were completed between 1985 and 2000 and have reached the end of their service life.

The execution period and average cost for each of the 14 standard projects are presented in Table 1.

Table 1:
ARTCC En Route Facilities 14 Standard Major Mod Projects

No.	Project	First Site Completion Date	Last Site Completion Date	Average Cost Per Site ($M)
1	Mod 1	Aug-85	Sep-91	1.31
2	Mod 2 (Only at 2 sites: ZTL and ZLC)	Jun-01	Jun-05	2.19
3	Mod 3	Apr-89	Mar-01	5.58
4	Mod 4 (ongoing)	Mar-03	*2014**	6.25
5	AWR1 (Auto Wing Basement/1st Floor and Host Room)	May-92	Oct-00	3.47
6	AWR2 (Auto Wing 2nd Floor and Attic (ongoing)	Oct-91	*2014**	2.89
7	Power Service Building	Jul-89	Jul-98	4.21
8	Fire Protection Backbone	Dec-92	Aug-01	0.78
9	Chiller 1	Aug-86	Apr-95	1.66
10	Cooling Tower Replacement	Aug-85	May-00	1.26
11	Chiller 2	Jul-96	Dec-03	1.49
12	Administration Wing Rehab (Only at 1 site - ZMA)	Aug-02	Jan-07	12.03
13	Administration Wing Mini-Mod	Mar-06	May-11	4.10
14	CWB and MMS (ongoing)	Feb-11	*2019**	7.45

* *Italicized dates are projected completion dates*

Table 1 is a presentation of the 14 standard major modernization projects that are accomplished at most ARTCC's. It provides the overall start date and completion date of the project for all facilities, and the average cost of the project on a site basis.

In-service engineering allows for immediate response to emerging technology solutions. Funding is needed for ongoing engineering support of all prototyping efforts.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The ARTCC Plant Modernization program is necessary to support Air Traffic Control (ATC) operational requirements, to reduce the risk of ATC delays caused by infrastructure failures, and to minimize future capital liabilities associated with infrastructure failures. These facilities and much of the mechanical and electrical equipment within them are approximately 50 years old. Many of the systems have exceeded their life expectancies and are at risk of failure. For example, in June 2001 smoke from a kitchen fire at the Cleveland ARTCC required an evacuation of the control room resulting in the loss of ATC capability for 16 minutes over 65,000 square miles. Fifty flights were delayed and all en route traffic was routed around the Cleveland airspace. In FY 2005 alone, there were eight catastrophic occurrences of pipe ruptures which could have similarly affected operations. At the Washington ARTCC, plastic sheeting had to be draped over air traffic control positions to continue operations during one such occurrence. Roof leaks, pipe failures and malfunctioning heating, ventilation and air conditioning (HVAC) equipment can also contribute to mold growth and adversely affect the health of employees within these facilities.

The presence of asbestos fireproofing continues to pose a risk to maintenance personnel and significantly increases costs associated with maintenance or repair activities. Fire protection systems must be added in some areas of the buildings to meet building codes and structural upgrades are also necessary at ARTCC's in seismic areas.

How Do You Know The Program Works?

Over the past seven years this program has been able to reduce the national backlog by approximately $30 million. The associated reduction in out-year capital liabilities is approximately $120 million. Operations risks have been mitigated by focusing sustain projects on the most crucial failure modes. Personnel and life safety risks have been reduced through asbestos abatement and fire protection projects. Indoor air quality and mold risks have been reduced through roofing, piping and HVAC projects. Space utilization has been improved by providing more efficient configurations in office areas.

Why Do We Want/Need To Fund The Program At The Requested Level?

A reduction in funding would result in increased risk of infrastructure failures that could affect ATC Operations, and increased OPS liabilities associated with the backlog infrastructure failures. Funding reductions will result in increasing the deferred maintenance backlog and further degrading the condition of the facilities, increasing the risk to operations and potentially increasing the facilities operations budget in the event of failure of equipment where replacement has been deferred.

Detailed Justification for - **2A06 Air Traffic Management (ATM) – Traffic Flow Management (TFM)**

What Is The Request And What Will We Get For The Funds?

FY 2015 – Air Traffic Management (ATM) – Traffic Flow Management (TFM)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Air Traffic Management (ATM)	$20,565	$13,800	$5,729	-$8,071

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. ATM-TFM Infrastructure Technology Refresh	---	$629.0
B. ATM-TFM Remote Site (or Field Site) Technology Refresh	---	3,000.0
C. In-Service Engineering	---	2,100.0
Total	Various	$5,729.0

For FY 2015, a total of $5,729,000 is requested for this line item and will fund the following:

- $629,000 is requested to perform system test, installation, and continue deployments of replacement hardware for the Traffic Flow Management (TFM) Processing Center (TPC), also referred to as the TFM System (TFMS) Core, at the William J. Hughes Technical Center (WJHTC), the Disaster Recovery Center at Mt. Weather, and the Computer Sciences Corporation developmental laboratories
- $3,000,000 is requested for the TFM Remote Site Technology Refresh to conduct engineering analysis, site surveys, and the procurement of additional spares for the TFM Remote Site (also called field) hardware to keep the remote sites operational until a full Technology Refresh can be funded
- $2,100,000 is requested for in-service engineering activities

What Is This Program?

The TFMS is the automation backbone for the Air Traffic Control System Command Center (ATCSCC) and the nationwide Traffic Management Units that assist the ATCSCC in strategic planning and management of air traffic. TFMS is the nation's primary source for capturing and disseminating flight information across the aviation community. The automation and communication mechanisms provided by the TFMS support the decision-making process used to adjust flight schedules and/or routes as necessary. When the National Airspace System (NAS) is impacted by severe weather, congestion, and/or outages, the TFMS has unique capabilities to predict chokepoints and facilitate the collaboration and execution of mitigation initiatives with stakeholders, using common information displays and tools, to minimize NAS delays.

A. ATM TFM Infrastructure Technology Refresh will:

- Provide a replace-in-kind technology refresh of the hardware used for the TFM Processing Center (TPC), also referred to as TFMS Core, at the WJHTC. This hardware provides the central data processing capability for the TFMS.

B. TFM Field (or remote) Site Technology Refresh will:

- Provide a replace-in-kind technology refresh of the TFMS hardware used by the Traffic Flow Managers in the field, at over approximately 87 TFM equipped FAA facilities around the country including Air Route Traffic Control Centers (ARTCCs), Terminal Radar Approach Control Facilities (TRACONs), Air Traffic Control Towers (ATCTs), ATCSCC, FAA Regional Offices, FAA test facility located at WJHTC and Prime TFM vendor test facilities.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The FAA must maintain mission-essential TFM operations at approximately 87 ATC facilities. The TFMS provides direct mission support to the FAA by ensuring efficient flow of air traffic through the NAS. TFMS is a major NAS system and the primary tool used by Traffic Flow Units in the field.

Currently the TFMS hardware is no longer produced and will not be supported by the hardware vendor after 2014. The TFM system exceeds the current hardware specifications and as a result, is experiencing performance degradation. Performance degradation forecasts have not taken into account the planned Collaborative Air Traffic Management Technologies (CATMT) Work Packages (WP) 2 and 3 functionality which will utilize the same hardware. There is an added risk that the increased utilization due to the additional functionality will accelerate performance degradation. The TFMS technology refresh improves performance by replacing the hardware providing the central data processing capability for the TFMS. This technology refresh maintains operational availability, avoids hardware obsolescence, and avoids increased cost of maintenance and performance degradation.

How Do You Know The Program Works?

The TFMS technology refresh is a hardware replacement of the TFMS Infrastructure (TFMS Core) and Remote Sites equipment to avoid obsolescence, system performance degradation and avoid impact on other programs. The TFMS performs today and provides benefits through the CATMT applications to improve capacity to minimize avoidable delays. By replacing aging equipment, this refresh activity avoids hardware obsolescence, system performance degradation and contributes to maintaining overall operational availability within the National Airspace System (NAS), thus enabling the TFM system and CATMT capabilities to continue providing benefits.

Due to the deployment of TFM CATMT WP 1 enhancements after 2005, the percentage of flights with "Inequitable Delays - Fraction of Flights with the Highest Delay (defined as a delay at least three times the median value of all delays) has been reduced from two percent in FY 2005 to one percent in FY 2009*, the last year data were available.

*Metrics and Analysis report performed by Flatirons Solutions, Inc. (November 2009).

Why Do We Want/Need To Fund The Program At The Requested Level?

$5,729,000 is required to conduct engineering analysis and purchase additional spare hardware for the remote sites as well as continue the technology refresh installation activities for the TFM Processing Center at WJHTC. TFMS is the platform for the NextGen CATMT enhancements. If funding is not provided, the ability to maintain today's system will be at risk as well as the ability to support the deployment of NextGen and CATMT capabilities.

Detailed Justification for - 2A07 Air/Ground Communications Infrastructure

What Is The Request And What Will We Get For The Funds?

FY 2015 – Air/Ground Communications Infrastructure
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Air/Ground Communications Infrastructure	$3,791	$5,500	$3,900	-$1,600

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Communications Facilities Enhancement (CFE) Expansion	---	$2,000.0
B. Radio Frequency Interference (RFI) Technology Refresh	---	1,000.0
C. In-Service Engineering	---	900.0
Total	Various	$3,900.0

For FY 2015, $2,000,000 is requested to initiate three new CFE expansion/relocation sites, procure replacement radios, equipment racks, antennas, towers, and site preparation. The FY 2015 three sites are:

Boston, MA - Remote Transmitter/Receiver (RTR) and is the continuation of a multi-year project
Bremerton, WA- Remote Transmitter/Receiver (RTR) a new project
Hoquiam, MA - Remote Transmitter/Receiver (RTR) a new project

For FY 2015, $1,000,000 is requested for engineering and technical services/support to mitigate Radio Frequency Interference (RFI) events in the NAS as well as procurement of 110 Receiver (RX) Multicouplers which will be used to mitigate RFI and maximize the overall throughput of the NAS. This program is needed to provide the Service Area with RFI mitigation equipment such as filters, tools and support services necessary to quickly restore the NAS radio services.

Also $900,000 is requested for in-service engineering activities.

What Is This Program?

Air/Ground Communications Infrastructure will replace aging and increasingly unreliable equipment and communications facilities. In addition, Air/Ground Communications Infrastructure will establish new communications facilities.

A. Communications Facilities Enhancement/Expansion (CFE)

This program provides new communications facilities and equipment. The program also improves and/or relocates current communication facilities to meet new demands. Self Sustained Outlets (SSOs) - In addition to providing funding for improvements to Remote Center Sir Ground Communication Facilities (RCAGs), Remote Transmitter Receivers (RTRs), and Remote Communications Outlets (RCOs), the AG Communications Solution Implementation Team has identified the need to help sustain critical communication in remote areas by either replacement or refurbishment of SSOs.

B. Radio Frequency Interference (RFI)

The RFI Elimination program is designed to help resolve Radio Frequency Interference (RFI) events to maximize the overall safety of the NAS and to replace non-supportable receiver (RX) multicouplers in the NAS. The RX Multicoupler allows for the connection of multiple radio receivers to one antenna which reduces RFI by utilizing the internal filters of the RX multicoupler and provides greater capacity by installing more frequencies on the limited number of antennas located at a Radio Control Facility (RCF).

There are approximately 900 RX multicouplers used in the NAS but many of these units are not supply supportable and have failing power supplies that cannot be replaced. In 2007, FAA awarded a contract for 4 and 8 port RX Multicouplers. Since awarding the Rx Multicoupler contract, 743Rx Multicouplers have been replaced. A technology refresh is planned to replace the remainder of the approximately 349 RX Multicouplers in the NAS that are not depot supported.

C. In-Service Engineering

This service allows for immediate response to emerging technology solutions. Funding is needed for on-going engineering support of all prototyping efforts.

DOT Strategic Goal - Economic Competitiveness.
- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The current air/ground communication system must be improved to support FAA's goal to provide increased capacity in the U.S. airspace system that reduces congestion and meets projected demand. The growth in air traffic operational requirements has increased the need for air/ground communications coverage. The current system is aging, increasingly unreliable, and susceptible to radio interference. Disruptions of air/ground communications impede the ability of controllers to communicate with aircraft around affected areas. Radio frequency interference at an Air/Ground (A/G) facility would severely disrupt air traffic services.

The FAA needs to mitigate and eliminate radio frequency interference that impacts Air Traffic Control communications. The RFI Elimination program is designed to expedite the detection and facilitate the resolution of radio frequency interference events to minimize delays and congestion thereby improving air traffic capacity, while maximizing the overall throughput of the NAS. This program is needed to provide the Service Areas with the tools and support services necessary to quickly restore NAS radio services.

Additionally, the CFE program represents 16 of the top 50 projects listed by the three Service Areas. Examples of these projects include establishing a Very High Frequency (VHF) Remote Communications Outlet (RCO), establishing a Remote Communications Air to Ground (RCAG) facility, and replacing an RCO antenna tower.

How Do You Know The Program Works?

New and relocated communication facilities enable the establishment of new sectors to support capacity. In addition, new and relocated communication facilities will enable new and more efficient flight patterns.

Efficient flight patterns reduce aircraft operations and maintenance costs for the airline industry. New communications equipment will lower periodic and correctional maintenance costs associated with the old and technically obsolete equipment in the field.

There are a significant number of RFI Elimination and Technology Refresh program requests that seek to improve communications capability in areas surrounding Core and Focus airports. Funding these projects will improve safety by eliminating gaps in air/ground communications in the NAS.

Why Do We Want / Need To Fund The Program At The Requested Level?

The CFE program maintains and increases air traffic capacity by ensuring the availability of equipment and facilities that are essential component in pilot and controller communications. A reduction would result in FAA not being able to purchase equipment or fund site surveys for several projects and will delay implementation of sites planned in FY 2015. The required funding is for engineering and technical services/support to mitigate RFI events that occur in the NAS on a continuous basis.

Detailed Justification for - **2A08 Air Traffic Control En Route Radar Facilities Improvements**

What Is The Request And What Will We Get For The Funds?

FY 2015 – Air Traffic Control En Route Radar Facilities Improvements
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Air Traffic Control En Route Radar Facilities Improvements	$5,591	$5,900	$5,100	-$800

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Long Range Radar Improvements Infrastructure Upgrades/Sustain	---	$4,300.0
B. In-Service Engineering	---	800.0
Total	Various	$5,100.0

The LRR Facilities Improvements program addresses the infrastructure requirements of the FAA-owned surveillance facilities serving the National Airspace System (NAS). This program is one of the 12 programs included in FAA's NAS sustainment strategy. For FY 2015, $4,300,000 is requested to continue facility maintenance and upgrades to the 150 Long Range Radar (LRR) sites. An additional $800,000 is requested for in-service engineering activities.

What Is This Program?

The NAS currently has 150 surveillance facilities that provide aircraft position information to FAA En Route control centers and to other users (e.g., Department of Defense and Homeland Security). They all contain vital long-range secondary beacon radars. Many of these (long range radar) sites were established in the early 1950's and have reached their design life. Due to the extreme age of these facilities, the need for infrastructure maintenance and upgrades are required at all of these sites.

The NAS requires reliable and continuous operation of surveillance equipment. The repairs, improvements, and modernization to existing infrastructure will enable the facilities to meet current operational, environmental, and safety needs. It will extend the service life of facilities, and reduce the chance of outages that often cause air traffic delays.

Today, FAA air traffic control (ATC) calls for seamless surveillance information provided within each air traffic controller's area of responsibility. In order to reliably provide flawless surveillance information in en route environment and avoid operational outages that have severe and immediate impacts on the air traffic control services, the infrastructure deficiencies must be corrected without delay.

The existing air surveillance infrastructure has shortfalls that must be addressed sequentially for the air surveillance system to continuously meet the user needs into the future. The immediate need is to ensure that current air surveillance capabilities do not further degrade while planning and implementing longer-term solutions.

The scope of LRR infrastructure sustainment program includes system upgrade and/or replacement of electrical, mechanical, lightning protection, fire detection, facility security, building structural components, and facility access. Funding for LRR in FY 2013 has enabled accomplishment of 40 of such projects. There are 27 sustainment projects currently planned for FY 2014, and 39 for FY 2015.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The planned infrastructure modifications will provide greater efficiency and reduce operating costs in en route air traffic control and facility maintenance operations by refurbishing en route equipment and facilities. The majority of the en route surveillance facilities require improvements and/or modifications to correct existing deficiencies. Approximately 40 percent of en route surveillance service outages currently experienced can be directly linked to infrastructure failures and deficiencies. Prior year accomplishments lowered the potential for reduced coverage. Projects include repair and replacement of heating, ventilation, air conditioning, air handlers, chillers, engine generators, elevators, uninterruptible power systems, lightning protection, grounding, bonding, and shielding (LPGBS) systems, access roads, security systems, storm water controls, sewage systems, roofs, and structural restorations to support Air Traffic Control Beacon Interrogator model 6 (ATCBI-6) deployments and existing Mode Select beacon radars.

How Do You Know The Program Works?

Air Route Surveillance Radar (ARSR) equipment availability over the previous 12 month period (ending March 31, 2013) has continued in an upward trend:

- Availability from April 2011 through March 2012............................ 98.8 percent
- Availability from April 2012 through March 2013 .... 99.0 percent

The LRR Infrastructure Improvements Program is one of the reasons for this increase. The LRR Infrastructure Program helps LRR facilities continue to meet operational, environmental, and safety needs, well beyond their expected service life. Without this program, infrastructure failures will result, causing surveillance equipment failures that directly impact the NAS.

Why Do We Want/Need To Fund The Program At The Requested Level?

$5,100,000 is required to make repairs to the facilities that are in poor condition and have greatest impact to the NAS. It will extend the service life and lower the risk of NAS outages occurring. Evidence shows up to ten-fold savings if properly funded sustainment programs were instituted. The required funding level will enable a proactive approach to facilities management and life-cycle. A reduction from the FY 2015 funding required will delay the required repairs and upgrades to LRR facilities.

Detailed Justification for - 2A09 Voice Switch and Control System (VSCS)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Voice Switch and Control System (VSCS)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Voice Switch and Control System (VSCS)	$10,425	$19,000	$13,800	-$5,200

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. VSCS Sustainment Activities	---	$5,600.0
b. Engineering Analysis	---	4,840.0
c. Program Management	---	1,060.0
d. Contractor Support	---	2,300.0
Total	Various	$13,800.0

For FY 2015, $13,800,000 is requested to continue VSCS Technology Refresh Phase 3 activities including Local Area Network (LAN) Transceiver Retrofit, Ground to Ground Switch Node Reduction, and Fiber Optic Tie Trunk (FOTT) Power Supply Retrofit.

What Is This Program?

The VSCS controls the switching mechanisms that allow controllers to select the communication channel they need to communicate with pilots, other controllers, other air traffic facilities, and commercial telephone contacts. It is essential that controllers be able to select the proper channel so they can communicate with pilots, coordinate with other controllers and/or contact emergency services as necessary. These large switches handle communication connections for 40 to 60 active air traffic control workstations at each of the 21 en route centers.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The VSCS Technology Refresh program will replace and upgrade hardware and software components for the voice switching systems in all 21 en route Air Route Traffic Control Centers (ARTCCs). The technology refresh will be required to ensure that the VSCS continues to provide reliable voice communications, which can support future en route operations. These upgrades will ensure that the air-to-ground and ground-to-ground communications capabilities are reliable and available for separating aircraft, coordinating flight plans, and transferring information between air traffic control facilities in the en route environment. The real time Field Maintenance/Testing System at the FAA William J. Hughes Technical Center (WJHTC) and the Training System at the FAA Academy will also be upgraded to perform the same as an operational site.

How Do You Know The Program Works?

VSCS is an integral part of a functional en-route air traffic control system; it provides the following qualitative benefits: Reliable access to many different Air Traffic Control (ATC) radios; Ability for ATC personnel to communicate with each other and coordinate work in the ARTCCs; and Reliable and maintainable voice communication switching in en-route ATC facilities.

Why Do We Want / Need To Fund The Program At The Requested Level?

$13,800,000 is required to conduct:

- Complete Ground to Ground (G/G) Node Reduction at three field sites
- Continue Single Port Transceiver technology refresh
- Continue Fiber Optic Tie Trunk (FOTT) power supply technology refresh
- Continue VSCS Training and Backup System (VTABS) technology refresh efforts
- VSCS vendor (Harris) Program Management, Engineering Analysis, and associated contractor support to identify and manage ongoing parts obsolescence issues

The VSCS System is the existing legacy voice switch system in the ational Airspace System and it will have to remain operational until the full deployment of the NextGen NAS Voice System.

Detailed Justification for - 2A10 Oceanic Automation System

What Is The Request And What Will We Get For The Funds?

FY 2015 – Oceanic Automation System
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Oceanic Automation System	$3,791	$4,800	$3,508	-$1,292

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Oceanic Automation System (OAS) Prime Contract	---	$2,000.0
b. Program Management	---	1,508.0
Total	Various	$3,508.0

For FY 2015, $2,000,000 is requested to fund the Oceanic engineering and software development contract to provide for the delivery of ATOP operational improvements, safety enhancements, and Agency commitments to the three Oceanic Air Route Traffic Control Centers (ARTCCs) at Oakland, New York and Anchorage. Also requested is $1,508,000 for program management and engineering support for ATOP requirements, and for the development of required analysis and documentation for the FY 2016 through FY 2020 ATOP Work Package 1 and ATOP Technology Refresh required acquisition decisions.

What Is This Program?

The Advanced Technologies and Oceanic Procedures (ATOP) program has replaced existing oceanic ATC systems and procedures with a single integrated system and modernizes facilities responsible for managing over 24 million square miles of airspace over the Atlantic and Pacific Oceans. ATOP fully integrates flight and radar data processing, detects conflicts between aircraft, provides data link and surveillance capabilities, and automates the previous manual processes. The ATOP system collects, manages, and displays oceanic air traffic data, including electronic flight-strip data, on the computer displays used by air traffic controllers and integrates capabilities such as flight data processing, radar data processing, automatic dependent surveillance, controller pilot data link and conflict probe. ATOP provides a modernized oceanic air traffic control automation system including installation, training, procedural development support and life-cycle system maintenance. Operational systems reside at the Oakland, New York, and Anchorage ARTCCs. A test and training system is in use at the William J. Hughes Technical Center (WJHTC). ATOP is now in operational use, the program office is gathering and documenting performance data and metrics to measure productivity, efficiency, user satisfaction, and project future system benefits.

The technology refresh for the automation system was completed for all three operational sites and the systems installed at the William J. Hughes Technical Center (WJHTC). This technology refresh activity increased system performance, capacity, and usability. The ATOP program has continued to deliver enhanced safety, provide operational efficiency improvements, and support other FAA initiatives such as ASD-B and NextGen oceanic requirements through FY 2015.

DOT Strategic Goals: Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

ATOP allows the FAA to reduce the use of the difficult communication systems and the intensively manual processes that limited controller flexibility in handling airline requests for more efficient profiles over long oceanic routes. The program provides integrated flight data processing, communications, Automatic Dependent Surveillance-Contract (ADS-C), and conflict resolution capability required to reduce oceanic aircraft separation from 100 nautical miles to 30 Nautical Miles (NM).

ATOP has been implemented at New York, Oakland and Anchorage. The system performance data has been analyzed, a baseline has been established, and a fuel savings performance model has been developed.

How Do You Know The Program Works?

Although oceanic flights comprise only four percent of total U. S. air carrier operations, they provide 43 percent of the cargo revenue and 23 percent of the passenger revenue. The ATOP automation system has enabled 30 NM lateral and 30 NM longitudinal separation (approximately four minutes) to be applied between suitably equipped aircraft in Oakland and Anchorage Oceanic airspace and to be planned for New York Oceanic airspace, thus allowing aircraft separation to be reduced from 50 nautical miles lateral and 10 minutes longitudinal. The average ATC response time to altitude change requests has decreased from over four minutes (pre-ATOP) to two minutes (post-ATOP) and the number of altitude change requests cleared have increased by 40 percent while demand has increased by 34 percent. ATOP has enhanced communication and surveillance, which has increased sector capacity.

Why Do We Want/Need To Fund The Program At The Requested Level?

$3,508,000 is required to fund the Oceanic engineering and software development contract to provide for the delivery of ATOP operational improvements, safety enhancements, and Agency commitments to the three Oceanic Air Route Traffic Control Centers (ARTCCs) at Oakland, New York and Anchorage. Funding at the required level will also provide for the necessary level of program management and engineering support for the analysis and documentation to pursue the FY 2016 through FY 2020 acquisition decision for the required ATOP Work Package 1 and ATOP Technology Refresh efforts.

A reduction in funding below the request level impacts the program's ability to deliver external and internal agency commitments and the follow-on program efforts to continue to enhance and improve the ATOP oceanic air traffic environment.

Detailed Justification for - 2A11 Next Generation Very High Frequency Air/Ground Communications System (NEXCOM)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Next Generation Very High Frequency Air/Ground Communications System (NEXCOM)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Next Generation Very High Frequency Air/Ground Communications System (NEXCOM)	$31,890	$20,250	$40,000	+$19,750

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Program Management	---	$4,000.0
b. Engineering Support	---	3,000.0
c. Hardware/Software	---	21,000.0
d. Logistics	---	1,000.0
e. Implementation	---	11,000.0
Total	Various	$40,000.0

For FY 2015, $40,000,000 is requested for NEXCOM Segment 2 Phase 1 which will be used to install 2,700 Very High Frequency (VHF) and Ultra High Frequency (UHF) radios (receivers and transmitters) at 160 terminal and flight services facilities.

What Is This Program?

NEXCOM will implement a new Air/Ground voice communication system using the limited available radio frequency spectrum more efficiently. NEXCOM will provide the operational flexibility and Voice over Internet Protocol (VoIP) capability required for NextGen.

- Segment 2 Phase 1 (2010 - 2018) will deploy 12,000 VHF and UHF radios that will service the high-density terminal areas and the flight service operations.
  - Achieve In Service Decision for Segment 2 Phase 1, in October 2013
  - Achieve first site initial operational capability for Segment 2 Phase 1, in April 2014
  - Deploy 2,700 new Terminal Air Traffic Control and Flight Service Radios in FY 2015

- Segment 2 Phase 2 (2018 - 2027) will deploy 23,040 VHF and UHF radios that will service the high-density terminal areas and the flight service operations.
  - FAA will implement approximately 160 sites per year with an average of 14 to 16 radios per site, including site spares

DOT Strategic Goal: Economic Competitiveness
- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The existing Very High Frequency (VHF) analog controller-to-pilot communications system lacks the capacity and flexibility to accommodate future growth in air traffic. The FAA goal of Reduced Congestion is at risk due to the lack of available air traffic control radio spectrum in high-density areas. The continuous growth in air traffic and the introduction of new services has driven a proportional demand (approximately four percent per year) for air/ground communication frequency assignments. The system is beyond its estimated life-cycle and is increasingly expensive to maintain. Air/ground communication is the most fundamental and safety important element of the ATC system supporting all phases of flight for en route, terminal, and flight service operational environments. There are approximately 60,000 analog radio units installed at over 3,000 sites.

NEXCOM will meet the new and growing demands for air transportation services; accommodate the growing number of sectors and services; utilize VHF spectrum required for voice communications more efficiently and make the recovered spectrum available for data communications (a future NextGen initiative); and improve reliability and reduce the growth of maintenance costs by replacing aging air/ground communications equipment with new digital equipment.

How Do You Know The Program Works?

Since deployment of NEXCOM radios in 2005, there have been two Air Traffic delays due to reported radio outages (for comparison, there were 32 in 2001 and 2002). Additionally, the Post Implementation Review team recently finalized an independent study of the NEXCOM program benefits and concluded the following: the NEXCOM investment program meets the service needs of its customers; the NEXCOM investment program meets baseline benefits expectations; and the NEXCOM investment business case is still valid.

Why Do We Want/Need To Fund The Program At The Requested Level?

NEXCOM Segment 2 site implementation is on schedule to complete the Acquisition Program Baseline (APB) milestone of Initial Operational Capability (IOC) at 450 sites for Phase 1. Sufficient radios were acquired from the NEXCOM 1a radio contract to bridge an early schedule delay gap until radios from the new procurement were available for deployment.

A funding reduction would delay implementation of multiple sites and negate the schedule gains that the program has achieved in recent years to keep the program within the baseline parameters.

Detailed Justification for - 2A12 System-Wide Information Management (SWIM)

What Is The Request And What Will We Get For The Funds?

FY 2015 – System-Wide Information Management (SWIM)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
System-Wide Information Management (SWIM)	$46,627	$66,550	$60,261	-$6,289

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. SWIM Segment 1		
a. Traffic Flow Management Data Publication	---	$651.0
b. Terminal Data Distribution System Publication	---	1,500.0
c. SWIM Core Services	---	3,000.0
d. Flight Data Publication Service	---	5,510.0
e. Airborn Access to SWIM (AatS)	---	4,000.0
e. Independent Operational Test and Evaluation (IOT&E)	---	300.0
Total	Various	$14,961.0
B. SWIM Segment 2A		
a. On-Ramping NAS Mission Services	---	$4,000.0
b. Purchase and Deploy SWIM NEMS Nodes	---	5,000.0
c. NEMS Functionality Enhancements	---	3,400.0
d. Installation of Equipment for NEMS Load Balancers	---	2,000.0
e. SWIM Segment 2A Core Services	---	1,800.0
f. SWIM Segment 2A Test and Evaluation	---	800.0
g. SOA Suitability Assessment, Sys Specifications Devel and Gov Support	---	3,000.0
h. Independent Operational Test and Evaluation (IOT&E)	---	300.0
Total	Various	$20,300.0
C. Common Support Services, Phase 1 – Weather		
a. Prime Development Contract (Hardware and Software)	---	$19,260.6
b. Program Management	---	2,135.7
c. Information System Security	---	220.4
d. Integrated Logistic Support and 2nd Level Engineering	---	589.7
e. Engineering Support Services	---	2,250.0
f. Test and Evaluation	---	543.6
Total	Various	$25,000.0

For FY 2015, $60,261,000 is requested for System-Wide Information Services (SWIM). Of that, $14,961,000 is requested for Segment 1 efforts, $20,300,000 for Segment 2A implementation of SWIM Service Oriented Architecture infrastructure services, and $25,000,000 is requested for the Common Support Services - Weather (CSS-Wx) Project. The funds will be used towards the development of the operational system. Individual outcomes for that year will include the following:

- Begin CSS-Wx Solution Implementation activities
  - Conduct requirements reviews
  - Conduct design reviews

What Is This Program?

The SWIM program is an information management and data sharing system for Next Generation Air Transportation System (NextGen). SWIM will provide policies and standards to support data management, secure its integrity, and control its access and use. SWIM is being developed incrementally. The initial phase of SWIM, Segment 1, includes capabilities that were selected based upon the needs of various data communities, maturity of concepts of use, and the ability of existing programs to accommodate development of these SWIM capabilities within their existing program plans. AatS leverages current and planned SWIM enhancements as well as flight deck tablets to provide a low cost capability by establishing the leadership for flight deck exchange and applications. This work is significant because a key component of the DataComm investment decision was the allocation of functions between the command and control DataComm requirements and alternative paths for information and coordination with the flight deck through SWIM.

In SWIM Segment 2, the program will continue to provide governance, standards, and software to NAS programs. SWIM will also implement enterprise messaging via the NAS Enterprise Messaging Service (NEMS) for new service providers and facilitate the transition by Segment 1 SIPs to using the NEMS. Future segments will be defined in a similar manner and will include additional capabilities that move the FAA toward the data sharing required for NextGen.

SWIM will reduce the number and types of unique interfaces, reduce redundancy of information and better facilitate information-sharing, improve predictability and operational decision-making, and reduce cost of service. The improved coordination that SWIM will provide allows for the transition from tactical conflict management of air traffic to strategic trajectory-based operations. In addition, SWIM will provide the foundation for greatly enhanced information exchange and sharing with other agencies.

CSS-Wx will be the FAA's first instance of a common support services capability. CSS-Wx will establish an aviation weather publishing capability for the NAS. It will enable universal access and the standardization of weather information for dissemination to users by SWIM, a data management and sharing system the FAA is implementing for the NextGen. CSS-Wx will filter weather information by location and time. Consumers of the information published by CSS-Wx will include air traffic controllers, traffic managers, commercial aviation, general aviation, and the flying public. CSS-Wx will also make weather information available for integration into NextGen's enhanced decision support tools (DTSs). CSS-Wx will be the FAA's single provider of aviation weather data, consolidating several legacy weather information systems. CSS-Wx will also be scalable to facilitate the addition of new users and new systems. The system is scheduled to achieve Initial Operating Capability (IOC) in FY 2017.

The CSS-Wx System will make improved weather products provided by the NextGen Weather Processor (NWP), the National Oceanic and Atmospheric Administration's (NOAA) NextGen Web Services, and other weather sources, available to FAA and NAS users for input into collaborative decision-making.

The program is working towards a Final Investment Decision (FID) in the first quarter of FY 2015.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

Today's hard-wired infrastructure and systems cannot readily support the addition of new data, systems, data users, and/or decision makers as NextGen requires. In general, they are connected directly to support yesterday's decision-making needs. Each of these interfaces is custom designed, developed, managed, and maintained individually at a significant cost to the FAA. NextGen relies upon a new decision construct that brings more data, systems, customers, and service providers into the process. Data will be needed at more places, for more purposes, in a timely manner, and in common formats and structures to ensure consistent use. These new "data customers" need to be accommodated by providing the governance and policy that tells them how to connect to existing, open interfaces instead of designing, developing, testing, and implementing new ones from scratch. Network technology and data management software must use commercial equipment and current industry standards, to reduce developmental and upgrade cost and simplifying maintenance. Today's point-to-point architecture does not support these goals.

SWIM is vital to the achievement of national, DOT, and FAA strategic plans and the future evolution of air transportation management in the nation because it will provide vital infrastructure to the NAS, replacing inefficient and costly information exchange currently in use. The current FAA systems and operations cannot support NextGen in part because they are not network-enabled, but are instead characterized by rigidly configured systems (communications lines, computers, and software applications).

SWIM contributes to meeting these NextGen objectives:

- Expand System Capacity - The projected increase of demand on the air traffic system exceeds current or projected growth in FAA resources. Information management is a key to providing increased capacity and efficiency in the NAS. SWIM will enable information to be readily shared and used by all NAS participants. With more widespread use of better data, SWIM will improve strategic planning and trajectory management to allow better use of existing capacity en route.
- Increase Predictability - SWIM will improve coordination to allow transition from tactical conflict management to strategic trajectory-based operations. SWIM will also provide the potential to increase machine-to-machine interchange supporting and disseminating decisions rather than the current man-to-man interactions. SWIM increases the likelihood that similar decisions will be consistent by enabling them to be based on the same data.
- Reduce Costs for Aviation - SWIM will help to reduce infrastructure costs by reducing the number and types of interfaces, systems, and potentially, facilities. Initially, SWIM will provide a common network capability, reducing operation and maintenance costs of the hundreds of current interfaces. New systems will interface with SWIM, saving future development costs. Ultimately, redundant sources of data will no longer be needed and can be decommissioned.
- Shared situational awareness - SWIM will help to provide shared situational awareness so that all appropriate parties are privy to the same complete set of information.
- Collaborative Decision Making - SWIM will enable collaborative decision-making, by providing all parties access to the same information where they can make real-time decisions and reach agreements quickly.

Delays in the NAS are primarily attributable to weather. Based on Operations Network (OPSNET) which is the official source of NAS air traffic operations and delay data, 68 percent of air traffic delays over 15 minutes for 2003-2012 were due to weather. In addition, 73 percent of delayed flights and 86 percent of delay minutes for CY 2010-2012 have weather as the primary cause. Weather also impacts safety. Weather was cited as a cause or factor in over 20 percent of the accidents investigated by the National Transportation Safety Board (NTSB) in 2007-2009.

Weather products currently being provided by the National Weather Service (NWS), combined with recent improvements to FAA's air traffic management tools, have significantly increased the size and geographic distribution requirements for weather information within the FAA network. In today's NAS, most decision tools, manual and automated, do not utilize weather information effectively or at all. This condition is partly due to gaps and inefficiencies in today's weather dissemination system. Information gathered by one system is not easily shared with other systems. This results in different decision makers having access to different weather information.

This lack of a common situational awareness results in inconsistent decision making across the NAS. Rather than sharing pictures of weather events, CSS-Wx will utilize open international data standards and access to aviation weather information for input into the FAA's collaborative decision-making tools for the NAS.

CSS-Wx will resolve the issue of multiple interfaces, inflexible and inefficient information data management, unique data types and point-to-point information exchange. Implementation of this capability will provide cost savings, improvement of capacity, efficiency and safety in adverse weather.

How Do You Know The Program Works?

SWIM represents the steps that FAA is taking to reduce costs while providing better service to:

- Change system interfaces to support network messaging, reducing the cost of testing and maintaining each individual interface (currently a major cost driver and resource load for NAS systems)
- Provide the flexibility to provide information to new systems and locations without adding custom interfaces. This will significantly reduce the marginal cost of adding new system interfaces. Among other metrics, SWIM measures the cost of developing an application-to-application interface
- Provide common interfaces that facilitate spontaneously adding new users and applications, for purposes of continuity of operations

CSS-Wx is currently in Investment Analysis. An Initial Investment Decision (IID) occurred in 2013. The CSS-Wx Program performed numerous Request for Information (RFI) inquiries with Industry, obtaining information that allowed the project team to better plan the acquisition. The CSS-Wx Program released a Screening Information Request (SIR) package on January 3, 2014. CSS-Wx will establish a baseline at Final Investment Decision (FID)

Open international standards are being used to format and exchange digital weather data to ensure harmonization and ease of future enhancement and implementation. The FAA's also leading the world with EUROCONTROL in developing the Weather Exchange Model (WXXM), which is the emerging worldwide standard for the exchange of weather data. The goal is to provide access to weather data tailored to each user's needs. This enables access by all decision support tools and trajectory-based operations.

Enhanced Weather Information Network Server (WINS) Dissemination (EWD), a CSS-Wx risk reduction activity, achieved a limited operational capability in 2013. EWD validates the performance of the standards in an operational environment.

Why Do We Want / Need To Fund The Program At The Requested Level?

$34,661,000 is required for the development of SWIM Segment 1 and Segment 2A. An additional $600,000 is required for IOT&E activities. Efforts in FY 2015 include completing implementation of several Segment 1 capabilities and continuation of core oversight activities. For FY 2015, SWIM funding will be used to:

- Complete deployment of Flight Data Publication Complete deployment of the SWIM Flow Information Publication
- Continue to operate the NAS Service Registry/Repository, COTS Repository, the SWIM Developer WIKI
- Complete implementation of SWIM Tool Kits (Core Services)
- Buy required SOA middleware licenses (FUSE) to develop, test, and operate SWIM-compliant capabilities
- Continue to provide SOA governance of the Segment 1 SWIM Implementing Programs (SIPs)
- Complete NEMS Security Services Capability Development Purchase and Deploy SWIM NEMS Nodes
- Complete FY 2015 NEMS Demand Assessment and Associated Deployment of new NEMS Nodes

Under Common Support Services- Weather, $25,000,000 is required in FY 2015 for the development contract for the CSS-Wx System. The development contract will include the necessary requirements reviews, design reviews and software development. The Preliminary Design Review (PDR) will be completed in FY 2015. Included in the request is funding for Program Management, Engineering Support Services, Test and Evaluation (T&E), Information System Security, Integrated Logistic Support and Second Level Engineering.

A reduction in the required amount would cause a significant delay in the IOC milestone. Schedule delays will occur to other programs ability to access aviation specific weather information. NextGen Systems will have to acquire similar information via limited weather dissemination capability if CSS-Wx is delayed. Legacy weather dissemination systems will need to be maintained for a longer period of time which will result in increased operational and maintenance costs.

Detailed Justification for - 2A13 ADS-B NAS Wide Implementation

What Is The Request And What Will We Get For The Funds?

FY 2015 – ADS-B NAS Wide Implementation
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
ADS-B NAS Wide Implementation	$257,394	$282,100	$247,200	-$34,900

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. ADS-B Baseline Service and Acquisition		
a. Program Management	---	$8,579.0
b. Services	---	2,121.0
c. ATC and Cockpit Applications	---	35,669.0
d. ITT Non-Subscription Costs	---	1,121.0
e. Subscription Services	---	190,910.0
f. Independent Operational Test and Evaluation (IOT&E)	---	900.0
Total	Various	$239,300.0
B. Gulf Expansion		
a. Program Management	---	$700.0
b. System Engineering Support	---	3,500.0
Total	Various	$4,200.0
C. In Trail Procedures		
a. Program Management	---	$400.0
b. System Engineering Support	---	3,300.0
Total	Various	$3,700.0

For FY 2015, $247,200,000 is requested to provide for the following:

FY 2015 provides for continuing ADS-B Baseline Services and Applications, utilizing performance based service fees for ADS-B infrastructure owned and operated by the prime contractor. Implementation continues for Airport Surface Surveillance Capability (ASSC) sites and NAS-wide deployment of Ground Interval Management – Spacing (GIM-S).

Funding for Colorado Wide Area Multilateration (WAM) is included in the Surveillance and Broadcast Services (SBS) for fiscal years 2015 and beyond. The Colorado WAM project is operating a Multilateration surveillance service capability providing aircraft location information to the automation system at Denver ARTCC, allowing controllers to provide separation services at four Colorado airports (Durango, Gunnison, Montrose and Telluride).

Subscription charges to the Service Provider consist of Service Establishment Charges (SEC's) for new service volumes established in 2015 and annual subscription charges to provide essential services to existing service volumes.

The anticipated FY 2015 accomplishments for Baseline Services and Applications are as follows:
- Provide service at 306 service volumes within specified requirements
- Achieve En Route ATC Separation Services IOC at Remaining Sites (24 Cumulative)
- Deploy GIM-S NAS wide
- Achieve Initial Operating Capability (IOC) of Terminal ATC Separation Services at 61st Site.
- Install Surface Advisory Services at one ASSC Site
- Gulf of Mexico Expansion - First Radio Station Construction Complete
- Complete 40 aircraft upgrades under Boeing/Rockwell Collins/ United Agreement
- Achieve Advanced Technologies and Oceanic Procedures (ATOP) In Trail Procedures (ITP) Operational Capability at one key site
- Reduced Oceanic Separation (ROS) – Final Investment Decision (FID)
- Provide WAM surveillance services of 99.996 percent availability supporting air traffic operations for the four Colorado airports
- Pay performance based subscription charges

What Is This Program?

Automatic Dependent Surveillance – Broadcast (ADS-B) is an advanced surveillance technology that provides highly accurate and more comprehensive surveillance information via a broadcast communication link. ADS-B is a surveillance technique in which aircraft provide, via a data link, flight data derived from on-board position-fixing and navigational systems. Aircraft determine their position (longitude, latitude, altitude, and time) using GPS, internal navigational reference system, or otherwise. The aircraft's ADS-B equipment processes this position information, along with other aircraft-derived flight parameters, into a periodic broadcast transmission, typically once a second, of the aircraft's position. Any airborne or ground-based ADS-B capable receiver, within range of broadcast, may receive and process the surveillance information for a variety of functions or uses.

The greater positional accuracy and ability to provide aircraft-derived, additional flight parameters (flight objects or flight data message elements), in addition to position data, defines ADS-B as "enhanced surveillance." The aircraft provides unique flight parameter information with the broadcast of its surveillance position. These other parameters, such as identification, directional vector, velocity, next waypoint, and other data are limited only by the equipment's capability, the communication link capacity, and the receiving system's capability. Additionally, ADS-B equipment may be placed on ground vehicles or obstacles to allow for locating and identifying these items. The FAA's ADS-B system is based primarily on providing three fundamental broadcast services to support the ADS-B enabled applications:

- **ADS-B**: This service provides highly accurate, aircraft-derived ADS-B reports that contain identification, state vector, and status/intent information about the aircraft. The information will be used for surveillance applications. ADS-B information is broadcast by the ADS-B equipped aircraft, received and processed by the ADS-B on-board avionics, and displayed on the aircraft's multi-function display.

- **TIS-B:** TIS-B is a surveillance service that derives traffic information from one or more radar-based surveillance sources, ASDE-X, and wide area multilateration (WAM), and uplinks this traffic information to ADS-B-in equipped aircraft. TIS-B enables ADS-B-in equipped aircraft to receive position reports on non-ADS-B-equipped aircraft during the transition period to full ADS-B equipage in the NAS.

- **FIS-B:** Flight Information Services provide ground-to-air broadcast of non-control, advisory information which provides users valuable, near real-time information to operate safely and efficiently. FIS-B products include graphical and textual weather reports and forecasts, Special Use Airspace Information, Notices to Airmen, and other aeronautical information.

FY 2013 Accomplishments:
- IOC at All Remaining Sites - Colorado WAM Phase 2.

- MEARTS Fusion Processing for Separation Services- Complete Key Site testing for 5NM Separation.
- Completion of IOC for En Route Automation Modernization Air Traffic Control Separation Services at four sites
- Surface Advisory Services IOC at 10 sites
- Terminal ATC Separation Services IOC at 26 Sites
- Critical Services Implementation Service Acceptance Testing completed for 89 Service Volumes
- First software delivery completed for ATOP
- Ground Based Interval Management – Spacing (GIM-S) completed Integration Testing
- Continue to provide and maintain baseline services and applications.

Anticipated FY 2014 Accomplishments
- MEARTS Fusion Processing for Separation Services - IOC at Key Site
- Surface Advisory Services – IOC at all Remaining Sites (35 Cumulative) - APB MILESTONE
- Achieve Surface Advisory Services installation at ASSC Key Site (SFO)
- Begin GIM Integration testing at the Test Center
- Achieve En Route Separation Services IOC at the 12 Site.
- Achieve IOC of Terminal ATC Separation Services at 55th Site
- Distribute FIM-S MOPS material to WG4 for review and comment
- Traffic Situational Awareness with Alerts (TSAA) Minimal Operational Performance Standards (MOPS)
- Complete 90 Capstone Avionics Upgrades to ADS-B Rule Compliant Avionics
- Critical Services (ISAT) at Remaining Service Volumes (306 Cumulative) - APB MILESTONE
- Initial Investment Decision (IID) for Reduced Oceanic Separation (ROS)
- ATOP- Complete In Trail Procedures Build
- Gulf of Mexico Expansion - Complete Service Volume Design in support of international agreement with Mexico
- Complete In Trail Procedures Operational Evaluation Year Three Data Analysis Report
- Continue to provide and maintain baseline services and applications

DOT Strategic Goals – Economic Competitiveness
- Maximum economic returns on transportation policies and investments.

ADS-B NAS Wide Implementation supports the FAA mission and helps accomplish agency goals to increase economic competitiveness and safety. The new Air Traffic Systems (ATS) Directorate's activities influence the performance metrics for Average Daily Airport Capacity and NAS On-Time Arrivals. ADS-B Out is considered a foundational program for NextGen.

Why Is This Particular Program Necessary?

The completion of the initial sites and approval of separation services enabled the FAA to release the Final Rule for avionics, published on May 27, 2010. FAA made a commitment to industry that the ADS-B service implementation would be completed by the end of 2013, providing stakeholders with an adequate amount of time (approximately seven years) to equip aircraft. Failing to complete ADS-B service implementation as promised would reduce the business benefit of the investment.

On January 1, 2020, when operating in the airspace designated in 14 CFR § 91.225 (outlined below) aircraft must be equipped with ADS-B Out avionics that meet the performance requirements of 14 CFR §91.227. Aircraft not complying with the requirements may be denied access to this airspace.

How Do You Know The Program Works?

Surveillance and Broadcast Services (SBS) includes a number of services and applications. The Essential Services (which include TIS-B, FIS-B and ADS-R) have been tested in the factory, in operations, and through independent tests to verify performance. The Advisory Services have been approved for national deployment. The Advisory Services In-Service Decision was approved in November 2008. The Air Traffic Services (which is ADS-B used for Air Traffic Control separation services) have been through factory and site testing. The four key sites Juneau, Philadelphia, Louisville, and Gulf of Mexico all underwent significant testing and evaluation to support the requirements. All sites have achieved operational readiness through

IOC as of April 2010. The completion of the sites and approval of separation services enabled the FAA to release the Final Rule for avionics, published on May 27, 2010. An In-Service Decision for Air Traffic Services was approved on September 23, 2010. While safety is shared between multiple programs, a comparison of equipped and non-equipped aircraft should provide benefits unique to the program. Low altitude Gulf of Mexico benefits are unique to the program.

Why Do We Want / Need To Fund The Program At The Requested Level?

In FY 2015 NAS Wide deployment of ADS-B will continue with subscription services for surveillance across the NAS and for weather in the Gulf and Alaska. The national deployment of over 630 stations will be complete in April of 2014. Achieving this milestone will serve as the entrance criteria for stakeholders to accelerate the installation of ADS-B Out avionics that meet the performance requirements of 14 CFR §91.227. This will allow for the ADS-B capability to deliver the benefits identified in the business case.

Additionally, ATOP automation platform ADS-B software development will occur in FY 2015. Interval Management IOC will be completed. Operation and maintenance of Wide Area Multilateration for surface surveillance will continue.

If funded at less than the $247,200,000 level the program office would have to extend the ADS-B schedule. A funding reduction would negatively impact the program schedule, and it would impact various NextGen programs with ADS-B interdependencies. The long-term impact can affect the national roll-out for the ADS-B implementation in the NAS and subsequent avionics equipage. This will decrease equipage rates and the identified program baseline benefits.

Detailed Justification for - 2A14 Windshear Detection Service (WDS)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Windshear Detection Service (WDS)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Windshear Detection Service (WDS)	$0	$2,000	$4,300	+2,300

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Hardware Procurement	---	$1,300.0
b. WSP Processor Production	---	2,000.0
c. LLWAS/WME Pole Procurement	---	500.0
d. Contractor Support	---	500.0
Total	Various	$4,300.0

For FY 2015, $4,300,000 is requested to procure replacement equipment for the Low Level Windshear Alerting System (LLWAS), Wind Measuring Equipment (WME), and Weather Systems Processor (WSP) Systems that are either obsolete, or no longer supported by the manufacturer. This funding will be used to initiate the Technology Refresh of these legacy windshear detection systems currently deployed in the National Air Space (NAS), and fund the contractor support necessary to integrate the replacement hardware into existing software platforms.

What Is This Program?

Windshear Detection Services (WDS) Work Package 1 (WP1) is a portfolio program consisting of legacy wind shear detection systems currently deployed in the NAS. The program will address obsolescence of the legacy systems Weather Systems Processor (WSP), Low Level Windshear Alert System (LLWAS) and Wind Measuring Equipment (WME). The program will sustain existing service levels by upgrading components of existing systems to mitigate safety hazards and to resolve obsolescence/supportability issues of the 34 WSP, 60 WME, and 50 LLWAS systems currently deployed in the NAS.

The Joint Resources Council (JRC) approved the WSDS WP1 Final Investment Decision (FID) on June 20, 2012.

The program will accomplish several key milestones by the end of FY 2015:

- Design of the replacement Weather Systems Processor (WSP) Radar Video Processor (RVP)
- Design of the Wind Measuring Equipment (WME) Upgrade
- Deployment of 40 Low Level Wind Shear Alerting System (LLWAS) Ultra High Frequency (UHF) Radios

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

The systems that are part of the Windshear Detection Services (WDS) Work Package 1 (WP1) portfolio alert controllers of dangerous wind shear events that are detected in approach and departure corridors. Since these systems have been deployed, no major wind shear related incidents have occurred in the NAS. WSDS WP1 will resolve system obsolescence to ensure that Air Traffic Controllers will continue to receive the wind shear alerts necessary to maintain the safety of the NAS.

How Do You Know The Program Works?

The projects contained within the WDS portfolio contribute significantly to the overall safety of the NAS by preventing wind shear related aircraft accidents. The WSDS project intends to sustain the level of service provided by these legacy ground-based systems to Air Traffic Controllers and the flying public.

Why Do We Want/Need To Fund The Program At The Requested Level?

$4,300,000 is required to address pressing obsolescence and unsupportability issues plaguing LLWAS, WME, and WSP. This funding is needed to resolve the LLWAS RF Radios obsolescence issue where only a small quantity is available in the Depot. Additionally, of the 34 WSP sites, eight are currently running on spare radar video processors. It is essential that the FAA acquire the necessary upgrades to prevent system outages and the resulting loss of service. A reduction in funding would delay the acquisition and replacement of obsolete equipment and result in increased windshear service interruptions, prolonged service outages and negatively impact NAS safety.

Detailed Justification for - 2A15 Collaborative Air Traffic Management (CATM) Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – Collaborative Air Traffic Management Technologies ($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Collaborative Air Traffic Management (CATM) Portfolio	$37,653*	$36,700*	$13,491	-$23,209

*indicates a comparability adjustment to prior budget structure.

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Collaborative Air Traffic Management Technology – WP3	---	$3,291.0
B. Strategic Flow Management Application	---	6,000.0
C. Strategic Flow Management Engineering Enhancement – WP4	---	4,200.0
Total	Various	$13,491.0

The Collaborative Air Traffic Management Portfolio, as described in the NextGen Implementation Plan (NGIP), involves NAS operators and FAA traffic managers, along with advanced automation, in managing daily airspace and airport capability issues, such as special activity airspace and weather. This portfolio has both pre-implementation and implementation activity. For FY 2015, $13,491,000 is requested to provide for the following three Capital Investment Plan initiatives:

- Collaborative Air Traffic Management Technology – Work Package 3 (CATMT WP3),
- Strategic Flow Management Application (SFMA), and
- Strategic Flow Management Engineering Enhancement (SFMEE or CATMT WP4).

CATMT WP3 completes development and deployment by December 2015. SFMA work furthers research on the Airborne Reroute capability to include potential changes to the Traffic Flow Management System (TFMS) and the Time-Based Flow Management (TBFM), which will support complex reroute execution in the En Route Automation.

A. Collaborative Air Traffic Management Technology – Work Package 3

- Complete development and deployment of CATMT WP3.

B. Flow Control Management – Strategic Flow Management Application (Integration Execution of Flow Strategies into Controller Tools)

- Continue concept validation activities including Human In the Loop (HITL) Test Plans, execution of HITL experiments, and reports on HITL findings for advanced Airborne Reroute (ABRR)
- Initiate requirements and refine alternatives for costs and benefits based on the concept for advanced ABRR with digital communication
- Develop investment analysis documentation for advanced ABRR with digital communication

C. Flow Control Management – Strategic Flow Management Engineering Enhancement (Enhancing the Strategic Flow Program) – Work Package 4

This program provides for pre-implementation activites to mature new capabilities targeted for implementation in CATM WP4. The new capabilities are:

- Arrival Acceptance
- Integrated TMI modeling
- Demand Prediction Capability
- Arrival Route Availability Route Planning (RAPT)
- Integrated Departure Route Planning (IDRP)

The requested funding will support completion of the final program requirements document, benefits basis of estimate, cost basis of estimate, acquisition program baseline, and support the process leading to a Final Investment Decision (FID) in the fourth quarter of 2015.

What Is This Program?

Collaborative Air Traffic Management (CATM) coordinates flight and flow decision-making by flight planners and FAA traffic managers to improve overall efficiency, provide greater flexibility to flight planners, and make the best use of available airspace and airport capacity. The overall philosophy driving the delivery of CATM services is to accommodate user preferences to the maximum extent possible. Traffic managers impose Traffic Management Initiatives (TMIs) to account for congestion, weather, special activity airspace, or other constraints. TMIs are the means by which traffic managers manage constraints. These initiatives can alter users' flight plans. The impact of TMIs can be reduced by tailoring flow management actions to specific flights. This can be done through a combination of increased information on the users' preferred alternative routes; enhanced tools for assessing the impact of rerouting decisions; and improved communications and display of instructions to the controllers who must implement the initiatives.

A. Collaborative Air Traffic Management Technology – Work Package 3

CATMT Work Package 3 (WP3) provides enhancements to the TFM capabilities deployed from FY 2011 to CY 2015. The FAA baseline for WP 3 includes the following capability enhancements:

- TFM Remote Site Re-engineering (TRS-R) Modernizes the software (SW) infrastructure, backbone of the TFM decision support tool suite used by Traffic Managers in the field:
  - Phase 1 Consolidates three software base codes into one. Allows the airlines to see the same information as the FAA for better situational awareness, collaboration and decision support
  - Phase 2 Consolidates software communications, control and data management to one modernized suite. This is the first and fundamental step for future mid-term CATMT capabilities as well as the TFM integrated tool suite and integrated displays planned for future CATMT work packages
- Collaborative Information Exchange (CIX) Manages information exchange between the TFM system and external systems through software interfaces:
  - Integrates Special Use Airspace (SUA) status information made available through SWIM Segment 1 for use in decision support tools and on the Traffic Situation Display

B. Flow Control Management – Strategic Flow Management Application (Integration Execution of Flow Strategies into Controller Tools)

Strategic Flow Management Application (SFMA) (Execution of Flow Strategies into Controller Tools) provides funding for the implementation of the ERAM modifications needed to receive/process the TMI in the ERAM baseline post 2018. These improvements include automatic identification to controllers of aircraft affected by Traffic Flow Management (TFM) TMIs. It also enables traffic managers to electronically transmit reroutes from TFM automation to ERAM for delivery to the airline operations center/flight operations center (AOC/FOC), flight crew, and the relevant air traffic control (ATC) operational positions. These decision support tools (DST) will help monitor how well aircraft are conforming to the TMI, and suggest controller actions to achieve the flow strategy.

This activity will also fund the requirements definition, risk mitigation and the assessment of possible changes in work behavior due to emerging technologies/DSTs for increments of Flow Strategy integration. It will also begin engineering analysis for future Airborne Re-route integration needs, such as identification and formulation of complex reroutes in TFMS and communication of these complex reroutes from AOC/FOC to TFMS, then, through ERAM to the aircraft via Data Communications.

C. Flow Control Management – Strategic Flow Management Engineering Enhancement (Enhancing the Strategic Flow Program) – Work Package 4

The Flow Control Management Strategic Flow Management Engineering Enhancement (SFMEE) initiative develops promising concepts to address operational Traffic Flow Management (TFM) shortfalls. In addition, the SFME program prepares analysis and documentation for the developed concepts in order to achieve CATM WP4 Final Investment Decision for implementation.

The fundamental goal of Traffic Flow Management (TFM) is to manage the flow of air traffic to minimize delays and congestion due to system stressors such as weather or equipment outages. Today's operations could be made more efficient through establishing strategic methods for mitigating delay and capacity issues. These strategic plans may provide predictability as well as a resource to base future decisions. The systems and capabilities that are used for TFM today do not provide an adequate foundation for future enhancements.

As systems and capabilities in TFM evolved, there was insufficient attention paid to their integration. The Traffic Management Units of today are crowded with workstations that provide piecemeal operational information and tools, but do not come together to formulate a dynamic, complete view of the operation or to provide optimal support to operational decision-making. Many of the functions performed by Traffic Managers require manual assimilation of data from various sources. Similarly, limited modeling capabilities necessitate mental integration and projection of data into the future. The potential impact of some traffic management initiatives is not known until the initiative is implemented. Traffic Managers do their best to estimate the impact by gathering data and applying their experience of how the initiative has performed in the past. Not only are these processes cognitively demanding and workload-intensive, they also make the effectiveness of the outcome highly dependent on the individual's skills and experience.

A comprehensive view of NAS status and the initiatives that are already in place will provide Traffic Managers with the information they need to identify problems earlier and to make better decisions. Better modeling capabilities will allow them to assess the effectiveness and potential impact of their decisions before they are implemented and eliminate the wait-and-see approach that is used today.

The SFMEE initiative will provide analysis and documentation needed for CATMT Work Package 4 (WP4) to achieve Final Investment Decision (FID) in the fourth quarter of FY 2015.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The overall philosophy driving the delivery of CATM services in NextGen is to accommodate flight operator preferences to the maximum extent possible, and to impose restrictions only when a real operational need exists to meet capacity, safety, security, or environmental constraints. CATM strives to adjust airspace and other assets to satisfy forecast demand, rather than constraining demand to match available assets. If constraints are required, maximizing user opportunities to resolve those constraints, based on their own preferences, is a goal.

The current system uses relatively blunt tools to manage demand and capacity imbalances. The tools do not "share" objectives for flights, nor do they have a common picture of the structure and status of NAS. While great strides have been made in the management of flow, this lack of common objectives, status and structure constrains improvement. The system needs to minimize the over constraint demand and assure efficient operations once constrained. Constraining flights needlessly costs carriers and the traveling public time and money. On the other hand, failing to accurately forecast constraints and manage demand when they are warranted also generates costs. Users have limited ability to specify their preferred alternatives when a constraint is required; creating a need to allow input from users on resolving imbalance issues.

The CATM portfolio supports three benefit areas: improved flight efficiency, improved route flexibility, and increased airspace capacity. The net result of CATM changes through 2015 will be the following:

- Aggregate flight efficiency is increased by factoring individual flight trajectories into the congestion solution
- User route flexibility is increased through negotiated trajectories for congestion resolutions. Collaborative Airspace Constraint Resolution (CACR) may apply these user-furnished options when adjusting the routing or delays assigned to flights, thus providing some added flexibility to the operator when fleet planning
- Fewer en route capacity constraints are imposed as congestion is resolved through tailored incremental congestion responses

How Do You Know The Program Works?

CATM encompasses the airspace and airports within the NAS. Since its beginning CATM has made great progress expediting the integration of new technologies within these domains. Below are examples of such successes and planned activities that have and will continue to improve the overall operations within the NAS.

A. Collaborative Air Traffic Management Technology – WP3

CATMT work packages operate on the TFMS platform. The Post Implementation Reviews (PIRs) that have been done on earlier CATMT enhancements show the following improvements:

- The PIR performed on the completion of ETMS v8.2 showed that Airspace Flow Program was successful insaving the aviation community approximately $38 million from June 2006 - December 2006
- The PIR performed on the completion of ETMS v8.3 showed that Adaptive Compression was successful in saving $22 million per year since it's deployment
- The PIR performed on ETMS v8.4 deployed in May 2007 resulted in a more usable system, although it did not quantify cost savings

Post Implementation Reviews (PIRs) will be conducted after WP3 capabilities (section A and B) listed above have been deployed. Metrics are being developed to measure the contribution of the work package efforts to the NAS

B. Strategic Flow Management Application

- Planning to conduct engineering analysis on future integration needs between TFMS and ERAM for deployment of Airborne Reroute (ABRR) into the NAS with integration between TFMS and ERAM
- Create Preliminary Design Document which will identify potential enhancements to current communication process between AOC and TMC, and TMC and En Route controllers

C. Strategic Flow Management Enhancement – WP4

- Complete Final Investment Decision (FID) in the fourth quarter of FY 2015.

Why Do We Want/Need To Fund The Program At The Requested Level?

$13,491,000 is required for the Collaborative Air Traffic Management (CATM) Portfolio. These funds are required to keep the efforts on their planned schedule for completion during CY 2015. A reduction would impact the overall schedule and will impact the ability to complete during CY 2015. A funding reduction will also result in a delay of the WP3 and expected future WP4 benefits.

Detailed Justification for - 2A16 Time Based Flow Management (TBFM) Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – Time Based Flow Management (TBFM) Portfolio
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
TBFM - Portfolio	$14,121*	$13,984*	$21,000	+$7,061

*indicates a comparability adjustment to prior budget structure

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Time Based Flow Management – Work Package 3	---	$20,500.0
B. TBFM Technology Refresh	---	500.0
Total	Various	$21,000.0

The Time-Based Flow Management (TBFM) Portfolio, as stated in the NextGen Implementation Plan, enhances system efficiency and improves traffic flow by leveraging the capabilities of the Traffic Management Advisor (TMA) decision-support tool, a system that is already deployed to all contiguous US Air Traffic Control Centers (ARTCCs). Currently, the TMA system provides time-based management (TBM) capability daily throughout the NAS. TMA has been field-tested over the past 10 plus years and is installed in the 20 Air Route Traffic Control Centers (ARTCCs) with supporting equipment in most of the major airports served by those centers. Its systems require a technology refresh.

- The TBFM program office, starting in the FY 2015 time frame, will begin the Investment Analysis (IA) process to reach a Final Investment Decision (FID) to replace this hardware through a technology refresh
- TBFM Technology Refresh will replace-in-kind the operational TBFM hardware that was deployed in 2012-2013 with new equipment in the FY 2018 - 2019 time frame
- The current hardware will begin to reach its end of service/end of maintenance by 2017

A. Time-Based Flow Management (TBFM) Work Package 3 (WP3)

Upon receiving approval of the Final Investment Decision (FID) in FY15, the FY 2015 $20,500,000 funds requested will be placed on contract and the program will begin implementation of the WP3 capabilities. The funding in FY 2015 is for implementation activities such as engineering analysis, design and initial development for Terminal Sequencing and Spacing (TSS). TBFM WP3 also will assess and refine requirements and schedule synchronization levied by WP3 on other programs, such as En Route Automation Modernization (ERAM) and Terminal Automation Modernization Replacement (TAMR).

B. TBFM Technology Refresh

In FY 2015 $500,000 is requested to support IA activities for the Technology Refresh effort. The current equipment which was purchased in 2013 and prior years will have reached end-of-life and will reach its end-of-service/maintenance by 2017.

What Is This Program?

TBFMWP3 will modernize and enhance the current TMA System. TMA is a vital part of the NAS and enhances air traffic operations by reducing delays and increasing efficiency of airline operations. TMA is an automation system currently available to enable the use of time-based metering and optimize the flow of aircraft as they approach and depart congested airspace and airports. TBFM uses Time Based Metering (TBM) to optimize use of NAS capacity. TBM determines specific time of arrival for points in an aircraft's route and Air Traffic Control (ATC) manages the flights to those times. This results in a systemic and efficient flow of aircraft to the terminal airspace, starting hundreds of miles away. ATC using this technique can assure that aircraft arrive properly sequenced and spaced to maximize capacity at the nation's busiest airports.

TBFM will improve upon TMA and supports NextGen Operational Improvement. TBFM WP3 is a follow-on phase of TBFM Work Package 2 (WP2) that will implement additional NextGen concepts such as Path Stretch to provide advisories to more efficiently meet metering times; Terminal Sequencing and Spacing (TSS) to provide efficient sequencing and runway assignment; expansion of the Integrated Departure/Arrival Capability (IDAC) to additional locations; and make TBFM more flexible to accommodate reroute operations during adverse weather conditions. The design, development and deployment of these concepts will occur during the 2015-2019 timeframe. These enhancements support the current NextGen Operational Improvements, which are not currently included in the NGIP 2013 schedules, are listed below:

- Integrated Departure/Arrival Capability (IDAC) 2-Geographical expansion of IDAC to 15 ARTCCs. IDAC automates the process of monitoring departure demand and identification of departure slots. The capability increases NAS efficiency and reduces delays (OIs 104117- Improved Management of Arrival/Surface/Departure flow Operations and 104122- Integrated Arrival/Departure Airspace Management)
- Point-in-Space Metering – Provides the flexibility to enable alternate, Predefined Meter Points (PDMP) in en route airspace, which will help to support metering during reroute operations when nominal meter points are not available or useable due to weather or changes to traffic flows. (OI 104120-Point-in-Space Metering) Time-Based Metering in the Terminal Environment – Supports a time-based sequencing and spacing capability in the terminal environment by providing TBFM runway and sequence assignment information to terminal automation for display to controllers (OI 104128- Time-based Metering in the Terminal Environment)

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

With increasing demand, the need grows to achieve peak throughput performance at the busiest airports and in the busiest arrival/departure airspace. The TBFM WP3 capability improvement via new procedures improve overall tactical flow management into and out of busy metropolitan airspace, is needed to maximize traffic flow and airport usage. Essentially the problem is getting the right aircraft to the right runway, in the right order and time, to minimize its individual impact on the system and maximize the use of these airports. Thus, operations are enabled to achieve maximum throughput while facilitating efficient arrival and departure.

TBFM Tech Refresh will replace-in-kind TBFM operational hardware deployed in 2012-2013 with new equipment in the FY 2018 - 2019 time frame to enable TBFM to continue to provide NAS efficiency benefits.

How Do You Know The Program Works?

TBFM is the next evolution on the TMA system by adding more sophisticated software to implement the Operational Improvements in the NextGen Implementation Plan. Implementation builds upon a re-architected system which supports increased capability. In FY 2012, TBFM deployed Flexible Scheduling which reduces total delays within the NAS by minimizing occurrences of unused arrival slots. In FY 2013, TBFM completed the deployment of the re-architected system to 20 ARTCCs. This resolved the issue of

TMA hardware obsolescence and reduced the logistical footprint. The program also completed deployment of TBFM to additional Operational Evolution Plan (OEP) Airports (CLE, DCA, BWI, SAN) in July.

TBFM WP3 will build upon the improvements delivered in TBFM WP2. TBFM determines specific time of arrival for points in an aircraft's route. This results in a systemic and efficient flow of aircraft to the terminal airspace, starting hundreds of miles away. Aircraft using this technique can arrive properly sequenced and spaced to maximize capacity at the nation's busiest airports. TBFM, formerly called TMA, has been field-tested over the past 10 years and is installed and operational in the 20 ARTCC) with supporting equipment in most of the major airports served by those centers. TBFM WP3 benefit mechanisms include increased metering over a larger horizon extending to the runway, improved trajectory planning, and improved predictability. The benefits due to these mechanisms will be qualified and quantified as part of the investment analysis process during FY 2014.

Why Do We Want/Need To Fund The Program At The Requested Level?

$21,000,000 is required to continue with the program's initiative to focus on the development of trajectory-based terminal operations and flow management in support of NextGen, and to start the investment analysis to support tech refresh of the end- of-service/maintenance. FY 2015 funding at this level will enable TBFM WP3 to begin to develop functions such as TSS. Thus, meeting NextGen and FAA milestones of delivering enhancements and enabling benefit of avoided delays and enable the benefits of Performance Based Navigation (PBN). The new capabilities provided by WP3 are Metering During Reroute Operations (MDRO), Path Stretch, TSS, and Integrated Departure and Arrival Capability (IDAC) Phase 2. In general, WP3 capabilities are associated with achieving increased arrivals and departures in areas where demand for runway capacity is high, airports have multiple runways interacting with airspace and taxiing, and close proximity airports with potential interference to airspace/approach. WP3 includes funding to integrate with the TRACON STARS/TAMR and the ARTCC ERAM systems.

Detailed Justification for - 2A17 Next Generation Weather Processor (NWP) Work Package 1 (WP1)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Next Generation Weather Processor NWP) Work Package 1 (WP1)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Next Generation Weather Processor (NWP) (WP1)	$0	$11,475	$23,320	+$11,845

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Prime Development Contract (Hardware and Software)	---	$18,212.0
b. Program Management and System Engineering	---	3,820.0
c. Test and Evaluation (Tech Center)	---	618.0
d. Tech Transfer Support	---	471.0
d. NAS Implementation (Planning and Site Preparation)	---	196.0
e. Integrated Logistics Support	---	3.0
Total	Various	$23,320.0

For FY 2015, $23,320,000 is requested for the Next Generation Weather Processor (NWP) Work Package 1 (WP1) to provide the following:

- Begin NWP WP1 Solution Development
- Complete WP1 Preliminary Design Review (PDR)
- Maintain 0 - 8 hour convective weather prototype operations (i.e., CoSPA)
- Execute Project Management oversight by the government

What Is This Program?

The goal of the NWP program is to establish a common weather processing platform that will functionally replace the legacy FAA weather processor systems and host new capabilities. As input, NWP WP1 uses information from the FAA and National Oceanic and Atmospheric Administration (NOAA) radar and sensors and NOAA forecast models. NWP WP1 uses sophisticated algorithms to create aviation-specific current and predicted weather. NWP WP1 creates value-added weather information that will be available via the Common Support Services-Weather (CSS-Wx) system. It will perform weather translation, which will enable the use of weather information by automated decision-support tools (DSTs). NWP WP1 will also provide aviation safety related windshear and microburst products. Altogether, these features will aid in reducing the rising operations and maintenance costs by consolidating the following systems, funded under separate Budget Line Items (BLIs), over its lifecycle:

- Corridor Integrated Weather System (CIWS): Provides 0 - 2 hour aviation weather information to the Traffic Flow Management System (TFMS) and associated users
- Weather and Radar Processor (WARP): Provides weather information to en route air traffic controllers; air traffic supervisors and traffic management coordinators
- Integrated Terminal Weather System (ITWS), which is funded under 2B20: Provides weather information to terminal air traffic supervisors and controllers

DOT Strategic Goal - Economic Competitiveness
- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

Weather information is needed for air traffic management (ATM) and flight operations decisions. Current aviation weather processing infrastructure and abilities are inadequate to meet real-time needs of ATM DSTs, operational decision-makers, and NextGen. Existing aviation weather products lack the spatial resolution and time accuracy needed for decisions involving key weather phenomena impacting aviation. Current legacy information is in unusable form for integrated use in ATM DSTs for the potential impacts on aircraft. Aviation weather products are often inconsistent, redundant, or are not accurate. Current legacy processing are closed architectural systems and incompatible with one another. Legacy weather infrastructure is too limited and unable to ingest and process observation, forecast, and modeling data to meet high-quality products with a longer time horizon. Existing legacy software is inefficient, difficult to modify, and unable or incompatible to serve users across multiple domains.

NWP WP1 will provide the following benefits:

- Transition to operations of reliable, high resolution products of aviation-relevant weather that meet the needs of users and their DSTs
- Generate Weather information in a form useable by ATM DSTs such as indices that indicate the severity of weather conditions for various parameters (e.g., convection) and the impact of the conditions on various aircraft types and configurations
- Scalable and expandable processor architecture serving multiple domains with capacity to support the intensive processing demands of advanced applications
- Portable, non-proprietary, open software applications to subsume legacy functionality and meet NextGen requirements
- Probabilistic weather information with regard to specific airspaces

How Do You Know The Program Works?

NWP WP1 is currently in Investment Analysis. An Initial Investment Decision (IID) occurred at the end of fiscal year 2013. The NWP Program conducted a Market Survey with Industry to determine vendor capabilities. The NWP also performed numerous Request for Information (RFI) inquiries with Industry, obtaining information that allowed the project team to better plan the acquisition. The NWP Program has developed a Screening Information Request (SIR) package that was released in fiscal year 2014. Final Investment Analysis activities are currently taking place. The baseline will be established at Final Investment Decision (FID), targeted for the end of fiscal year 2014.

NWP WP1 is tied to producing aviation-relevant weather that meets the needs of users and their decision-support tools. When combined with the optimization of weather observations, improved predictions, probabilistic predictions, and translation into direct airspace constraints, users will be able to identify the best routes to fly for their aircraft type, flight plan and flying preferences, and for traffic flow management to optimize the airspace capacity given the weather constraints and demand. Advanced NWP WP1 products will also benefit other NextGen portfolios, including separation management portfolio, on demand NAS portfolio, collaborative ATM portfolio, time based flow management portfolio, and improved surface/Terminal Flight Data Manager (TFDM) portfolio.

The Corridor Integrated Weather System (CIWS) Prototype has undergone extensive user demonstrations/evaluation. It has been evaluated and found to provide accurate results over a two-hour period. Prototype users have attested to its effectiveness in support of strategic planning. Similarly, the 0 - 8 hour prototype product has achieved highly positive user evaluation. The NWP WP1 Program has hardened the code and produced documentation associated with the legacy prototypes as part of a Government Furnished Information (GFI) package for this investment.

Why Do We Want / Need To Fund The Program At The Requested Level?

$23,320,000 is required to continue work for the NWP WP1. As stated above, NWP WP1 provides a weather processing platform that will replace the existing (aging) FAA weather processor systems, and will also provide new capabilities to meet the anticipated needs of DSTs and operational decision makers in the NextGen era.

A reduction in the NWP WP1 funding would cause a significant impact on the planned NWP contract which will ultimately impact the Initial Operating Capability (IOC) milestone. CIWS would need a technology refresh in the same time frame which would be avoided by subsuming CIWS functionality into NWP. The WARP program would continue funding the maintenance and sustainment contract.

Detailed Justification for - 2A18 Airborne Collision Avoidance System X (ACASX)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Airborne Collision Avoidance System X (ACASX)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Airborne Collision Avoidance System X (ACASX)	$0	$0	$12,000	+$12,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Airborne Collision Avoidance System X (ACASX)	---	$12,000.0

For FY 2015, $12,000,000 is requested to support formal standards development activities of ACAS X within Joint RTCA SC-147/EUROCAE WG-75 forum (Xa and Xo variants). Efforts in 2015 will be focused around freezing the ACAS X design within RTCA and beginning the process of codifying system requirements in formal Minimum Operational Performance Standards (MOPS) format.

Funds are also requested to support the continued performance monitoring of existing Traffic Alert and Collision Avoidance Systems II (TCAS II v6.04a, V7.0, v7.1), the maintenance and sustainment of TCAS Resolution Advisory Monitoring System (TRAMS) field equipment, the upkeep of US encounter models (Correlated, Uncorrelated, Mini-Models, etc.) and corresponding simulation toolsets (i.e., surveillance, spectrum, stress testing, and encounter/safety assessment simulators); and Continued Certification Support and Independent V&V of Manufacturer TCAS Equipment.

What Is This Program?

Aircraft flying in the NAS began equipping with the Traffic Alert and Collision Avoidance System (TCAS) in 1990. The TCAS display is mounted in the cockpit to warn pilots of collision risks with other aircraft. There are currently two versions of TCAS. TCAS I is a low-cost version of the system that provides traffic advisories only. TCAS II is a more capable version that can provide resolution advisories (RAs) telling the pilot the specific vertical maneuvers that are necessary to avoid potential midair collisions. TCAS II is required in U.S. airspace for all commercial aircraft with 30 or more seats and on all cargo aircraft with a maximum certified take-off weight greater than 33,000 pounds.

Existing TCAS has been very effective in mitigating the risk of mid-air collisions. Safety studies indicate that TCAS II reduces risk of mid-air collisions by 75 – 95 percent in encounters with aircraft that are equipped with either a transponder (only) or TCAS II respectively. In order to achieve this high level of safety, however, the alerting criteria used by TCAS II often overlap with the horizontal and vertical separation associated with many safe and legal airspace procedures. TCAS II monitoring data from the U.S. indicate that as many as 90 percent of observed Resolution Advisories (RAs) are due to the interaction between TCAS II alerting criteria and normal ATC separation procedures (e.g., 500 feet IFR/VFR separation, visual parallel approach procedures, level-off with a high vertical rate 1,000 feet above/below IFR traffic, or VFR traffic pattern procedures). Separation statndards may be decreased in the future in order to achieve intended efficiencies in the airspace, so the standards in collision avoidance alerting thresholds may need to be updated minimizing "nuisance alerts". Initial examination of NextGen procedures such as Closely Spaced Parallel Operations (CSPO) or use of three nautical mile en-route ATC separation indicate that existing ACAS performance is likely not sufficient to support these future airspace procedures. As a result, a new approach to airborne collision avoidance is necessary.

The FAA has been researching a new approach to airborne collision avoidance for the past several years – known as Airborne Collision Avoidance System X (ACAS X). This new system, called ACAS X, will have four variants: the first two are called ACAS X_A and ACAS X_P, which refer to the means by which they perform the surveillance and coordination functions- X_A will have active means to collect that data, where X_P will acquire the information passively. The third variant, ACAS X_U is tailored for Unmanned Aircraft Systems (UAS). Finally, ACAS X_O is the variant used for specific operations in NextGen, such as parallel approaches, that may cause excessive alerts with current TCAS avionics.

This new approach takes advantage of recent advances in dynamic programming and other computer science techniques to generate alerts using an off-line optimization of resolution advisories. This approach uses extensive actual aircraft data to generate a highly accurate dynamic model of aircraft behavior and sensor performance. Based on a predetermined cost function and using advance computational techniques, this approach generates an optimized table of optimal actions based on information regarding intruder state information. This approach significantly reduces logic development time and effort by focusing developmental activities on developing the optimization process and not on iterative changes to pseudo-code.

Initial evaluations of this approach have been conducted using the same Monte Carlo safety simulation employed in recent TCAS v7.1 safety studies. These studies indicate that, compared to existing TCAS II, the new approach significantly reduces the probability of a Near Mid-Air Collision (NMAC) while also significantly reducing the number of alerts and RA reversals. In addition to enhanced alerting and safety, development of associated new surveillance logic also has the potential to dramatically reduce use of the 1030/1090 MHz spectrum. Initial research on improved ACAS surveillance logic indicates that a 40 percent reduction in spectrum can be achieved and further reductions are likely.

Based on these very promising initial results, the FAA is working towards developing preliminary performance standards over the next five years. This system can accommodate surveillance information in addition to Mode S surveillance and is designed to be compatible with legacy TCAS.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

As reflected in RTCA DO-337, Recommendations for Future Collision Avoidance Systems (published March 21, 2012), an improved future collision avoidance system is required to facilitate NextGen procedures and applications (i.e., continuous descent approaches (CDA), curved Required Navigation Performance (RNP) approaches, closely spaced parallel runways approaches, aircraft-based merging and spacing, closer parallel en route operations, lateral passing maneuvers in non-radar airspace) and to compensate for issues in existing TCAS performance (i.e., nuisance alert rate).

How Do You Know The Program Works?

TCAS is certified equipment currently mandated by a number of countries and equipped on approximately 25,000 aircraft worldwide on airline, cargo, business, and government including military aircraft. Accident and incident statistics have validated the safety benefit provided by TCAS. TCAS has been credited with averting near mid-air collisions in a significant number of documented encounters. Since its introduction, a number of programs have been established to monitor the performance of TCAS II. These programs are used to facilitate evaluation of the safety improvement it provides and its operational acceptability to pilots and controllers. The TCAS Operational Performance Assessment (TOPA) program was established in 2008 to quantitatively characterize and assess the operational performance of TCAS units that are currently operating in the NAS.

Why Do We Want / Need To Fund The Program At The Requested Level?

A reduction of funding in FY 2015 will significantly delay the targeted delivery date of initial MOPS for ACAS X, as well as reduce the support required to complete the operational validation and software verification assessment of the new logic. The development timeline for ACAS X_a is aligned with the "ADS-B Out Mandate" compliance timeframe and a delay in MOPS would result in lost opportunity to minimize operator costs by missing this equipage window.

Additionally, a funding reduction in FY 2015 would also impact the ability of the Program Office to continue the safety monitoring activities associated with current TCAS II (TRAMS - TCAS Resolution Advisory Monitoring System and TOPA TCAS Operational Performance Assessment) system performance sustainment, as well as the sustainment and tech refresh of legacy TCAS II logic and all independent manufacturer system verification and validation support the PO provides to AVS.

Detailed Justification for - 2A19 Data Communications in Support of NextGen

What Is The Request And What Will We Get For The Funds?

FY 2015 – Data Communications in Support of NextGen
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Data Communications in Support of NextGen	$135,169	$115,450	$147,340	+$31,890

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Segment 1 Phase 1 (S1P1)		
a. Program Management	---	$10,448.5
b. DCL Trials	---	320.4
c. Systems Engineering	---	8,176.8
d. Monitoring and Control (M&C)	---	647.0
e. Operational Test	---	1,888.3
f. Tower	---	2,160.4
g. En Route	---	14,976.3
h. DataComm Integrated Services (DCIS)	---	17,812.7
i. DataComm Network Service (DCNS)	---	18,069.6
j. Avionics Equipage Initiative	---	21,600.0
k. Independent Operational Test and Evaluation (IOT&E)	---	800.0
Total (S1P1)	Various	$96,900.0
B. Segment 1 Phase 2 (S1P2)		
a. Program Management	---	$6,089.7
b. Systems Engineering	---	13,071.2
c. En Route	---	12,987.8
d. En Route Trials	---	10,864.7
e. DataComm Integrated Services (DCIS)	---	6,298.4
f. DataComm Network Service (DCNS)	---	4,128.2
g. 4D Trajectory Demonstration	---	2,000.0
Total (S1P2)	Various	$50,440.0

For FY 2015, $147,340,000 is requested for the Data Communications (DataComm) program. This funding supports the development of Segment 1 Phase 1 (S1P1) and Segment 1 Phase 2 (S1P2) work. DataComm S1P1 includes Departure Clearance (DCL) service in the tower environment, and will be implemented beginning in FY 2016. S1P2 includes enhancements to En Route services, and will be implemented beginning in FY 2019.

A. Segment 1 Phase 1 (S1P1)

For FY 2015, the Data Communications (DataComm) program is requesting a total of $96,900,000 for S1P1, of which $800,000 is for IOT&E activities. The funding for S1P1 will enable the initial deployment of the DataComm Network Service (DCNS) to the tower key sites. In addition, deployment for Tower Data Link Service (TDLS) and En Route Automation Modernization (ERAM) Release 4 (R4) software will take place, and operational telecommunications links will be procured.

Funding is required to continue the integration and engineering services from the DataComm Integrated Services (DCIS) vendor; which includes systems integration and implementation and administration of the Avionics Equipage Initiative to incentivize DataComm avionics equipage.

There will be systems integration testing, operational testing, site acceptance testing, spectrum engineering, program and engineering management, deployment planning and coordination, and second level engineering support.

B. Segment 1 Phase 2 (S1P2)

For FY 2015, DataComm is requesting $50,440,000 for S1P2. This funding will enable continuation of the En Route Automation Modernization (ERAM) upgrades for initial En Route services. In FY 2015, requirements will be finalized and the final system specifications will be reviewed. This leads to initial software development activities. When this software package is complete, a number of foundational services will be provided that make continuous data communication between airborne planes and their controlling ground facilities possible.

Funding is required to continue efforts under the DataComm Integrated Services (DCIS) contract, including the network engineering and design for En Route airspace, as well as integration and engineering services such as support for systems integration, avionics validation and interoperability, system performance and capacity loading, failure modes and effects analysis, reliability/maintainability/availability, network security, human factors, etc.

Support services will be required for the development and planning of systems integration, second-level testing, operational testing, deployment, implementation, spectrum engineering, En Route operational trials, and program and engineering management. Funding will also be needed for En Route spectrum bandwidth clearing. Successful completion of these activities will support the objective of achieving Initial Operating Capability (IOC) by the planned 2019 date.

The requested funding for S1P1 and S1P2 is also intended to support RTCA Task Force 5 Recommendations 16, 17, 39, 44, and 42. DataComm is supporting these recommendations by completing the following activities between FY 2013 and the mid-term (FY 2020):

- Conduct Departure Clearance (DCL) operational trials at Memphis and Newark airports
- Implement departure clearance capability (DCL) in the tower environment via VHF Data Link mode 2 for aircraft equipped with Future Air Navigation System 1/A+
- Achieve Final Investment Decision (FID) on En Route applications and services
- Initiate development of En Route automation enhancements
- TDLS engineering and software enhancements to accommodate flight plan changes correlated in ERAM
- Software enhancements to the protocol gateway to support the En Route core services of initial check-in and transfer of communications
- Upgrade air/ground network for expanded En Route services
- Achieve IOC for initial En Route Services

The requested funding for 4D Trajectory Demonstration is to provide analysis of feasibility of advanced trajectory management in NextGen timeframes; validation report on capability and safety of current standards and recommendations for future standards; and benefits analysis of advanced trajectory management. This demonstration will show the benefits of a limited DataComm ATN Baseline 2 to support future DataComm investment for ground and flight deck.

What Is This Program?

The DataComm program will provide data communications between ATC facilities and aircraft, and will serve as an enabler for the Next Generation Air Transportation System (NextGen) operational improvements. DataComm is necessary to transition from voice-based ATC communications system to data-centric NextGen.

DataComm will:

- Improve controller productivity and reducing controller workload by automating delivery of routine clearances
- ImproveNAS capacity and reducing flight delay by enabling existing controller staffing to handle increased traffic
- Enhance safety by reducing operational errors associated with voice communications
- Enable many of the NextGen operational improvements that require negotiation or exchange of information that cannot be efficiently delivered via voice communications

DataComm Segment 1 will deliver the initial set of DataComm services integrated with automation support tools, which provides NAS benefits and lays the foundation for a data-driven NAS. DataComm Segment 2 will enable more advanced NextGen operations, which would not be possible using the existing voice systems.

Near-term DataComm program efforts include (FY 2013 - FY 2015):

<u>S1P1</u>

- Full Formal Departure Clearance (DCL) Operational Trials and Validation (at Memphis and Newark) – September 2013
- DCNS FANS Build 1 Delivered at WJHTC – May 2014
- DCNS FANS Build 2 Delivered at WJHTC – November 2014
- Accepted DCNS FANS Service at Tower Key Site – January 2015
- ERAM R4 Initial Test Release (ITR) – June 2014 (APB Milestone)
- Tower Data Link Services (TDLS) V12 Initial Test Release – July 2014
- System Integration Release (SIR) – September 2014
- Completion of Formal Integration – December 2014

<u>S1P2</u>

- Requirements Review– August 2014
- Final Investment Decision (FID) for En Route Services – October 2014
- System Requirements Design Technical Interchange Meeting (TIM) – November 2014

Long-term DataComm program efforts include (FY 2016 - FY 2023):

<u>S1P1</u>
- Initial Operating Capability (IOC) for Tower Services – March 2016 (APB Milestone)
- In-Service Decision (ISD) for Tower Services – December 2016 (APB Milestone)
- Final IOC for Tower Services (57 Towers) – May 2019 (APB Milestone)

<u>S1P2 Planning dates</u>

- Complete software development – May 2017
- Complete developmental testing – October 2017
- Operational Testing – February 2019
- IOC for initial En Route Services – September 2019

DOT Strategic Goal – Economic Competitiveness
- Maximum economic returns on transportation policies and investments

Why Is This Particular Program Necessary?

DataComm is needed to bridge the gap between current voice-only ATC and the data-intensive NextGen. DataComm will enable air traffic controller productivity improvements, and will permit capacity growth without requisite cost growth associated with equipment, maintenance, and labor. DataComm is comprised of automation enhancements for air traffic control message generation and exchange (hardware and software), and the communications data link between ground and airborne users. Current analog voice communications contribute to operational errors due to miscommunications, stolen clearances, and delayed messages due to frequency congestion. In FY 2004 and FY 2005, approximately 20 percent of En Route operational errors were voice communication related. Of those, 30 percent of the high severity operational errors were deemed to be communications related. DataComm will significantly reduce communications related operational errors and improve the safety of air travel. Segment 1 Phase 1 will lay the foundation for a data-driven NAS.

The capacity and productivity of the NAS will be improved by DataComm. Initially, DataComm will be used in conjunction with the current traffic control strategies as well as planned strategies such as traffic flow management (TFM) re-routes. DataComm will increase controller efficiency by automating routine exchanges. As controllers become more productive, tower and En Route capacity will grow without the need to assign additional resources. This increase in traffic handling ability has a direct correlation to reduced delays and increased efficiency - recent benefits analysis suggests airline operations will benefit from reduced gate delay and taxi times, improved on-time performance and the opportunity to expand flight schedules. The busiest positions in airport clearance delivery positions at Core 30 airports will see the most dramatic benefit.

How Do You Know The Program Works?

The DataComm program is currently in the solution implementation phase for S1P1. Upon deployment, DataComm S1P1 will provide delay savings by reducing ground delays through enhanced terminal services. Through analysis and simulation it has been determined that the Aircraft Direct Operating Cost (ADOC) benefit associated with this DCL capability will be approximately $215 million through 2042. With the addition of Passenger Value of Time (PVT) benefit, there will be at least $700 million more in benefits. DataComm will begin to accrue benefits after Initial Operating Capability (IOC) in FY 2016.

The Program has continued to meet S1P1 Acquisition Program Baseline (APB) milestones such as the Critical Design Review (CDR) for En Route Automation Modernization (ERAM) and the Preliminary Design Review (PDR) and CDR for the Tower Data Link Services (TDLS).

DataComm S1P2 is currently in the Final Investment Analysis phase and has a planned FID date of October of 2014. The enhancements provided in Phase 2 of DataComm will generate benefits such as delay savings and flight efficiency in the En Route environment. These enhancements will increase throughput, while reducing controller workload. The reduction in workload of En Route controllers will provide cost avoidance to the FAA. The benefits analysis shows that sector capacity should increase by 15 percent to 21 percent depending upon altitude. That means there can be more planes in the air during peak hours.

Why Do We Want/Need To Fund The Program At The Requested Level?

The DataComm Program needs to be funded at the requested level in order to execute the multiple threads of activity that need to come together in FY 2015 so that DataComm will be able achieve an IOC for (S1P1 tower services in FY 2016. These activities include: end-to-end integration testing, formal operational testing, field familiarization, testing and deployment of En Route Automation Modernization (ERAM) software and Tower Data Link Service (TDLS) software with DataComm enhancements, training, tower spectrum bandwidth clearing, ground telecommunications upgrades and installations, network service supporting testing activities, avionics equipage, outreach to industry, and integration and engineering services. These activities are augmented by program management and systems engineering support.

Funding for DataComm S1P2 will enable software engineering for the ERAM system to accommodate enhancements for En Route controller-pilot data communications. Additional activities include network engineering to deploy the Data Communications Network Service to En Route airspace, spectrum bandwidth clearing for En Route airspace, En Route operational trials, and Data Communications Integrated Services (DCIS) integration and engineering services. These activities are augmented by program management and systems engineering support.

Funding in FY 2015 is required to ensure a seamless integration into overall ERAM deployment, which is critical to achieving the initial roll-out of DataComm En Route services. All of these activities will support the objective of achieving IOC for initial En Route services by the planning date of 2019.

Detailed Justification for - 2B01 Airport Surface Detection Equipment – Model X (ASDE-X) Technology Refresh (TR) and Disposition

What Is The Request And What Will We Get For The Funds?

FY 2015 – Airport Surface Detection Equipment – Model X (ASDE-X) – Technology Refresh and Disposition
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
ASDE-X Technology Refresh (TR) and Disposition	$7,013	$12,100	$5,436	-$6,664

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Hardware/Software Engineering Services	---	$2,436.0
b. Program Management	---	2,500.0
c. Second Level Engineering	---	500.0
Total	Various	$5,436.0

For FY 2015, $5,436,000 is requested to complete hardware procurement for the ASDE-X processor replacement project. Funds will also be used to continue processor replacement site implementation and for contractor support.

What Is This Program?

ASDE-X is a surface surveillance system that provides air traffic controllers with a visual representation of the traffic situation on the airport movement area and arrival corridors. It improves the controller's ability to maintain awareness of the operational environment and to anticipate contingencies. ASDE-X Safety Logic (AXSL) uses surveillance information from ASDE-X to determine if the current and projected positions and movement characteristics of tracked aircraft and vehicles present a potential collision situation. Visual and audible alerts are provided to air traffic controllers when safety logic predicts a collision.

The first ASDE-X system was delivered in 2002. Some of the equipment has reached the end of its life and is no longer supportable. The ASDE-X technology refresh program provides for the replacement and upgrade of hardware to ensure the continued operation of the surface surveillance system through its designated lifecycle. The ASDE-X program baseline included costs for the periodic replacement of commercial off-the shelf (COTS) system components; e.g., processors, displays, computer operating systems, and commercially available software (CAS).

A study was completed in 2012 to determine the equipment and software that needs to be upgraded, updated, or replaced as part of the ASDE-X Technology Refresh effort. Three of the five potential projects identified in the study were approved.

The three approved projects are:

- Obsolescence/Spare Parts Procurement will increase the depot stock of components that are projected to be depleted from the ASDE-X Depot prior to the end of the ASDE-X lifecycle

- ASDE-X Processor Replacement to replace the obsolete ASDE-X processors with Linux based processors running applications updated via the Airport Surface Surveillance Capability (ASSC) Program. This will reduce the amount of development / design work required to implement this project.
- The Universal Access Transceiver Receiver (UATR) Upgrade modifies the existing UATR in each remote unit (RU) to the updated UATR2 to address existing UATR performance shortfalls. The UATR Upgrade also supports the projected increase in ADS-B message traffic over the ASDE-X lifecycle

All 35 ASDE-X systems are operational and commissioned in the National Airspace System (NAS). The first ASDE-X system was delivered in 2002 and the final system was installed in 2011. ASDE-X systems are located at the following airports:

General Mitchell International Airport, Milwaukee, WI	Orlando International Airport, Orlando, FL
Theodore Francis Green State Airport, Providence, RI	William P. Hobby Airport, Houston, TX
Seattle -Tacoma International Airport, Seattle, WA	Lambert - St Louis International Airport, St. Louis, MO
Hartsfield - Jackson Atlanta Int'l Airport, Atlanta, GA	Bradley International Airport, Hartford, CT
Louisville International Airport, Louisville, KY	Chicago O'Hare International Airport, Chicago, IL
Charlotte - Douglas International Airport, Charlotte, NC	Washington Dulles International Airport, Chantilly, VA
Detroit Metro Wayne County Airport, Detroit, MI	Phoenix Sky Harbor International Airport, Phoenix, AZ
John F. Kennedy International Airport, New York, NY	Los Angeles International Airport, Los Angeles, CA
Ft. Lauderdale/Hollywood Airport, Ft. Lauderdale, FL	Newark International Airport, Newark, NJ
Boston Logan International Airport, Boston, MA	George Bush Intercontinental Airport, Houston, TX
Miami International Airport, Miami, FL	Denver International Airport, Denver, CO
Philadelphia International Airport, Philadelphia, PA	Minneapolis-St. Paul International Airport, Minneapolis, MN
Dallas/Ft. Worth International Airport, Dallas-Fort Worth, TX	John Wayne-Orange County Airport, Santa Ana, CA
Salt Lake City International Airport, Salt Lake, UT	Ronald Reagan Washington National Airport, Washington, DC
Chicago Midway Airport, Chicago, IL	San Diego International Airport, San Diego, CA
Honolulu International – Hickam AFB Airport, Honolulu, HI	New York LaGuardia Airport, New York, NY
Las Vegas McCarran International Airport, Las Vegas, NV	Baltimore-Washington International Airport, Baltimore, MD
Memphis International Airport, Memphis, TN	

DOT Strategic Goal - Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

The ASDE-X technology refresh program will maintain the safety and efficiency benefits attained during ASDE-X system deployment. The first site was delivered in FY2002 and some of the equipment has reached the end of its service life and is no longer supportable. By replacing obsolete and high failure items, the technology refresh effort will maintain the current levels of system availability and reliability. If ASDE-X systems are not operational, safety and efficiency benefits resulting from system deployment will be lost.

The ASDE-X systems provide both safety and efficiency benefits. The primary benefit, increased safety, is achieved by providing air traffic controllers with improved situational awareness. This results in a reduction of the number of Category A and B runway incursions and accidents. Additionally, the improved surveillance capacity allows for more efficient coordination and communication with aircraft, improved mobility, reduced taxi times and delays, and consequently lower costs for aviation providers and customers.

Also, the Runway Status Lights (RWSL) system requires ASDE-X data to function. The RWSL benefits are not achievable without a reliable and available ASDE-X system.

How Do You Know The Program Works?

The ASDE-X Technology Refresh program will be considered successful if after the implementation of technology refresh equipment, the ASDE-X system reliability and availability numbers continue to meet the system specification and requirements especially as the system ages.

The program will be deemed a success if the number of Category A and B runway incursions is maintained at the current levels or further reduced.

Why Do We Want/Need To Fund The Program At The Requested Level?

If the ASDE-X Technology Refresh program is not funded at the requested level, ASDE-X systems in the NAS may see increased system outages. A reduction would result in delays in the procurement and installation of technology refresh equipment. Operational systems may be impacted when parts of the system start to fail and are no longer supportable. Impact to operational systems may also affect the deployment and operation of RWSL systems.

Detailed Justification for - 2B02 Terminal Doppler Weather Radar (TDWR) – Provide

What Is The Request And What Will We Get For The Funds?

FY 2015 – Terminal Doppler Weather Radar (TDWR) – Provide
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Terminal Doppler Weather Radar (TDWR) – Provide	$2,369	$3,600	$1,900	-$1,700

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Program Management and Development of FID Documentation and Artifacts	---	$600.0
b. Logistical Support	---	150.0
c. Second Level Engineering Support	---	400.0
d. Contract Support	---	750.0
Total	Various	$1,900.0

For FY 2015, $1,900,000 is requested for the TDWR Service Life Extension Program (SLEP) Phase 2 technology refresh planning and procurement efforts. Final Investment Decision is planned to be obtained by September 30, 2015 and this funding will be used for the following: Business Case, Cost Analysis, and Artifacts Development; Service Order Agreements with FAA Logistics Center Support for development and analysis of logistical data, scope of work preparation, market surveys, and technical support; Program Directives will be obtained for FAA Second Level Engineering support with engineering studies, technical expertise and support, specification development, test and evaluation, and support with lifecycle cost estimates and benefits formulation. In addition, Contract Support will be utilized for program management of FID and contract procurement preparation, system engineering, and overall documents development and management.

What Is This Program

The TDWR is an important component of the FAA and National Weather Service (NWS) weather information, alerting and forecasting family of monitoring and predicting systems. The current system is facing serious obsolescence issues and must be updated to preclude an adverse, potentially disastrous, impact to the current aviation weather safety initiatives.

The primary mission of the TDWR is to enhance the safety of air travel through timely detection and reporting of hazardous weather conditions including wind-shear events, microburst, gust fronts, and thunderstorms in and near an airport's terminal approach and departure zones. TDWRs are installed at higher-density airports with high occurrences of thunderstorms, and provide controllers current information on severe weather so that they can issue warnings to pilots. TDWRs are operational at 46 airports. TDWR weather data is transmitted to FAA automation systems and also to other federal agencies; see below.

- **TDWRs main customers.** The TDWR Service Life Extension Program serves 46 major airports by providing weather data to the Integrated Terminal Weather System (ITWS) which disseminates windshear products based on TDWR data to major ATCTs and to over one thousand airline dispatchers among seven airline companies.

- **TDWRs primary FAA interfaces.** Nine TDWRs receive windshear and airport wind information from the Low-Level Wind Shear Alert System-Network Expansion (LLWAS-NE++) system. TDWR integrates LLWAS-NE data with its own detections to provide enhanced wind shear protection services at those nine airports. At the 37 airports with no LLWAS-NE, the TDWR receives airport wind data from the Wind Measurement Equipment (WME) (formerly LLWAS-2) or from the Automated Surface Observing System (ASOS). TDWR is also a major weather source for the Corridor Integrated Weather System (CIWS) which further integrates a suite of weather decision aids for en route aviation facilities in the U.S.
- **TDWR serves other federal agencies and the general public.** TDWR provides weather radar data to 34 NWS forecast offices. The TDWR data complements the other radar and non-radar sensor data available to the local Weather Forecast Office (WFO) allowing them to prepare better local forecasts, alerts, warnings and additional products and services provided to the FAA and the general public by NOAA/NWS. The four TDWRs in the Washington, DC area provide data to the Urban Shield Wind Dispersion Project that is operated by the Pentagon Force Protection Agency.

DOT Strategic Goal - Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

The TDWR system has been in service since 1994. It is comprised of a substantial number of proprietary software and hardware components, many of which have become obsolete and present significant supportability problems that worsen with time. Without the SLEP, TDWR outages will become more numerous and lengthy, and support costs will rise faster than with the SLEP.

The previous TDWR SLEP project funding will end in FY 2015 and all projects will be completed by the end of FY 2017. These initial SLEP projects addressed the antenna drive systems, out of date computer processor systems, and several other assemblies which needed to be upgraded and modernized. TDWR SLEP2 will address other TDWR systems that have deteriorated due to aging, and have become obsolete or unsupportable.

How Do You Know The Program Works?

The TDWRs deployed at commercial airports have increased aviation safety through the accurate and timely detection of hazardous aviation weather conditions. The last wind shear related accident at a TDWR protected airport occurred at Charlotte/Douglas International Airport on July 2, 1994 **before** the TDWR was installed and operational. (Aircraft Accident Report (AAR 95-03)).

Weather related delays have been reduced, allowing savings in aviation fuel consumption.

Operational benefits of the system include the real-time detection of microburst, gust fronts, wind shifts, and precipitation, as well as prediction of wind changes that allow improved airfield efficiency when making runway changes. The program will continue to deploy improvements that will lower TDWR operations costs and improve its reliability.

Thus far, the SLEP has eliminated outages due to antenna gear failure, and maintained service availability by replacing parts of the system that are difficult to maintain and support.

Why Do We Want/Need To Fund The Program At The Requested Level?

FY 2015 funds are required to support the TDWR technology refresh planning and procurement efforts. Investigation and analyzes of TDWR system failures are essential to ensure selected projects are the most cost beneficial in maintaining TDWR system availability and reliability. These efforts are needed to obtain Final Investment Decision (FID) by September 2015. A reduction in the FY 2015 appropriation may delay the FID milestone, and may decrease the system service availability. Failure of a TDWR system during hazardous weather could result in an aircraft accident.

Detailed Justification for - 2B03 Standard Terminal Automation Replacement System (STARS) (TAMR Phase 1)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Standard Terminal Automation Replacement System (STARS) (TAMR Phase 1)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Standard Terminal Automation Replacement System (STARS) (TAMR Phase 1)	$32,695	$45,500	$50,700	+$5,200

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Task	Locations/ Quantity	Estimated Cost ($000)
A. TAMR Phase 1		
a. Software Design and Development	---	$2,976.0
b. MDM Hardware Procurement	---	2,492.0
c. G-4 Hardware Procurement	3	12,495.0
d. Site Preparation and Installation	3	4,110.0
e. Logistics	---	3,655.0
f. Program Management Support	---	9,357.0
g. FTI	---	1,236.0
h. Prime Vendor Program Management Support	---	8,518.0
i. System Engineering (COTS/CAS)	---	5,861.0
Total	Various	$50,700.0

TAMR Phase 1 is requesting $50,700,000 for the following:

- $3,000,000 is requested for continuation of STARS software enhancements to implement required security and safety enhancements, and new functionality, upgrades needed for enhanced performance and capacity in support of NextGen initiatives. These include additional tracker changes, priority STRs, and initial efforts for the first TAMR convergence build. The funding will continue to provide for program, system engineering, and technical support. Specifically, STARS will continue coding the merge of the operational builds (R25B and prior) with the TAMR builds (E1). This merge will result in a common software baseline to be used on all current STARS systems.

- $47,700,000 is requested to fund the replacement of the Sun Ultra 5 processors and the obsolete Sony Main Display Monitors (MDM) which is the old Cathode Ray Tube (CRT) type displays with current state of the art high definition flat panel LCD displays. The program will conduct three site surveys and three hardware procurements for the G-1 to G-4 technology. Three STARS operational sites which currently use the Sun Ultra 5 processor will be technically refreshed. In addition to the site specific activities, Commercial off the Shelf/Commercially Available Software (COTS/CAS) tech refresh sustainment engineering efforts will continue. This request also funds the programs non-prime support/activities. (This includes Program Management, Systems Engineering, Risk Management, Finance, Deployment and Project Administration).

What Is This Program?

STARS is a joint Department of Defense (DoD) and FAA program to modernize terminal air traffic control automation systems.

The STARS program funded replacement of the automated radar processing and display systems at 47 TRACONs and their associated Air Traffic Control Towers with Ultra-5 processors and Sony 2K displays (1996 – 2005). The program is currently in a tech refresh cycle. Air traffic controllers use STARS automation and displays to ensure the safe separation of military and civilian aircraft within the nation's airspace. This investment is part of a phased approach to modernizing our terminal air traffic control equipment. Currently the program updates existing TRACONs and towers with state-of-the-art systems featuring, current processor technology, large-screen, high-resolution, LCD displays, and is expandable to accommodate future air traffic growth and new hardware and software. STARS addresses; technology, mobility, and security gaps with the existing systems.

On April 20, 2004, the FAA Joint Resources Council (JRC) directed a phased approach to terminal automation modernization. The JRC approved STARS as a replacement for 47 key site systems, out of the 51 operational STARS sites, within three years. The current scope of the STARS program is to sustain and enhance those systems already deployed. To sustain operations STARS requires technology refresh and software enhancements. A brief discussion of both initiatives follows below:

Technology Refresh: As in any Commercial Off-The-Shelf (COTS) based system, an aggressive hardware technology refreshment program is essential. Planning for technology refresh enables identification and qualification of affected components before they become inoperable due to obsolescence. For example, the processor currently used in STARS is no longer available from the manufacturer. The consequences of obsolescence have collateral implications in the areas of engineering, training, maintenance and many other disciplines.

Terminal (Software) Enhancements: Funding for Terminal Enhancements addresses issues identified by controllers, stakeholders, and operating facilities personnel. This project funds required security enhancements, corrective and perfective changes to enhance system performance and functionality. Enhancements include addressing evolving safety requirements (e.g. Minimum Safe Altitude Warning system and Conflict Alert) and upgrading interfaces with other systems (surveillance, centers, oceanic). Regular reviews of system performance identify and prioritize issues and schedule the work to be completed in any fiscal year. Software changes that are needed to address changes in hardware are done under this program to support the STARS technology refresh activities, and/or the upgrades needed for enhanced performance and capacity.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

STARS is essential to provide safe separation of arrival and departure aircraft in the terminal area of the national airspace system. The STARS system is fully digital and capable of tracking all aircraft within the defined terminal airspace using available FAA or DOD surveillance products, including ADS-B. This system provides functions equivalent to or better than those accomplished by the existing terminal automation systems along with enhanced security. The STARS infrastructure can be expanded and extended to meet increased traffic demands and accommodate the introduction of new automation functions necessary for improved safety, efficiency, and capacity.

Replacing the original Ultra-5 processors, that have reached their end of maintenance, provides technology refreshment which allows for continued STARS system terminal services. The action to remove the Ultra-5's from service is necessary and is driven by expiring battery life, depleted repair capability, parts availability, and performance degradation due to current and future NextGen requirements. Adequate batteries were procured as a one-time buy to insure utilization of the Ultra-5 processors until FY 2015. A further procurement will not be available. Replacing the original Sony 2K CRT (cathode Ray Tube), that have degraded display capability, provides air traffic controllers with high definition displays.

To enable completion of the Ultra 5 replacement, qualification of a new processor, began in FY 2009 and continued into FY 2010 – FY 2011. Procurement and replacement of the first block of replacement processors occurred in FY 2011. This enabled current system availability to be maintained and allow the STARS system to support proposed NextGen capabilities as they are fielded. The new generation of processors will also enable STARS to move into a more open architecture providing benefits in increased Mean Time Between Failure (MTBF) and potentially lower overall system operating costs.

How Do You Know The Program Works?

STARS systems are a vital link in the nation's air traffic control system. Fifty-one STARS systems are successfully operating in the National Airspace System (NAS). For example, STARS is operational at Philadelphia, Miami, Houston, Las Vegas, and Phoenix, all major airports. Over the past five years, the average equipment availability for STARS is 99.9996 percent.

This program will fund the technology refresh activities at 47 of the 51 operational STARS sites.

Why Do We Want / Need To Fund The Program At The Requested Level?

$50,700,000 is required to support the continued high operational availability STARS by incorporating software enhancements/refinements and hardware technology refresh. In addition, STARS supports the automation infrastructure on which to build the future NextGen (ADS-B) operational initiatives.

A reduction in funding will defer procurement of Generation 4 (G4) STARS System processors at five sites. G4 processors are required to replace STARS G1 (SUN Ultra 5) processors that have been in service beginning in 2001. Without these upgrades, STARS cannot support ADS-B and advanced applications due to processor limitations. Reductions to proposed funding will also diminish the procurement of MDM replacement for existing SONY CRTs. The Sony CRTs have reached end-of-life and must be replaced.

Detailed Justification for - 2B04 Terminal Automation Modernization/Replacement Program (TAMR Phase 3)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Terminal Automation Modernization/Replacement Program (TAMR Phase 3)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Terminal Automation Modernization/Replacement Program (TAMR Phase 3)	$144,997	$155,550	$136,150	-$19,400

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
TAMR Phase 3 Segment 1		
a. Solution Implementation	7	$10,400.0
b. Program Management	10	1,500.0
c. Systems Engineering	--	1,000.0
d. Test and Evaluation	--	1,000.0
e. Integrated Logistics Support	--	500.0
f. Implementation	--	9,000.0
Total	Various	$23,400.0
TAMR Phase 3 Segment 2		
a. Solution Implementation	30	$74,000.0
b. Program Management	30	3,800.0
c. Systems Engineering	30	2,500.0
d. Test and Evaluation	30	4,000.0
e. Integrated Logistics Support	30	3,800.0
f. Implementation	12	15,500.0
g. Telecommunications	12	2,000.0
h. ASR-8 Digitizers	---	6,800.0
Total	Various	$112,400.0
Independent Operational Test and Evaluation (IOT&E)	---	350.0

For FY 2015, $136,150,000 is requested for TAMR Phase 3, which includes $23,400,000 to complete the development of software, equipment purchases, site preparation, equipment installation of the STARS system for Segment 1, and $112,400,000 for TAMR Phase 3 Segment 2 for hardware procurement, testing, site preparation, and equipment installation of the STARS system for Segment 2. In addition $350,000 is requested for Independent Operational Test and Evaluation efforts.

What Is This Program?

Terminal Automation systems are essential for controllers to manage the operations at our nation's busiest airports. The automation systems rely on information from radar and weather sensors, along with flight plan information for each aircraft to inform controllers of the aircraft's location and intended path of flight so they can safely and efficiently maintain aircraft separation at or near airports.

The TAMR program provides a phased approach to modernizing the automation systems at the FAA's Terminal Radar Approach Control (TRACON) facilities and their associated Airport Traffic Control Towers (ATCT) throughout the NAS.

TAMR Phase 3 addresses the modernization/replacement of Common Arts automation systems at 103 TRACONs and associated Air Traffic Control Tower facilities with STARS to meet NextGen mid-term goals. The FAA will continue to sustain the automation systems at these sites while monitoring system performance to identify any deterioration in service.

On April 21, 2010, the TAMR Phase 3 Program received Joint Resource Council (JRC) approval to segment the program.

A. Segment 1

On December 21, 2011 the TAMR Phase 3 Segment 1 Program received a Final Investment Decision from the JRC to replace 11 ARTS IIIE automation systems and associated Air Traffic Control Towers with a STARS system in support of ADS-B, and to enable convergence to a single Terminal Automation hardware and software platform by 2017.

The requested funds will be used as follows:

- Complete ORD at Dallas (D10)
- Install equipment at two additional sites
- Purchase hardware for last three sites
- Complete Initial Operating Capability (IOC) at 5th Site

B. Segment 2

The TAMR Phase 3 Segment 2 program will replace 91 ARTS IIEs and six ARTS IEs and associated Air Traffic Control towers with a STARS system and will complete the convergence to a single Terminal Automation hardware and software platform by 2019. The Segment 2 program Final Investment Decision (FID) was approved by the JRC on September 19, 2012.

The requested funds will be used as follows:

- Achieve IOC at five additional sites
- Site preparation activities at 10 additional sites
- Installation of hardware at 12 additional sites
- Procure 30 additional systems

DOT Strategic Goals - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

A. Segment 1

The ARTS IIIE automation systems have commercial-off-the-shelf (COTS) hardware that is either aging or approaching the end of its useful life and will need to undergo technology refresh in order to support ADS-B services in the NAS.

The 11 ARTS IIIE automation systems must be modernized. Their size and importance to the NAS will not allow them to continue to operate with current functionalities indefinitely. These systems were installed or upgraded to their current configuration in the 2000 - 2008 timeframe.

Additionally, the decision was made to converge terminal automation systems to a single terminal automation platform to avoid dual software development costs and resolve hardware supportability issues.

B. Segment 2

The ARTS IIE sites have hardware that is aging, is beyond its useful life, and must be replaced to support ADS-B services in the NAS.The 91 ARTS IIE sites must be modernized. These systems were installed in the 1970s, with processors upgraded to their current configuration in the 2000 – 2002 timeframe.Additionally, the ARTS IIEs, due to lack of processing speed and capacity, are suffering from software stability issues. Without resolution, these sites risk significant decreases in system availability, and with that, increased safety risk.

The ARTS IEs will be replaced to complete the convergence to a single terminal automation system.

How Do You Know The Program Works?

By replacing the 11 ARTS IIIE, the 91 ARTS IIE and six ARTS IE automation systems with a STARS solution it is expected that the system will have the same availability as the current STARS solution. The STARS system is already operational at 51 terminal sites, and over the past five years, the average equipment availability for STARS is 99.9996 percent.

Quantitative benefits (cost avoidance) expected include: cost avoidance to maintain aging equipment, maintaining a single software baseline versus two software baselines, lifecycle benefits of common displays and processors, common hardware for re-use and expansions. Qualitative benefits are expected to enhance controller's situational awareness and lessen risk through efficiency and commonality.

The TAMR program will replace and/or upgrade the existing automation to a state-of-the-art digital, radar and flight data processing and display system, providing new air traffic control workstations and backroom automation equipment to enable safe control of airplanes, continued service and support of ADS-B services in the NAS.

Why Do We Want/Need To Fund The Program At The Requested Level?

$136,150,000 is required to complete the activities. Failure to fund these activities at the requested level will result in delays to the program, increased operational and maintenance costs to support two terminal automation systems in the NAS, failure to meet ADS-B and NextGen Segment Alpha operational enhancements, a delay to complete the convergence to a single terminal automation system, and a potential breach of the approved Acquisition Program Baseline.

Detailed Justification for - 2B05 Terminal Automation Program

What Is The Request And What Will We Get For The Funds?

FY 2015 – Terminal Automation Program
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Terminal Automation Program	$2,369	$2,600	$1,600	-$1,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Technology Refresh Implementation	---	$750.0
b. Optimization, Enhancements, Engineering Services	---	150.0
c. Program Management	---	300.0
d. System Engineering	---	400.0
Total	Various	$1,600.0

For FY 2015, $1,600,000 is requested to continue procurement of hardware and software to replace obsolete equipment currently in the field and program management support to procure and install replacement Flight Data Input/Output (FDIO) system components at 100 FAA and DoD ATC facilities. Replacement components consist of monitors, terminal servers, printers and a new Operating System and software procured in FY 2015 and prior years will be deployed at FAA and DoD ATC facilities during FY 2015.

What Is This Program?

The FDIO replacement project ensures the continuation of services in the National Airspace System (NAS) by replacing key components (i.e., servers, displays, keyboards, printers, remote control units (RCUs), and Replacement Alpha Numeric Keyboards (RANKS)) as they reach end-of-life or become obsolete. The replacement of FDIO system equipment serves to enhance the capability and sustain system operational availability at the required levels. Also provided is a common IP infrastructure to support future En Route Automation Modernization (ERAM)/System Wide Information Management (SWIM) architectures.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The NAS relies on the continuation of the capabilities provided by FDIO until these capabilities are replaced by future NextGen technologies such as Terminal Flight Data Management (TFDM) system in the 2017 to 2020 timeframe.

The FDIO equipment operates on 1980's technology which limits system capacity and increases the difficulty in maintaining the systems. Since 1998, the program has replaced obsolete/end-of-life components in the system. However, in FY 2010, components procured and replaced between 1998 and 2007 again reached end-of-life or became obsolete requiring another cycle of technology refreshment. For example, the

Personal Computers, keyboards, CRT monitors, and printers are key components of the system that require replacement. Replacement of the legacy equipment will benefit the FAA by providing greater operational availability of the FDIO through the use of state-of-the-art equipment.

The FDIO system provides standardized flight plan data, weather information, safety related data, and other information to air traffic controllers at more than 650 NAS facilities. Controllers input flight data to the Host Computer System (HOST) at ARTCC facilities. The FDIO system electronically retrieves the flight data from the HOST and prints this information on paper strips provided to the controllers at the (TRACON, ATCT, and Radar Approach Control (RAPCON)) facilities. This information assists controllers in tracking aircraft and anticipating the arrival of aircraft in the sector under their control. The FDIO system also receives data from the TRACON, ATCT, and RAPCON facilities and relays this data back to the HOST.

How Do You Know The Program Works?

The FDIO Program has been replacing obsolete and end-of-life components since 1998. According to the NAS Performance Analysis System (NASPAS), the average adjusted level of system availability between 1998 and 2010 has ranged between 99.942 percent and 99.954 percent, which meets the FAA's target to, "Sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the Nation's busiest airports through FY 2013"

Why Do We Want / Need To Fund The Program At The Requested Level?

$1,600,000 is required to ensure the availability and reliability of system hardware and software to support current system capabilities and NAS modifications/enhancements. The modifications help improve airport arrival efficiency, and enhance safety and system utility. The funding requested will ensure the continued procurement of hardware and software as well as the installation of hardware and software procured in prior years.

Moreover, as the FDIO System currently runs on Versatile Real Time Executive (VRTX) which is no longer supported by the vendor, in the current form, the FDIO system is unable to keep up with and meet applicable mandated operational and security requirements for NAS operational systems. A funding reduction will delay the deployment of technology refresh kits which could pose operational and security problems within the NAS.

Detailed Justification for - 2B06 Terminal Air Traffic Control Facilities – Replace

What Is The Request And What Will We Get For The Funds?

FY 2015 – Terminal Air Traffic Control Facilities – Replace
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Terminal Air Traffic Control Facilities – Replace	$64,900	$69,000	$29,800	-$39,200

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Segment 1 Advance Requirements and Other Direct Costs	---	$8,200.0
b. Segment 4 Equipment/Utilities Installation	---	10,900.0
c. Segment 5 Disposition, Demolition, and Decommissioning	---	10,700.0
Total	Various	$29,800.0

Tower and TRACON replacement is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. As outlined in the Activity 2 summary, funding the programs in this strategy will improve and maintain the facility condition index ratings at FAA facilities that provide the backbone for the NAS, and by extension, the backbone of NextGen. FAA is seeking enough funding to finish completing new towers and TRACONs under construction, but it is not proposing any new towers in this Budget. Rather, FAA is focused on improving conditions at existing facilities and strengthening its analysis to ensure faciliites in most dire need of replacement are the ones that get new facilities.

Tower and TRACON replacement are large capital investments, and given constrained resources, FAA is focusing on risk-based analysis to ensure those facilities in greatest need are replaced first. Over the next year, FAA will conduct analysis will provide the public with a complete list of which towers and TRACONs that will be slated for replacement in future years. FAA will then only initiate studies and construction for that list of most direly needed facilities.

Segment 1 funding in the amount of $8,200,000 is requested in FY 2015 to support Advance Requirements Definition and Program Management costs for planning and overseeing the program. Activities supported under Segment 1 include the evaluation of unique operational and maintenance requirements that impact Tower/TRACON Facilities, development of the business case, mock-up of the Airport Facility Terminal Integration Laboratory (AFTIL) to assist with evaluation of the attributes of proposed airport sites, actual site selection, and other advance engineering considerations.

Segment 4 funding in the amount of $10,900,000 is requested in FY 2015 to procure equipment and utilities installation at facilities that are currently nearing the end of facility construction. Equipment planned for purchase and installation includes: automation systems, airport surveillance connectivity, engine generators, voice switches, and FAA Telecommunications Infrastructure (FTI). The facilities that are slated for Segment 4 funding include Tucson, AZ Tower for $8,620,000 and West Palm Beach, FL for $2,280,000.

Segment 5 funding in the amount of $10,700,000 is requested for four facilities. This segment funds the disposition, demolition, and decommissioning of the old facility that has been replaced. The facilities included in this request are; San Francisco, CA for $3,800,000, Las Vegas Tower/TRACON for $4,000,000, Houston TRACON for $1,800,000 and Cleveland, OH Tower/TRACON Facility for $1,100,000.

Replace Terminal Air Traffic Control Facilities:

Segment Description	FY 2015 ($M)
Advance Requirements-Segment 1	**8.2**
Advance Requirements Definition/Program Management	8.2
Equipment Acquisition / Installation-Segment 4	**10.9**
Tucson Tower (TUS)	8.6
West Palm Beach Tower and TRACON (PBI)	2.3
Disposition - Segment 5	**10.7**
San Francisco (SFO)	3.8
Las Vegas Tower and TRACON (LAS)	4.0
Houston TRACON (I90)	1.8
Cleveland Tower and TRACON (CLE)	1.1
Total	**29.8**

What Is This Program?

The FAA provides air traffic control services from more than 500 Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) facilities. Under this program, FAA evaluates which buildings may need to be replaced, sustained or modernized, especially relative to other facilities across the country, to ensure an acceptable level of building condition in support air traffic control services and to meet current and future operational requirements.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

FAA is concerned about the building conditions at various ATCT/TRACON facilities. The average age of an ATCT is 31 years and a TRACON is 25 years, with some as much as 60 years old, and in some cases, control towers and TRACONs built 20 years ago do not meet today's OSHA, operational, and building requirements. The facilities also may not have been built to meet today's technological needs, and while some facilities can be modernized or sustained to meet those needs, replacement may be the most cost beneficial method for FAA to meet operational need and conform to current building codes and design standards.

How Do You Know The Program Works?

The FAA knows that the program works because, after commissioning, operational issues associated with (a) Line of Sight (LOS); (obstructions, viewing angle and depth perception), (b) adequate space for all approved operational and support positions, (c) adequate space and infrastructure for new modern equipment and systems, and (d) the high cost of maintaining old and fragile building systems have been eliminated. Additionally, the new facility increases the FCI (Facility Condition Index) by replacing an old facility.

Why Do We Want / Need To Fund The Program At The Requested Level?

For FY 2015, $29,800,000 is required to ensure continuation of equipment procurement, equipment installation, and disposition activities. To avoid impacts to the program schedule, the requested funding will ensure the continuation efforts of replacing aging terminal facilities.

Detailed Justification for - **2B07 ATCT/Terminal Radar Approach Control (TRACON) Facilities - Improve**

What Is The Request And What Will We Get For The Funds?

FY 2015 – ATCT/Terminal Radar Approach Control (TRACON) Facilities – Improve ($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
ATCT/Terminal Radar Approach Control (TRACON) Facilities – Improve	$20,364	$48,229	$45,040	-$3,189

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Initiate Modernization, Improvements, and Repairs System Eng. Configuration Mgmt. Risk Mgmt.	---	$38,330.0
b. Facility Condition Assessment	---	2,400.0
c. Facility Planning and Program Support	---	1,510.0
d. In-Service Engineering	---	2,800.0
Total	Various	$45,040.0

ATCT/Terminal Radar Approach Control (TRACON) Facilities – Improve is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. FAA is requesting slightly less funding than was enacted in FY 2014 for this BLI, because FAA is requesting an increase in the OSHA BLI, which will also include OSHA related benefits for ATCT and TRACONs.

For FY 2015, $45,040,000 is requested to provide for the following:

- Initiate modifications, improvements, and repairs to ATCT/TRACON facilities, system engineering, configuration management, facility planning, facility condition assessments and program support services, and in-service engineering activities.

What Is This Program?

The ATCT/TRACON Terminal Facilities Improvement Program (TFIP) includes projects that will enable facilities to maintain current operational, environmental, and safety needs in lieu of replacing or relocating the entire facility. This effort will result in a smooth and orderly transition of new equipment into the FAA's terminal facilities. This will also improve the operational efficiency and environment of equipment within ATCT/TRACON facilities. These upgrades and improvements to terminal facilities support the NAS modernization strategy to achieve efficient aerospace systems and operations.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The FAA must continually upgrade and improve aging terminal facilities and equipment to provide an acceptable level of service and to meet current and future operational requirements. Upgrades and improvements include replacing obsolete equipment, such as tower cab consoles, and rehabilitating administrative and equipment space due to facility expansion. Facility expansion includes adding operational positions, training space, base building construction, and environmental equipment, accessibility, structural and electrical upgrades.

Facility improvements must incorporate new requirements for relocated or replaced equipment with minimal impact to existing operations. The power and heating, ventilation, and air conditioning (HVAC) systems at many terminal facilities must be upgraded to handle both the new and old equipment during the in-service change-out. A successful transition of improvement projects is vital. In many towers, there is no room for additional equipment; therefore, base buildings must be expanded.

The program funds an average of 50 sustainment projects each year. Sustainment is defined as activities to continue the NAS/Terminal Service capability by modifying, repairing and replacing, and reconfiguring. Routine and ongoing maintenance activities are not funded from this program. The sustainment projects include many sites throughout the NAS and will consist of efforts like those described below:

- Waterproofing – Replace/Repair of building envelop components (e.g., siding, roof, windows, fascia's, eaves, gutters, downspouts, soffits, etc.)
- HVAC and Electrical/Mechanical – Replace/Repair HVAC (e.g., replace handling units, condensing units, controls, pumps, boilers, chillers, and roof top units)
- Electrical/Mechanical - (e.g., replacement/repair of electrical power cable, branch circuits and distribution wiring, light fixtures, outlets, etc.)
- Elevators – Replacement/Major refurbishment of elevators
- Plumbing – Replacement/Repair of facility plumbing system and components
- Specialties in Operations Areas– Major Replacement/Repair of Tower Cab or TRACON consoles, renovation of interior finishes, reconfiguration of operational areas
- Exterior (Civil Components) - Establishment of new access road/parking, major replacement of access road/parking lot, refurbishment of facility grounds, replacement of curbs, walkways, step, railing, etc.
- Interior Finishes - Replacement/Repair Interior finishes in Administrative areas (e.g., doors, carpets, floor and ceiling tiles, stairs, handrails, catwalks, and reconfiguration of Administrative areas)

The $2,400,000 requested will fund in-depth facility condition assessments of all the components of a subset of the roughly 500 ATCT facilities to perform a qualitative evaluation and generate prioritized lists of locations for investing in replacement, sustainment or building modernization efforts. Rough order of magnitude construction cost estimates are then generated for modernizing the existing facility, and upgrading it into compliance with current codes and FAA Orders and standards, to the extent feasible.

How Do You Know This Program Works?

Between FY 2011 – FY 2012, there has been a 1.25 percent increase in FAA maintained facilities rated in "Good" standing and a one percent decrease in those rated in "Poor" standing.

Why Do We Want/Need To Fund The Program At The Requested Level?

For FY 2015, $45,040,000 is required to initiate modifications, improvements, and repair ATCT/TRACON facilities. This includes system engineering, configuration management, facility condition assessments, facility planning, program support services, and in-service engineering.

A funding reduction from the requested level would result in the impacts to several improve projects, which are planned for FY 2015. A reduction of funding would adversely impact the current FAA backlog of deferred maintenance and life cycle requirements, which presents life safety/operational risks and increases maintenance costs.

Detailed Justification for - 2B08 Terminal Voice Switch Replacement (TVSR)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Terminal Voice Switch Replacement (TVSR)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Terminal Voice Switch Replacement (TVSR)	$3,791	$5,000	$2,000	-$3,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Contract Support	---	$1,300.0
b. Program Management	---	700.0
Total	Various	$2,000.0

For FY 2015, $2,000,000 is requested to recover available legacy terminal voice switch assets and to enable existing Terminal Voice Switch Replacement (TVSR) contract vehicles to remaining active. This will allow the program to maintain the infrastructure needed to procure terminal voice switches that are required for new terminal facilities.

What Is This Program?

The on-going TVSR program involves replacing the aging, obsolete voice switches in the Air Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) facilities. Voice switches enable air traffic controllers to communicate with aircraft as well as other air traffic control facilities. The TVSR program ensures that controllers continue to have reliable voice communications in the terminal environment. The program consists of several multiyear equipment contracts for voice switches, including: Small Tower Voice Switches, Enhanced Terminal Voice Switches, Rapid Deployment Voice Switches model IIA, Voice Switch Bypass Systems, and Interim Voice Switch Replacement. The program also provides contract vehicles for the FAA to procure voice switch equipment for new and modernized terminal facilities.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

New terminal voice switches are required to allow the use of new runway capacity that is being added to the National Air Space (NAS) as well as for all new Air Traffic Control Towers (ATCT) and Terminal Radar Approach Control (TRACON) that require a new Terminal Voice Switch.

These voice switches provide Ground/Ground and Air/Ground communications. Many of the older Integrated Command Switching System (ICSS) systems and key systems used to provide Terminal Equipment Systems are currently being replaced under the Terminal Voice Switch Replacement (TVSR) program.

The TVSR program has been successful by replacing the older populated integrated digital voice switching systems in ATCT and TRACON that provide non-blocking voice communication between the air traffic control operator positions, radio channels, and interphone land lines throughout the NAS for both FAA and DoD sites located in CONUS and OCONUS.

Terminal voice switching systems provide key equipment used to direct and control voice communications. This allows the terminal air traffic controllers to select the various communications paths and direct the communications to desired locations. The controller can communicate with another controller position at his/her own facility or another air traffic control facility, with aircraft (via radio) and with other locations as required. Voice switching is the mechanism that facilitates communications between controllers and the pilots.

How Do You Know The Program Works?

This program provides reliable voice communications in support of air traffic terminal operations. The reliability of communications from controller to controller and controllers to pilots is vital to a safe air traffic control system. By providing an essential element of FAA communications network, this program will support the safety of our transportation system. Approximately $7,300,000 per year will be saved in operational costs by reducing the current annual maintenance cost for older outdated switches, reducing annual depot support costs, and reducing man-year costs associated with greater reliability.

Why Do We Want/Need To Fund The Program At The Requested Level?

$2,000,000 is required to recover available legacy terminal voice switch assets and for contract support and program management to enable existing TVSR contract vehicles to remain active. TVSR will need to remain active until a few years after its successor, NAS Voice System (NVS), has its In Service Decision (ISD), which is estimated to be in FY 2018.

A reduction of funding would not enable the program to maintain the infrastructure needed to procure terminal voice switches that are required for new terminal facilities.

Detailed Justification for - 2B09 NAS Facilities OSHA and Environmental Standards Compliance

What Is The Request And What Will We Get For The Funds?

FY 2015 – NAS Facilities OSHA and Environmental Standards Compliance ($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
NAS Facilities OSHA and Environmental Standards Compliance	$24,640	$21,000	$43,501	+$22,501

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Environment and Occupational Safety and Health (EOSH) Compliance	---	$33,501.0
b. Fire Life Safety for Airport Traffic Control Towers (ATCTs)	---	10,000.0
Total	Various	$43,501.0

National Airspace System (NAS) Facilities OSHA and Environmental Standards Compliance is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. This BLI is requesting the largest increase of any program in the strategy because this line item is expanding the implementation of the program from only serving Air Traffic Organization Facilities to serving the entire FAA. In FY 2015, $43,501,000 is requested to continue the implementation of the following major EOSH programs: Fire Life Safety, Occupational Safety and Health (OSH) Compliance, Environmental Compliance, Fall Protection, Electrical Safety, Indoor Air Quality, Incident Response, Safety Integration, EOSH Training, Requirements Integration, Workplace Inspections and Hazard Abatement.

What Is This Program?

The Administrator authorized and funded a comprehensive study of the occupational safety and health (OSH) programs of the FAA in 2012. That study documented significant OSH compliance gaps in the agency's program. Examples of those gaps include:

- Eight out of 11 organizations interviewed were either unaware of their OSH responsibilities or had undertaken little or no actions to implement a compliant OSH program
- Most Lines of Business (LOB)/Service Organizations (SO) had not received funding and were at their infancy in meeting mandatory basic OSH program compliance requirements for federal agencies
- Accident investigators were sent to crash sites without personal protective equipment (thus being exposed to body parts, sharp fragments and bloodborne pathogens)
- Numerous employees were not trained in basic safety awareness, and were not cognizant of the job-specific hazards they encountered
- Since 2010, the FAA has incurred an on-the-job fatality, experienced 1,546 recordable cases of injuries and illnesses, and incurred 66,472 hours of lost staff time away from mission support resulting from OSH-related issues

A key recommendation of the study was to develop an empowered Office of the Designated Agency Safety and Health Official (DASHO) that would provide safety support to all FAA LOBs and SOs. The Chief Operating Officer committed to provide such a DASHO, and the Administrator appointed the Vice President of Technical Operations in the Air Traffic Organization as the DASHO on May 21 2013.

A significant additional workload exists in order to meet the OSHA minimum regulatory standards across the entire agency and that work will be performed under this program.

National Airspace System (NAS) Facilities OSHA and Environmental Standards Compliance programs will continue to provide comprehensive environmental, occupational safety and health management initiatives and core FAA-wide occupational safety and health management initiatives to meet federal, state, and local legal requirements in addition to negotiated agreements with employees. The EOSH Services Group is the lead organization within FAA charged with the protection of employees' well-being and the environment. Through the development of policy guidance, technical assistance, employee training, compliance monitoring, and corrective actions, the EOSH Services Group designs and manages national compliance programs that integrate risk management into each level of the FAA infrastructure life cycle and promote FAA-wide employee occupational safety and health.

The Fire Life Safety program manages the implementation of projects to upgrade ATCTs and other essential NAS facilities to meet current regulatory and industry standards for employee evacuation and fire suppression consistent with the requirements of negotiated agreements. In addition to physical infrastructure upgrading, the program is responsible for developing policy and guidance, fire prevention and emergency action plans, and for training tower occupants, resident engineers, maintenance technicians, and employees on maintenance requirements for fire safety systems. Effective support and protection of the air traffic control environment is essential to limiting the impact of fire, explosion, or related events on NAS operations and facilities that also affect the flying public and FAA employees.

DOT Strategic Goal - Organizational Excellence
- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

Non-compliance with federal, state, and local environmental, safety and health legal and other requirements imposes significant liabilities on the FAA in the form of interruptions to NAS operations, violations of bargaining unit agreements, regulatory fines and sanctions, civil and criminal lawsuits, post-incident response actions, such as costly cleanups, and a decrease in employee morale. Recent examples of non-compliance events include Polychlorinated Biphenyl (PCB) contamination after an equipment malfunction at an Air Route Surveillance Radar site, and potential employee exposure to asbestos fibers during ceiling tile removal at an Air Route Surveillance Radar site. Monthly, approximately 31 events result in disruptions to NAS operations. Effectively managing environmental and safety risks to ensure that new acquisitions, installations and modifications do not introduce new hazards and maintaining compliance with regulations, requires the implementation of EOSH compliance programs to continually identify and assess risks, integrate risk reduction into system designs, implement controls and best management practices into daily operations, and maintain a workforce with the knowledge to identify and mitigate EOSH risks at their source.

How Do You Know The Program Works?

This program implements nationally directed technical compliance programs designed to fully address federal, state, and local environmental and safety regulations and bargaining unit agreements. The EOSH Services Group directs these programs in close collaboration with the Service Areas and Service Centers. The Workplace Inspections and Hazard Abatement Programs are a good indicator that the program works. The Workplace Inspections Program has been responsible for overseeing the annual EOSH inspection of over 11,400 separate facilities nationwide. During these inspections, workplaces are evaluated for both OSH and Environmental compliance and deficiencies are noted as workplace hazards. Workplace hazards are recorded in the FAA Workplace Inspection Tool (WIT) database, along with a risk assessment and an estimated cost to correct each individual hazard. The Hazard Abatement Program then tracks the identified hazards until they are completely abated. As of March 15, 2013, the FAA WIT is tracking 123,368 individually identified workplace hazards, of which 118,497 have been completely abated.

A significant measure of the success of the program is the reduction in total injury/illness case rates. In FY 2012, the FAA overall case rate per 100 employees was 1.58, reflecting a steady improvement since 2001, when the case rate was 3.18. The total direct Office of Workers Compensation Programs (OWCP) costs for the Chargeback Year 2013 were $86.8 million (including current and past injuries on which claims are still being paid), an actual decrease since 2003 (when those costs were $88.3 million), despite rising medical costs and cost-of-living adjustments for long-term recipients of wage loss compensation benefits. Even with those successes, significant compliance gaps remain, as shown by a gap analysis, funded by the Administrator and conducted in the first quarter of FY 2013.

Also, the Fire Life Safety program initiated upgrades at 20 ATCTs and certified 20 completed upgrades to the meet OSHA requirements, which significantly increased the protection of the Agency's infrastructure and increased employee safety. Effective fire life safety systems are crucial to protecting personnel. For example, on March 26, 2010, a fire occurred at the Bishop International ATCT in Flint, MI. All occupants were evacuated safely because the fire life safety systems were in good order.

Why Do We Want/Need To Fund The Program At The Requested Level?

$43,501,000 is required to continue implementing nationally directed technical compliance programs designed to fully address federal, state, and local environmental and safety regulations and binding commitments. Within the ATO, the EOSH Services Group directs these programs in close collaboration with the Service Areas and Service Centers to ensure the safety and health of FAA employees.

A reduction in the funding requirement would increase the exposure of FAA employees to electrical safety hazards, fall protection hazards and fire hazards. Each year, employees are exposed to potential arc flash hazards at least 6,000 times. Past arc flash injuries have resulted in an average of 12 lost work days and 18 restricted duty days per incident. FAA would not be able to meet the terms of an agreement with OSHA that committed the agency to upgrading fire life safety systems in 20 Air Traffic Control Towers (ATCT) annually. The average cost per ATCT upgrade is $500,000.

Detailed Justification for – 2B10 Airport Surveillance Radar (ASR-9) Service Life Extension Program (SLEP)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Airport Surveillance Radar (ASR-9) Service Life Extension Program (SLEP)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Airport Surveillance Radar (ASR-9) Service Life Extension Program (SLEP)	$6,065	$10,900	$13,600	+$2,700

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Implementation	---	$3,700.0
b. Solution Development	---	9,900.0
Total	Various	$13,600.0

For FY 2015, $13,600,000 is to:

- Procure Digital Remote Surveillance Replacement (DRSR) production units
- Implement DRSR production units
- Procure Spectrum Analyzers and ASR-9 Processor Augmentation Cards (9PACs) for Depot Replenishment
- Procure Transmitter Backplane production units
- Continue Implementation of Transmitter Backplane production units in the National Airspace System (NAS)
- Procure Air Route Traffic Control Center (ATRCC) Radar Data Access Point (RDAP) production units
- Implementation of ARTCC RDAP production units
- Procure Power Meter production units
- Install Power Meter production units

The 135 Airport Surveillance Radar Model 9 (ASR-9) systems provide aircraft detection and weather information to air traffic controllers at major airports, including the highest activity airports (e.g., Atlanta, Chicago, Los Angeles, and Dallas/Ft. Worth). The ASR-9 SLEP Phase 2 program will mitigate supportability problems and reduce the operational and maintenance (O&M) cost for these systems.

What Is This Program?

ASR-9 SLEP Phase 2 will consist of implementing modifications to the aging ASR-9 radar systems and peripheral equipment to sustain primary surveillance in terminal airspace through 2028. The sustainment of the ASR-9 aligns with the NAS Enterprise Architecture Surveillance Roadmap Decision Points[1], and the Surveillance and Broadcast Services (SBS)/Automatic Dependent Surveillance Broadcast (ADS-B) backup strategy.[2] Based on this strategy, ASR-9 systems will remain in service through 2028.

The ASR-9 SLEP will mitigate issues of obsolescence, reliability and maintainability, and lifecycle costs for:

[1] https://nasea.faa.gov/products/roadmap/main/display/7/tab/dps/
[2] https://nasea.faa.gov/products/roadmap/main/display/7/tab/assumptions/

- **ASR-9 Communications Infrastructure –** The Remote Surveillance Communications Interface Processor (RSCIP) is expensive, obsolete, and is not available in sufficient quantities to meet future TRACON expansions and/or consolidations. The DRSR will remove unnecessary assemblies, reducing power consumption and reclaiming stock for future use, where applicable.
- **ASR-9 Control and Monitoring Infrastructure –** The ASR-9 Transmitter Backplane provides the interface between four major circuit cards (control and monitoring [C&M]) that control the transmitter and provide C&M functions to site technicians. The backplane uses a wire wrap-based architecture to support important signal distributions, which couple with 21 ribbon cable assemblies to interface to various C&M components in support of system functions. A customizable transmitter backplane is required to expand transmitter C&M and reduce system outages and downtime.
- **ASR-9 Depot Replenishment –** ASR-9 SLEP Phase 2 will reinforce the FAA Logistics Center inventory spares of Power Meters.
- **Air Route Traffic Control Center (ARTCC) Radar Data Access Point (RDAP) –** ATRCC RDAP will replace the ARTCC Enroute Radar Intelligence Tool (ERIT) due to the antiquated architecture and outdated components. The ATRCC ERIT is no longer supportable.

DOT Strategic Goal - Economic Competitiveness
- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

ASR-9 terminal service provides for maintenance of separation standards, reduces delays, and improves safety at congested airports. During instrument meteorological conditions the radar provides air traffic controllers' information that allows closer aircraft operations and increases air traffic arrival and departure operations. This particular program, ASR-9 Service Life Extension Program Phase 2, reduces the risk of unscheduled outages and ensures the continuation of maximum service capabilities. In addition, this program will reduce the overall lifecycle operation costs by improving system reliability and maintainability.

How Do You Know The Program Works?

Extending the service life of the ASR-9 system will reduce outages due to performance deterioration and parts obsolescence. Furthermore, the ASR-9 service life extension will increase equipment and service availability. The success of the program will be measured by analysis of ASR-9 outages attributable to system components affected by this modification, air traffic delays due to these outages, and related demand for spare parts.

Why Do We Want/Need To Fund The Program At The Requested Level?

The ASR-9 was procured in the mid-1980s and fielded between 1989 and 1994. The system is expected to remain operational until 2028, however, the radar systems are becoming difficult to maintain. The system hosts hardware and software architectures which are becoming increasingly difficult to procure, and some of which are obsolete, resulting in cannibalization and re-engineering for short term results as a means to repair or refurbish in order to maintain this vital system.

A reduction from the FY 2015 requested funding level will result in increased risk to the ability to award contracts to:

- Award Transmitter Backplane Contract
- Continue procurement of DRSR production units
- Implement Transmitter Backplane production units
- Initiate procurement of Power Meter Depot replenishment
- Implement DRSR production units
- Implement ATRCC RDAP production units

Detailed Justification for – 2B11 Terminal Digital Radar (ASR-11) Technology Refresh and Mobile Airport Surveillance Radar (MASR)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Terminal Digital Radar (ASR-11) Technology Refresh and MASR ($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Terminal Digital Radar (ASR-11) Technology Refresh and Mobile Airport Surveillance	$7,771	$19,400	$21,100	+$1,700

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. ASR-11 Technology Refresh, Segment 2		
a. Prime Mission Product	---	$2,617.0
b. Program Management	---	469.0
c. System Engineering	---	1,109.0
d. Integrated Logistics Support	---	49.0
e. Implementation	---	156.0
Total	Various	$4,400.0
B. Mobile Airport Surveillance Radar (MASR)		
a. System Procurement and Development	---	$11,691.0
b. Test Support	---	551.0
c. Life Cycle Support Infrastructure	---	1,764.0
d. ASR-9 Refurbishment	---	180.0
e. Program Management	---	2,514.0
Total	Various	$16,700.0

A. ASR-11 Technology Refresh, Segment 2

For FY 2015, $4,400,000 is requested for ASR-11 Technology Refresh Segment 2 to continue software development for Stability, fault monitoring/fault isolation (FM/FI), and Site Control Data Interface SCDI. Funding will also support remaining implementation of UPS and provide Program Management, System Engineering, and System Development.

B. Mobile Airport Surveillance Radar (MASR)

For FY 2015, $16,700,000 is requested for procurement of the second MASR asset, System Development, Program Management, and System Engineering. Funds will also include life cycle support requirements.

What Is This Program?

The ASR-11 surveillance capabilities provide air traffic personnel with coverage performance suitable for air traffic control of aircraft arrivals and departures at airports throughout the United States. These capabilities permit safe and efficient movement of aircraft in and out of airport terminal areas allowing air carriers to maximize their resources without compromising the safety of air traffic services.

A. ASR-11 Technology Refresh, Segment 2

The ASR-11 Technology Refresh Segment 2 is planning to resolve parts obsolescence and fault monitoring/fault isolation shortfalls andensure continued reliable and cost effective operation of the radar system through its designated lifecycle. The Segment 2 Final Investment Decision (FID) was received inDecember 2013.

B. Mobile Airport Surveillance Radar (MASR)

The MASR is planned to eliminate an existing shortfall, which is the lack of a mobile surveillance system that can provide the level of surveillance performance needed to support planned in-service radar relocations, temporary radar service needs and emergency operations in a dense or complex airspace.

This performance shortfall will be accomplished by procuring a terminal surveillance service that can be deployed within known, short-duration timeframes and is compatible with any airport traffic control towers (ATCT), Terminal Radar Approach Control centers (TRACON), Air Route Traffic Control Centers (ARTCC), and their associated automation systems. Loss of primary and secondary surveillance products, due to either catastrophic events or long term outages, would have a definite impact on Federal Aviation Administration (FAA) mission capabilities, specifically in the areas of controller situation awareness, safety, capacity, and industry vitality.

This proposed system architecture is a reusable, service-oriented capability with an emphasis on providing the terminal surveillance service efficiently and quickly. The program goal is to have interfaces for power, mechanical, data, and remote monitoring and control defined to be interoperable with all currently deployed ASR-8, ASR-9 and ASR-11 terminal radars and their associated automation interfaces.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

A. ASR-11 Technology Refresh, Segment 2

The technology refresh Segment 2 program will allow the Airport Surveillance Radar, Model-11 (ASR-11) to continue to provide terminal surveillance of aircraft in support of FAA and Department of Defense (DoD) air traffic control (ATC) operational needs throughout its intended service life. More specifically the technology refresh Segment 2 program will address shortfalls created by parts obsolescence issues and unreliable or incomplete fault monitoring/fault isolation results. The goal of the program will be to ensure continued sustainment of ASR-11 equipment throughout its service life and reduction in number of Records of Operational Assistances (ROAs) related to incomplete fault monitoring/fault isolation results.

B. Mobile Airport Surveillance Radar (MASR)

The benefits of the MASR capability are to eliminate long-term surveillance outages primarily due to airport modernization and construction projects, or a major casualty to the airport radar. Airport modernization and construction often requires the radar to be relocated, causing a multi-month outage. Large-scale radar catastrophic failures, while rare, pose a particularly significant challenge since the majority of deployed radars are no longer manufactured, and complete radar systems are typically not stocked by the logistics depot. The MASR system capability would bridge this gap and provide seamless transition from the existing legacy radar system to the system that will provide terminal surveillance service into the future.

The MASR will eliminate these two crucial operational shortfalls in the National Airspace System (NAS):

- Lack of scheduled Response Assets. The MASR can be deployed to provide temporary terminal surveillance services at an airport while the existing surveillance asset is taken off-line for scheduled relocation, airport construction, or any other long term outage
- Lack of disaster Response Assets. The MASR can be deployed to replace terminal surveillance assets that have been taken off-line due to natural or man-made disasters. The MASR system can be transported by truck, rail, or ship, and installed, and certified operational in as few as five days from the initial incident

How Do You Know The Program Works?

The ASR-11 Technology Refresh Segment 2 business case analysis and planning commenced in FY 2011. The Technology Refresh Segment 1 baseline provided funding for Investment Analysis in FY 2011 through 2013 to assess the ASR-11 program and identify parts obsolescence, operational performance deficiencies or other areas requiring technology refresh to ensure continued reliable and cost effective operation of the radar system through its designated lifecycle. The ASR-11 Technology Refresh Segment 2 Final Investment Decision (FID) was received in December 2013. The Acquisition Program Baseline will begin in FY 2014.

The MASR Program received the Final Investment Decision (FID) to proceed on June 20, 2012.

Why Do We Want/Need To Fund The Program At The Requested Level?

$4,400,000 is required for ASR-11 Technology Refresh Segment 2 to continue software development for Stability, FM/FI, and SCDI. Funding will also support remaining implementation of UPS and provide Program Management, System Engineering, and System Development. Any reduction in the ASR-11 Technology Refresh Segment 2 in FY 2015 could impact ASR-11 system operation readiness and cost effective operation of the radar system through its designated lifecycle.

$16,700,000 is required for procurement of the second MASR asset, System Development, Program Management, and System Engineering. A reduction to MASR budget in FY 2015 will put at risk the implementation timeline which will result in the delay of planned in-service relocation activities at several airports. FY 2015 is the final year available on the contract vehicle to procure the second MASR asset. A reduction to the MASR budget would require renegotiation on the contract vehicle to procure the second MASR asset with a significant increase in program costs.

Detailed Justification for – 2B12 Runway Status Lights (RWSL)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Runway Status Lights (RWSL)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Runway Status Lights (RWSL) – Phase - 1	$29,038	$35,250	$41,710	+$6,460

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Program Management	---	$3,213.6
b. Implementation	---	3,625.0
c. Hardware Procurement	---	7,108.8
d. Construction	---	16,398.3
e. System Engineering	---	8,469.5
f. Optimization/Enhancements/Engineering Services	---	487.5
g. Logistics and Documentation	---	1,500.3
h. Second Level Engineering	---	407.0
i. Independent Operational Test and Evaluation (IOT&E)	---	500.0
Total	Various	$41,710.0

For FY 2015, $41,210,000 is requested to continue RWSL implementation and construction activities, and $500,000 is requested for Independent Operational Test and Evaluation. Implementation and construction activities include: starting site design for one airport, starting construction at two airports, delivering and installing the system at four airports, and achieving initial operational capability at two airports. Remaining funds will be used for systems engineering, software maintenance, Interim Contractor Depot Logistics Support (ICDLS), spare parts, second level engineering support, initial utility service, information systems security requirements, and contractor support for the program office and all of the above activities.

What Is This Program?

RWSL serves as stop lights on runways and taxiways, signaling when it is unsafe to enter, cross or begin takeoff on a runway. Located along the centerline of a runway or taxiway, Runway Entrance Lights (REL) and/or Takeoff Hold Lights (THL) will illuminate red when a runway is in use, notifying the pilot of a taxiing aircraft to either stop prior to crossing the runway, or yield to the aircraft landing or taking off. RWSL is designed to independently supplement existing air traffic controller tools and procedures without increasing the controller workload by automatically providing a clear, prompt indication of runway status directly to pilots and ground vehicle operators. RWSL acts as an independent safety enhancement and does not replace air traffic control issued clearance. The RWSL system provides a vital layer of redundancy in runway safety and is a backup and reinforcement of controller guidance.

- Construction, installation, and Site Acceptance Testing (SAT) has been completed at eight airports: Orlando (May 2011), Phoenix (November 2012), Las Vegas (March 2013), Charlotte (August 2012), Minneapolis (November 2012), Dulles (March 2012), Houston (June 2012), Seattle (March 2013)
- Construction is ongoing at five airports: Baltimore, LaGuardia, Detroit, San Francisco, Los Angeles

DOT Strategic Goal - Safety:

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

A top priority of the FAA is to enhance airport safety while increasing airport capacity. Reducing runway incursions is a major component of this effort. Runway incursions develop quickly and without warning from safe and routine traffic situations on the airport surface. Such time key runway incursions usually leave very little time for corrective action. The National Transportation Safety Board (NTSB) issued a safety recommendation to the FAA to "Implement a safety system for ground movement that will ensure the safe movement of airplanes on the ground and provides direct warning capability to the flight crews." RWSL are designed to provide direct indication to flight crews and vehicle operators that it is unsafe to enter a runway or to begin a takeoff.

How Do You Know The Program Works?

This concept has been proven by Lincoln Labs and three prototype sites were deployed between 2005 and 2010 and are being evaluated in an operational environment at Dallas Fort Worth (DFW), San Diego (SAN), and Boston (BOS). The RWSL program experienced cost-overruns related to additional light arrays and costly construction methods. The FAA rebaselined the program in July 2013 and reduced the scope from 23 to 17 airports. For the sites no longer on the RWSL waterfall, the agency is institutionalizing a new process and has chartered the Surface Safety Initiatives Team to develop a comprehensive plan that will include a combination of innovative non technology and technology solutions tailored for each airport environment.

This Surface Safety Initiatives Team began its work in February 2013 and has developed a plan for moving the evaluations forward. Assessment of the first two sites site (Boston and Dallas) will begin in April 2014 and the final recommendation for these sites will be made in April 2015.

Runway status lights shown directly to pilots and vehicle operators offer the potential to reduce runway incursions and runway conflict accidents by increasing overall situational awareness of the dynamic runway environment. This automated system has minimal Air Traffic Controller action required for its operation.

Why Do We Want/Need To Fund The Program At The Requested Level?

A reduction in funding would have a direct result in delaying the deployment of this safety system.

Detailed Justification for - 2B13 National Airspace System Voice System (NVS)

What Is The Request And What Will We Get For The Funds?

FY 2015 – National Airspace System Voice System (NVS)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
National Airspace System Voice System (NVS)	$9,714	$16,000	$20,550	+$4,550

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Second Article Test System	1	$550.0
b. Engineering and Software Development	---	3,341.2
c. Program Management	---	1,005.1
d. Testing	---	3,028.2
e. Installation	---	240.0
f. Telecommunications	---	115.0
g. Logistics	---	2,199.5
h. Contractor Support	---	7,542.0
i. Security	---	1,169.0
j. NextGen Program Management	---	1,010.0
k. Independent Operational Test and Evaluation (IOT&E)	---	350.0
Total	Various	$20,550.0

For FY 2015, $20,550,000 is requested to deliver a second article test system, develop and perform testing, logistics, and for engineering and software development. An additional $350,000 is requested for Independent Operational Test and Evaluation efforts.

What Is This Program?

NVS will provide voice communications services to Air Traffic Control Specialists (ATCS), supervisors, and ancillary Air Traffic Control (ATC) operators in support of continuous ATC operations in the Terminal and En Route domains of the National Airspace System (NAS). Voice communications connectivity will be provided to aircraft flight crews and Unmanned Aircraft System (UAS) operators through Air to Ground (A/G) radio circuits or equivalent network connections. Voice communications connectivity between ATCS, supervisors and traffic managers will be provided through access to intra-facility and inter-facility G/G voice circuits or equivalent network connections.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The current switch technology deployed in the NAS will not support the expected future NextGen concept of operations for either: networked facilities, or such concepts as dynamic re-sectorization (expanding or contracting a controller's volume of airspace electronically) and off-loading during non-peak operations. These capabilities require that lines connected to a controller's workstation can be changed to add or eliminate lines as the geographical boundaries of the sector change. The NVS will support current and future ATC operations as envisioned by both government and industry forecasters. In addition, the current voice switch system is aging and needs to be modernized to mitigate obsolescence.

This program maps to the FAA goal of increased airport capacity to meet reductions in the projected operating costs by: reducing the number of equipment components needing to be inventoried, reducing the number of switch types; reducing acquisition, training, and maintenance costs by reducing the number of voice-switch designs; improving equipment availability and related inventory issues by reducing obsolete equipment; and reducing potential costs to users from air traffic delays due to projected outages of the existing systems and increased user demand.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments

How Do You Know The Program Works?

NVS demonstration systems were delivered in FY 2013. In early FY 2014, demonstration conduct was performed to demonstrate NextGen capabilities (e.g. resource sharing, load balancing, and enterprise management) in support of a production-ready system for deployment to any of the target environments.

NVS will replace the service that is currently provided by 11 different voice switch configurations including Terminal Voice Switch Replacement (TVSR) and Voice Switching and Control System (VSCS). The focus will be on designing a replacement system that can be scaled to facility size with standardized components that will reduce maintenance and parts inventory costs.

Why Do We Want/Need To Fund The Program At The Requested Level?

$20,550,000 is required to deliver a second article test system, develop and perform testing, logistics, and for engineering and software development. The current voice switch system is aging and needs to be modernized to mitigate obsolescence. Current switch technology that is deployed in the NAS will not support the expected future NextGen concept of operations for either networked facilities, or such concepts as dynamic re-sectorization and off-loading during non-peak operations. These capabilities require configurable connections to a controller's workstation so as to allow or terminate access to the lines as the geographical boundaries of the sector change. The NVS will support current and future ATC operations as envisioned by both government and industry forecasters. An additional $350,000 is required for Independent Operational Test and Evaluation (IOT&E) activities.

A reduction would delay delivery of NextGen production systems and prolong engineering and software development efforts.

Detailed Justification for - 2B14 Integrated Display System (IDS)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Integrated Display System (IDS)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Integrated Display System (IDS)	$3,980	$4,100	$16,917	+$12,817

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Procurement, Production and Deployment of IDS-R Systems	21	$16,917.0

For FY 2015, $16,917,000 is requested for the IDS program to procure and install workstations at 21 networks at Terminal Radar Approach Control (TRACON) Facilities and the associated Airport Traffic Control Towers (ATCTs).

What Is This Program?

The IDS is a local and wide area network information dissemination and display system that consolidates information from several operational NAS weather subsystems and other operational sources onto a single display, and distributes the data to air traffic controllers and airspace managers at TRACON, Airport Traffic Control Tower (ATCT), and Air Route Traffic Control Center (ARTCC) facilities. These capabilities permit safe and efficient movement of aircraft in and out of airport terminal areas allowing air carriers to maximize their resources without compromising the safety of air traffic services.

The IDS-R program provides for the replacement of the legacy Integrated Display Systems-4 (IDS-4) with current technology. The program will replace 1,944 IDS-4 systems at approximately 256 sites nationwide. The prime contract was awarded in May 2010 and design efforts were completed in early 2011. FY 2015 funding supports installing 21 IDS-4 sites, and FAA anticipates completing all 1,944 workstations by the end of 2017.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The NAS relies on the continuation of the capabilities provided by the IDS. The existing IDS-4 has been operational since 1994 without any technology refresh of hardware/software. As currently configured, the IDS-4 system is unsupportable and lacks the capacity to incorporate software updates. Essential hardware components needed to support DOS-based software are not available from industry and the proprietary software is no longer supported by the vendor. Due to obsolescence issues, Logistic Center spares stocks are being depleted and the single board computer necessary to support DOS based programs is unavailable for purchase. As the age of the equipment increases, the cost of maintenance support increases. Additionally, the lack of repair parts increases the likelihood and frequency of system failures. Increasing system failures will negatively impact ATC workload, increase labor costs, and reduce ATC situational awareness thereby increasing flight delays. Recent obsolescence issues and loss of proprietary software support make it necessary to replace this system to sustain its functionality.

Replacement of the legacy equipment at the 256 facilities will benefit the FAA by providing greater operational availability of the IDS associated with the use of state-of-the-art equipment thereby reducing delays at the airports. The consolidation of information provided by the IDS enhances controller's situational awareness and reduces the need for multiple displays. Additionally, controllers will be able to provide more dynamic responses to operational changes (ex: real-time weather information communicated to satellite facilities). The equipment removed from the 256 sites will enable the depot to provide supply support for the remaining sites.

How Do You Know The Program Works?

Replacing IDS systems with current technology will reduce outages, thereby reducing delays at the airports associated with the sites addressed by this investment. Measurement criteria established upon final investment decision will focus on operational availability, which were assessed on an annual basis beginning in FY 2011. The first IDS-4 site achieved Initial Operational Capability (IOC) on September 16, 2013, and the system operational availability has been 100 percent since that date.

Why Do We Want/Need To Fund The Program At The Requested Level?

A reduction from the FY 2015 baseline funding will delay the procurement and installation of the workstations at the sites as planned.

Detailed Justification for2B15 Remote Monitoring and Logging System (RMLS)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Remote Monitoring and Logging System (RMLS)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Remote Monitoring and Logging System (RMLS)	$4,454	$1,000	$3,930	+$2,930

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. RMLS Technology Refresh	---	$2,430.0
b. Automated Maintenance Management System (AMMS)	---	1,000.0
c. 2 Dimensional Barcoding (2DBC)	---	500.0
Total	Various	$3,930.0

A. RMLS Technology Refresh

For FY 2015, $2,430,000 is requested for the Remote Monitoring and Logging System (RMLS) Technology Refresh to initiate hardware procurement to right size RMLS core components for National Air Space (NAS) growth; increase storage and bandwidth limits for new Remote Monitor and Supply Chain management requirements; and provide security updates for full network separation between the non-NAS (Mission Support) and NAS (Operations) at three sites. The three sites for FY 2015 are:

- National Operations Control Center (NOCC)
- Pacific Operations Control Center (POCC)
- William J. Hughes Technical Center (WJHTC)

B. Automated Maintenance Management System (AMMS)

For FY 2015, $1,000,000 is requested for the Automated Maintenance Management System (AMMS) to complete investment analysis requirements for Final Investment Decision (FID) and to complete data exchange requirements for System Wide Information Management (SWIM) implementation and supply chain integration.

C. 2 Dimensional Barcoding (2DBC)

For FY 2015, $500,000 is requested for the purchase of a small quantity of integrated handheld devices. The requested funding will initiate a multi-year contract for the deployment of an integrated handheld device for reading barcodes, as well as to facilitate collecting maintenance and logistics data and streamlining several operational activities.

These activities support the Supply Chain Optimization Portfolio (SCOP) initiative.

What Is This Program?

A. RMLS Technology Refresh

RMLS Technology Refresh will replace aging RMLS core components for NAS growth to ensure the Remote Monitoring and Maintenance (RMM) infrastructure supports the agency's storage, bandwidth, and security needs.

B. Automated Maintenance Management System (AMMS)

AMMS provides new and improved functionality to access, translate and publish Operations and Maintenance (O&M) data from authoritative databases to NAS and non-NAS users. This enables lower information costs, increases speed to establish interfaces, and increases common situational awareness. AMMS provides easy data retrieval to allow stakeholders to publish and subscribe to O&M services.

C. 2 Dimensional Barcoding (2DBC)

2DBC provides unique identification to the Lowest Replaceable Unit (LRU) level. This enables the capture of data tied to each individual asset. This data includes but is not limited to inventory tracking, configuration management, and other technical information such as run time information lead to better data analysis capabilities.

Currently FAA technicians who maintain the NAS use a mix of manual and automated means to collect LRU level information from warehoused and fielded parts. These projects will reduce technician time to capture data and improve maintenance logging which will allow for making more effective decisions. Through the implementation of RMLS Technology Refresh, AMMS, and 2DBC, it is expected the FAA will improve the way it provides Air Traffic (AT) services and realize a positive business impact in the following areas: tracking and traceability, configuration management, warranty control, reliability and maintainability data, inventory accountability, data quality, acquisition management, and vendor accountability.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

Several key issues affect the FAA's ability to ensure the efficiency of air transportation, such as the numerous stand-alone FAA programs used to support the O&M of the NAS. While FAA programs have been working towards making improvements, legacy systems and future FAA systems are not currently planning for improved interoperability and/or integration. This results in unnecessary costs due to duplication of efforts and inefficient labor usage. Many Technical Operations programs are not integrated, and the O&M data is shared through manual processes, e.g., voice communications, email, point-to-point message exchange services, and manually searching multiple databases. Updating system status through these means of communication often result in errors which can lead to potential safety hazards, delays in NAS status information as well as equipment repairs, execution of improper maintenance actions and improper direction for supply chain management.

A. RMLS Technology Refresh

The FAA relies on the RMLS to ensure all NAS facilities and systems are operational so that flights are safe and on time. The NAS Defense program and Homeland Security also relies on the data for 24/7 monitoring of the NAS.

B. Automated Maintenance Management System (AMMS)

AMMS will use web-based implementations like Service-Oriented Architecture (SOA), cloud computing, and net-centric operations to reduce the number of Technical Operations legacy systems to a smaller set of integrated, centralized data-sharing entities.

C. 2 Dimensional Barcoding (2DBC)

2D Bar Coding (2DBC) provides the physical infrastructure needed for the FAA to have an automated data collection and sharing system. This infrastructure will use barcodes and scanners to enable an integrated supply chain with AMMS, RMLS, and Logistics Center Support System (LCSS) which is the agency's logistics system.

The synergy from these programs is expected to provide benefits in the following areas: tracking and traceability, configuration management, warranty control, reliability and maintainability data, inventory accountability, data quality, acquisition management, and vendor accountability.

How Do You Know The Program Works?

The individual projects within RMLS have shown previous success directly or are tied to previous successes within the agency.

2D Bar Coding (2DBC) operation was implemented in the FAA Logistics Center distribution center and has marked over 230,000 assets to date. A field marking pilot was conducted in 2010 at Dallas Fort Worth (DFW), marking field spares and field spares storage locations.

The integrated hardware solution will be deployed starting in FY 2015. The planning has occurred in accordance with the Technical Operations Maintenance Concept of Operations and Government Accountability Office (GAO) recommendations for performing inventory management.

The team also demonstrated success in FY 2013, as RMLS was made fully operational across the NAS.

Why Do We Want / Need to Fund The Program AT The Requested Level?

$3,930,000 is required for successful implementation of FY 2015 needs of the RMLS Program, which support the Supply Chain Optimization Portfolio (SCOP) initiative.

A. RMLS Technology Refresh

$2,430,000 is required to complete technology refresh of RMLS commercial-off-the shelf (COTS) components and comply with the FAA's mandated security requirements. Solution implementation of RMLS Technology Refresh activities include: procurement, operational test and evaluation, technical data, supply support, site preparation, installation, and testing and activation.

B. Automated Maintenance Management System (AMMS)

$1,000,000 is required for AMMS to complete FID and to implement data exchange requirements leveraging the FAA Service Oriented Architecture infrastructure to manage On-demand Technical Operations and Maintenance Information.

C. 2 Dimensional Barcoding (2DBC)

$500,000 is required to support dependencies with 2DBC and programs that are directly tied to the integrated supply chain. LCSS is expected to be operational in 2015 and logging enhancements made available by AMMS should be in place by late 2015.

The Supply Chain Optimization Portfolio is an enterprise effort to manage the integration of the maintenance and logistics functions. If the FAA delays deploying the integrated handheld device, data exchange requirements for supply chain integration and hardware procurement for maintenance facilities there will be delays in receiving benefits and using capabilities within AMMS, RMLS Technology Refresh, 2DBC and LCSS.

Detailed Justification for – 2B16 Mode S Service Life Extension Program (SLEP) - Phase 2

What Is The Request And What Will We Get For The Funds?

FY 2015 – Mode S Service Life Extension Program (SLEP) - Phase 2
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Mode S Service Life Extension Program (SLEP) - Phase 2	$3,791	$7,300	$8,100	+$800

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Mode S Service Life Extension Program Phase 2	---	$3,900.0
B. ASR-9 and Mode S Service Life Extension Program Phase 3 Planning	---	4,200.0
Total	Various	$8,100.0

For FY 2015, $3,900,000 is requested for Mode S Select (Mode S) Service Life Extension Program (SLEP) Phase 2 to continue development of Critical Lowest Replaceable Units (LRUs), complete installation of Beacon Video Reconstitutor (BVR), and procure Depot replenishment of components (High Gain Open Planar Array (HGOPA) and Non-Volatile Memory (NVMEM)).

For FY 2015, $4,200,000 is requested for Airport Surveillance Radar Model 9 (ASR-9) and Mode S SLEP Phase 3 Planning and in service support to improve radar performance.

What Is This Program?

A. Mode S Service Life Extension Program Phase 2:

Mode S SLEP Phase 2 will implement modifications to the aging secondary Mode S subsystems architecture and peripheral equipment to sustain secondary surveillance in terminal and En Route airspace through 2028. The sustainment of the Mode S aligns with the Surveillance Roadmap Decision[1], and the Surveillance and Broadcast Services (SBS) / Automatic Dependent Surveillance Broadcast (ADS-B) backup strategy.[2]

Based on this strategy, at a minimum, the Mode S systems at the 23 long range radar facilities and the top 50 high density terminal facilities will remain in service through 2028.

The Mode S SLEP will mitigate issues of obsolescence, reliability and maintainability, and lifecycle costs for:

- **Beacon Video Reconstitutor:** The Beacon Video Reconstitutor is comprised of assemblies / components that have reached the end-of-life, and are not supportable. The FAA cannot repair or reverse engineer these assemblies. There are no other known sources of repair for the BVR assemblies. Without the BVR, these radar sites are precluded from the full Mode Select display functionality. Current separation standards cannot be applied using ASR-8 videos and the ARTS II position symbols (ARTS tags) alone. The lack of analog beacon slash is a major configuration change to what is

[1] https://nasea.faa.gov/products/roadmap/main/display/7/tab/dps/
[2] https://nasea.faa.gov/products/roadmap/main/display/7/tab/assumptions/

currently in the field and would adversely affect present ATC procedures. The beacon position symbols alone are not acceptable for target separation.

- **Mode S High Gain Open Planar Array (HGOPA):** A five foot beacon antenna was deployed throughout the mid to late 1970's with a projected lifecycle of 20 years. All five foot beacon antennae currently servicing the NAS are operating at 10+ years past the intended lifecycle, and support for these obsolete assets is increasingly challenging. The primary means of repair/refurbishment is cannibalization of a limited number of unserviceable five foot beacon antennae for parts. There is an urgent need to manage the supportability issues of the legacy five foot beacon antenna issues.

- **Mode S Depot Replenishment:** Mode S SLEP Phase 2 will procure components to reinforce the FAA Logistics Center inventory of spares including these products: High Gain Open Planar Array (HGOPA) and Non-Volatile Memory (NVMEM).

- **Mode S Development of Four Critical Lowest Replacement Unit (LRU) Prototypes:** The Critical LRU Prototypes provide an alternative that will maintain current functionality balanced with the versatility to achieve future requirements. The Critical LRU addresses the issue of diminishing manufacturer sources and parts obsolescence issues at the LRU level.

B. ASR-9 and Mode S Service Life Extension Program Phase 3:

ASR-9 and Mode S SLEP Phase 3 Planning: For FY 2015, $4,200,000 is requested for investment analysis and implementation for SLEP Phase 3.

This program will perform engineering studies to determine the scope of the ASR-9 and Mode-S SLEP Phase 3 programs and develop a Data Communications Equipment (DCE) prototype, Receiver Protector prototype and the four critical LRU prototypes. There are components of these radar systems that may not be supportable through 2028 and these analyses will determine the extent of re-engineering and system modifications needed. An investment decision for Phase 3 is planned for 2016.

In addition, this program provides in service support to improve radar performance, engineering and planning to correct performance/operational and reliability issues, resolution of performance issues such as radar interference, sustainability management of ASR and MODE S surveillance systems deployed in the National Airspace System (NAS).

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

ASR-9 and Mode S service provides for maintenance of separation standards, reduces delays, and improves safety at congested airports. During instrument meteorological conditions the radar provides air traffic controllers with information that allows closer aircraft operations and increases air traffic arrival and departure operations. This particular program, ASR-9 Service Life Extension Program Phase 3, reduces the risk of unscheduled outages and ensures the continuation of maximum service capabilities. In addition, the ASR-9 and Mode S service life extension modifications will reduce the overall lifecycle operation costs by improving system reliability and maintainability.

The sustainment of the ASR-9 and Mode S aligns with the Surveillance Roadmap Decision[1], and the Surveillance and Broadcast Services (SBS)/Automatic Dependent Surveillance Broadcast (ADS-B) backup strategy[2].

[1] https://nasea.faa.gov/products/roadmap/main/display/7/tab/assumptions/
[2] https://nasea.faa.gov/products/roadmap/main/display/7/tab/assumptions/

How Do You Know The Program Works?

The FAA developed a phased strategy to provide a Service Life Extension of the ASR and Mode-S Systems at the 132 highest traffic airports. Phase 1 was completed in October 2010 - four months ahead of schedule. Phase 2 is in solution implementation. ASR-9 and Mode S SLEP Phase 3 will be implemented in a similar fashion to achieve similar benefits (reliability and maintainability improvements and maintenance cost reductions).

Phase 3 will build upon previous successes by ensuring that proven Commercial-Off-The-Shelf- (COTS) technologies are utilized to the fullest degree possible. Where such products are not available, prototypes will be developed to demonstrate the desired functionality, and will be formally verified for compliance with the ASR-9 and Mode S Final Requirements standards and tolerances.

Extending the service life of the ASR-9 and Mode S systems will reduce outages due to performance deterioration and parts obsolescence. Furthermore, the ASR-9 and Mode S service life extensions will increase equipment and service availability. The success of the program will be measured by analysis of ASR-9 and Mode S outages attributable to system components affected by this modification, air traffic delays due to these outages, and related demand for spare parts.

Why Do We Want/Need To Fund The Program At The Requested Level?

Extending the service life of the ASR-9 and Modes S system will reduce outages due to performance deterioration and parts obsolescence. Furthermore, the ASR-9 and Mode S service life extension will increase equipment and service availability. Absent the requested funding, the ASR-9 and Mode S systems will continue to experience elevated maintenance costs and increasing reliability issues as the legacy ASR-9 and Mode S subsystems and components continue to age. The ASR-9 and Mode S programs are mandated to maintain operational availability of the National Airspace System (NAS) at 99.7 percent. Currently, ASR-9 is operating at 99.4 percent and Mode S at 99.3 percent which is below the mandate.

ASR-9 and Mode S service provides for maintenance of separation standards, reduces delays, and improves safety at congested airports. During instrument meteorological conditions the radar provides air traffic controllers' with information that allows closer aircraft operations and increases air traffic arrival and departure operations. This particular program, ASR-9 and Mode S Service Life Extension Program Phase 3, will continue to perform engineering studies that determine the scope of these programs.

A reduction from the FY 2015 funding request will result in increased risk to the ability to:

- Continue supportability analysis studies and required documentation to support the investment analysis process
- Develop Data Communications Equipment (DCE) prototype
- Develop Receiver Protector prototype
- Develop four Critical LRU prototypes
- Continue Engineering Studies to determine the extent of re-engineering and system modifications needed

Detailed Justification for – 2B17 - Surveillance Interface Modernization (SIM)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Surveillance Interface Modernization (SIM)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Surveillance Interface Modernization (SIM)	$0	$6,000	$4,000	-$2,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Program Mission Product	---	$1,822.0
b. Program Management	---	1,020.0
c. System Engineering	---	490.0
d. Integrated Logistics Support	---	320.0
e. Implementation	---	348.0
Total	Various	$4,000.0

For FY 2015, $4,000,000 is requested to complete Final Investment Analysis and fund Second Level Engineering to complete Preliminary Design Reviews (PDRs) in support of the Investment Analysis. Funding will also support source selection activities for a contract award for data converters at Final Investment Decision (FID), and development of test procedures for ERAM software changes, Beacon Interrogator (BI)-6 software changes, ASR-11 software changes, and Mode-S data converters.

What Is This Program?

The Surveillance Interface Modernization (SIM) Program will modernize the interfaces between FAA surveillance radar, automation, and specific weather systems, for both Terminal and Enroute. The result will be improved interconnectivity with less downtime and errors, potentially increased data precision, increased aircraft surveillance information delivered to the air traffic automation system, and increased operational efficiency. SIM accomplishes these goals by improving existing Radar to Automation interfaces, message formats, and information flow from Radar to Automation, and ultimately to Air Traffic Controllers.

Currently surveillance data is sent using Common Digitizer message format [version 2] (CD2) over point to point serial interfaces. SIM's improvements are achieved by converting the radar and automation systems from the serial interfaces to flexible Internet Protocol (IP) addressable interfaces, over a secure network. Upgrading from serial to IP data transmission formats will simplify circuit management and provide a platform to enforce security policies, ensure delivery to each customer, and provide direct performance metrics.

The data formats will carry the additional data fields needed by automation to improve tracker, display, and safety logic performance. New formats enable the transmittal of extensive radar data, available at the radar sensor, to be delivered to the automation platform. The more extensive data transmission includes the distinct 24-bit aircraft address, a time stamp associated with the aircraft position, Mode S data link access to aircraft sensors, and additional positional resolution bits which provide a more accurate determination of an aircraft's location.

Access to additional radar data provides performance enhancements for ATC automation systems, and allows, in the long-term, a more robust support of future operational improvements (OIs) as well as providing improved backup capabilities when ADS-B surveillance transitions as a primary resource of aircraft position reporting.

As a result of simplifying the radar data transmission architecture, the distribution of all available radar system data, to both the FAA and external users, will be more effective and efficient, and information security measures can be applied more consistently, resulting in greater flexibility with expandable information flow from the Aircraft, to Radar, and, ultimately, to Automation. The enhanced capabilities resulting from the SIM Program will reduce the maintenance overhead costs of legacy systems, reduce costs for the implementation of future systems, simplify the calculation for fusion, add increased range resolution, and enable future capabilities such as Enhanced Mode S Altitude Intent.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments

Why Is This Particular Program Necessary?

Surveillance data from today's legacy radars is distributed to automation systems over serial point-to-point interfaces to the nearest one or two automation facilities using various formats. Distribution to additional facilities and external users requires additional physical connections. The point-to-point connectivity and non-standard formats have inherent limitations that restrict the ease of distribution of surveillance information to other users and limit the capability to use reporting accuracy as well as architecture improvements available in more modern reporting formats and distribution schemes.

As part of NextGen, surveillance systems will be required to serve as backup to ADS-B surveillance, and to provide surveillance data needed to other government agency missions (e.g. Department of Defense, Homeland Security); however, they currently cannot be used to support the transfer and flexible distribution of expanded radar data, as legacy systems have not yet been modernized to support the more modern interface requirements. To align with future NextGen requirements additional capabilities are required to be implemented into legacy surveillance systems. These legacy systems will be required to provide data distribution other than point-to-point via modern networking techniques and transition to standard interface message formats with higher reporting precision which also provide additional target information to support future OIs. This program will implement a common industry standard communications architecture and format.

It is anticipated by having all legacy radar interfaces and applications converged to a common data format, the cost of maintaining these interfaces as the NAS transitions to NextGen will be significantly reduced. The number of surveillance interface parts requiring repair and replacement will be reduced.

How Do You Know The Program Works?

The objective of the program is to standardize all FAA radar to automation interfaces from point to point, limited data architecture to net-centric expanded data architecture. This will reduce cost and performance risks associated with data limitations and non-standard interfaces.

Why Do We Want/Need To Fund The Program At The Requested Level?

$4,000,000 is required to complete Final Investment Analysis and fund Second Level Engineering to complete Preliminary Design Reviews (PDRs) in support of the Investment Analysis. Funding will also support contract award for Mode-S data converters at FID, test compatibility with ERAM, BI-6, Mode-S and software and data converters.

Detailed Justification for - 2B18 Voice Recorder Replacement Program (VRRP)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Voice Recorder Replacement Program (VRRP)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Voice Recorder Replacement Program (VRRP)	$0	$6,200	$1,000	-$5,200

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. NAS Voice Recorder Program (NVRP)		
a. Program Office Support	---	$462.0
b. Cost Analysis Support	---	38.0
Total	Various	$500.0
B. Voice Recorder Safety and Audit	---	$500.0

For FY 2015, $500,000 is requested for NAS Voice Recorder Program (NVRP) Requirements Development and Definition. An additional $500,000 is requested for Voice Recorder Safety and Audit Requirements Development and Definition.

What Is This Program?

A. NAS Voice Recorder Program (NVRP)

Air-to-ground (A/G) and ground-to-ground (G/G) communications at FAA facilities are required to be recorded and stored for later retrieval. This applies to all Air Traffic Control (ATC) domains, including Air Traffic Control Tower (ATCT), Terminal Radar Approach Control (TRACON) facilities, Air Route Traffic Control Center (ARTCC), Automated Flight Service Station (AFSS), and the FAAs Air Traffic Control Systems Command Center (ATCSCC). The voice recorder provides the legally accepted recording capability for conversations between air traffic controllers, pilots, and ground-based air traffic facilities, and the recording is used in the investigation of accidents and incidents and routine evaluation of ATC operations. As the voice recorder technology and voice recorder requirements have continued to evolve, early digital voice recorders are experiencing obsolescence and supportability issues. These digital recording systems are reaching the end of their service life.

The previous program, Next Generation Voice Recorder Replacement Program (NG VRRP) has completed legacy voice recorder replacements, known as Digital Audio Legal Recorders (DALRs), at all FAA-owned NAS facilities; the remaining systems are scheduled to be completed in FY 2014. The NAS Voice Recorder Program (NVRP) is replacing the obsolete digital voice recorders and provides enhanced digital voice recording functionality to meet new requirements that have evolved since the implementation of NG VRRP DALR. The replacement of aging voice recorders will reduce operational costs and address the increasing demand for more expeditious audio access and capabilities such as increased recording capacity, recording of Voice Over Intranet Protocol (VoIP) telephones, connection to FAA Telecommunications Infrastructure (FTI)'s enterprise Network Time Protocol (NTP).

Funding in FY 2015 will provide for the analysis, update and development of specifications document and requirements document to address the new demands on voice recorders from various stakeholders.

B. Voice Recorder Safety and Audit

The Voice Recorder Safety and Audit initiative is needed for Requirements Development and Definition of off-site remote voice retrieval capability.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

NAS Voice Recorder Program (NVRP) is necessary to comply with new safety order requirements, provide a Voice Over Intranet Protocol (VoIP) enabled voice recorder for NAS Voice System (NVS), utilize FAA Telecommunications Infrastructure (FTI)'s enterprise Network Time Protocol (NTP) in lieu of costly to maintain Global Positioning System (GPS) units, and to either Technology Refresh or replace Digital Audio Legal Recorder (DALR) equipment that will have reached its End-of-Life (EOL). Additional requirements will be discovered as part of the Requirements Development and Definition process with involvement from all stakeholders.

How Do You Know The Program Works?

The previous program, NG VRRP, has completed legacy voice recorder replacements at all FAA-owned NAS facilities; the remaining systems are scheduled to be completed in FY 2014.

The NG VRRP Program Implementation Review (PIR) was conducted in early 2010 and concluded that the program meets the needs of its customers and that it has provided an overall cost savings due to lower maintenance costs. It also validated that the programs original business case remains valid, which provides an estimated $7,400,000 of benefits annually.

Why Do We Want/Need To Fund The Program At The Requested Level?

$500,000 is required to conduct NAS Voice Recorder Program (NVRP) requirements development and definition in order to award a contract in FY 2017. An additional $500,000 is required for Voice Recorder Safety and Audit Requirements Development and Definition.

A reduction of funding would delay contract award, because the pre-acquisition documentation would not be completed on-schedule.

Detailed Justification for - 2B19 Precision Runway Monitor Alternate (PRMA) – Multilateration Technology Upgrade

What Is The Request And What Will We Get For The Funds?

FY 2015 – Precision Runway Monitor Alternate (PRMA)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Precision Runway Monitor Alternate (PRMA)	$0	$5,000	$1,000	-$4,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Program Management	---	1,000.0

For FY 2015, $1,000,000 is requested to conduct analysis of new flight standards for required runway separation for triple simultaneous independent approaches on closely spaced parallel runways (CSPRs). The outcome of these standards might alleviate the need for precision runway monitoring (PRM) service at Atlanta (ATL) and San Francisco (SFO) effectively ending the business case. If the results of these flight standards confirm the existing PRM requirement at ATL for triple approaches and if Final Investment Decision is approved, the program office will require funding for procurement activities in a future year.

The PRMR program received Joint Resource Council (JRC) initial investment decision (IID) approval on September 26, 2012. In anticipation of new flight standards for CSPRs, the program office postponed Final Investment Decision (FID) for two years. FID is now scheduled for December 2015.

What Is The Program?

The PRM Electronic Scan Radar (PRM-E), a congressionally mandated program, is a high-update rate surveillance radar specifically designed for use during inclement weather and reduced visibility conditions. It is designed to monitor closely spaced parallel approaches (CSPA) in order to sustain or increase capacity during Instrument Meteorological Conditions (IMC) and Marginal Visual Meteorological Conditions (MVMC). During IMC, air traffic separation standards require greater distance between aircraft, thus limiting the Airport Arrival Rate (AAR) or the Airport Departure Rate (ADR), the number of aircraft arrivals (or departures) an airport is capable of accepting each hour. The system also incorporates alert algorithms to both predict and warn controllers of aircraft deviations from their nominal approach course. A PRM system must be used to conduct independent simultaneous instrument approaches to runways spaced less than 3,600 feet apart. When used with the appropriate air traffic procedures, precision runway monitoring enables operations in which aircraft are allowed to fly with shorter separation distances between them than otherwise permitted thus increasing normal IMC airport capacity.[1]

The PRM comes in two forms, the PRM-E and the Precision Runway Monitor Alternate (PRM-A). PRM-E is currently installed at Philadelphia International Airport (PHL), Lambert St. Louis International Airport (STL), San Francisco International Airport (SFO), Cleveland Hopkins International Airport (CLE), and Atlanta Hartsfield International Airport (ATL). The PRM-A is a single site system, commissioned at Detroit's Metro Wayne County Airport (DTW) in June 2009. The PRM-A was developed by Sensis Corporation and Raytheon

[1] NAS-Wide Precision Runway Monitoring Alternatives Analysis Final Report, September 9, 2004

Corporation and utilizes the Airport Surface Detection Equipment, Model X (ASDE-X) multilateration (MLAT) technology to perform the PRM operations.

Due to changing airport conditions, and a subsequent reduction in traffic volume, PRM is no longer required at CLE, PHL and STL. These airports are able to maintain their AAR during IMC at acceptable levels without the use of the PRM-E. Therefore, the decision was made by the Vice President of Terminal Services to decommission these three systems and return them to the FAA Logistics Center (FAALC) to be used as spare parts to support the needed SFO and ATL PRM systems. The plan to decommission these systems is in process.

The ATL and SFO PRM-E systems are nearing the end of their planned 10-year service life and logistical support for the systems is waning. The PRM-E systems were upgraded in 2005 and 2006 to replace obsolete components and to take advantage of advances in computing technologies. However, this upgrade did not address the costlier antenna and beacon radar subsystems. As a result, obsolescence is a growing concern in these areas, and the systems are reliant on a limited number of non-COTS components for which the availability and serviceability is severely limited. This is especially true with the antenna and beacon RF components, antenna dipoles, and channel cabinet assemblies. In addition, repair times have increased significantly, in some cases in excess of 26 weeks, due to limited parts and a diminishing sub-vendor repair base. Over the last 12 months, the ATL TRACON scopes have failed several times, and the FAALC is coordinating a short-term plan to cannibalize existing equipment from CLE, PHL, and STL to maintain these systems prior to a full system replacement.

The purpose of the PRM Replacement program is to identify the most cost effective solution for maintaining the PMR service at SFO and ATL in support of NextGen.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The PRM Replacement program supports the FAA's Destination 2025 Strategies of using NextGen technologies and operational improvements to reduce the average time it actually takes to go from one core airport to another. This program also maintains the needed PRM capability at SFO and ATL.

How Do You Know The Program Works?

PRM-R is a fully-integrated multilateration PRM solution modeled after PRM-A which is operational at DTW. The PRM-R system would provide the same service that PRM-E and PRM-A do now. AARs and ADRs are measures of airport capacity. AARs and ADRs are significantly reduced during adverse weather and reduced visibility conditions. At ATL, PRM allows for simultaneous, independent approaches on triple closely spaced parallel runways (CSPRs) during IMC, thus maintaining or improving ADR. ATL uses PRM technology regularly for simultaneous, independent triple approaches, improving capacity during arrival pushes, maintaining arrival and departure runway configurations, and reducing airport confusion. At SFO, PRM allows for simultaneous, independent approaches on dual CSPRs during MVMC, improving AAR by approximately 20 percent (30 – 36). Without the PRM technology, these airports would be required to conduct dependent simultaneous approaches, significantly reducing the airport's AAR or causing other airport delays and confusion.

Why Do We Want/Need To Fund The Program At The Requested Level?

The PRM-E and PRM-A are both an integral part of the transition to the NextGen and are currently the only available solutions for providing closely spaced parallel approach services during MVMC and IMC. Parts shortages and obsolescence are mounting concerns for the PRM-E systems with limited support provided through Raytheon Corporation. Thus, as parts fail, system availability is degraded. In addition, this project directly supports RTCA and Task Force 5's recommendation to implement closely spaced parallel operations (CSPO) in a phased manner and to extend the use of multilateration using PRM-A on a case-by case basis.

Detailed Justification for - 2B20 Integrated Terminal Weather System (ITWS) – Technology Refresh and Disposition

What Is The Request And What Will We Get For The Funds?

FY 2015 – Integrated Terminal Weather System (ITWS) – Technology Refresh and Disposition ($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Integrated Terminal Weather System (ITWS) – Technology Refresh	$0	$1,300	$4,400	+$3,100

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Systems Engineering and Integration	---	$400.0
b. Test and Evaluation	---	200.0
c. Software Development	---	2,700.0
d. Program Support	---	800.0
e. Logistics	---	300.0
Total	Various	$4,400.0

For FY 2015, $4,400,000 is requested to support the Integrated Terminal Weather System (ITWS) technology refresh planning and procurement efforts. Planned activities include software development, engineering and testing that will support hardware procurement and deployment the following year. The ITWS technology refresh will allow the FAA to sustain the generation of essential ITWS weather products to the Air Traffic Controller user community across the National Airspace System (NAS).

What Is This Program?

The Integrated Terminal Weather System (ITWS) provides automated weather information for use by air traffic controllers, supervisors, pilots and airline dispatch. The ITWS integrates data and information from FAA and National Weather Service (NWS) sensors such as the Terminal Doppler Weather Radar (TDWR), the Next Generation Weather Radar (NEXRAD), Airport Surveillance Radar (ASR), Low Level Wind Shear Alert System (LLWAS), Automated Weather and Surface Observing Systems (AWOS/ASOS), lightning detection systems, NWS weather models and aircraft via the Meteorological Data Collection and Reporting System (MDCRS).

Automated weather products produced by the ITWS include essential safety, windshear and microburst detection and predictions, storm cell intensity and direction of motion, lightning information, detailed winds in the terminal area and a one hour storm forecast. The graphical, full-color display provides an easy-to-use interface that does not require meteorological interpretation. ITWS weather information is available to air traffic managers, controllers and airlines via dedicated situation displays at FAA Air Traffic facilities, the web or an ITWS data feed. There are no other FAA weather programs that provide the type of airport-specific weather products that are generated by ITWS.

The ITWS Technology Refresh will include the systematic replacement of all ITWS Commercial Off-The-Shelf (COTS) system components, including: processors, situation displays, computer operating systems and software to assure continued supportability over the service life of the system. This will include the replacement of obsolete hardware at 145 Air Traffic facilities across the NAS.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

ITWS Technology Refresh activities are planned to begin in FY 2014. Beginning in FY 2015, logistics support for the current ITWS sites will begin to diminish, according to an ITWS Supportability Study conducted by the FAA in 2010. System hardware spares, support tools and maintenance provisions for keeping the current ITWS sites operational will become unavailable, support costs will escalate and system outages will increase.

How Do You Know The Program Works?

The ITWS technology refresh program will replace COTS components and is mandated to provide the same "form, fit, and function" as the current ITWS.

An evaluation of ITWS by the US Government Accountability Office (GAO) reported that ITWS is a well-managed program that has met all provisions of the FAA Acquisition Management System (AMS). The program has established internal processes that are in accordance with GAO best practices. Most notably, ITWS has been implemented within all FAA approved budget and schedule constraints. The ITWS technology refresh program will conform to the same standards. http://www.gao.gov/new.items/d127.pdf

Why Do We Want / Need To Fund The Program At The Requested Level?

$4,400,000 is required to support the Integrated Terminal Weather System technology refresh. There are no other FAA weather programs that provide the type of airport-specific weather products that are generated by ITWS. Planned activities include software development, engineering and testing that will support hardware procurement and deployment the following year. The ITWS technology refresh will allow the FAA to sustain the generation of essential ITWS weather products to the Air Traffic Controller user community across the NAS.

A reduction in funding will impact the software development and testing planned for FY 2015. Lack of funding to complete the software development in FY 2015 will delay the ITWS technology refresh deployment scheduled to begin the following year.

Detailed Justification for - 2C01 Aviation Surface Weather Observation System

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aviation Surface Observing System
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Aviation Surface Weather Observation System (ASWON)	$0	$10,000	$8,000	-$2,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Weather Sensor Procurement		$1,500.0
b. Integration Contract	---	2,000.0
c. ASWON Software Upgrade	---	1,000.0
d. Wind Sensor Pole Procurement	---	500.0
e. Pole Construction	---	2,500.0
f. Contractor Support	---	500.0
Total	Various	$8,000.0

For FY 2015, $8,000,000 is requested to continue the procurement of commercial-off-the-shelf (COTS) hardware required to upgrade/replace components of legacy FAA surface observation stations. An integration contractor will be funded to continue to produce upgrade kits for ASWON systems. Additionally, the funding will be used to continue the FAA's necessary software upgrades for these systems. Wind Sensor poles will be procured and installed as part of this activity. The remaining funding is required to fund contractors at FAA Headquarters that provide the necessary engineering support for this project.

The FAA granted a Final Investment Decision (FID) on the ASWON Technology Refresh investment September 26, 2012.

What Is the Program?

Aviation Surface Weather Observation Network (ASWON) is a service portfolio composed of the following primary and backup weather observation systems deployed throughout the NAS:

- Automated Weather Observing System (AWOS) - 188 systems
- Automated Surface Observing System (ASOS)* -571 systems
- Automated Weather Sensor System (AWSS) - 44 systems
- Stand Alone Weather Sensors (SAWS) - 139 systems
- Digital Altimeter Setting Indicator (DASI) - 500 systems
- Wind Equipment F-Series (WEF) Wind System - 230 systems
- AWOS Data Acquisition System (ADAS) - 22 systems

*ASOS is maintained by the NOAA National Weather Service (NWS) through an interagency agreement.

ASOS, AWOS and AWSS provide the primary weather observation at airports, while DASI, SAWS and F420 provide secondary weather parameter measurements for backup/augmentation purposes at staffed air traffic facilities. These systems provide wind speed and direction, temperature, dew point, barometric pressure, cloud height and amount, visibility and precipitation information for approximately 1,100 airports in the National Airspace System (NAS).

The ASWON Technology Refresh program will provide form/fit/function technology upgrades/replacements to five legacy ASWON systems (ASOS, AWOS, AWSS, DASI, F420) experiencing obsolescence, supportability, and maintainability issues. This sustainment effort will extend the service life of these systems and continue their role of providing required weather observations. The investment will result in a cost-avoidance of the continually increasing maintenance costs of these systems.

The following systems, agencies, and users depend on the data provided by ASWON:

- NOAA National Weather Service (NWS)
- Commercial Aviation, General Aviation, and the Flying Public
- Air Traffic Approach and Ground Controllers
- Surveillance Broadcast Services (SBS) - Flight Information Service Broadcast (FIS-B)
- Common Automated Radar Terminal System (ARTS) - ARTS IIIE
- Airport Surveillance Radar 9 (ASR-9) - Weather System Processor (WSP) for Windshear Detection
- Integrated Terminal Weather System (ITWS)
- Weather and Radar Processor (WARP)
- Corridor Integrated Weather System (CIWS)
- Automatic Terminal Information Service (ATIS)

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The five systems in the ASWON portfolio require a technology refresh (or equivalent replacement in-kind) effort in order to continue meeting current operational requirements. No new functionality or requirements will be added by this technology refresh effort. No other FAA initiatives address the shortfalls addressed by the ASWON technology refresh program. ASWON Technology Refresh ensures that the following functions will continue to be met:

- Acquisition of surface weather information
- Surface weather observations used by aircraft operators
- A minimum of two altimeter setting indicators (ASI) at ATC facilities
- Backup wind and altimeter required to maintain Parts 121 and 135 operations

How Do You Know the Program Works?

ASWON Systems are deployed and operational at over 1,100 sites in the CONUS, Alaska, and Hawaii. NextGen programs such as ADS-B are installation ASWON weather stations in Alaska for use with their surveillance and broadcasting systems. Surface observations provided by ASWON are used continually by Air Traffic Control, Pilots, the general public and several Air Traffic Control Systems.

ASWON technology refresh received Final Investment Decision (FID) on September 26, 2012.

Why Do We Want/Need To Fund The Program At The Requested Level?

$8,000,000 is required to continue execution of the Technology Refresh. The FAA second level engineering support group, Logistics Depot, and Maintenance personnel continue to struggle to find ways to support aging, unsupportable, and obsolete ASWON equipment. The required funding will initiate ASWON technology refresh implementation and will lead to a supportable and cost-effective ASWON, thus eliminating any risk of losing the essential services that ASWON provides to its numerous users. A funding reduction from the required level would delay this important task aimed at extending the service life of existing ASWON systems. These delays would potentially cause increased service interruptions, prolonged service outages and ultimately have a negative impact on NAS safety.

Detailed Justification for - 2C02 Future Flight Services Program (FFSP)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Future Flight Services Program (FFSP)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Future Flight Services Program (FFSP)	$6,634	$3,000	$1,000	-$2,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Future Flight Services Program	---	$1,000.0

For FY 2015, $1,000,000 is requested conduct studies, and related acquisition documentation for a future Initial Investment Decision (IID) on the Future Flight Services Program.

What Is This Program?

Currently, a combination of entities and platforms provide Flight Services to the General Aviation (GA) community. These services include but are not limited to: Flight planning, advisory, operations, and Search and Rescue (SAR) coordination to name a few. These services are provided within the Continental U.S., Puerto Rico, Alaska, and Hawaii. Flight Services provides weather briefings and flight planning services to pilots, and coordinate Visual Flight Rules (VFRs), provide orientation service to lost aircraft, maintain continuous weather broadcasts on selected Navigational Aids (NAVAIDs), and issue Notices to Airman (NOTAMs). While flight service functions in Alaska are provided by government personnel, flight service functions in the lower 48 states are being provided by contractor personnel. General Aviation (GA) pilots also access flight service information directly through web portals which eliminate the need for pilots to talk to a flight service specialist.

The primary objective of FFSP is to use automation to improve the delivery of flight service, and reduce the overall cost to the FAA. FFSP will transition flight services away from human delivery of flight service to more automated means. Once this transition is complete, pilots will have more direct access to flight service functions and an improved Pilot experience.

FFSP will expand the web portion of flight services, and reduce or eliminate human delivery of flight services as much as possible. The timeframe associated with the transformation is heavily dependent on the technologies responsible for enabling the new functions, and the availability of the interdependent programs to perform their essential functions. These interdependencies are as follows: Automatic Dependent Surveillance-Broadcast (ADS-B), System Wide Information Management (SWIM), Common Support Services-Weather (CSS-Wx) NextGen Equipage Policy, National Voice System (NVS), Next Generation Very High Frequency Air/ground Communications System (NEXCOM) Segment 2, Time Based Flow Management (TBFM), Traffic Flow Modernization System (TFMS), and Terminal Flight Data Management (TFDM).Flight services will continue to be provided by government personnel in Alaska and contractor services in the lower 48 states.

DOT Strategic Goal – Safety

- Reduction in transportation related fatalities and injuries.

Why Is This Particular Program Necessary?

The FFSP will replace the existing Automated Flight Services Station contract that covers the CONUS. This contract ends in last quarter of FY 2015. The contract that allows pilots to access flight service information directly, the Direct User Access Terminal Access (DUATS) contract, will expire in the fourth quarter of FY 2014. The DUATS contract will not be extended beyond 2014 and will not be replaced. Continued delivery of flight services within the continental US and Alaska is heavily dependent upon the success of the Future Flight Service Program.

Currently the combined services are utilized more than 30,000 times on a typical day by GA pilots with the vast majority using the direct access web portal contractor service. Ensuring this essential service continues and eliminating the high cost associated with human delivery of many other services, will require extensive coordination and analysis to ensure continuity of service and reduce programmatic risk.

FFSP will focus on bringing Flight Services into the 21st Century by leveraging new and innovative technologies both internal and external to the FAA to improve the delivery of Pre-Flight, In-flight, and Post-Flight service, and reduce the cost to the FAA.

How Do You Know The Program Works?

GA pilots have shown a clear preference in using electronic means to obtain the services they need. For this reason, FFSP will utilize more automation to deliver Flight Service to the GA community. The functions not directly or specifically related to flight planning are provided by other means today, (i.e., NOTAM entry, weather entry, inflight assistance). FFSP will perform the necessary analyses and coordination to upgrade and realign the services to achieve the most efficient and cost effective delivery of flight service to the GA community.

Why Do We Want/Need To Fund The Program At The Requested Level?

$1,000,000 is required to fund the community outreach, requirements development and related acquisition activities required to execute the FSSP program. The program will modify and monitor the existing AFSS contract to ensure goals are being met and costs are being reduced. FFSP will eliminate several inefficient and ineffective processes currently plaguing the FFSP program, and reduce FAA cost for delivering flight service to the general aviation community.

Detailed Justification for - 2C03 Alaska Flight Service Facility Modernization (AFSFM)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Alaska Flight Service Facility Modernization (AFSFM)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Alaska Flight Service Facility Modernization (AFSFM)	$2,748	$1,500	$2,800	+$1,300

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Alaska Flight Service Facility Modernization (AFSFM)	---	$2,000.0
B. In-Service Engineering	---	800.0
Total	Various	$2,800.0

The FY 2015 funding is planned for upgrades to the interior and exterior lighting at the Fairbanks AFSS, to decommission the old Gulkana and Kotzebue FSS buildings, to complete roof replacement at Ketchikan FSS, and to refurbish the equipment rooms, break rooms, pilot briefing rooms, and rest rooms at the Ketchikan FSS, Deadhorse FSS, Kotzebue FSS, and Nome FSS facilities.

What Is This Program?

The Alaska Flight Service Facility Modernization (AFSFM) program modernizes or replaces the 17 Flight Service facilities in Alaska to ensure the security and sustainment of Flight Services, and develop the infrastructure for continuity of operations. Over 33 percent of the Alaska Flight Service facilities were constructed in the 1970's and require extensive renovations to meet current building codes, fire life safety, Architectural Barriers Act Accessibility Standard (ABAAS) and electrical standards. Specifically, Flight Service buildings will be updated to meet Occupational Safety and Health Administration (OSHA) and Americans with Disabilities Act (ADA) requirements, and the electrical and safety systems will be upgraded to ensure they meet standards. The program benefits FAA flight service specialists and technical operations personnel by providing a safe and secure environment for conduct of flight service operations.

In addition, the program corrects deficiencies such as substandard lightning, grounding and bonding protection, electrical systems, and/or heating and cooling systems that could disrupt flight service operations by reducing reliability of flight service automation systems.

The AFSFM program conducts on-going analysis of Alaskan Flight Services facilities to identify and prioritize actions required to maintain and sustain each facility. The projects vary each fiscal year depending on priorities and available funding.

In coordination with Alaska Technical Operations and Western Service Center personnel, individual Site project plans and schedules are developed to maintain and sustain Alaskan Flight Services facilities.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The existing Flight Service facilities in Alaska are old, suffer from environmental, electrical, structural and safety deficiencies and generally do not meet the American's with Disabilities Act accessibility requirements, as defined and imposed by the Uniform Federal Accessibility Standards and the Architectural Barriers Act Accessibility Standard. These conditions endanger FAA personnel health and safety and increase the risk of service outages.

How Do You Know The Program Works?

Each project is managed in accordance with a schedule and cost baseline. Monthly status reports track scheduled activities and funding expenditures. A project is not complete until FAA Technical Operations personnel conduct a Joint Acceptance Inspection of the work performed as compared to the project scope of work, associated standards and policy. Any identified exceptions must be cleared before the project is designated "completed" within the FAA's Corporate Work Plan system.

The AFSFM program successfully completed the construction of a new Dillingham Flight Service Station (FSS) in FY 2014 to bring it into compliance with FAA Standards, current local building codes, and current fire/life safety regulations. The old facility had far exceeded its expected useful service life after years of continuous and constant operations in a harsh, maritime climate. Operations at the New Dillingham FSS began on December 17, 2013.

Why Do We Want/Need To Fund The Program At The Requested Level?

A funding reduction from the requested amount would require re-prioritization of planned projects and result in a delay in initiation for one or more projects. Delays due to reduced funding will prevent the expected benefits of this program identified above (i.e. providing a safe and secure working environment for FAA personnel; disruption of flight service operations by reducing reliability of flight service automation systems due to environmental, power or electrical deficiencies) from being achieved.

Detailed Justification for - 2C04 Weather Camera Program

What Is The Request And What Will We Get For The Funds?

FY 2015 – Weather Camera Program
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Weather Camera Program	$4,170	$1,200	$200	-$1,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Replace Aging Camera System Server	1	$200.0

For FY 2015, $200,000 is requested to fund the replacement of the Camera System Server equipment hardware and software that is located in the Anchorage Regional Office. This equipment is aging and will no longer be supportable after 2015. Weather cameras are extremely beneficial in areas with rapidly changing terrain, weather phenomena, and as information about the safety Alaska airports and mountain passes. Weather cameras allow pilots to have weather information about their destination airport and route of flight. Pilots are able to make more informed decisions on whether it is safe to fly before they are airborne and whether to continue flight. This prevents accidents and avoids unnecessary fuel costs.

What Is This Program?

The Weather Camera Program improves safety and efficiency by providing weather visibility information to aviation users that is obtained from near real-time camera images. These images, from airports and strategic en route locations, are provided to pilots and flight service station specialists to enhance situational awareness, preflight planning and en route weather briefings. Images are updated every 10 minutes and stored for 15 days. These images are made available through a user-friendly, web-enabled application and on the servers that will be upgraded with the requested funding. Additionally, the program funded procurement and installation of weather camera sites.

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Weather cameras contribute to the FAA goal by reducing a subset of Alaska accidents per 100,000 operations. The following table shows the program metrics as compared to actual results.

Year	Goal	Actual
2007	.28 accidents per 100,000 operations (Baseline)	
2008	.24 accidents per 100,000 operations	.21 accidents per 100,000 operations
2009	.22 accidents per 100,000 operations	.21 accidents per 100,000 operations
2010	.20 accidents per 100,000 operations	.17 accidents per 100,000 operations

2011	.18 accidents per 100,000 operations	.13 accidents per 100,000 operations
2012	.17 accidents per 100,000 operations	.17 accidents per 100,000 operations
2013	.16 accidents per 100,000 operations	
2014	.15 accidents per 100,000 operations	

Annual accident analysis is conducted to determine if program metrics are met. Metrics are based on a baseline of an en route or approach and landing low visibility related accident rate per 100,000 operations for non-IFR capable commercial and general aviation aircraft within the state of Alaska.

Why Is This Particular Program Necessary?

In the state of Alaska, flying is equivalent to driving in the continental U.S. (CONUS). Alaska's skyways are equivalent to the road infrastructure found throughout the CONUS making the use of small aircraft essential to everyday life. Many times flying is the only means to get children to and from school activities; to transport service providers such as clergy, doctors, dentists, and nurses; to deliver patients to medical facilities; and to supply the communities with groceries, fuel, and mail.

The combination of many pilots and extreme flying conditions has resulted in a much higher accident rate in Alaska. According to the National Institute for Occupational Safety and Health, a disproportionate number of all U.S. aircraft crashes occur in Alaska. Between 1990 and 2006, there were 1,497 commuter and air taxi crashes in the United States of which 520 occurred in Alaska – 35 percent of all commuter and air taxi crashes.

Deficient weather information in Alaska contributes to a higher risk of accidents and flight inefficiencies. Without weather information about their destination airport and route of flight, pilots cannot make informed decisions on whether it is safe to fly or continue their flight. This leads to accidents and unnecessary fuel costs.

How Do You Know The Program Works?

The installation of weather cameras improves pilot situational awareness which prevents aviation accidents. Performance metrics for reducing accidents have been exceeded every year (2008 through 2012) since the program was baselined and measurements began as reflected in the metrics above.

Why Do We Want/Need To Fund The Program At The Requested Level?

Statistics indicate that weather cameras have contributed to the actual reduction in aircraft accidents in Alaska at a rate that is better than targeted. Funding the replacement of program system core servers and automation software is necessary to continue camera services and operations. A reduction in the level of funding required will reduce stability and supportability of the camera services, which will result in a greater number of aircraft accidents occurring that could have been prevented.

Detailed Justification for - 2D01 VHF Omnidirectional Radio Range (VOR) with Distance Measuring Equipment (DME)

What Is The Request And What Will We Get For The Funds?

FY 2015 – VHF Omnidirectional Radio Range (VOR) with Distance Measuring Equipment (DME) ($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
VHF Omnidirectional Radio Range (VOR) with Distance Measuring Equipment (DME)	$2,369	$8,300	$8,300	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. VOR with VORTAC		
a. Procure VOR Dopplerization Equipment	---	$500.0
b. Complete On-Going Project to Dopplerize a Conventional VOR	---	2,000.0
Total	Various	$2,500.0
B. VOR Minimum Operating Network (MON) Implementation Program	---	$5,800.0

A. VOR with VORTAC

For FY 2015, $2,500,000 is requested for procurement of five DVOR Doppler Antenna Kits; procurement of two DVOR electronic kits and completion of one on-going DVOR projects, and conduct an analysis to determine the feasibility of redesigning the Line Replaceable Units (LRU) for the current VOR.

B. VOR MON

For FY 2015, $5,800,000 is requested to continue funding a collaborative effort to complete the investment analysis process and manage the implementation of the VOR Minimum Operating Network (MON).

What Is This Program?

A. VOR with VORTAC

This program sustains and relocates VOR and VORTAC facilities and also converts conventional VORs to Doppler VORs to improve NAS efficiency and capacity.

B. VOR MON

This program will implement a VOR MON that will provide the following:

- A back-up capability for non-DME/DME/IRU IFR aircraft (GA, Business RJ) in the event of a GPS outage
- An operational contingency, but not the robust network of current VORs
- A transitional network of VORs to allow users time to equip with new avionics to transition to RNAV and RNP

- VOR coverage of sufficient density to allow RNAV operation using TSO-129 avionics
- Basic, though not efficient, navigation service to users who choose not to equip with GNSS

DOT Strategic Goal - Economic Competitiveness
- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

A. VOR with VORTAC

This program relocates and dopplerizes VOR facilities to improve NAS efficiency and capacity. The VOR family includes VOR/DME (combination of VOR and Distance Measuring Equipment), and VORTAC (combination VOR and TACAN (Tactical Air Navigation)).

There are approximately 1,000 VORs (including VORTACs and VOR/DMEs) currently operating in the United States. These radio aids to navigation help pilots accurately determine their location in all weather conditions. They are used as navigational aids, and the VOR network is used to define established victor airways and jet routes.

Finally, analysis of the current VOR/VORTACs will:

- Provide for a technical and cost effective evaluation to extend the service life of VOR/VORTACs
- Evaluate the feasibility of extending the service life of VOR/VORTACs
- Assure viability of the VOR/VORTAC network through the transition to NextGen

B. VOR MON

The FAA navigation roadmap indicates that the decision was made regarding the VOR network drawdown. When the drawdown is completed, the remaining network will serve as backup to satellite navigation and continue to define VOR routes and procedures for legacy users.

The FAA cannot afford to sustain the full legacy network of VORs while also transitioning to NextGen technologies, which will enable performance-based navigation (PBN). NextGen's plan entails transitioning from defining airways, routes and procedures using VORs and other legacy ground-based navaids towards a NAS based on area navigation (RNAV) everywhere and required navigation performance (RNP) where beneficial. The majority of the current VORs are more than 40 years old. This program will avoid spending capital resources in support of the service. If the program is not funded the FAA will have to spend capital resources maintaining the full network of VORs and may even have to replace them all.

How Do You Know The Program Works?

A. VOR with VORTAC

VOR/VORTAC equipment have been deployed and maintained in the NAS for more than 50 years. VOR/VORTAC equipment is the primary source of navigational aid for commercial, private pilots, and military flying within the NAS and also for worldwide aviation.

B. VOR MON

FAA currently has a VOR network of approximately 1000 VORs. As PBN equipage increases the solution will support discontinuing VORs to implement the VOR MON. FAA has discontinued 5 VORs in the NAS over the last 3 years, and we will be applying the lessons learned in the execution of that program to implement the MON.

Why Do We Want / Need To Fund The Program At The Requested Level?

A. VOR with VORTAC

The VOR/DME program maps to the FAA goal of reduced congestion by making air traffic flow more efficient over land and sea. The replacement, relocation, conversion, or modification of VOR facilities (including VOR/DME) will improve VOR performance and enable the FAA to maintain a highly reliable, safe, and efficient ground based VOR and VOR/DME system until the use of Global Positioning System is widespread. The improved availability of this program provides enhanced aircraft routing and increased airport capacity.

$2,500,000 is required for procurement of three VOR/DME VOR Doppler Antenna Kits and completion of a project to dopplerize a conventional VOR. If the program were funded at a lower level the Navigation Program Group would procure fewer VOR Doppler Antenna kits and/or delay funding the on-going project to dopplerize a conventional VOR which could result in a schedule slip.

B. VOR MON

$5,800,000 is required in FY 2015 in order to accomplish the goals of this program. If the funding were to be reduced the investment analysis process may be delayed impacting, the discontinuance rate and the implementation of the VOR MON. The sustainment cost for VORs may increase as the systems continue to age and spare parts become harder to obtain.

Detailed Justification for - 2D02 Instrument Landing System (ILS) – Establish

What Is The Request And What Will We Get For The Funds?

FY 2015 – Instrument Landing System (ILS) – Establish
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Instrument Landing System (ILS) – Establish/Expand	$7,478	$7,000	$7,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Equipment Procurement	---	$2,465.0
b. Complete Two ILS Replacements/Begin Three ILS Replacements	---	4,375.0
c. Logistics/Engineering Support Service	---	160.0
Total	Various	$7,000.0

For FY 2015, $7,000,000 is requested for engineering and technical services support; procurement of five ILS systems, and ancillary equipment, attain service availability for two ILS projects, and initiate three sustain ILS replacement projects.

What Is This Program?

This program replaces older ILS equipment. The ILS provides the pilot with both vertical and horizontal guidance information allowing aircraft to land in weather conditions that would otherwise be prohibited. The ILS also enables airports to meet increasing traffic demands. The ILS includes three components, a localizer which gives lateral guidance to the runway centerline, a glide slope to give vertical guidance and marker beacons. The ILS sends information to instruments in the cockpit so that the pilot can maintain a perfect flight path to the runway even in low visibility. Some aircraft are equipped with an autopilot which can directly receive ILS signals to automatically guide the plane to a landing.

There are three categories of ILS. Each category is defined by the lowest altitude at which a pilot is able to decide whether to land or abort (decision height) and how far the pilot can see the runway (runway visual range).

- Category I: Decision Height (DH) 200 feet and Runway Visual Range (RVR) 2,400 feet (with touchdown zone and centerline lighting, RVR 1,800 feet)
- Category II: DH 100 feet and RVR 1,200 feet
- Category IIIa: No DH or DH below 100 feet and RVR not less than 700 feet
- Category IIIb: No DH or DH below 50 feet and RVR less than 700 feet but not less than 150 feet
- Category IIIc: No DH and no RVR limitation, requires an autopilot

Approximately 1,200 runway ends are equipped with an ILS in the U.S. Of these, approximately 125 are more than 25 years old and may be candidates for replacement because they have exceeded their expected service life and their original manufacturer no longer provides support. The FAA is aggressively pursuing implementation of satellite navigation but until that transition is complete, the ILS remains the world standard for providing approach and landing services. In the next decade, more than 700 currently deployed ILS will exceed their service life.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The ILS along with required approach lighting systems directly impact both system safety and capacity. The ILS provides the pilot with vertical and horizontal guidance allowing aircraft to land safely in both Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). The ability to land in IMC reduces the number of weather caused flight delays, diversions, over-flights and cancellations, therefore, increasing the capacity of the airport. A precision approach capability allows an airport to remain open to traffic when it would otherwise have closed; thereby avoiding weather caused flight delays. Additionally, replacement of aging ILS equipment will improve reliability and availability, therefore reducing the outage rate and the maintenance man-hours.

How Do You Know The Program Works?

ILS equipment currently deployed in the National Airspace System (NAS) has been there for better than 40 years. The ILS has proven itself as a navigational aid for pilots landing within the NAS. In 2016, the FAA will make a decision to begin the drawdown of Category I instrument landing systems (ILS), because they may be replaced with Wide Area Augmentation System (WAAS) for GPS procedures.

Why Do We Want/Need To Fund The Program At The Requested Level?

For FY 2015, $7,000,000 is requested for engineering and technical services support; procurement of five ILS systems, and ancillary equipment, attain service availability for two ILS projects, and initiate three sustain ILS replacement projects.

A reduction would defer engineering and technical support. If the program were funded at a lower level the Navigation Program Group would procure fewer ILS systems and/or delay funding ILS replacement which could result in a schedule slip.

Detailed Justification for - 2D03 Wide Area Augmentation System (WAAS) for GPS

What Is The Request And What Will We Get For The Funds?

FY 2015 – Wide Area Augmentation System (WAAS) for GPS
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Wide Area Augmentation System (WAAS) for GPS	$90,031	$84,000	$103,600	+$19,600

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Wide Area Augmentation System (WAAS)		
a. GEO Satellite Acquisition	---	$48,010.0
b. Technology Refresh	---	25,920.0
c. NAS Implementation	---	9,860.0
d. Technology Evolution	---	5,110.0
e. Technical Engineering Program Support	---	14,700.0
Total	Various	$103,600.0

WAAS supports the ADS-B program, WAAS satellites provide the exact positioning accuracy for ADS-B and will enable ADS-B to fully implement all capabilities (reduced separation).

A. Wide Area Augmentation System

GEO Satellite Acquisition, **$48,010,000** - Ongoing Lease payments for the operational 3rd, 4th and Gap Filler GEO services. Development of GEO satellite payload and Ground Uplink Station (GUS) sites for the 5th and 6th GEO will be ongoing. WAAS requires a minimum of three GEO satellites to meet performance requirements. Sustainment of three GEOs requires acquisition of replacement services to include development of satellite payload and all supporting ground infrastructure.

Technology Refresh, **$25,920,000** – WAAS Telecommunications Subsystem (TCS) will be upgraded and equipment including routers will be operationally deployed. The Signal Generator Subsystem (SGS) development will be completed for integration into the 5th GEO GUS sites.

NAS Implementation, **$9,860,000** – Supports the following activities: feasibility studies, procedure design, procedure development, flight inspection, and surveys for 100 WAAS procedures In addition, funds will be used for survey validation, data collection by operators, benefits analysis, avionic integration, and development of WAAS-specific operations within the NAS.

Technology Evolution, **$5,110,000** – Supports WAAS Integrity Performance Panel threat model assessments, ionospheric evaluation, safety analyses, and improving/maintaining SBAS interoperability. Support studies for the development and validation of SBAS standards supporting integration of modernized GNSS signals and services such as Advanced Receiver Autonomous Integrity Monitoring (ARAIM). A major focus for FY 2015 will be to assess the integrity implications of the L5 transition activity.

Technical Engineering/Program Support, **$14,700,000** - Hazardously Misleading Information (HMI) analysis support, Radio Frequency Interference (RFI) support, software and hardware development, system performance assessment, finance, logistics, training, test and evaluation, reliability-maintainability-availability (RMA) analysis, quality assurance (QA), human factors, EVM, security, safety engineering, program management, planning and specialty engineering. In FY 2015 a major focus of the Program will be on the 5th GEO signal generator development and deployment, 5th GEO payload testing, GIII reference receiver fielding, TCS (Communications) upgrades, WAAS safety computer integration and WAAS software recertification.

What Is This Program?

WAAS, a satellite based navigation technology, allows qualifying airports (ref. advisory circular 150/5300-13A. Table 3-4, 3-5 and Terminal Instrument Procedures Standards (TERPS) 8260.58) in the NAS to have vertical and horizontal guidance during all phases of a flight, regardless of weather conditions, without installing expensive legacy navigation hardware at each runway. WAAS consists of a network of 38 FAA ground reference stations distributed across the continental United States and Alaska that monitor the global positioning system (GPS) satellite signals. Three master stations collect the reference station data and calculate corrections and integrity messages for each GPS satellite. The WAAS messages are broadcast to user receivers via leased navigation transponders on two commercial geostationary (GEO) satellites. The user receiver on the aircraft applies the corrections and integrity information from the WAAS message to obtain the precise navigation service. Today, WAAS users can conduct en route operations across the entire NAS and precision approach take off and landings at 95 percent of the qualifying airports in the 48 contiguous states.

WAAS is not mandatory for ADS-B operations but will allow for ADS-B enhanced operations. WAAS has been used as the ADS-B on-board position sensor in all demonstrations to date, because it meets the requirements to achieve levels of accuracy, integrity, and availability required by an ADS-B position sensor for enhanced surveillance operations. The development of a common WAAS/ADS-B avionics suite using the same WAAS-based position sensor will reduce the overall cost to the user and will facilitate the widespread, rapid, and cost-effective deployment of both WAAS and ADS-B.

WAAS supports NextGen Positioning, Navigation and Timing (PNT) capabilities and is integrated with most commercial GPS chips and receivers. Other investments that WAAS interfaces with include Continuously Operating Reference Stations (CORS) operated by the National Geodetic Survey under the National Oceanic and Atmospheric Agency, Mobile E911 and a very large population (hundreds of thousands) of WAAS enabled GPS receivers being used in aviation, marine, automobile, telecommunication, agriculture, surveying and recreation.

Collaboration also occurs between the WAAS team, industry and international representatives through participation in the Institute of Navigation (ION), International Civil Aviation Organization (ICAO), RTCA (joint government-industry collaborative body for aviation standards development), Asian Pacific Economic Cooperative (APEC), Indian Space Research Organization (ISRO), Interoperability Working Group (IWG), International Committee on GNSS (ICG), Airports Authority of India (AAI), Japan Civil Aviation Bureau (JCAB), as well as Transport Canada, NAV CANADA, and Servicios a la Navegación en el Espacio Aéreo Mexicano SENEAM.

In FY 2015, WAAS will execute the approved baseline, WAAS Phase IV Dual Frequency Operations. Phase IV implements changes to the WAAS necessary to launch Dual Frequency Operations. WAAS Phase IV activities for FY 2015 include development, test, integration and operational cutover of initial incremental changes. Additionally, the Department of Defense has announced December 2020 as the sunset of the current GPS L2P(Y) signal necessary for WAAS user services. The WAAS Phase IV Dual Frequency Operations effort will address this mandate by replacing the L2P(Y) with the L5 signal.

WAAS Strategy to Contribute to NextGen, Air Traffic Operations domain:

The WAAS program is developing 100 LPV/LP procedures in 2015, enabling more efficient aircraft trajectories. WAAS will be used in the redesign of airspace with RNAV T and Q routes that will increase efficiency and capacity.

In Alaska, WAAS enables users to operate under Instrument Flight Rules (IFR) on routes currently classified as uncontrolled airspace. The WAAS enabled routes improve operator efficiency, access and safety, while incrementally reducing dependency on Ground Based navigation, which supports the solution sets of Trajectory Based Operations and Flexibility in the Terminal Environment.

WAAS will support the near-term demonstrations with vertical flight aircraft, business/regional jets, and air carriers with airspace redesign and WAAS LPV approaches. The business/regional jet portion of these projects will be to develop RNAV/RNP routes from an en route environment using Optimized Profile Descents (OPDs), and WAAS LPV final approach segments that avoid environmentally sensitive areas.

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

The FAA is required by law to establish, operate, and maintain navigation capability for all phases of flight. Historically, the FAA has invested in ground-based navigation equipment, such as Instrument Landing Systems (ILS), to provide this navigational capability. However, FAA has determined that WAAS' satellite-based GPS navigation capability provides the most efficient and cost-effective means of providing the service moving forward. It leverages modern technology advancements and NextGen capabilities will build off this capability. A minimum operating network of ground based navigation aids will be retained. WAAS will provide access and LPV procedures at all runway ends which may allow for a reduction in Instrument Landing Systems (ILS).

Many of the aircraft flying in the national airspace system (NAS) lack seamless navigation capability and many runways in the NAS lack navigation aids that deliver stable vertical guidance in all weather conditions.

By increasing procedures and expanding WAAS coverage, users will equip with WAAS receivers and increase the total benefit realized by WAAS. WAAS will reach over $980 million in safety benefits and $4.7 billion in efficiency benefits over the program life-cycle. In 2016, the FAA will make a decision to begin the drawdown of Category I ILS.

How Do You Know The Program Works?

In terminal area and approach operations, a Flight Safety Foundation Report found that there is nearly an eight fold reduction in approach accident rates (53 per million for non-precision approaches vs. seven per million for precision approaches) when precision vs. non-precision approaches were used. Specifically, 141 accidents could be prevented over a 20 year period and save over 250 lives when using WAAS for vertically guided approaches at airports where stable vertical guidance is not available or not used today. WAAS provides vertical and horizontal guidance with an aviation safety component enabling pilots to make stable, vertically guided approaches to all qualified runway ends in the continental United States and most of Alaska. Presently precision vertically guided approaches using CAT I ILS are only available at 1,283 of the nation's 19,000 runway ends.

WAAS performance data is collected daily and provided in a quarterly report that produces real time plots, daily plots, real time data, performance videos and performance analysis. The website for this information is http://www.nstb.tc.faa.gov/.

Cargo aircraft have shown increased cargo capacity, reduced fuel loads, reduced divert rates (inability to land at planned destinations), and operational cost savings of approximately $200,000 per year. Regional airlines have shown fuel and time savings by utilizing satellite-based waypoints that facilitate straight-line, shortest-distance routes as compared to legacy (zigzag) routes that fly a series of straight line route segments connecting ground based navigation aids. Commuter airlines have demonstrated cost avoidances attributable to lower minimum descent altitudes at airports through the installation of LPV approach procedures. This savings, along with very short return on investment timelines, has translated into commitments to fully equip airline fleets with WAAS avionics. Business jet operators in FAA Government

Industry Partnerships (GIPs) have been able to decrease in-flight conflicts with major airport traffic while on approach at feeder airports. This has allowed increased frequency of operations and reduction of in-flight and ground clearance delays.

EMS helicopter operators have been able to create IFR LPV approaches to medical center helipads, eliminating the requirement to land at distant airports necessitating ground transportation and consequent delays in patient care. WAAS-based helicopter routes have allowed elimination of Air Traffic Control delays by assuring deconfliction with airline traffic at major metroplex airports. WAAS based helicopter routes and LPV approaches have been developed into independent infrastructure systems that eliminate ground delays for executive transport in extremely complex and congested airspace such as the New York metropolitan area, allowing significant increases in flight operations during poor visibility. In effect WAAS, and the resulting ability to reduce separation requirements, has enabled the creation of a second infrastructure system where previously only one could exist.

In 2010, an independent Post Implementation Review (PIR) found that WAAS was successfully delivering the expected performance and benefits while maintaining the program cost and schedule baseline.

Why Do We Want / Need To Fund The Program At The Requested Level?

The FAA mission to transition to Performance Based Navigation is heavily dependent on the WAAS program to be fully implemented. Funding reductions for the WAAS Program will directly impact the ability of the NAS to transition from ground based to satellite based navigation. WAAS is a key enabler for NextGen programs (ADS-B, RNAV/RNP, etc.) and supports the Performance Based Navigation (PBN) and Metroplex Portfolio.

In FY 2015 $103,600,000 is required to execute planned tasks. WAAS is a fully operational navigation system within the NAS that requires continued robust annual budgets to fund the critical technology updates along with the maintenance needed to sustain ongoing operations. WAAS has 65,696 users over a broad cross section of the aviation community, such as regional airlines, airports, air carriers, helicopter operators, general aviation pilots, and many other users. The program provides precision approaches to airports that do not have ground based navigation aids. Failure to fund the WAAS program at the requested level will cause a cascading effect, which would affect non-aviation communities that rely on the WAAS signal for navigation.

Detailed Justification for - 2D04 Runway Visual Range (RVR) and Enhanced Low Visibility Operations (ELVO) Program

What Is The Request And What Will We Get For The Funds?

FY 2015 – Runway Visual Range (RVR) and Enhanced Low Visibility Operations (ELVO) Program
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Runway Visual Range (RVR) and Enhanced Low Visibility Operations (ELVO) Program	$3,791	$6,000	$6,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Complete RVR Replacement Projects and Initiate Activities to Increase Operating Capability at Existing RVR Locations	---	$4,000.0
B. Enhanced Low Visibility Operations (ELVO) Phase II	---	2,000.0
Total	Various	$6,000.0

A. RVR
For FY 2015, $4,000,000 is requested for engineering and technical services/support; to complete 14 RVR replacement projects.

B. ELVO Phase II
For FY 2015, $2,000,000 is requested to begin activities to increase the operating capability at a minimum of five ELVO locations.

What Is This Program?

A. RVR

This program replaces older RVR equipment with new generation RVR equipment. The RVR provides air traffic controllers and pilots with vital meteorological visibility data that is used to allow take-offs or landings during limited visibility conditions. Approximately 20 percent of all RVR systems in the National Airspace System (NAS) exceed their 20 years of Economic Service Life. Consequently, there is an increasing likelihood of loss of service due to life-cycle issues associated with the older RVR systems currently in the National Airspace System (NAS). Furthermore, the older RVR equipment is mounted on rigid structures. If struck accidentally during departure or landing, severe damage to aircraft and possible loss of life could result.

The older RVR systems are being replaced with new-generation RVR equipment that will eliminate the emerging life-cycle issues (i.e., Reliability, Availability, and Maintainability) associated with the older RVR systems currently in the NAS. Furthermore, the new-generation RVR equipment is mounted on frangible, low-impact-resistant structures that break away if struck accidentally by aircraft during take-off or landing.

B. ELVO Phase II

The Enhanced Low Visibility Operations (ELVO) Program Phase II builds on the success of Phase I. Phase I was an initiative by Flight Standards Operations that put into place several additional flight services with lower RVR minimums for approach and departure. These services include lower departure minimums to as low as 500 feet (ft) down from 1,600 ft and approach services including the following:

- Category (CAT) I approach with a 200 foot (ft) Decision Height (DH) but RVR minimums of 1,800 ft from 2,400 ft for Standard CAT I
- A new service of Special Authorization (SA) CAT I with a 150 ft DH and 1,400 ft RVR minimums
- SA CAT II with the same 100 ft DH and 1,200 ft RVR as Standard CAT II but with far less lighting requirements

The difference in lighting requirements makes ELVO Phase II a very cost effective way to increase services to the CAT II level of service without the expense of Standard CAT II investments. Phase I put these services into place for runway ends that did not require any infrastructure investment; Phase II identifies certain locations that should also receive the benefit of these services yet requires some infrastructure investment.

The approach and departure procedures supported by ELVO Phase II were shown in a cost-benefit analysis to have a very fast return on investment, even less than 12 - 18 months in many cases. The benefit includes increased NAS efficiency and fewer delays or cancellations and fewer diverted flights.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

A. RVR

The two main areas from which cost savings can be expected are:

- Reduced Flight Disruption: Weather caused flight disruptions; delays, diversions, over-flights, and cancellations impose economic penalties on both aircraft operators and users. Favorable RVR information is required to land during category II, III and many category I precision approaches. This allows an airport to remain open to traffic when it would otherwise have closed, avoiding weather-caused flight disruptions. These benefits are calculated by estimating the number of flight disruptions avoided multiplied by the unit cost for a flight disruption. The unit cost for a flight disruption is based on assumed operating scenarios that describe the flow of events when a flight is disrupted.

- Improved Safety: The benefit realized is the reduction or elimination of fatalities and costs associated with aircraft accidents involving low-impact resistant structures versus aircraft accidents involving rigid approach structures. Use of low-impact-resistant structures reduces fatalities and the severity of damage to aircraft that accidentally strike them during departure or landing.

B. ELVO Phase II

Specific benefits include:

- Increased number of arrivals/departures during low visibility conditions
- Decreased number of flight delays, cancellations, and/or diversions
- Increased flexibility in the terminal environment, with potential decreased congestion and better traffic flow
- Increased ability to utilize closer and more optimally located alternate airports, leading to less fuel requirements for dispatch
- Increased capacity for airlines to schedule flights in marginal weather conditions (since both the primary and alternate routes must be approved within the flight plan)
- Natural incentives to industry to modernize onboard equipment with advanced avionics such as the Head Up Display (HUD).

There is additional need for CAT II level of service within the NAS. Though SA CAT II is at the same minimums as Standard CAT II service, there is a large cost savings since the overall lighting requirements are less. SA CAT II has overall life-cycle cost savings of $10 - 15 million over Standard CAT II since only a Medium-Intensity Approach Lighting System (ALS) with Runway Alignment Indicator Lights (MALSR) is required vice the High-Intensity ALS with Sequenced Flashers (ALSF-2) required by Standard CAT II. The MALSR is less of an initial investment and maintenance and operational costs are also less. Additionally, SA CAT II has less lighting requirements overall since no Centerline lights or Touch down lights are required.

Part of the need for additional service to the CAT II level is caused by Single-Thread airports. A single-thread airport is usually one of the hundred busiest and it has only one Standard CAT II/CAT III capable runway end. If some event occurs, rendering that runway end out of service, then the entire airport is left with downgraded capability. The FAA's Continuity of Service Order stipulates that if an Instrument Landing System (ILS) experiences too many failures, it must be taken out of service for a minimum of six weeks rendering an area's only major airport capable of downgraded services. ELVO Phase II addresses this by providing such an airport additional runway capability cost-effectively.

Currently, NAS users must select alternate airport sites that are capable of handling that aircraft. For the larger air carriers, these sites are often quite far away geographically from the primary landing location. ELVO allows these alternate sites to be closer to the primary. The aircraft then requires less fuel for dispatch, flies more efficiently, and reduces the carbon footprint for flight operations.

Further, the lower RVR minimums for departures have increased NAS efficiency. If low visibility, often caused by fog, occurs in the morning delaying the first flights out, the rest of the day's schedule is impacted. Getting that first flight to depart is crucial for on time schedule throughout the rest of the day.

How Do You Know The Program Works?

A. RVR

The FAA has been deploying RVR equipment for more than 40 years. The RVR has proven itself as an extremely useful aid for controllers and pilots flying within the NAS.

B. ELVO Phase II

Phase I is already currently operational within the NAS, and there are numerous examples of saved flight operations are attributable to those efforts. Additionally, post-implementation analysis have shownoperational benefits accruing at several sites, exceeding the projected benefits presented while seeking funding. The return on investment is often within one year.

Why Do We Want/Need To Fund The Program At The Requested Level?

A. RVR

$4,000,000 is required for engineering, technical services/support, and completion of RVR replacement projects. If the program were funded at a lower level, the Navigation Program Group would have to delay funding RVR replacement projects.

B. ELVO Phase II

$2,000,000 is required for ELVO Phase II to address the shortfalls for sites requiring RVR 1800, SA CAT I, and/or SA CAT II or lower departure minimums. ELVO Phase II sites address those sites that require infrastructure investment. The first sites are in the New York/New Jersey (NY/NJ) area and other sites within the NAS. Since operational benefits accrue immediately upon completion of this work, delays in funding or at lesser levels will delay these operational benefits.

Detailed Justification for - 2D05 Approach Lighting System Improvement Program (ALSIP)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Approach Lighting System Improvement Program (ALSIP)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Approach Lighting System Improvement Program (ALSIP)	$2,843	$3,500	$3,000	-$500

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Equipment Procurement	---	$940.0
b. Installation of One MALSR	---	2,000.0
c. Logistics/Engineering Support Service	---	60.0
Total	Various	$3,000.0

For FY 2015, $3,000,000 is requested for engineering and technical services/support; procurement of approximately four Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) systems and ancillary equipment; Replace a MALSR at one location.

What Is This Program?

The Approach Lighting System Improvement Program (ALSIP) upgrades approach lighting systems built before 1975. It upgrades the equipment to current standards and reduces the potential severity of take-off and landing accidents by replacing rigid structures with lightweight and low-impact resistant structures that collapse or break apart upon impact. The entire approach lighting system is replaced when rigid structures are replaced. The High Intensity Approach Lighting System with Sequenced Flashing Lights (ALSF-2) provides visual information on whether the pilot is aligned with the runway centerline, the aircraft's height above the runway plane, roll guidance, and horizontal reference for Category II and III Precision Approaches. The Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) provides visual information on runway alignment, height perception, roll guidance, and horizontal references for Category I Precision Approaches.

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

Improved Safety: This program reduces fatality incidents and costs associated with aircraft accidents involving rigid approach lighting structures, through the use of low-impact-resistant structures.

Reduce Flight Disruption: Weather-caused flight disruptions – delays, diversions, over-flights, and cancellations – impose economic penalties on both aircraft operators and users. An operational MALSR or ALSF-2 allows an airport to remain open to traffic, when it would otherwise have closed, avoiding weather-caused flight disruptions. These benefits are calculated by estimating the number of flight disruptions avoided multiplied by the unit cost for a flight disruption. The unit cost for a flight disruption is based on assumed operating scenarios that describe the flow of events when a flight is disrupted.

How Do You Know The Program Works?

Collisions between aircraft and low impact resistant structures have shown minimal or no effect on aircraft, passengers and crew.

Why Do We Want / Need To Fund The Program At The Requested Level?

$3,000,000 is required for engineering and technical services/support; procurement of approximately four MALSR systems and ancillary equipment; Replace a MALSR at one location. If the program were funded at a lower level the Navigation Program Group would reduce the number of MALSR systems procured and/or reduce the amount of funding provided for the installation of one planned MALSR replacement project.

Many of the older approach lighting systems in the National Airspace System (NAS) have rigid structures. Aircraft that accidentally strike these structures during departure or landing can incur substantial damage. The National Transportation Safety Board (NTSB) recommended replacing the rigid approach lighting structures with low-impact resistant structures that collapse or break apart upon impact.

A reduction in funding would reduce the number of MALSR systems procured.

Detailed Justification for - 2D06 Distance Measuring Equipment (DME)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Distance Measuring Equipment (DME)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Distance Measuring Equipment (DME)	$4,738	$4,000	$3,000	-$1,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Distance Measuring Equipment (DME) Procurement	---	$1,870.0
b. Complete and Initiate Establish/Replacement DME Projects	---	800.0
c. Logistics/Engineering Support Services	---	330.0
Total	Various	$3,000.0

For FY 2015, $3,000,000 is requested for engineering and technical services/support; procurement of 25 DME systems; provide final incremental funding for 15 ongoing DME installations; and initiate funding for 20 DME installations.

What Is This Program?

DME is a radio navigation aid that is used by pilots to determine the aircraft slant distance from the DME location.

This program procures state-of-the-art DME systems to support requirements for Commercial Aviation Safety Team (CAST), sustainment of DMEs that have exceeded their 20 year service life expectancy, replacement of ILS markers and new DME requirements.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The current antiquated DME network will not meet the projected 2025 requirements. Without replacement of the current DME systems the network will be unsustainable. The unavailability of a DME network will severely impact general aviation's capability to navigate, commercial aviation FMS performance, airport capacity due to the non-availability of CAT II/III ILS approaches and safety of the flying public in the NAS. Foreign carriers operations in the NAS will also be severely impacted. Delaying the upgrade of the DME network will increase future replacement costs and will prevent realization of the projected cost savings from future NAS improvements.

The program requires the new DME design to incorporate enhanced local and remote diagnostics and repair capability utilizing proven industry best practices and design. While the design of the new DME is more complicated, it has been designed with human engineering factor considerations for ease of troubleshooting and replacement of Line Replaceable Units (LRU) as well as system status indication, high reliability design considerations, ease of future improvements and upgrades, and a 150 percent increase in aircraft interrogation capability. The new system will improve reliability by 300 percent and reduce down time and maintenance cost.

DMEs are replacing ILS marker beacons at existing and newly established Category I ILS locations thus eliminating the need for expensive land lease outside airport property.

How Do You Know The Program Works?

The FAA has successfully procured, deployed and maintained over 900 DMEs within cost and schedule for over 50 years. All systems procured on the DME program have met or exceeded their functional requirements to be used in the NAS.

Presently there are the plans, procedures, technical resources, appropriate support and a contract in place to successfully manage this program within cost and schedule.

Why Do We Want/Need To Fund The Program At The Requested Level?

$3,000,000 is required for engineering and technical services/support; procurement of 25 DME systems; provide final incremental funding for 15 ongoing DME installations; and initiate funding for 20 DME installations. If the program were funded at a lower level the Navigation Program Group would procure fewer DME and/or delay funding DME installation projects.

The program is required to meet urgent needs to sustain DMEs according to the FAA Roadmap to 2025 and beyond.

Detailed Justification for - 2D07 Visual Navaids – Establish/Expand

What Is The Request And What Will We Get For The Funds?

FY 2015 – Visual Navaids – Establish/Expand
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Visual Navaids – Establish/Expand	$3,317	$2,500	$2,000	-$500

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Complete PAPI Establish Project	---	$1,628.0
b. Logistics/Engineering Support Service	---	372.0
Total	Various	$2,000.0

For FY 2015, $2,000,000 is requested for engineering, technical services/support, and to install CAST PAPI Systems at 17 locations.

What Is This Program?

This program supports the procurement, installation, and commissioning of Precision Approach Path Indicator (PAPI) systems and Runway End Identification Light (REIL) systems. The PAPI provides visual approach glide slope information to pilots and enables them to make a stabilized descent with a safe margin of approach clearance over obstructions. PAPI consists of four lamp housing assemblies arranged perpendicular to the edge of the runway. PAPI projects a pattern of red and white lights along the desired glide slope so a pilot can tell whether they are on the glide slope and how to correct their glide slope if they above or below it. A REIL is a visual aid that provides the pilot with a rapid and positive identification of the approach end of a runway. The REIL system consists of two simultaneously flashing white lights, one on each side of the runway landing threshold.

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

Visual Navaids are necessary to assist pilots in optically acquiring the runway environment. These lighting systems facilitate the transition from cockpit instruments to external visual references during the final landing phase. Different categories and types of approaches require different visual navaid equipment.

The program supports a Commercial Aviation Safety Team (CAST) recommendation to implement a visual precision-like vertical approach capability on various airport runways and Land and Hold Short Operations (LAHSO) requirements. The CAST, a group including FAA, airline and airport personnel, has identified 781 runway ends that require implementation of a visual precision-like vertical approach capability. This capability will reduce the number of the controlled flight into terrain accidents during approach and landing. The FAA has agreed to implement this capability at the 170 highest priority runways. The FAA will procure and install PAPI equipment to satisfy the CAST requirements. A PAPI is a visual glide slope indicator system that provides visual approach slope information to pilots enabling them to make stabilized descent and approach clearances over obstructions.

How Do You Know The Program Works?

The FAA approved and began deployment of the PAPI in the mid 1980's. For more than 25 years the PAPI has served as the preeminent visual glide slope indicator for pilots flying within the National Airspace System (NAS). The benefit gained from this program is to reduce the occurrences of Controlled Flight into Terrain (CFIT) and accidents during approach and landing. The FAA is scheduled to complete the remaining high priority runways by FY 2015.

Why Do We Want / Need To Fund The Program At The Requested Level?

$2,000,000 is required for engineering, technical services/support, and completion of 17 CAST PAPI establishment projects. If the program were funded at a lower level, the Navigation Program Group would reduce the amount of funding provided to the completion of the PAPI establish projects which could result in schedule slips.

Detailed Justification for - 2D08 Instrument Flight Procedures Automation (IFPA)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Instrument Flight Procedures Automation (IFPA)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Instrument Flight Procedures Automation (IFPA)	$6,729	$4,500	$2,400	-$2,100

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Technology Refresh/COTS Software Upgrade – Phase 2	---	$300.0
b. Technology Refresh/Workflow Implementation – Phase 2	---	1,600.0
c. Technology Refresh/Workflow Implementation – Phase 3	---	500.0
Total	Various	$2,400.0

For FY 2015, $2,400,000 is requested to continue IFPA technology refresh activities to include completion of workstation-based COTS software upgrade, and design, configuration and development of server-based business process workflow software (phase 2 completions and phase 3 initiation).

What Is This Program?

IFPA is a suite of next generation Information Technology (IT) tools. These tools create products using fully integrated solutions for visual and instrument flight procedures. IFPA consists of the Instrument Procedure Development System (IPDS), Instrument Flight Procedures (IFP) database, Airports and Navigations Aids database (AirNav), Obstacle Evaluation (OE) system, and the Automated Procedures Tracking System (APTS). The IPDS tool is being developed in modules, with the first module providing space-based navigation (RNAV and RNP) procedure design capability. IPDS module two will provide ground-based navigation procedure design capability and the legacy design tool will be replaced and decommissioned.

In FY 2012, the program entered a Technology Refresh phase for its COTS hardware and COTS software upgrades for its IPDS and APTS tools.

Technology Refresh/COTS Software Upgrade – Phase 2 - The IPDS tool COTS upgrade is being performed in two phases. Phase 1, funded in pervious years, will be delivered in FY14 and the Phase 2 delivery will occur in FY 2016.

Technology Refresh/Workflow Implementation – Phase 2 and 3 - The APTS tool COTS upgrade is being performed in three phases, with Phase 1 delivery occurring in FY14, Phase 2 will be delivered in FY15, and Phase 3 will be delivered in FY16. The APTS tool provides business process workflow automation for the AeroNav Products organization.

DOT Strategic Goal – Organizational Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

IFPA provides the following benefits:

- Increases the airport arrival capacity for eight major metropolitan areas, and at the nation's busiest airports when visibility is restricted
- Modernizes systems in support of both visual and instrument flight procedure development such as approaches, standard terminal automation replacement system, airways, and departures
- Increases automated capabilities for all types of precision and non-precision flight procedures, including conventional (ground-based navigation aids) and performance-based (satellite-based navigation)
- Provides an integrated obstacle evaluation application, replacing a manual process
- Provides new capability because existing systems cannot generate and integrate the necessary physical, temporal and spatial information needed to develop, inspect and publish flight procedures as well as evaluate the impact of obstacles

In addition to supporting FAA Flight Plan goals and strategic initiatives, IFPA provides additional benefits as follows:

- Capability for ongoing maintenance of over 21,000 instrument flight procedures in use at over 4,000 paved airports, accommodating requirements for precision approaches and departures using Global Positioning System/area navigation, Wide Area Augmentation System (WAAS) and Local Area Augmentation System (LAAS)
- Efficient response to Air Traffic Obstacle Evaluation (OE) requests, evaluating effects on instrument flight procedures, alleviating manual effort currently required for more than 60,000 OE requests annually. In addition, application of Terminal Instrument Procedures (TERPS) rules as part of automated obstacle evaluation will be an important benefit
- Conversion of legacy software to OMB, DOT and FAA recommended architecture, providing opportunities for improved integration as well as a foundation for anticipated flight procedure demand well beyond FY 2010

How Do You Know The Program Works?

The IFPA tool suite provided productivity gains for all Aeronautical Navigation (AeroNav) Products' major work products, using FY 2006 labor hours as a baseline. For example, the development time required for a new Instrument Flight Procedure was reduced from 132 labor hours in FY 2006 to 104 hours by FY 2011, the amendment time for an existing Instrument Flight Procedure was reduced from 46 labor hours to 27 hours, the procedure NOTAM generation time was reduced from ½ labor hour to ¼ labor hour, and the obstacle evaluation time was reduced from ½ labor hour to 3/8 hour. These efficiency gains are multiplied by the hundreds and thousands of these products produced on an annual basis. A table of these benefits is included in the program's Baseline Case Analysis Report (BCAR) approved by the JRC in FY 2006. Also, these gains are included in AeroNav's documented unit cost reductions, tracked and reported on an ongoing basis.

Why Do We Want/Need To Fund The Program At The Requested Level?

IFPA is a key component in evolving the National Airspace System (NAS) into a performance-based system. Such an evolution requires an investment in systems integration and the automation of aviation data for safety and reliability purposes, as well as an automated electronic means of information sharing. COTS workstations were deployed in early FY 2008 to all procedure developers. In accordance with the approved program baseline, technology refresh activities began in FY 2012 and extend through FY 2016.

A reduction from the FY 2015 IFPA baseline funding request would result in the program delaying the COTS software upgrades and/or delaying the business process workflow implementation.

Detailed Justification for - **2D09 Navigation and Landing Aids – Service Life Extension Program (SLEP)**

What Is The Request And What Will We Get For The Funds?

FY 2015 – Navigation and Landing Aids – Service Life Extension Program (SLEP)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Navigation and Landing Aids – Service Life Extension Program (SLEP)	$6,634	$3,000	$3,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Equipment Procurement	---	$1,056.0
b. Complete Replacement Projects	---	1,854.0
c. Logistics/Engineering Support Services	---	90.0
Total	Various	$3,000.0

For FY 2015, $3,000,000 is requested for engineering and technical services/support; procurement and installation of three ALSF-2 Replacement Lamp Monitoring System (RLMS) sets; non-Core and to complete Runway End Identifier Lights (REIL) replacement projects at 10 locations.

What Is The Program?

This program renovates or replaces airport approach lighting systems at sites where there is a high risk for failure of these systems and where failure would result in denying use of the primary precision approach. NAVAIDS include:

- Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) for Category I approaches
- High Intensity Approach Lighting System with Sequenced Flashing Lights (ALSF-2) at Category II/III approaches
- Runway End Identifier Lights (REIL)

This program also supports Instrument Landing Systems (ILS) sustain and replace efforts at non-Core Airports where primary precision approach capability outages are most likely. ILS components include electronic devices (i.e., localizers, glide slopes, and distance measuring equipment, etc.). ILS's (Mark 1F) removed from Core Airports are reinstalled at lower activity airports to replace existing Mark 1D and Mark 1E ILS.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The replaced and upgraded equipment will help to reduce runway downtime and technician time associated with maintenance and repair of the visual and navigation aids. Additionally, the new in-pavement approach lights will require less maintenance, thus reducing runway downtime. These benefits will increase safety and airport capacity. The installation of RLMS' will reduce the need for technicians to physically monitor the ALSF-2's during adverse weather conditions.

How Do You Know The Program Works?

Under this program the FAA renovates or replaces the older equipment within the NAS with newer equipment that performs the same functionality or service. The replacement of the current equipment with new equipment merely preserves the functionality or service already existent. Furthermore, the technological changes are minimal, if any at all, between the old and the new equipment. Finally, the functionality or services being performed is the same as that for the past 50 plus years.

Why Do We Want / Need To Fund The Program At The Requested Level?

$3,000,000 is required for engineering and technical services/support; procurement and installation of three ALSF-2 Replacement Lamp Monitoring System (RLMS) sets; and to complete Runway End Identifier Lights (REIL) replacement projects at 10 locations. If the program were funded at a lower level the Navigation Program Group would need to reduce the number of ALSF-2 RLMS sets procured and installed and/or reduce the amount of funding provided for REIL replacement projects which could result in schedule slips.

The replaced and upgraded REIL and RLMS equipment will help to reduce runway downtime and technician time associated with maintenance and repair of the visual and navigation aids.

Detailed Justification for - 2D10 VASI Replacement – Replace with Precision Approach Indicator

What Is The Request And What Will We Get For The Funds?

FY 2015 – VASI Replacement – Replace with Precision Approach Indicator
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
VASI Replacement – Replace with Precision Approach Path Indicator	$3,791	$2,500	$5,000	+$2,500

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Precision Approach Path Indicator (PAPI) Equipment	---	$2,500.0
b. Complete VASI Systems with PAPI Systems	---	2,300.0
c. Logistics/Engineering Support Services	---	200.0
Total	Various	$5,000.0

For FY 2015, $5,000,000 is requested for engineering and technical services/support; procurement of approximately 18 PAPI systems and ancillary equipment, final incremental funding for on-going VASI replace PAPI projects and initial funding for approximately 18 new replacement projects to replace a Visual Approach Slope Indicator (VASI) system with PAPI system.

What Is This Program?

The International Civil Aviation Organization (ICAO) has recommended that all International airports replace the Visual Approach Slope Indicator (VASI) lights with Precision Approach Path Indicators (PAPI) lights. This standardizes the equipment used to allow pilots to determine visually that they are on the proper glideslope for landing. The program supports the procurement, installation, and commissioning of PAPI systems in order to comply with this ICAO recommendation.

At the inception of this program, there were approximately 1,387 older (pre-1970's) VASIs at international and other validated locations requiring replacement. The first phase of the program addresses replacement of VASI systems at approximately 329 ICAO runway ends. The remaining VASI systems in the National Airspace System (NAS) will be replaced during the second phase of the program.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

This replacement program:

- Fulfills the need to replace the aging VASI systems within the NAS
- Supports the ICAO standard to install PAPI systems at all international runways
- Responds to Airline Pilots Association and General Aviation requests for PAPI equipment at validated approaches within federally controlled airspace

- Reduces maintenance labor
- Eliminates the current supply support deficiencies related to lack of uniformity between various VASI configurations

How Do You Know The Program Works?

To date, the FAA has replaced 629 VASIs with PAPIs. FAA began deployment of the PAPI in the mid 1980's and for more than 25 years the PAPI has served as the preeminent visual glide slope indicator for pilots flying within the NAS and as the international standard.

Why Do We Want / Need To Fund The Program At The Requested Level?

$5,000,000 is required for engineering and technical services/support procurement of approximately 18 PAPI systems and ancillary equipment, final incremental funding for on-going VASI replace PAPI projects and initial funding for approximately 18 new replacement projects to replace VASI systems with PAPI systems. If the program were funded at a lower level the Navigation Program Group would reduce the number of PAPI systems procured and/or reduce the amount of funding provided to replace VASI with PAPI projects which could result in schedule slips.

Detailed Justification for - 2D11 Global Positioning System (GPS) Civil Requirements

What Is The Request And What Will We Get For The Funds?

FY 2015 – Global Positioning System (GPS) Civil Requirements
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Global Positioning System (GPS) Civil Requirements	$18,000	$6,000	$27,000	+$21,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Technical Oversight	---	$2,000.0
b. OCX Civil Signal Monitoring (Baseline)	---	18,000.0
c. OCX Civil Signal Monitoring (new requirements, Block 2)	---	7,000.0
Total	Various	$27,000.0

For FY 2015, $27,000,000 is requested to accomplish the following activities:

- GPS Technical oversight; MITRE support, Technical Assistance Support, , VOLPE, and National Coordination Office (NCO) support
- Next Generation Operational Control System (OCX) for Civil Signal Monitoring baseline activities include:
  - Continued design, procurement, integration, testing and factory acceptance of GPS monitor station and the processing facility equipment. Continued test and evaluation planning, data collection to support prototyping, and logistics support planning for the GPS monitor station and processing facility equipment. Documentation will be developed to establish the operation standards for the GPS Signal Monitoring system
- OCX Civil Signal Monitoring new requirements, Block 2 activities: OCX Block 2 activities are the second phase of the contract and will support upgrades to the monitor, and control capabilities for additional civil and military navigation signals. The OCX activities include:
  - Continued design and prototyping of the civil signal monitoring software algorithms and hardware development

What Is This Program?

The Global Positioning System (GPS) is a satellite-based system that provides position, navigation and timing (PNT) service for use by the U.S. government and world-wide users with no direct user charges. GPS provides two PNT services 1) the Precise Positioning Service (PPS), using dual L1-P(Y) and L2P(Y) signals, and 2) the Standard Positioning Service (SPS), using the single L1-C/A signal. L1P(Y)/L2P(Y) is the military precise coded GPS signal.

The GPS program, which is run by DOD but includes other agency support, s transitioning from GPS-II to the third generation (GPS-III) and the modernized operational control segment (OCX)/Civil Signal Monitoring. The Air Force currently has a contract for OCX deployment. Technical challenges and delays in funding for this program are impacting DOD's ability to fulfill contractual requirements that fulfill the needs of multiple civilian agencies. DOT/FAA have been charged with being the lead civilian agency in requesting the resources and ensuring that the civilian community's needs are met in the OCX contract.

National PNT Policy NSPD-39 (December 2004) directed the Department of Transportation (DOT) to fulfill responsibilities to fund civil unique capabilities (L1C and Civil Signal Monitoring). The FAA serves as the implementing agency to fund the civil unique requirements per a Memorandum of Agreement (MOA) with the Department of Defense (DoD) and DOT. DoD has awarded the OCX contract for the GPS, work jointly funded by DoD and FAA. The United States Air Force (USAF) has also guaranteed a dedicated electronic/network interface to civil users based on an existing OCX interface design. USAF has also agreed to provide signal performance data for the civil users.

The civil monitoring capability will allow all civil agencies to monitor the performance of the civil signals. The civil signal monitoring requirements are documented in the Civil Monitoring Performance Standard (CMPS). Implementation of Civil Signal Monitoring will consist of system design and development activities performed by the GPS-III and OCX prime contractors, managed by the USAF GPS Directorate. In FY 2015, the work required to implement Civil Signal Monitoring is expected to consist of system design and development activities and program management. The GPS Signal Monitoring system will consist of a worldwide network of 18-21 GPS monitor stations connected to two processing facilities. The monitor stations must be installed at worldwide geographically dispersed locations such that every GPS satellite can be continuously monitored from at least two monitor stations. The monitor stations will collect real-time measurements of the GPS signals (L1C, L1-C/A, L2C, and L5) and forward this information to the processing facilities where a suite of software algorithms will monitor the accuracy, integrity, continuity, and availability of performance to verify that modernized GPS is suitably safe for use.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The program is necessary to provide civil signal performance to all users, including domestic and international. The civil monitoring capability allows the United States to validate performance against the standards published for GPS signals and provide global leadership for all GNSS service providers, such as GALILEO-Europe, GLONASS – Russia and BEIDOU - China. In addition, civil monitoring allows the US to effectively monitor worldwide GPS and provide civil users such as Department of Agriculture, Commerce, and NASA, with confirmation and assurance of system performance.

Currently, the GPS operational control segment does not monitor all civil signals so it may take several hours to detect an anomaly on an unmonitored signal. The Civil Signal Monitoring capability closes this gap by providing monitoring for all existing civil signals and the new civil signals being implemented through GPS modernization. Civil Signal Monitoring provides a real-time interface between the GPS Operator and the status of the entire GPS civil signal outputs.

How Do You Know The Program Works?

When implemented, civil users (i.e. FAA, Department of Agriculture, Department of Commerce), will have the ability to observe the performance of the civil signals and be able to validate its performance against the critical requirements identified in the Civil Monitoring Performance Specifications (CMPS).

Why Do We Want/Need To Fund The Program At The Requested Level?

In FY 2015, $18,000,000 is required to continue work on the baseline capability, $7,000,000 is required to continue the new requirements work, and $2,000,000 is required for Technical Oversight. Funding is needed at the requested level to prevent delays on this activity, which will lead to reduction in the credibility in the global sphere and ability to require other GNSS providers (GALILEO – Europe, GLONASS – Russia, BEIDOU – China) to meet and maintain a certain levels of performance standards and publish those performance standards, which will be required for multi-constellation applications. Furthermore, civil monitoring affects the United States Government's ability to effectively monitor worldwide GPS and provide civil users (i.e. Department of Agriculture, Commerce, and NASA) with confirmation and assurance of system performance.

The Air Force currently has a contract for OCX deployment. Technical challenges and continued delays in funding for this program are impacting DOD's ability to fulfill contractual requirements that fulfill the needs of multiple civilian agencies. DOT/FAA have been charged with being the lead civilian agency in requesting the resources and ensuring that the civilian community's needs are met in the OCX contract.

Detailed Justification for - 2D12 Runway Safety Areas (RSA) – Navigational Mitigation

What Is The Request And What Will We Get For The Funds?

FY 2015 – Runway Safety Areas (RSA) – Navigational Mitigation
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Runway Safety Areas (RSA) – Navigational Mitigation	$28,431	$38,000	$35,000	-$3,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Program Management	---	$1,000.0
b. Procurement of NAVAIDs	---	365.0
c. Installation of NAVAIDs	---	33,635.0
Total	Various	$35,000.0

For FY 2015, $35,000,000 is requested to conform to RSA standards contained in AC 150/5300-13 Airport Design. RSA compliance provides a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots and veer-offs. The funding being requested will allow the continuation of the NavAids procurement and the completion of 75 RSA improvements.

What Is This Program?

The FAA runway safety program includes numerous programmatic elements intended to improve the overall safety of the runways and RSA. The RSA must be free of all objects that are three inches above the grade and are not frangible. The program will focus on and accelerate efforts to complete RSA improvements. One key element of this program is RSA Sterilization. Current standards for RSA Sterilization include provisions for clear areas, surface drainage, and weight supportability. The FAA currently owns and operates numerous NAVAIDs that violate the RSA clear area provision of 14 CFR Part 139. Although measured incremental progress has been made to correct these FAA-owned NAVAID RSA violations, a concerted, focused initiative must now be launched to ensure compliance of FAA owned NAVAIDs with 14 CFR 139 pertaining to RSA. The 2006 DOT Appropriations (PL-109-115) required Part 139 certificated airports to comply with the current RSA airport design standards prior to December 31, 2015. In accordance with PL-109-115, the FAA must report on the agency's progress toward RSA improvements.

The initiative to correct FAA-Owned NAVAID violations in RSA will take the corrective action on those Navigation systems that are not in compliance with the RSA requirements. The scope of the work to be accomplished will range from the installation of frangible connections on identified structures to the relocation of facilities within RSA if no other solution is available. The objects are in two classifications: those fixed by function and those not fixed by function. Those objects that are fixed by function and will not be able to perform their intended function if relocated, in all likelihood, may receive a waiver with the addition of frangible mounting. Those objects that are not fixed by function will have to be moved outside of the RSA. Below is a listing of objects by classification.

Objects fixed by function:

- Runway End Identifier Lights (REIL)
- Precision Approach Path Indicator (PAPI)
- Visual Approach Slope Indicator (VASI)
- Inner Marker (IM)
- Approach Light System (ALS)
- Runway Visual Range (RVR)
- Access Roads
- Radar Reflectors
- Power Panels (case by case)
- Individual Control Cabinets (ICC)
- Engineered Materials Arresting System (EMAS)
- Glide Slope Antennas
- Antennas
- Maintenance Stands (Frangible Connections)

Objects not fixed by function:

- Localizer (most cases when not possible to relocate)
- NAVAID Buildings (power sheds)
- Transformers
- Power Panels (case by case)

The activities associated with this effort will be prioritized according to the major airport hubs, their supporting reliever airports and then other airports with reported NAVAID violations. The FAA has identified approximately 2,384 violations that need to be addressed at various airport locations. The FAA is committed to clearing all violations by December 31, 2018.

DOT Strategic Goals – Safety
- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

The primary benefit is the prevention of loss of life from aircraft striking non-compliant NAVAIDS located in designated RSAs.

Large NAVAIDs that are not moved or made frangible can pose a considerable safety risk to aircraft and passengers when struck during an overrun. For example, in June 1975 a Boeing 727 crashed into several non-frangible approach lighting systems (ALS) towers while attempting to land at John F. Kennedy Airport in New York. Of the 124 persons aboard, 113 died of injuries received in the crash. Another example, in November 1976, an aircraft taking off at Stapleton International Airport in Denver, Colorado collided into two non-frangible ALS structures resulting in 14 injuries.

In response to the Stapleton incident, the National Transportation Safety Board (NTSB) recommended that FAA expedite retrofitting of ALS structures with frangible materials so that the improvements would be completed within three to five years. However, more than 30 years later, FAA found that non-frangible ALSs remain in RSAs and continue to pose a safety risk to aircraft and passengers.

How Do You Know The Program Works?

The FAA has relocated and/or modified NAVAIDs at more than 106 RSAs over the last three years through grants provided by the Airport Improvement Program (AIP). However, to address projects that do not meet the criteria for the AIP grants program, the FAA request additional funding to focus on accelerating the completion of NAVAID improvements.

Why Do We Want / Need To Fund The Program At The Requested Level?

$35,000,000 is required to conform to RSA standards contained in AC 150/5300-13 Airport Design. RSA compliance provides a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots and veer-offs. The funding being requested will allow the continuation of the NavAids procurement and the completion of 75 RSA improvements.

Detailed Justification for - 2E01 Fuel Storage Tank Replacement and Management

What Is The Request And What Will We Get For The Funds?

FY 2015 – Fuel Storage Tank Replacement and Management
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Fuel Storage Tank Replacement and Management	$6,255	$8,700	$15,500	+$6,800

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Fuel Storage Tank (FST) upgrades at four ARTCC fuel systems	68	$9,775.0
b. FST upgrades at two TRACON fuel systems	10	970.0
c. FST modernizations at four critical facilities (CORE ATCT, Long Range Radar) fuel storage systems	8	1,080.0
d. FST replacements at General National Airspace System (GNAS) fuel systems focusing on coastal/island locations subject to salt water deterioration	14	1,625.0
e. Engineering and Program Support	---	2,050.0
Total	100	$15,500.0

Fuel Storage Tank Replacement and Management is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. The Fuel Storage Tank (FST) program business case and supporting documentation was approved by the FAA Joint Resource Council in June 2013. The business case validated that, since FY 1999, the FST program has been significantly underfunded against requirements. The funding deficit contributes to a growing fuel system related environmental remediation liability for the Agency exceeding $81 million and accruing at a rate of $14 million annually.

For FY 2015, $15,500,000 is requested to fund approximately 100 FST replacement/upgrade projects at approximately 24 planned locations. In addition, $2,050,000 is requested for engineering and program support.

The FST program has developed a prioritization model that validates year over year specific project locations by facility. Implementation of Air Route Traffic Control Center (ARTCC) fuel storage system upgrades and Prime Power/TRACON modernizations are primary program initiatives. System upgrades are implemented to increase operational readiness, attain regulatory compliance, and for lifecycle sustainment.

Fuel systems may contain more than a single tank at any facility location.

What Is This Program?

The FST Replacement and Management Program designs, fields, and sustains bulk liquid storage systems in support of vital FAA operations across the NAS. FST systems are fielded at facilities that cross every FAA line of business and all operational divisions.

The majority of FAA FST systems support electrical generator operations that provide primary and emergency power supplies for key NAS facilities. The FST is also deployed to service bulk liquid storage requirements for lubricating oils, building heater and boiler system fuels, service vehicle fuels, liquid wastes, and similar NAS operational requirements. The FAA active tank system inventory includes over 3,800 units that must be continually sustained.

The FST Replacement and Monitoring Program operate under three primary objectives:

- Sustain NAS operational readiness
- Mitigate environmental damage and regulatory non-compliance
- Manage system lifecycle

The FST Program interacts with and supports numerous organizations in sustaining bulk liquids storage requirements.

- The Program office coordinates FST systems fielded as subcomponent of larger FAA stakeholder projects (new ATCT installations, ASR replacements)
- The Program acts as the Subject Matter Expert repository for all FAA organizations and provides technical oversight, support, guidance and resources to the FAA Service Areas, Service Centers, District Offices, and Systems Support Center (SSC) for tank system construction, installation, operations, and removal

The FST Program serves as the primary coordination point for FAA storage system construction, installation, removal, and operations with outside regulatory authorities/agencies (U.S. EPA, state programs, county and municipal governments, building code officials, fire protection officials, and airport operating authorities). This coordination supports the Department and Agency goals for environmental stewardship and eco-friendly solutions.

The funding request, though a major percentage increase, represents a manageable funding escalation to address the portfolio of active equipment that exceeds service lifecycle. The program office has the contracts and other supporting management tools in force to enable the funding to be obligated in accordance with the ATO NAS Sustainment Strategy goals. The FST program implementation strategy and planning documents describe the processes and governance that the program office will employ to assure allocated funding is managed effectively and efficiently. Funding the FST program at the indicated levels reduces the Agency environmental liability risk, increases operation readiness, and assures that fielded systems comply with regulatory mandates and industry best practices.

DOT Strategic Goal – Environmental Sustainability

- Reduction in transportation related pollution and impacts on ecosystems.

Why Is This Particular Program Necessary?

The FST Program reduces potential FAA environmental liabilities. The FST lifecycle sustainment initiative supports the FAA goal of greater capacity by avoiding aircraft delays due to NAS equipment outages.

How Do You Know The Program Works?

Monthly reporting indicates fuel systems continually achieve minimum goal of 99.7 percent sustained operational availability.

Why Do We Want / Need To Fund The Program At The Requested Level?

The FST program has been significantly underfunded against requirements. The funding deficit contributes to a growing fuel system related environmental remediation liability for the Agency exceeding $81 million and accruing at a rate of $14 million annually. The FST lifecycle sustainment program maps to the FAA goal of greater capacity by avoiding delays from NAS equipment outages. Executing an FST lifecycle sustainment program achieves the cost benefit of sustaining availability of the systems for NAS operations, reducing the risk of leaking FST systems, minimizing adverse impacts to personal and environmental safety, and preventing regulatory fines of up to $32,500 per day that may be assessed by the Environmental Protection Agency for failing to comply with regulatory standards for tank system installation, configuration, operation, and removal.

Detailed Justification for- 2E02 Unstaffed Infrastructure Sustainment (UIS) Program

What Is The Request And What Will We Get For The Funds?

FY 2015 – Unstaffed Infrastructure Sustainment
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Unstaffed Infrastructure Sustainment	$17,058	$20,000	$32,300	+$12,300

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Unstaffed Infrastructure Sustainment	---	$29,500.0
B. In-Service Engineering	---	2,800.0
Total	Various	$32,300.0

Unstaffed Infrastructure Sustainment (UIS) is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. The FY 2015 request includes a substantial increase to this program, and shows FAA's commitment to sustaining the infrastructure for nearly 36,000 structures and reducing the current maintenance backlog. The funding will allow FAA to convert the program's current reactionary model to a proactive enterprise portfolio management system that prioritizes component sustainment activities against impact to overall NAS operations.

For FY 2015, $29,500,000 is requested to sustain approximately 120 unstaffed infrastructure projects located in all three Service Areas for Communication, Navigation, Surveillance, Weather and Support Services. In addition, $2,800,000 is requested to support in-service engineering activities.

The sustainment projects include upgrades, modernization, refurbishment and replacement of National Airspace System (NAS) antenna and equipment towers buildings, shelters, roofs, storage buildings, plumbing, heating, ventilating and air conditioning (HVAC) equipment, electrical panels and distribution wiring, locks and alarm sensors and lighting, access roads, grounds, fencing, storm water controls, parking lots, security lighting, and walkways.

What Is This Program?

The FAA owns thousands of buildings whose sole purpose is to house, support and protect the NAS Communications, Surveillance, Weather and Navigation aids. These structures are failing. They suffer from leaking roofs, deteriorated foundations and walls, inadequate air conditioning systems and electrical systems, and severely eroded roads that hinder access by FAA technicians. A majority of these 36,000 plus structures were built during the 1940's and 1950's.

The UIS Program tries to proactively sustain infrastructure supporting the NAS to enable the delivery of NAS systems required availability. Proactive NAS sustainment includes major repairs to and replacement of real property and structures which are normally not staffed. Sustainment of the unstaffed infrastructure includes:

- Major repair and replacement of FAA property including: grounds, fencing, storm water controls, parking lots, security lighting, and walkways

- Major repair and replacement of FAA facilities including: buildings, shelters, roofs, storage buildings, plumbing, heating, ventilating and air conditioning (HVAC) equipment, electrical panels and distribution wiring, locks and alarm sensors and lighting
- Major repair, refurbishment and replacement of NAS antenna and equipment towers

Funding will also support modification, acquisition or development and population of tools to better support program decision making and project/funding prioritization, project tracking, facility and infrastructure condition and upward reporting. Perhaps most significantly, less reactive sustainment shall allow for the cost effective integration of NextGen with the existing and emerging unstaffed NAS communication infrastructure.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The UIS program is striving to reduce the backlog of deferred maintenance , $446 million, by approximately 10 percent annually. The majority of unstaffed facilities provide surveillance, communications, weather, and air traffic assistance to remote areas in a very efficient and cost saving manner. While no labor costs are necessary to operate these facilities, the facilities require periodic upgrades. The program extends the service-life of the buildings and equipment, preventing system outages and providing cost savings for FAA, the airline industry and the public. The request will also fund building inspections, which could identify life safety hazards that must be addressed to satisfy OSHA and FAA Safety Management System requirements.

How Do You Know The Program Works?

As a result of the continued sustainment at the Unstaffed Infrastructure facilities that house the NAS equipment, NAS outages have decreased at Core Airports.

The UIS Program supports the FAA's greater capacity goal by providing major repairs to or replacements of existing FAA-owned unstaffed facilities and structures serving the NAS. The NAS requires reliable and continuous operation of surveillance, navigation, communication, and weather equipment. In addition the infrastructure protects the electronic equipment from weather hazards, radio interference, and unauthorized entry. Failure of the infrastructure will result in NAS equipment failures directly reducing capacity of the NAS.

The benefits of increased funding to the UIS Program will be:

- Improved availability of Air Traffic Control (ATC) services as a direct result of building improvements (e.g. Heating Ventilation and Cooling (HVAC) replacement, electrical system upgrades) that provide a safe and optimum operating environment for electronic systems
- Extended operational service life of NAS remote facilities that house and protect valuable systems and equipment
- A safe and secure work environment for the Air Traffic Organization (ATO) technical operations personnel that is free from safety hazards
- Identification of opportunities for consolidation, modification, or reuse of existing assets in alignment with NextGen implementation requirements

Why Do We Want/Need To Fund The Program At The Requested Level?

$32,300,000 is required to reduce the number of NAS outages and repair facilities in poor condition and support the FAA facilities paradigm shift to a proactive enterprise-wide portfolio management system rather than simply the current reactionary model.

Detailed Justification for - 2E03 Aircraft Related Equipment Program

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aircraft Related Equipment Program
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Aircraft Related Equipment Program	$9,572	$10,400	$9,000	-$1,400

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Flight Inspection (FI) Flight Program	---	$9,000.0

For FY 2015, $9,000,000 is requested for ongoing modifications/upgrades to FAA's flight inspection (FI) aircraft, avionics, and mission equipment as follows:

- $1,085,000 will be used to continue the Beech aircraft fleet modernization program
- $4,790,000 will be used for the Challenger aircraft fleet to modify the space configuration and wiring requirements necessary to support Phase I installation of Next Generation Automatic Flight Inspection System (NAFIS) and to modernize the aircraft avionics for upgraded Traffic Alert and Collision Avoidance System (TCAS) and radar altimeters
- $1,190,000 to sustain the current generation NAFIS
- $1,935,000 to begin implementation of NAFIS Phase I and continue development of NAFIS Phase II

What Is This Program?

The FAA's worldwide flight inspection (FI) mission is to evaluate and certify instrument flight procedures and to evaluate and certify both ground-based and space-based navigational equipment including facilities for Federal, State, Department of Defense (DoD), private and international customers. The FI mission requires aircraft equipped with specialized test equipment. The Aircraft Related Equipment program ensures the FAA's flight inspection aircraft fleet is equipped with systems required to inspect, certify, sustain, and modernize the NAS and evolving NextGen requirements.

The FI aircraft fleet is composed of 32 specially equipped aircraft. Currently, 66 percent of the FI fleet is limited in its support capabilities. This program provides the technical equipment upgrades and/or replacements to existing aircraft avionics and mission equipment to meet current and future performance requirements. It also provides the Flight Operations Management System (FOMS), used to schedule and manage the inspection process, and the navigation facility data upgrades needed for the inspection systems.

The Flight Inspection Flight Program projects are grouped into three activities:

- Aircraft Modernization projects to support avionics technology refreshes and new or changing regulatory requirements for operating aircraft in domestic and international airspace
- Flight Inspection System Sustainment projects to support mission equipment technology refreshes and new or changing regulatory requirements necessary to continue flight inspection of legacy NAS systems

- Flight Inspection System Modernization projects to support new mission equipment requirements and new or changing regulatory requirements necessary to provide flight inspection of Performance Based Navigation and implementation of evolving NextGen systems

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

The FI mission ensures FAA navigational systems, facilities, and tools are sound and operating according to specifications. This program not only provides for expanded capability across the fleet, but the useful life of the aircraft, avionics, and mission equipment is extended from 20 years to more than 30 years.

The FAA sustains system availability by ensuring the accuracy of navigational aid electronic signals, as well as validating and certifying the approach/departure flight procedures and terminal routes at all airports within the NAS and at military facilities world-wide. To do this the fleet of flight inspection aircraft must be modernized and updated to be compatible with the latest equipment and procedures. By constantly checking electronic aids for navigation and landing, and the associated procedures, availability is maintained. As the data below shows, the checks identify discrepancies that are fixed before they cause delays and diversions of aircraft.

In FY 2011 and FY 2012, a total of 31,849 flight inspections were conducted of existing ground based navigational aids and existing Instrument Flight Procedures (IFPs) and 1,988 had reportable discrepancies. This equates to 6.2 percent of published IFPs and associated ground based navigational aids requiring further attention. In addition, 7,162 IFPs required flight inspection in order to publish a new or amended flight procedure. The results of those flight inspections required 808 IFPs to be adjusted and found 126 IFPs to be unsatisfactory. Of the new or amended IFPs, 11.3 percent required correction and thereby avoided potentially unsafe IFPs from being published.

Flight Inspection is a key component of FAA's safety and increased capacity initiatives and evolving the NAS into a performance-based system. A performance-based NAS allows civil aircraft to navigate airspace more safely and with greater flexibility than the current ground-based system. Performance-based initiatives will be achieved through implementation of Required Navigation Performance (RNP) Area Navigation (RNAV), in addition to the Ground-Based Augmentation System (GBAS) and the Satellite-Based Augmentation System (SBAS). To meet these safety and greater capacity objectives, the FI aircraft fleet must be updated to continue to certify an expanding number of RNAV RNP, GBAS, and SBAS approaches at the lowest possible cost.

The following FAA programs are dependent on flight inspection services:

- Performance Based Navigation (PBN)
- Required Navigation Performance (RNP)
  - Area Navigation (RNAV) Routes
  - RNAV Standard Instrument Departure (SID) (includes DME)
  - RNAV Standard Terminal Arrival Route (STAR) (includes DME)
- Augmentation System Navigation
  - Space Based (SBAS) - Wide Area Augmentation System (WAAS), Lateral Precision with Vertical (LPV) Guidance
  - Ground Based (GBAS) - Local Area Augmentation System (LAAS), GNSS Landing Systems (GLS)
- Surveillance Systems
  - Automatic Dependent Surveillance Broadcast (ADS-B)
  - Wide Area Multilateration (WAM)
  - Airport Surface Detection Equipment Model-X (ASDE-X)
- Legacy
  - Instrument Landing System (ILS)
  - Visual NAVAIDS
  - Very High Frequency Omni-Directional Range station and/or Tactical Air Navigation (VORTAC)

- Distance Measuring Equipment (DME)
- Non-Directional Beacon (NDB)
- Global Positioning System (GPS)
- ARE supports Aeronautical Information Management (AIM)
- Ensuring data integrity for IFP development and publication
- Verifying the accuracy of the National Flight Database (NFD)

If the program was not funded, or funded at a lower amount, FI would not be able to meet FAA published goals/schedules and the aircraft would lose certification as the NAS evolves. For example, the FAA ADS-B mandate would not be met.

How Do You Know The Program Works?

In the last 20 years the Aircraft Related Equipment program has overcome numerous challenges in the engineering, manufacturing, and development of new technologies that provide the necessary mission equipment and support required of FAA-owned flight inspection aircraft to commission new facilities or NAS systems and to certify the flyability of new or amended Instrument Flight Procedures. Flight Inspection services are provided both domestically and internationally. This program is key to successfully meet the legacy and NextGen flight inspection workload demands with minimal or no impact to the NAS or international commitments.

Flight Inspection productivity has increased by 2.5 percent from 2009 to 2012 and this program will continue to support expansion in the number of Instrument Flight Procedures (IFPs) published and support existing NAS periodic flight inspection requirements within the periodic window and/or grace period.

Accomplishments include the first deployment of two "enhanced" BE-300 aircraft with the capability to flight inspect NextGen instrument flight procedures (e.g., performance-based navigation).

Why Do We Want/Need To Fund The Program At The Requested Level?

This program should be funded at the required level in order to continue multi-year initiatives and to implement new NextGen starts as planned without negatively impacting the flight inspection support required by non-NextGen (legacy) facilities, systems, and equipment across the NAS. The FAA will continue to ensure the safe operation of over 5,000 Navigational Aids (NAVAIDS), the periodic re-certification of over 21,000 Instrument Flight Procedures (IFPs), and up to 3,000 new and amended IFPs annually. In addition, flight inspection aircraft will be modified to operate in the NextGen NAS (ADS-B/SBAS/GBAS/DoD JPALS) and the evolving international environment.

A reduction from the required level would impact the Challenger space configuration and wiring project which would impact NAFIS Phase I implementation. Some Challenger requirements are being deferred to future years due to funding limitations.

Detailed Justification for - 2E04 Airport Cable Loop Systems – Sustained Support

What Is The Request And What Will We Get For The Funds?

FY 2015 – Airport Cable Loop Systems – Sustained Support
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Airport Cable Loop Systems – Sustained Support	$4,738	$5,000	$5,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Site Engineering and Fiber Optic Installation	8	$4,150.0
b. Program Management	---	750.0
c. Engineering Support/Design/Documentation	---	100.0
Total	Various	$5,000.0

For FY 2015, $5,000,000 is requested for advanced engineering, construction activities, and Fiber Optic Transmission Systems (FOTS) equipment installations for Anchorage (ANC) and Oakland (OAK). This funding will continue work on these projects that were enacted in FY 2014.

What Is This Program?

The program replaces existing on-airport, copper-based, signal/control cable lines that have deteriorated. The primary focus will be on projects at airports with high traffic counts and enplanements. The obsolete underground telecommunications cable infrastructure systems are vulnerable to failure and have caused flight delays related to these cable outages. These lines feed airport surveillance radar, air/ground communications, and landing systems data and information to the Air Traffic Control Tower (ATCT), and operational and maintenance information to FAA-staffed facilities. Where cost effective, the program will install fiber optic cable in a ring configuration to provide communications diversity. The ring configuration allows information to flow from either side if there is a break in the cable. The program takes advantage of opportunities to save cost by coordinating projects with major construction projects (e.g. tower relocations and runway projects).

In FY 2013, intermediate engineering and construction efforts will be underway at Miami (MIA), San Francisco (SFO), Cleveland (CLE), John F Kennedy (JFK), and Denver (DEN). SFO phase 1 of technology refresh will be completed by the end of FY 2013 and phase 2 reconfiguration will begin. MIA construction contract will be awarded by end of FY 2013 with construction activities starting subsequently. DEN construction activities will be completed and FY 2014 will see electronics install start. JFK phase 1 construction design will be completed and CLE remaining construction contract will be awarded with construction activities starting by the end of FY 2013. All of these projects will be ongoing in FY 2014 and part of FY 2015.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

All surveillance, navigation, landing, and Air/Ground communications systems at National Airspace System (NAS) airports are endangered because of the condition of the underground cable (either copper or aged multimode fiber) supporting these systems. Many of the control/signal cables serving key airport facilities are 25 to 50 years old, exceeding expected service life, and are badly deteriorated. The copper cable used to sustain the airports infrastructure that meets the FAA specifications is in short supply and not logistically supported. Copper cable, in the gauge required, is not readily available from the industry and is costly since it has to be special ordered in large quantities. This makes the NAS vulnerable to catastrophic failure.

Additionally, the cable infrastructure supporting newly developed NAS systems must be upgraded with fiber optics or the deteriorated cable replaced in order to meet these new NAS requirements. This relates to the higher capacity demands of future NAS systems. The sustainment performed under the Airport Cable Loop (ACL) program addresses these issues.

How Do You Know The Program Works?

The cable loop program maps to FAA goal of increased capacity by reducing or eliminating communications cable related outages. The program also supports the goal of increased on-airport safety by reducing or eliminating runway incursions. System reliability and safety are enhanced due to increased system performance from diverse paths provided by the airport cable loop ring configurations. Standardizing installation configurations and fiber optic equipment will simplify logistics, configuration management, training, procurement, and depot support.

The FAA can realize savings in costs, resources, and time. Using fiber optic cable instead of copper reduces the possibilities of interference and impedance faced by deteriorated copper wire currently in use. Fiber optic cable is impervious to extremes in weather, lightning strikes, electromagnetic pulses, and electromagnetic interference. By using fiber optic cable and equipment, known as Fiber Optic Transmission Systems (FOTS), the agency will be assured of bandwidth and capacity to serve future requirements.

The program measures the delays associated with cable outages on airports and analyzes them from previous years to determine success in trying to reduce delays by two percent a year on average. The impact of one project may not be seen immediately as a typical project takes 2.5 - 4 years to complete. We are presently reducing cable related outages for Operational Evolution Partnership (OEP) airports by 3.42 percent averaged annually based on the original data record from 1998 of 128 delays.

Why Do We Want/Need To Fund The Program At The Requested Level?

$5,000,000 is required to ensure the ability of the FAA to improve, sustain and/or upgrade the communications infrastructure at airports across the nation.

Detailed Justification for - 2E05 Alaskan Satellite Telecommunications Infrastructure (ASTI)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Alaskan Satellite Telecommunications Infrastructure (ASTI)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Alaskan Satellite Telecommunications Infrastructure (ASTI)	$6,444	$8,500	$11,400	+$2,900

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Replace/Upgrade Modems, Multiplexers, Switches and Radio Equipment	---	$5,024.0
b. Install and Test Network Management Hardware and Software	---	3,244.4
c. Engineering, Technical and Program Management	---	1,716.4
d. Logistics Support	---	622.4
e. Training	---	792.8
Total	Various	$11,400.0

For FY 2015, $11,400,000 is requested to continue the ASTI Technology Modernization and complete key site testing activities including engineering and integration work efforts. Goals include all work related to completing installation at the 37th site. The final investment analysis decision for the ASTI Technology Refresh was received in June 2011 and implementation is currently underway. This funding request is necessary to complete modernization efforts in the allotted five-year implementation schedule and achieve improved availability.

What Is This Program?

The Alaskan Satellite Telecommunication Infrastructure (ASTI) program (formerly named Alaskan NAS Interfacility Communications System (ANICS)) will upgrade the FAA owned and operated communications network (using satellite transmissions of data) that provides Alaska with critical, essential and routine air traffic control telecommunications services such as:

- Remote Control Air Ground (RCAGs) and Remote Communications Outlets (RCOs) for voice communication with pilots
- En Route and Flight Service Station Radio Voice Communications
- En Route and Terminal Radar Surveillance Data; Digitized Radar Data and Digitized Beacon Data
- Flight Service Station Flight Service Data processing System and the Digital Aviation Weather Network
- Weather Advisories, Briefings, and Products supporting Automatic Surface Observation System (ASOS), Automated Weather Observation System (AWOS), and AWOS Data Acquisition System (ADAS)
- WAAS Reference Station
- Automatic Dependent Surveillance-Broadcast (ADS-B)

The System provides Alaska with 90 percent of the inter-facility communications for essential and routine air traffic control services. In recent years, aggressive system technical service efforts have been required to maintain overall system availability and reliability. The loss of performance capability, along with increased maintenance and higher costs make it necessary to replace outdated technology platforms.

ASTI uses primary and alternate satellites that meet FAA Order 6000.36 specifications to provide system circuit diversity and redundancy. The Alaskan Satellite Telecommunications Infrastructure (ASTI) program was initiated to modernize the legacy ANICS network. The ASTI Modernization Contract was awarded in August 2011.

The ASTI Technology Modernization program provides for the replacement and upgrade of vital system components due to aging and obsolescence and implements improved Support Services: Training, Logistics, Second Level Engineering, and radome maintenance. The program will raise system availability to required levels for critical services to 0.9999 and for essential and routine services to 0.999, reduce the frequency of system alarms and outages, improve system security, and curtail the ongoing growth in maintenance costs.

The ASTI funding request is consistent with the December 2009 FAA CFO Business Case submittal and Independent Government Cost Estimate for the ASTI Modernization effort. The final investment analysis for the ASTI Technology Refresh was completed June 2011.

DOT Strategic Goals – Safety

- Reduction to transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

ASTI is needed to address the current system deficiencies:

- Availability has fallen significantly below 0.9999 (for critical services) and 0.999 (for essential and routine services) and continues to decline
- Crucial systems components are no longer supportable for required system operations
- Environmental destruction of system components
- Lack of support infrastructure for training, second level engineering support, radome maintenance, and logistics

The ASTI technology modernization effort will increase system availability to required levels. ASTI will improve and sustain the availability of the infrastructure and reduce future operations and maintenance costs. Additional qualitative benefits include:

- Improved training for FAA technicians and other operations personnel
- Improved second level engineering support
- Improved logistics support system
- Improved radome maintenance
- Modern and flexible system to support emerging NAS requirements
- Improved Information Systems Security (ISS)

How Do You Know The Program Works?

The ASTI network is already a part of the NAS (facility type "SACOM"). Phase I site construction began in 1994 and the last sites were completed in 1999; Phase II site construction began in 2001 and completed in 2007. Modernization is required to ensure future system availability to meet air traffic requirements.

ASTI is in the implementation phase with Final Investment Decision (FID) completed in June FY 2011. The ASTI program has completed the radome and antenna installations with the exception of warranty issues. FY 2015 activity targets include continuing efforts to upgrade satellite communications equipment at the 64 facilities and accomplishments are through the completion of CAI at the 37^{th} site.

Why Do We Want / Need To Fund The Program At The Requested Level?

$11,400,000 is required for the continued ASTI Technology Modernization effort to achieve system-wide component replacements/upgrades at 64 locations (including four hubs). The most serious concern surrounds a potential failure at one of the hubs. If the Anchorage ARTCC hub converters fail, 50 of 52 RCAGS at the ARTCC would not be available, leaving the ARTCC without air-to-ground communications.

A reduction to the FY 2015 required funding level would delay implementation of system-wide upgrades and the completion of installation at the 37th site in addition to all future milestones which would delay the start of full scale deployment since sufficient lead time is required for equipment ordering. The program is beginning implementation in FY 2014 and the majority of the implementation work will occur in FY 2015.

Detailed Justification for - 2E06 Facilities Decommissioning

What Is The Request And What Will We Get For The Funds?

FY 2015 – Facilities Decommissioning
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Facilities Decommissioning	$4,738	$6,500	$5,700	-$800

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Facility Disposition	125	$5,150.0
b. Program Management	---	550.0
Total	Various	$5,700.0

For FY 2015, $5,700,000 is requested to fund the final disposition of decommissioned infrastructures and associated property restorations, conducting Environmental Due Diligence Audits (EDDAs), and investigating required work as listed below:

- Final disposition of decommissioned infrastructures and property restorations, meeting all applicable laws, including, but not limited to: the appropriate removal and disposal of hazardous materials; appropriate disposal of debris, evaluation of impact upon cultural preservation, historic preservation, wetlands, natural resource protection issues
- Conducting Phase I EDDA reports for government owned properties, as required by the General Services Administration (GSA), and other applicable laws
- Investigating and documenting the structures to be removed at each site and associated restoration

What Is This Program?

The June 2005 GAO report "Air Traffic Operations, the Federal Aviation Administration Needs to Address Major Air Traffic Operating Cost Control Challenges," states that FAA needs to expand its efforts to cut operational costs to address an expected gap between budget forecasts and expenses. The report recommends accelerating ground-based navigational aids decommissioning.

In recent years FAA has decommissioned many redundant or underused facilities. Funding was identified in FY 2007 to begin the divestiture (including environmental testing, infrastructure demolition, and property restoration) of these facilities. In addition, under the Next Generation Air Transportation System (NextGen) program, FAA plans to decommission entire classes of facilities such as Non-Directional Beacons and Remote Communications facilities.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

This program is necessary to complete the life cycle of the project/program. The program results in the final disposition of decommissioned buildings, access roads and other real property. This program provides the expertise and oversight to enable all discontinued FAA facilities to be handled in a comprehensive and systematic approach. The future NextGen facilities will require disposition of legacy systems in order to meet the Cost Benefit Analysis derived from facility disposal. The program has the structure in place to provide for those needs.

How Do You Know The Program Works?

This program has experienced great success since FY 2005 to present. Funded work results in the release of decommissioned real property from FAA inventory and associated cost avoidance of: property lease fees; property maintenance fees (grass cutting, snow removal, etc.); utility fees and communications frequency fees. There are also monetary gains for the US government in the sale by GSA of FAA property no longer needed. Between FY 2008 through FY 2013, the Facility Decommissioning Program disposed of 950 sites at a 10 year cost avoidance of $38.4M.

Why Do We Want/Need To Fund The Program At The Requested Level?

$5,700,000 is required to fund the final disposition of decommissioned infrastructures and associated property restorations, conducting Environmental Due Diligence Audits (EDDAs), and investigate other required work. The work this funding level will support is approximately 125 projects. The current backlog of inventory is projected to increase every year due to the discontinuance of ground based NAS facilities.

Detailed Justification for - 2E07 Electrical Power System – Sustain/Support

What Is The Request And What Will We Get For The Funds?

FY 2015 – Electrical Power System – Sustain/Support
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Electrical Power System – Sustain/Support	$68,897	$68,075	$102,000	+$33,925

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. NAS Battery Set Replacement	76	$6,000.0
b. Power Conditioning System (UPS)	19	7,000.0
c. DC BUS Systems	24	4,900.0
d. ACEPS En Route Critical Power Systems	3	24,200.0
e. Lightning Ground Bonding Protection System Elements	5	2,200.0
f. ELD Replacement	9	20,000.0
g. Engine Generator Replacement	99	17,100.0
h. Critical Power Distribution Systems (CPDS)	3	2,200.0
i. Alternative Energy Sustainment	8	900.0
j. Program Management and System Engineering	9	17,500.0
Total	Various	$102,000.0

Electrical Power System – Sustain/Support (PS3) is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. The FY 2015 request includes a substantial increase to this program, because current infrastructure is failing to deliver power reliably, resulting in outages and delays. The power system infrastructure is vital to both maintaining existing capacity and increasing the capacity of the NAS in the future. The FAA must maintain the current Air Traffic Control (ATC) system capacity by supplementing unreliable commercial power with FAA power system equipment to avoid facility outages and service interruptions in the future. The funding will allow FAA to convert the program's current reactionary model to a proactive enterprise portfolio management system that prioritizes component sustainment activities against impact to overall NAS operations.

For FY 2015, $102,000,000 is requested to accomplish the following:

- PS3 ensures that electrical power is reliable and that availability meets NAS requirements
- PS3 directly impacts all NAS service areas having air traffic control equipment and responsibilities
- Backup Power provides an average of 40 hours of uninterrupted operation each year to every system in the NAS. Each system would fail to provide any service for a total of 40 hours per year without access to backup power
- Sustainment is implemented with national contracts for the supply and installation of replacement infrastructure
- The Joint Resource Council (JRC) approved a 10 year baseline (FY 2009 - FY 2018) that provides proactive power sustainment for 92 percent of NAS value (300 top airports/En Route) and are based on average costs of the power systems over that time period. The costs shown above reflect site specific considerations for the power systems requested in FY 2015 and will begin addressing the systemic issues that have been identified in the NAS Sustainment Strategy for the facilities programs.

a. NAS Batteries: Large scale battery complexes serve as backup power sources for key NAS electronic installations at en route, terminal, and General National Airspace System (GNAS) facilities. These batteries provide power for a limited time during major power system disruptions and maintain the function of key systems. The PS3 program sustains Air Route Traffic Control Centers (ARTCC) Critical and Essential Power System (ACEPS) and GNAS battery installations with periodic 5- to 7-year replacements to assure reliability.

b. Power Conditioning System (PCS) / Uninterruptible Power Supply (UPS): The PCS/UPS is a power quality and backup system that conditions commercial power and provides a short duration power source that prevents power disruptions and surges from adversely affecting electronic system performance and critical NAS infrastructure. PCS/UPS systems have an expected useful life of 20 years. The PCS/UPS inventory requires replacement due to reliability and supportability issues attributable to age.

c. Direct Current Backup System (DC BUS): A DC BUS stores power in batteries, providing a low cost, short term power source at facilities with a limited number of equipment. System availability is increased by preventing commercial power outages from disrupting air traffic operations for up to several hours. DC BUS systems with a useful life of up to 20 years.

d. ARTCC Critical and Essential Power System (ACEPS): The critical role of the En Route and large Terminal Control Centers requires they be protected with high quality and reliable power provided by ACEPS. The FAA operates ACEPS at 21 ARTCCs, 2 Combined Center Radar Approach Control (CERAPS) and 3 large Terminal Radar Approach Control (TRACONs). ACEPS is comprised of engine generators, switchgear, and UPS systems. Engine generators have a useful life of 24 years and other components have useful lives that range from seven to 20 years. Most of FAA's ARTCC generators exceed 45 years. The average age of these is 53 years.

e. Lightning Protection, Grounding, Bonding and Shielding (LPGBS): LPGBS replaces, sustains and optimizes elements to minimize electrical hazards to personnel and facilities and electronic equipment caused by lightning, voltage surges, electrostatic discharge (ESD), and power faults. Sites are hardened sufficiently to prevent NAS delay or loss of service, to minimize or preclude outages, and to enhance personnel safety. The useful life of LPGBS elements is 25 years.

f. Electrical Line Distribution (ELD): ELD is the infrastructure at airports and ancillary facilities that distributes commercial and backup power to key NAS equipment. The ELD is comprised primarily of distribution cable, transformers, and switchgear. FAA replaces ELD components that have exceeded their useful life of 25 years.

g. Engine Generators: Engine generators provide backup power (and are the primary source of power at some remote locations) for essential NAS electronic systems at GNAS facilities when commercial power is unavailable or becomes unreliable. Engine generators have a 24-year useful life.

h. Critical Power Distribution System (CPDS): The CPDS is comprised of components such as electrical distribution equipment, transfer switches, engine-generators, UPS, and batteries. The FAA has a family of standardized CPDS types and each type is optimally matched to the criticality and activity level of the NAS facility it serves.

i. Alternative Energy Systems (AES): This activity integrates a broad range of clean energy technologies to meet NAS operational demands. Using AES technologies reduces the Agency's carbon footprint and helps to achieve the goals of Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance, for reduction of fossil fuel dependencies. Alternative energy generation systems used within the FAA include: Solar Energy, Wind Energy, and Fuel Cell.

j. Program Management and System Engineering: This activity provides program management and power systems engineering for design and management of electrical power systems in the NAS. Systems engineering within the Power Services Group defines and documents customer requirements for power systems and administers those requirements through the design phase, system validation, quality control, quality assurance, safety improvement, and the useful life. Systems engineering also addresses sustaining established alternative energy generation systems, and addresses establishing and administering test facilities and developing procedures for enhanced system designs.

Prioritization: Projects will be prioritized to provide the maximum reduction of risk of loss of NAS service. This will utilize the monetized impact priority model developed by the Air Traffic Organization (ATO) for the Power Services Group. This model prioritizes sustainment projects to the locations in the NAS that would result in the most disruption.

What Is This Program?

PS3 is an infrastructure sustain and renewal program. Other NAS programs fund the initial purchase and installation of components for backup power systems and power regulation and protection equipment.

PS3 supports system sustainability by providing emergency power systems that are necessary to allow continued operation of air traffic control facilities when there is an interruption in commercial power sources. These power systems also protect sensitive electronic equipment from commercial power surges and fluctuations. After new equipment/facilities have been commissioned, the Power program replaces, refurbishes and renews components of their emergency power system and cable infrastructure when necessary to maintain and improve the overall electrical power quality, reliability, and availability.

Program elements include replacing, refurbishing, or sustaining: the large battery systems used for essential power and power-conditioning systems; uninterruptible power systems; DCBUS; ACEPS; CPDS; engine generators; airport power cable; and lightning protection and grounding systems. Projects are prioritized using NAS metrics of capacity, demand, passenger value of time, and other specific expert information.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The Power Systems Sustain/Support (PS3) program funds the purchase and installation of components to sustain the $4.2B NAS electrical power infrastructure. The PS3 program is vital to both maintaining and increasing NAS capacity by sustaining the reliability and availability of NAS equipment. These actions avoid system and equipment failures that result in costly delays. Without reliable NAS power systems, ATC electronics cannot deliver their required availability and commercial power disruption results in flights being kept on the ground, placed in airborne holding patterns, or being re-routed to other airports. The PS3 program also prevents expensive damage to ATC electronic equipment. Without backup power it is not possible to deliver Air Traffic operations with the required availability.

The ELDs (i.e. power cable and associated components) at the nation's top 300 airports are essential to the operation of air traffic and constitute $1.6 billion of the NAS electrical power infrastructure. Fifty-seven percent of the cable is beyond the age that OMB recognizes as useful life (OMB Circular A-76, 25 years), resulting in a cable replacement backlog of approximately $900M. We are seeing the results of this aging process through an increasing number of electrical failures or systems in imminent danger of failure, such as the cable failures that occurred at Charlotte Douglas Airport and Philadelphia International Airport. The operational risk of the NAS is rising since the number of ELD-related incidents is increasing at a rate of about five percent a year.

Engine generators supply electrical power to about 60 percent of the FAA's GNAS facilities during loss of normal commercial utility-supplied power. When commercial power outages occur, the engine generators keep air traffic operations available and reliable. Engine generators are becoming more important since commercial power failures are increasing according to industry sources. However, engine generator support is at risk. One-quarter of the FAA's total inventory of engine generators is more than 40 years old and over 40 percent are beyond their 24-year useful life. The FAA has an engine generator replacement backlog of $697M.

The PSG LPGBS Program replaces existing LPGBS components at NAS facilities. Components include transient protection components, circuits that are designed to attenuate or divert conducted energy to ground, cables, conductors, connectors and bonds. Replacing LPGBS components supports the optimum operation of NAS electronic equipment and augments electrical safety in the NAS work place. Activities of the LPGBS program reduces the coupling of electric and magnetic fields into or out of circuits and prevents accidental contact of objects and persons with parts or components that are operating at hazardous voltage levels. As a result of an air traffic controller receiving a shock from NAS electronic equipment in an air traffic control tower (ATCT) from a lightning strike, the LPGBS program is currently surveying and evaluating the quality of the lightning protection installations at more than sixty (60) ATCTs. Annual projects are assigned based on the risk to employee safety and impact to the NAS. The present backlog of replacing LPGBS components at the top 300 airports in the NAS is approximately $222M.

How Do You Know This Program Works?

The target for this Capital Investment Plan (CIP) program is to sustain adjusted operational availability of 99.7 percent for the reportable facilities that support the Nation's busiest airports through FY 2018. Currently PSG has maintained operational availability for the Nation's busiest airports at 99.9 percent.

Why Do We Want / Need To Fund The Program At The Requested Level?

The PS3 program is vital to both maintaining and increasing NAS capacity by sustaining the reliability and availability of NAS equipment. These actions avoid power disruptions to NAS equipment that result in costly delays.
Without reliable NAS power systems, air traffic control electronics cannot deliver their required availability and commercial power disruption results in flights being kept on the ground, placed in airborne holding patterns, or being re-routed to other airports.

Detailed Justification for - 2E08 Energy Management and Compliance (EMC)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Energy Management and Compliance (EMC)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Energy Management and Compliance (EMC)	$0	$0	$1,000	+$1,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Energy Management and Compliance (EMC)	---	$1,000.0

Energy Management and Compliance (EMC) is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. For FY 2015, $1,000,000 is requested for the EMC program to achieve cost savings by installing advanced electric meters, monitoring energy and water consumption and developing cost-effective recommendations to reduce energy and water use, implementing energy and water efficiency projects, and tracking and reporting on energy usage. Requested funding will support the following projects:

- Install 14 advanced electric meters at select covered facilities
- Perform energy and water improvements at three covered facilities
- Complete the design for energy and water improvements at seven covered facilities
- Complete the design for High Performance Sustainable Buildings (HPSB) upgrades at one covered facility

Provide the required annual reports on progress against legislative and executive order mandates to the Department of Energy (DOE) and the Office of Management and Budget (OMB).

This funding will allow the agency to demonstrate a concerted effort toward compliance with federal sustainability mandates. A national energy management program is critical to ensuring that ATO has single point of reference for technical expertise and analytical capabilities, and is making the best use of the investment dollars by centrally identifying the best opportunities for the greatest return on efficiencies.

What Is This Program?

The EMC Program will be a new capability that will centrally orchestrate cost-effective reductions of energy and water use at ATO facilities. This will be accomplished by coordinating policies, technical support, targeted infrastructure investments, and data analysis and reporting. By upgrading older facility infrastructure, such as mechanical and electrical systems, the EMC program will not only reduce operational costs but will also increase reliability of the NAS by reducing the likelihood of facility outages and disruptions caused by out of service cooling equipment. The EMC Program shall promote energy and water-use efficiency and the use of off-grid power and non-polluting energy sources for all activities and acquisitions. The EMC Program tracks energy and water expenditures and usage at facilities and those costs comprise 75 percent of the organizations energy use.

The EMC Program intends to focus on five specific capability areas:

- Improving monitoring of ATO energy performance including engineering, designing, planning and testing a cost-effective approach for a installing advanced electric meters to comply with the provisions of 42 U.S. Code Section 8253
- Implementing energy and water efficiency projects at targeted sites to improve performance including infrastructure improvements with the greatest cost to benefit ratios and shortest payback periods
- Increasing the number of high performance sustainable buildings in the FAA portfolio by implementing targeted infrastructure improvements at selected large staffed facilities in compliance with Executive Order mandates
- Improving building operating performance by designating trained Energy Managers for the highest energy-using facilities to monitor energy and water consumption and develop cost-effective recommendations to reduce energy and water use
- Benchmarking performance and documenting progress by completing 10 annual data call reports mandated by Executive Orders and Legislative statutes

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The EMC Program offers a centralized approach for identifying and implementing cost effective investments in FAA infrastructure to reduce ongoing utility expenses. FAA faces increasing utility costs that affect the Operational budget. For the period between 2004 and 2010, expenditures in electricity increased an average of three percent per year.

The EMC Program will ensure that progress is made against executive and legislative mandates on energy and water use reductions, greenhouse gas emissions and sustainability. FAA faces significant political pressure given that DOT is in last place among federal agencies on compliance with these mandates. These requirements are highly visible, since FAA must report quarterly to DOT and annually to OMB on progress. The mandates FAA will make some progress on include but are not limited to:

- Energy use: reduce by 30 percent of 2003 baseline by 2015
- Greenhouse gas emissions: decrease by 12.3 percent from 2008 baseline by 2020
- Water use: decrease by 26 percent from 2007 baseline by 2020
- Renewable energy: increase to 7.5 percent of total usage
- Sustainable buildings: 15 percent of inventory by 2015, eventual goal 100 percent

How Do You Know The Program Works?

The EMC Program has conducted a business case analysis as part of its request for FY 2015 -2019 funding to the Joint Resources Council (JRC). The estimated costs and benefits for execution of EMC Program improvements are the result of sample energy and water audits conducted at about 16 FAA facilities of various types from 2010 to 2012. Once established, the EMC Program will monitor energy and water consumption at the facilities where improvements have been implemented to confirm estimated reductions in utility usage and costs.

Why Do We Want/Need To Fund The Program At The Requested Level?

The EMC Program is required to contribute to FAAs progress toward meeting federal greening mandates, including:

- National Energy Conservation Policy Act
- Energy Policy Act of 2005 (EPACT)
- Energy Independence and Security Act of 2007 (EISA)
- Executive Orders 13423 and 13514
- FY 2012 DOT/FAA Strategic Sustainability Performance Plan (SSPP) Goals 1, 2, and 4

At the required funding level, the EMC program will be able to achieve measurable cost savings by installing advanced electric meters, monitoring energy and water consumption and developing cost-effective recommendations to reduce energy and water use**,** implementing energy and water efficiency projects. These activities will demonstrate progress against energy and sustainability mandates. The EMC Program has identified 618 facilities that comprise 75 percent of the Air Traffic Organizations energy usage. The mandates of the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007 (EISA), specify that the Agency needs to identify and implement recommended energy and water improvements to reduce utility costs at all of these facilities. The Agency is also required to work towards making 100 percent of its existing inventory of buildings over 5,000 square feet sustainable per the requirements of Executive Order 13514.

Executive Summary – Facilities and Equipment, Activity 3.

What Is The Request And What Will We Get For The Funds?

The Facilities and Equipment (F&E) Activity 3 program is requesting $158,280,000 for FY 2015, an increase of $11,480,000 (7.8 percent) above the enacted FY 2014 level. This funding supports modernization of non-air traffic control facilities, business systems, and equipment. The programs support safety, regulation, security, information technology security, and regional and service center building infrastructure and support.

$18.7 million has been requested for a System Safety Management Portfolio. Included within that portfolio is $14 million for Aviation Safety Information Analysis and Sharing (ASIAS) which has identified opportunities to support NextGen Operational Improvement (OI) incremental design, development, and post-implementation performance tracking. The ASIAS program will be instrumental in detecting the impacts of system performance anomalies around the NAS.

The Aviation Safety Knowledge Management Environment (ASKME) is a suite of information technology (IT) tools designed to support and enable Aircraft Certification (AIR) to more efficiently certify new aircraft and modifications to existing aircraft. In FY 2015, ASKME is requesting $10.2 million to perform technical evaluations, airworthiness directives development, engineering design approval, electronic filing service, and work tracking software activities.

The System Approach for Safety Oversight (SASO) Program will transform the FAA Flight Standards Service to a national standard of system safety based upon Safety Management System (SMS) principals. The primary beneficiaries are the flying public. $22.5 million is requested to support SASO in FY 2015.

A key outcome expected to be achieved in the budget year with the requested resources includes increasing functionality enhancements of existing systems to allow FAA to be proactive in analyzing safety data.

The three remaining programs under the NAS Sustainment Strategy for Facilities Portfolio; Hazardous Materials Management and Mobile Asset Management Program (MAMP), are included under Activity 3. In the FY 2015 Budget, funding is requested to address:

- The most serious FAA owned or leased sites that have experienced contamination and FAA has been deemed responsible for remediation.
- The Mobile Asset Management Program provides easily transportable NAS equipment to establish, restore, or augment air traffic control operations. Funding will refurbish or replace 20 year old Mobile ATCT's.

What Is This Program?

This Activity is a subset of F&E programs that support modernization of the tools and support infrastructure used to perform Aviation Safety, Regions and Centers, Information Security, and Security and Hazardous Materials activities. Activity 3 also provides funding for the procurement and modernization of systems that allow the agency to archive safety-related data and perform complex analyses in support of aviation safety issues.

Activity 3 efforts contribute to the following DOT Strategic Goals:

- Safety: Reduction in transportation related injuries and fatalities
- Economic Competitiveness: Maximum economic returns on transportation policies and investments
- Environmental Sustainability: Reduction in transportation related pollution and impacts on ecosystems
- Organizational Excellence: Diverse and collaborative DOT workforce
- Organizational Excellence: Enhance cyber security and privacy and improve governance of IT resources

Why Is This Particular Program Necessary?

Our number one priority is safety, and the majority of Activity 3 programs support our safety, security, and statutory functions. These programs support the efficient and effective processes we use to meet the increasing demands of a growing National Airspace System (NAS). Several programs in this portfolio directly support external mandates. For example, the NAS Recovery Communications (RCOM) and Information Security programs are both presidentially- and congressionally-mandated.

How Do You Know The Program Works?

Funding for Activity 3 programs has been requested in the budget for almost two decades. We believe our approach for funding these programs is succeeding because these programs have successfully achieved expected performance measures over time. For example, RCOM has a Continuity of Operations Plan (COOP) that is tested regularly and serves as a major element of our training exercises in this area. The Information Security program, which is responsible for tracking and reporting cyber security incidents in compliance with the provisions of the Federal Information Security Management Act (FISMA) of 2002 and National Institute of Standards and Technology (NIST) Special Publication (SP) 800-61 has allowed the discovery and remediation of multiple system compromises. In addition, ASIAS has discovered potential safety issues in the NAS that were addressed through procedural and airspace design. Coordination efforts have ensured that throughout the NextGen evolution planning process ASIAS results were integrated into the airspace and design process and information design tools.

Why Do We Want/Need To Fund The Program At The Requested Level?

Funding for Activity 3 programs is required for accomplishing our safety, security, and statutory mission effectively and efficiently. If F&E funding is reduced, implementation of Activity 3 programs would be delayed, and the costs of these improvements would increase over time. We would prioritize reductions in Activity 3 programs with respect to the ATC requirements identified in Activity 1 and 2 programs. Activity 3 investments would be reduced in a manner that would enable FAA to sustain ATC safety and services at levels expected by the public, the military, and our other stakeholders.

Detailed Justification for - 3A01 Hazardous Materials Management

What Is The Request And What Will We Get For The Funds?

FY 2015 – Hazardous Materials Management
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Hazardous Materials Management	$20,000	$18,500	$22,000	+$3,500

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Superfund Sites Remediation (WJHTC)	---	$7,000.0
b. Investigation and Remediation (Alaska)	---	10,000.0
c. Investigation Other Sites and Program Management	---	5,000.0
Total	Various	$22,000.0

Hazardous Materials Management is one of the 12 programs included in FAA's National Airspace System (NAS) sustainment strategy. For FY 2015, $22,000,000 is requested to continue the management and remediation of approximately 100 of the 720 contaminated areas of concern (AOCs) that require investigation, remediation, and closure activities.

- $7,000,000 for remediation activities at 10 AOCs at the National Priority List (NPL) "Superfund" site at the William J. Hughes Technical Center (WJHTC), Atlantic City, New Jersey
- $10,000,000 for investigation and remediation at 70 AOCs in the former legacy Alaskan Region
- $5,000,000 for investigation and remediation of 20 AOCs at the Mike Monroney Aeronautical Center, Oklahoma City, Oklahoma, and the Central Service Area, the Eastern Service Area and the Western Service Area (not including the Alaskan Region)

What Is This Program?

The FAA operates the Hazardous Materials (HAZMAT) Management program to clean up approximately 720 contaminated areas of concern at approximately 150 distinct sites nationwide that require investigation, remediation, and closure activities. Site investigations at the identified sites have revealed that toxic contamination resulted from a variety of hazardous substances, including cleaning solvents, degreasing agents, pesticides, asbestos, polychlorinated biphenyls (PCBs), and heavy metals.

DOT Strategic Goals - Environmental Sustainability

- Reduction in transportation related pollution and impacts on ecosystems.

Why Is This Particular Program Necessary?

The FAA has identified cleanup schedules in place as part of enforcement agreements with regulatory agencies. These agreements require the FAA to remediate contaminated soil and groundwater. Extensive contamination at the WJHTC prompted the United States Environmental Protection Agency (EPA) to place the site on the EPA National Priorities List (NPL or Superfund) as one of the nation's most environmentally dangerous sites. Other contaminated sites (many of which are located in Alaska) and the requirements of the HAZMAT Management program account for a large portion of unfunded environmental liabilities documented in FAA's financial statements.

To achieve compliance with all federal, state, and local environmental cleanup statutes, including the Resource Conservation and Recovery Act of 1976, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and the Superfund Amendments and Reauthorization Act of 1986, FAA must continue mandated program activities. The FAA's program activities include investigating sites; remediating site contamination; and obtaining closure of sites.

How Do You Know The Program Works?

The target is to remove five percent annually of the total sites listed in the HAZMAT Management program's published Environmental Site Cleanup Report (ESCR).

The FAA continues to exceed its goal of closing five percent of the total sites.

The United States Environmental Protection Agency (EPA) lists federal facilities that require remediation actions on the Federal Hazardous Waste Compliance Docket (FHWCD). Currently, there are 73 DOT facilities listed on the Docket, of which 70 are FAA facilities, the most of any DOT organization. Of the 70 sites FAA is responsible for, 67 have achieved No Further Remedial Action Planned (NFRAP) status from EPA. The FAA is currently conducting investigation, remediation, and closure activities at the four FHWCD sites that have not achieved NFRAP status. Those sites are:

- Mike Monroney Aeronautical Center
- Ronald Reagan Washington National Airport
- William J. Hughes Technical Center

The HAZMAT Management program continues to maintain the DOT's goal of a status of "No Further Remedial Action Planned" (NFRAP) at 94 percent of FAA sites listed in the Federal Agency Hazardous Waste Compliance Docket. On an annual basis, the Environmental Site Cleanup Report (ESCR) is prepared to monitor the progress of site identification and remediation efforts throughout the Agency.

A 2002 cost benefit analysis determined a benefit ratio of 3.7 and an internal rate of return of 12.6 percent for the HAZMAT Management program. In FY 2011 the agency's reported Environmental Remediation (ER) liability was reduced by six percent ($35 million) from the ER liability reported in FY 2010.

Why Do We Want / Need To Fund The Program At The Requested Level?

$22,000,000 is required to continue the management and remediation of the 720 contaminated areas of concern. To achieve compliance with all federal, state, and local environmental cleanup statutes, including the Resource Conservation and Recovery Act of 1976, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, and the Superfund Amendments and Reauthorization Act of 1986, FAA must continue mandated program activities.

$22,000,000 is required to:

- Continue to attain 94 percent "No Further Remedial Action Planned" closure documentation for FAA listed on EPA's Federal Hazardous Waste Compliance Docket by conducting contaminant investigations, implementing site remedial projects, and completing regulatory closures at the four remaining Docket sites: Mike Monroney Aeronautical Center; Ronald Reagan Washington National Airport; and William J. Hughes Technical Center.
- Continue to perform investigations and remediation projects at all other identified contaminated sites in accordance with federal and state mandates and enforcement agreements to limit future liability to the Agency and foster environmental stewardship.

Detailed Justification for - 3A02 Aviation Safety Analysis System (ASAS)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aviation Safety Analysis System (ASAS)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Aviation Safety Analysis System (ASAS)	$15,800	$12,700	$11,900	-$800

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Hardware/Software System/Services	---	$11,900.0

For FY 2015, $11,900,000 is requested to support the Aviation Safety Analysis System (ASAS) Registration and Certification Infrastructure for System Safety (RCISS). ASAS RCISS will provide technology refresh of equipment for the existing infrastructure as it continues to develop and implement Information Technology (IT) services. The ASAS RCISS program will continue to deploy these IT services in the following areas:

- Mobile Technologies
- Remote Connectivity Telecommunications
- Consolidated Server/Storage Area Network (SAN) systems
- Enterprise Software
- Disaster Recovery

These services ensure continuity of operations for critical and non-critical safety systems. Additionally, these services ensure that critical safety data are safeguarded against loss by providing a secure, reliable and timely back up of data. These new services support the coming integration of Aviation Safety's (AVS') safety data when data are no longer associated with a system. In this new environment, safety workers assemble data as needed from various data sources to support new business processes. Data in these data stores requires critical recovery response.

What Is This Program?

This program consolidated all previous IT infrastructure programs that supported the Associate Administrator for AVS safety workforce. It also enhances the current AVS infrastructure while leveraging components across the AVS services. ASAS RCISS provides all IT infrastructure components to the AVS safety workforce, ensuring standard and reliable accessibility to safety data. The program is continuing to enhance and maintain the AVS IT infrastructure to meet evolving AVS business needs by addressing its mobile safety workforce requirements and changes in the aviation industry. The program focuses on providing safety data to the AVS workforce while they are mobile (off-site) and conducting safety inspections and investigations of airlines, manufacturers, pilots, accidents, etc. ASAS RCISS' enterprise infrastructure provides the access methods to all AVS national safety applications developed by System Approach for Safety Oversight (SASO) or Aviation Safety Knowledge Management Environment (ASKME), and all other national safety programs deployed within AVS. The ASAS RCISS infrastructure directly contributes to the success of AVS in meeting its mission goals as it is developed, implemented and administered as an integrated IT solution.

During FY 2015, RCISS Segment 2 will be performing technology refreshments and enhancements on the enterprise infrastructure that was established during RCISS Segment 1.
RCISS encompasses the following six key components:

- Devices for AVS' 7,000+ Safety Workforce (including mobile devices) - Activities include lifecycle replacement of existing devices
  - Provides equipment designed to meet operational demands and outdated or malfunctioning devices

- Telecommunications - Activities include lifecycle replacement of existing devices and procurement of additional equipment and services where telecommunications bandwidth is deficient.
  - Improves accessibility and speed in utilizing national safety systems and supports centralized server infrastructure
  - Provides enhanced services for the transmission of safety data
  - Replaces outdated or malfunctioning equipment
  - Provides enhanced communication infrastructure for Disaster Recovery environment
  - Coordinates communication infrastructure enhancements in line with FAA Administrative Voice Enterprise Services (FAVES) objectives

- Enterprise Services (Hardware and Software which allow components of the infrastructure to work together) - Activities include lifecycle replacement of existing devices and software.
  - Improves management and operation of the infrastructure through enhanced monitoring, consolidation of equipment and data collection
  - Improves infrastructure reliability
  - Maintains Service Oriented Architecture (SOA) infrastructure and services that lower development costs for AVS national safety applications

- Application Data Servers (Hosting of national AVS safety applications) - Activities include lifecycle replacement of existing servers and storage devices.
  - Continues implementation of application servers supporting national AVS safety applications
  - Replaces outdated or malfunctioning servers by reducing the number of physical servers through virtualization, resulting in reduced costs
  - Provides additional processing power and data storage for the AVS Data Center required to support new (SASO and ASKME) and legacy AVS safety applications
  - Provides enhanced data center environmental upgrades to increase reliability, maintainability and availability (RMA)

- COTS Software (Operating System Software, Database Software) - Activities include maintenance of enterprise software licenses.
  - Ensures continued vendor support for software
  - Evaluate future software to support safety workforce, enterprise management services and all other aspects of the infrastructure

- Contractor Support - Activities include assistance in refining and streamlining the ASAS RCISS enterprise infrastructure.
  - Provides specialized technical expertise in the enhancement of select component areas, e.g., mobile technologies and data center optimization

DOT Strategic Goal – Safety:
- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

The ASAS RCISS program addresses AVS' need to design and implement its enterprise IT infrastructure to support AVS personnel responsible for promoting aviation safety through regulation and oversight of the civil aviation industry. ASAS RCISS addresses the need for enhancing and evolving the current infrastructure to support data storage, data access, data integration, connectivity, availability and disaster recovery created by the changes in the aviation and IT industries.

The ASAS RCISS IT infrastructure supports the AVS safety workforce in their effort to reduce aviation accidents by making real-time safety data immediately accessible to and from all involved, e.g., inspectors, engineers, investigators, and medical examiners.

Additionally, work load capacity, performance, and reliability of the workforce is increased and enhanced by the ASAS RCISS IT Infrastructure. It also enables AVS to modify its IT infrastructure to respond to changing business processes without additional staffing requirements, such as allowing for a more mobile workforce and the creation of virtual workplaces.

How Do You Know The Program Works?

The ASAS RCISS program provides detailed reports about IT investments and their progress over time to senior FAA executives and makes reports publicly available on the Federal IT Dashboard. The ASAS RCISS program assesses actual program results against baseline expectations determining if performance and benefit targets as well as customer needs are being met. The program management team continues to conduct surveys and data calls to monitor actual investment costs, schedules, benefits, performance, and mission outcomes.

The team has an integrated master schedule that provides a holistic view of the program and its components. ASAS RCISS uses Earned Value Management techniques and metrics to assess actual results against appropriate measures of effectiveness. As variances occur, ASAS RCISS prepares and executes corrective action plans and/or contingencies to head off substantial variances.

RCISS program management team periodically surveys end users to measure effectiveness of mobile safety devices deployed. Results are used to validate solutions meet end user requirements and to identify lessons learned for future deployments. Surveys conducted to date have successfully demonstrated user satisfaction and validated benefit projections.

Why Do We Want / Need To Fund The Program At The Requested Level?

A reduction from the FY 2015 required level would delay the technology refresh of infrastructure components and end user devices that have reached the end of their lifecycle. Devices in service beyond their intended lifecycle have higher component failure rates resulting in reduced overall reliability of IT infrastructure. To avoid these failures, RCISS would need to forego necessary infrastructure enhancements needed to accommodate new capabilities resulting from evolving business needs. It is critical that RCISS address these business needs in order to contribute to the DOT and FAA strategic goals to increase aviation safety.

ASAS RCISS enables the safety benefits promised by the SASO and ASKME programs by providing the IT infrastructure required by those programs. The data developed, manipulated, analyzed, and reported on by the SASO and ASKME programs will reside on the ASAS RCISS IT infrastructure. Without the ASAS RCISS infrastructure, SASO and ASKME will not be able to realize their full capabilities.

Detailed Justification for - 3A03 Logistics Support System and Facilities (LSSF)

What Is The Request And What Will We Get For The Funds?

FY 2014 – Logistics Support System and Facilities (LSSF)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Logistics Support System and Facilities (LSSF)	$10,000	$10,000	$8,000	-$2,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Initial operational Capability (IOC)	---	$5,465.6
b. Government Labor/Maintenance/Integration	---	2,240.6
c. Program Support	---	293.8
Total	Various	$8,000.0

For FY 2015, $8,000,000 is requested for full operational capability, maintenance, integration and government and contract support.

What Is This Program?

The Logistics Center Support System (LCSS) is a mission support IT procurement to re-engineer and automate the FAA's logistics management processes. The program modernizes the FAA's supply chain management and replaces the 20-year old Logistics Inventory System (LIS) in support of the Next Generation of air traffic control (NextGen) environment.

The FAA Logistics Center (FAALC) at the FAA Mike Monroney Aeronautical Center (MMAC) in Oklahoma City manages the central NAS inventory warehouses and distribution facilities for the FAA. It provides routine and emergency logistics products and services to FAA customers at facilities nationwide, as well as, to the Department of Defense (Air Force, Navy, and Army), state agencies, and foreign countries. It provides logistics support to systems nationwide, by providing parts, services, supplies and emergency restoration services. The current system that is used to manage these functions is the LIS.

LCSS is replacing LIS which is an agency developed legacy mainframe application that lacks the capability and flexibility to accommodate the near term or future long-term supply support needs necessary to maintain the NAS. LIS is built using Natural and COBOL languages and was deployed in 1990. Its archaic architecture lacks the scalability to support the increased performance requirements projected by the NAS architecture.

Anticipated FY 2015 Accomplishments

- Finalize end user training
- Complete system documentation and transfer of knowledge
- Achieve Initial Operational Capability (IOC)

The current LIS system fails to meet the current agency business needs. Performance gaps (as noted below) will continue to impact supply support to the NAS. These mission gaps include:

- An expensive legacy system that does not meet business requirements – LIS was implemented in 1990 and contains undocumented modules dating back to the 1960s. Over 39,000 patches/revisions have been made to LIS degrading system performance and increasing operational costs. The system requires specialized knowledge to maintain because of obsolete technology and tacit understanding of its database structure. The workforce to maintain this system continues to retire, which puts the FAA at a risk of being unable to sufficiently maintain the system. Additionally, the use of old technology has made it tedious and error-prone to interface with new systems. If the system fails, logistics support of the NAS will be disrupted
- Limited shop floor automation – Minimum visibility of assets in repair at the Logistics Center, comprising 30,000 assets valued at $241 million annually, or 50 percent of all repairs to the NAS
- Limited monitoring of part quality and limited vendor performance monitoring and metrics to identify poorly performing parts and suppliers. Serial number tracking is not currently possible. Incomplete data makes it impossible to analyze part failures and adjust inventories
- Parts obsolescence – Legacy system does not provide information to support continued repair, condemnation, or re-engineering of parts. Some parts are not procurable and have to be re-fabricated at agency cost. Without a picture of the agency's repairable asset population, purchases for economies of scale cannot be realized. We need a timely connection to be proactive rather than reactive
- Warranty – The agency incurs the cost of Logistics Center or commercial repair when the manufacturer should bear the cost
- Spares planning - current agency cost of initial spares for new programs is unknown

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The FAA provides a safe, secure, and efficient global aerospace system, contributing to United States national security and promoting aerospace safety. In support of this mission, the FAA Logistics Center (FAALC) manages the central NAS inventory warehouses and distribution facilities for the FAA. It provides routine and emergency logistics products and services to 8,000 FAA customers at 41,000 facilities and 28,000 sites as well as to the Department of Defense (Air Force, Navy, and Army), state agencies, and foreign countries. It provides logistics support for 80,000 parts and services and supplies, tracks, and account for Capital and Operations-funded parts totaling $740 million. The current system used to support this mission is LIS. LIS is an agency-developed legacy mainframe application that lacks the capability and flexibility to accommodate the near term or future long-term supply support needs necessary to maintain the NAS. LIS was built using Natural and COBOL languages and was deployed in 1990. Over the last two decades more than 39,000 changes have been implemented in LIS.

The LIS architecture lacks the scalability to support the increased performance requirements projected by the NAS architecture. The goal of the LCSS Program is two-fold: replace the current LIS system and greatly increase the efficiency of the FAA's supply chain management process by leveraging an ERP system using best industry practices.

LCSS will be a COTS ERP implementation. In addition to gaining the technological benefits associated with adopting object oriented software design, service oriented architecture (SOA), relational databases and a web-based user interface; this system will provide the robust operational business practices and industry standard business processes to the FAA that are needed to support the NAS and meet the objectives outlined in the flight plan.

The implementation of LCSS directly supports the agency initiative of improving the NAS supply chain through modernization of the supply chain infrastructure. The benefits of acquiring an industry leading COTS solution from the commercial supply chain industry will provide significant capability improvements. These benefits directly accommodate the agency goal to increase capacity and meet the projected demand.

How Do You Know The Program Works?

The program has been planned with comprehensive analysis, which has been vetted by entities within the FAA, but external to the program. These entities include the Office of the Chief Financial Officer, Office of the Chief Information Officer, and various offices within the Air Traffic Organization (COO, CFO, CIO, etc.).

The program's technical solution was identified after extensive market research vetted by Gartner, Forrester, and AMR. The solution is a commercial-off-the-shelf (COTS) containing industry standard best practice for supply chain management. An independent third party assessment found that 80 percent of the 64 core functional requirements could be met without extensions or customizations.

Why Do We Want / Need To Fund The Program At The Requested Level?

The LCSS program supports the strategic priority to deliver benefits through technology and infrastructure with enhanced capability to accurately manage NAS spares and repair requirements in centralized and automated manner.

Funding at the requested level is needed to complete the final segment of the currently baselined program. Based on the program Final Investment Decision for Segment 2 (Implementation), the funds are needed to meet its baseline and contract obligations for FY 2015. The program is schedule to achieve Initial Operational capability (IOC) in FY 2015 and Final Operational Capability (FOC) in FY 2016. A funding shortfall will delay the LCSS schedule and result in additional operating cost for the FAA.

Detailed Justification for - 3A04 National Air Space Recovery Communications (RCOM)

What Is The Request And What Will We Get For The Funds?

FY 2015 – National Air Space Recovery Communications (RCOM)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
National Air Space Recovery Communication (RCOM)	$12,000	$12,000	$12,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. VHF/FM and HF Radio Equipment	---	$2,500.0
b. Emergency Operations Network (EON)	---	3,600.0
c. Emergency Operations Facility	---	2,000.0
d. Communications Support Team (CST)	---	250.0
e. Secure Communications (COMSEC)	---	800.0
f. Information Technology Support	---	2,150.0
g. Satellite Telephone Emergency Network (STEN)	---	700.0
Total	Various	$12,000.0

For FY 2015, $12,000,000 is requested for NAS RCOM. For this amount the Command and Control Communications (C3) program will provide the FAA command and control communications capability necessary to direct the management, operation, and reconstruction of the National Airspace System (NAS) during local, regional, or national emergencies when normal common carrier communications are disrupted. The C3 program will also provide capabilities for Continuity of Operations (COOP) for the FAA.

What Is The Program?

The C3/NAS RCOM program provides both emergency and routine capabilities. These capabilities are mandated by Executive Order 13618, NSCD-51/HSPD-20, NCSD 3-10, FCD-1, FCD-2, and various FAA orders. FAA specific needs are taken from the public safety mission to maintain a continuously viable National Airspace System. The national security mandates are contained in executive orders, national security defense directives, federal preparedness circulars, and other national policy edicts.

- $2,500,000 to continue funding of the Very High Frequency (VHF)/Frequency Modulated (FM) and national High Frequency (HF) radio network modernization efforts. Existing regional networks will continue to operate in the 25 kHz mode until all antiquated infrastructure equipment has been replaced with 12.5 kHz equipment in accordance with the National Telecommunications and Information Administration (NTIA)
- $3,600,000 to continue funding Emergency Operations Network (EON). Support includes the continued development of Google Earth layers, Secure Instant Messenger, EON Dashboard, EON Off-line, and the EON Data Discovery platform
- $2,000,000 to continue funding Emergency Operations Facilities activities which includes, the development of audio/video display systems, national situational awareness view, Domestic Event Network (DEN), incident monitor, emergency notification system, conference bridge, and help desk support

- $250,000 for support of the Communications Support Team (CST) emergency response activities and related communication equipment
- $800,000 for continued funding of Secure Communications (COMSEC) activities and exercises to ensure continued system viability related to all secure telephone, secure facsimile, and secure classified communication equipment
- $2,150,000 for continued funding of C3 Information Technology (IT) Activities used to maintain the IT infrastructure for COOP sites and the Emergency Operations Network
- $700,000 for continued support and refresh of the Satellite Telephone Emergency Network (STEN)

DOT Strategic Goal - Organizational Excellence

- Enhance cyber security and privacy and improve governance of IT resources.

Why Is This Particular Program Necessary?

The Command and Control Communications (C3)/Recovery Communications (RCOM) program enables the FAA and other Federal agencies to exchange and collaborate information both, classified and unclassified, to promote national security. The C3/RCOM program also supports the Washington Operations Center Complex and modernizes several "continuity of operations" sites, which ensures FAA executives command and communications during times of crisis. Where applicable, C3 is an OMB SAFECOMM compatible program that encompasses multiple independent procurement projects, which are currently at various stages in the acquisition lifecycle.

In 1995, the National Telecommunication and Information Administration (NTIA) required a decrease in the frequency bandwidth used by the current VHF/FM network. As a result, the older VHF/FM radios that are configured to the outdated frequency separation requirements can no longer be utilized. In addition, the current system lacks coverage and integration with current VHF/FM equipment. This makes it difficult, and often impossible, to communicate over long distances. Network hardware has been fielded for approximately 20 years, long past its expected life cycle. For example, the cost to repair one module is more than the purchase of a new modern radio, yet for compatibility reasons, the repair of outdated equipment is continued.

The FAA, Emergency Operations, and C3 have a mission to develop web-based emergency operation information-sharing tools that create a common operational picture and support effective decision-making. A secure, highly available, and flexible infrastructure has been created for effective collaborative communications, continuity of operations, and adaptive situational awareness for enhancing decision support. This new Emergency Operations Network (EON) infrastructure has been built upon existing FAA networks and technologies and the operations framework is built upon the lessons and best practices learned from previous and existing initiatives.

The C3 program office has Presidential and Congressionally mandated responsibilities to provide reliable communications support to the White House, Department of Transportation, FAA and other government agencies during national security events, disaster recovery efforts, accident investigations, government exercises, and special invitational events.

Other efforts within the C3 program also revolve around National Security. There are several operational command and control centers within the Washington area and other sites around the country that require modernization. Since September 11, 2001, the C3 program has had its responsibilities increased to meet the current national security demands.

How Do You Know The Program Works?

The C3 program performs annual, quarterly, and monthly exercises to ensure that communications systems are functioning properly. Site installations for VHF/FM have proceeded according to established timelines.

Why Do We Want/Need To Fund The Program At The Requested Level?

Funding the C3/NAS RCOM program at the current level will ensure that the FAA fulfills its mission to maintain emergency communications in the event of a crisis and meet national security mandates. Furthermore, current funding levels will allow the FAA to replace aging VHF/FM radios and meet NCS Directive 3-10, FAA Emergency Operations Plan (FAA Order 1990.1), the National Telecommunications and Information Administration (NTIA) narrow-banding, and the OMB/DHS SAFECOM compatibility requirement.

The C3 program office provides key communications for both daily NAS operations and disaster/crisis management by providing:

- Increased command and control by national leaders in the FAA and other agencies
- Quicker response to natural and wartime disasters thereby helping avoid loss of life and property
- Assurance that COOP will be maintained
- OMB/DHS SAFECOM compatibility

The new C3 equipment will directly benefit the FAA in the form of lowered periodic and correctional maintenance costs of the old and technologically obsolete C3 equipment in the field. The C3 program also provides the FAA with OMB/DHS SAFECOM compatible emergency communication systems, ensuring interagency interoperability.

Detailed Justification for - 3A05 Facility Security Risk Management

What Is The Request And What Will We Get For The Funds?

**FY 2015 – Facility Security Risk Management
($000)**

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Facility Security Risk Management	$14,200	$15,000	$14,300	-$700

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Construction/Installation for Security Upgrades	---	$3,500.0
b. Equipment Design/Installation	---	3,000.0
c. Engineering Design/Equipment Installation (MMAC and Regional Offices)	4	4,000.0
d. Security PIV Upgrades Security Level – 2 Facilities	---	3,800.0
Total	Various	$14,300.0

For FY 2015 $14,300,000 is requested to support the continuing effort for the following upgrades:

- Construction/Installation for security upgrades
- Security Equipment Installation at Mike Monroney Aeronautical Center (MMAC)
- Engineering design and equipment installation at MMAC and the Eastern, Northwest Mountain and Western Pacific Regional Offices
- Security Personal Identity Verification (PIV) upgrades at Security Level 2 and Level 3 facilities

What Is This Program?

In 1999, the FAA established the Facility Security Risk Management (FSRM) Program. The program implements standardized facility protective measures at all FAA staffed facilities. These measures include personnel access control (via card readers, fencing, gates and security guards), surveillance (cameras), vehicle access control (barriers), visibility enhancements (lighting) and x-ray machines. The FSRM Program participates in construction of facilities that secure FAA personnel and assets; such as guard houses, and facility retrofitting to protect against blast (explosive attacks). Finally, the FSRM Program manages contracts that provide maintenance of installed security systems regardless of age, manufacturer or condition. In addition to the protection of FAA personnel and assets, another program goal is one of standardization across the NAS. The standardization of security equipment and processes will result in a substantial cost savings to the FAA. To aid in NAS-wide standardization, the FSRM Program facilitates security system installation for not only ATO facilities, but also for facilities serving the Aviation Safety (AVS) and Airports (ARP) Lines of Business within the FAA. FSRM is participating with NextGen Planning in identifying security needs and vulnerabilities of NextGen facilities to ensure that the safety and security of FAA assets and personnel are maintained as FAA prepares for the Future of Flight.

DOT Strategic Goal - Organizational Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

Aviation assets are attractive targets for those who would seek to harm and terrorize Americans. FAA facilities are vulnerable to outside intruders if not properly protected. Security vulnerabilities jeopardize air traffic services to the National Airspace System. Threats to aviation safety are ever increasing and ever adapting. FSRM, in conjunction with FAA Security and Hazardous Materials (ASH), ensures that FAA has an operational and administrative environment that provides reasonable safeguards against disruptions that could occur if FAA facilities were attacked. Homeland Security Presidential Directives (HSPD) 7, Crucial Infrastructure Identification, Prioritization and Protection mandates that agencies identify, prioritize, and coordinate the protection of infrastructure and key resources against terrorist acts. The work of FSRM is part of that effort.

The FSRM Program is instrumental in ensuring that FAA efficiently and cost effectively implements all issued Presidential Directives aimed at securing federal facilities and personnel. With regard to HSPD 12: "Policy for a Common Identification Standard for Federal Employees and Contractors", through the national Security System Design and Integration Contract, managed by FSRM, card readers throughout the NAS are being replaced with those that will read the common ID media required by the Directive. Through HSPD 16, National Strategy for Aviation Security, the federal government intends to "deter and prevent terrorist attacks and criminal or hostile acts in the Air Domain." The installation of security measures by the FSRM Program accomplishes the goal of this Directive.

How Do You Know The Program Works?

FSRM has contributed to obtaining security accreditation at over 980 FAA facilities. This was accomplished by the Program's management of national contracts through which security measures such as X-ray machines, cameras, card readers, gates, vehicle barriers, etc. were installed. The installation of the measures led to security accreditation of the facility as required by FAA Order 1600.69. The impact of those upgrades has been to reduce the risk of the facility to intrusion and unauthorized entry. Additionally, the installation and standardization of security equipment across the NAS has led to cost savings to the FAA.

Why Do We Want/Need To Fund The Program At The Requested Level?

$14,300,000 is required in order to sustain the work of securing FAA facilities. Securing the facilities requires funding to continue the following:

- Construction/Installation of security measures at all FAA staffed facilities
- Security engineering design and equipment installation at MMAC and Regional Office Facilities
- Security equipment installation at the Eastern, Northwest Mountain and Western Pacific Regional Offices
- Security PIV upgrades at Security Level 2 and Level 3 facilities

A reduction in the funding required would reduce the number of facilities at which required security upgrades could be performed. It would also affect the completion of security upgrades at the Regional Offices.

Detailed Justification for - 3A06 Information Security

What Is The Request And What Will We Get For The Funds

FY 2015 – Information Security
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Information Security	$14,000	$13,000	$12,000	-$1,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Information Systems Security (ISS)	---	$12,000.0

For FY 2015, $12,000,000 is requested to provide funds for Information Security Services and includes the following:

- Cyber Security Management Center (CSMC)
- Enterprise Architecture and Interoperability
- Academia and National Science Foundation Technology
- William J. Hughes Technical center (WJHTC) Prototyping Laboratory
- Advanced Concept Technology Demonstrations
- Wireless Intrusion Detection System (WIDS)
- Vulnerability Code Scanning
- Data Loss Prevention (DLP)
- NAS/NextGen Information System Security Capability

These projects and services allow FAA to meet the following outcomes:

- Implement solutions and services to achieve Continuous Diagnostics and Mitigation (CDM) endpoint integrity goals of managing: hardware, software, configuration settings and known vulnerabilities, including the NAS
- Protect NextGen and NAS systems and networks from attempted attacks; with improved and predictable, reliable, available systems
- Protect the Enterprise by expanding capability through Advanced Persistent Threat (APT) efforts
- Complete Enterprise Network Mapping which shows all FAA interconnections ensuring all system are secure
- Achieve detailed analysis of network traffic with Full Packet Capture, which allows capture of network traffic contents verses addressing information. It also allows for analyzing the data/commands across the network
- Comply with OMB Memorandums and mandates to remain green
- Improve the efficiency for access mechanisms that meet current federal security guidelines
- Ensure confidentiality, availability and integrity of FAA assets, particularly crucial information systems, networks, and administrative systems, through the purchase and customization of commercial-off-the-shelf (COTS) products
- Privacy and sensitive information scanning software installed and monitored for all FAA egress points to increase capability to detect rogue access connections into FAA networks
- Increase number of software scanning services to meet ongoing testing and evaluation of information security software controls effectiveness

- Improve cyber incident detection, analysis and response in NextGen ISS activities
- Improve and enhance boundary protection, internal policy enforcement, and ISS governance
- Applied Technology transition to improve operations and increase efficiency
- Implement Internet Protocol version 6 (IPv6) securely in the FAA network environment
- Develop data and information architecture to seamlessly share information internally and externally
- Develop strategies to evaluate and implement applied technologies in support of FAA programs and initiatives; such as, Cloud Computing, Trusted Internet Connection (TIC), IPv6 and Mobility.

What is This Program?

The FAA ISS program spans governance, operations and compliance and is comprised of the following areas: CSMC; IT and ISS awareness and training; IT development; policy, standards, and requirements; program evaluations; system certification and compliance; Data Loss Prevention and applied technology and enterprise architecture.

The CSMC is the operational branch of the FAA ISS Program. It is comprised of facilities, technologies, as well as FAA and contract personnel. The CSMC is a 24x7x365 day operation and represents the entire DOT as the single source provider of the cyber "big picture" when reporting to the Department of Homeland Security (DHS). At the Federal reporting level, the CSMC holds two seats on the National Cyber Response Coordination Group (NCRCG), a DHS-sponsored emergency action team and advisory council reporting directly to the White House on cyber issues affecting, or potentially affecting, national security.

DOT Strategic Goal – Organizational Excellence

- Enhance cyber security and privacy and improve governance of IT resources.

Why is This Particular Program Necessary?

This program funds Information Security Services including the CSMC with responsibility for cyber security incident management for the Department of Transportation (DOT) in compliance with the Federal Information Security Management Act (FISMA) of 2002 and National Institute of Standards and Technology (NIST) Special Publication (SP) 800-61, Revision 1. In 2011, the CSMC detected over 7.5 billion alerts/attacks generated against DOT infrastructure. From these alerts the CSMC generated over 3,700 incidents for DOT infrastructure including the FAA. To date, the FAA alone has had 181 special threat events. The facilities and equipment required to maintain this level of vigilance is essential to the overall success of the CSMC's cyber security mission.

How Do You Know The Program Works?

Information Security has allowed for the discovery and remediation of multiple system compromises:

- The immediate discovery of the exfiltration of FAA employee data in 2009 allowed the FAA to mitigate the severity by providing Identity Theft Protection to those affected in a timely manner
- By the detection of hacker activity, we were able to remediate systems and prevent valuable information from being stolen

Information Security has been responsible for FAA system vulnerability scanning and assessment to provide a proactive approach to protecting the FAA network:

- Vulnerabilities on FAA websites have been found that could have been used in compromising FAA servers
- Vulnerability Audits are provided to the FAA to enable an awareness of the risks on their network and provide recommendations to reduce those risks.

The combined F&E and OPS funded efforts for detection, assessment, and mitigation of security risks have contributed to the success that the FAA has had in meeting its goal:

- IT Risk Management and Information Systems Security: As a result of AIT's tenacity, for all of FY 2012 and as of March 2013, the agency has experienced no cyber security events that have significantly degraded or disabled a mission-critical FAA system.

Why Do We Want/Need To Fund The Program At The Requested Level?

In the Homeland Security Presidential Directive/HSPD 7, FAA was directed to protect and ensure the integrity, confidentiality, and availability of all National Airspace Information Systems as well as federal information due to ever increasing cyber terrorism and malicious activities by hackers and other unauthorized personnel. Under the FISMA of 2002, FAA must ensure all information systems identify and provide information security protection equal to the risk and magnitude of the harm resulting from unauthorized access, use, disclosure, disruption, modification, or destruction of information that support the agency, aviation safety and security, and the NAS.

State Sponsored Threat events are targeted attacks on federal government systems, which pose a serious and imminent threat to those systems. These are events specific in nature, objective, and patterned, and dictates that they be detected/prevented to the maximum extent to which the FAA is capable.

Information systems security enhances the National Airspace System (NAS) architecture including cyber security; hardening individual NAS systems and network elements by completing remediation for the discovered vulnerabilities; enhancing boundary protection to NAS facilities; improved recovery rate during times of cyber-attacks through information sharing; conducting systemic monitoring and addressing the challenge of providing cyber protection while maintaining reliability, availability and high system integrity through applied research and development initiatives. The safety-essential aspect of NAS operations leads to stringent requirements for reliability and availability, resulting in extensive use of system and equipment redundancy, path diversity, and software diversity. A reduction in funding below the requested level could reduce FAA's ability to prevent data loss from increasing threats and attacks on our mission networks and applications.

NAS Information Systems Security Transformation: FAA will complete concept of operation and implement strategy for automated recovery, which involves isolating those systems that have been affected by a virus, instituting the fix, and making sure that affected systems get back online as soon as possible. Architecture and engineering efforts for alternative solutions to secure new NAS systems will be developed (NSure concept). The NAS information technology systems will be monitored and all necessary actions will be taken to ensure the systems are not interrupted and are available at all times. FAA will acquire and implement enhanced tools to be used by the CSMC to address complex and rapidly changing cyber threats and vulnerabilities. These include analysis of NAS Netflow data, modeling and simulation of attack vectors into the NAS, data clustering and early indications and warning. As a result, FAA will gain the capability to do predictive analysis of events that could cause a service outage to the NAS. Funds are also required to begin to examine the ISS requirements of a space based NAS.

Enterprise Architecture (EA) and Interoperability: OMB Circular A-130 and OMB Circular A-11 mandate an annual baseline of the EA by the Investment Decision Authorities. The FAA Acquisition Management System (AMS) enforces compliance with these federal mandates. The FAA EA has been approved by the Joint Resource Council and the Architecture Review Board for the last several years. OMB recommends the FAA EA as a model to other federal agencies in IT investment management practices.

F&E funding supports the current state "as is", transition, and target "to be" architecture compliance, governance, and planning. In FY 2015, FAA will continue to enhance its enterprise architecture including the target architecture to ensure that Administrative, NAS-Support and the NAS architecture, defined by the Next Generation Transportation System (NextGen) program, target architecture states are compatible and meet the agency's future requirements. FAA will pursue opportunities to leverage architectural products to reduce costs and improve efficiencies, including the development and enhancement of investment roadmaps.

Data and Information Architecture: Continue to develop and maintain the necessary information architecture to seamlessly share information between the agencies participating in the NextGen architecture, formalize agreements and develop policies to foster the transfer of necessary information between Government agencies and commercial entities. Continue to support the System Wide Information Management (SWIM) program and other NAS program's data architecture efforts.

Applied Technology Transition: Provide the capability to explore and execute implementation plans and demonstrate strategies to leverage existing technology applicability to meet ongoing operational requirements. Artifacts from the demonstrations will be transitioned into FAA networks and facilities.

The following graphic shows the interrelationships between all FAA information security components.

Detailed Justification for - 3A07 System Approach for Safety Oversight (SASO)

What Is The Request And What Will We Get For The Funds?

FY 2015 – System Approach for Safety Oversight (SASO)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
System Approach for Safety Oversight (SASO)	$23,000	$12,500	$22,500	+$10,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Change Management and Workforce Training	---	$7,100.0
b. Information Technology (IT) Support	---	9,800.0
c. Business Process Re-Engineering	---	2,100.0
d. Program Management	---	3,500.0
Total	Various	$22,500.0

For FY 2015, $22,500,000 is requested to continue the Safety Assurance System (SAS) Phase 2a development and implementation and to achieve a Final Investment Decision (FID) and begin Phase 2b development for SASO.

Changes in the testing and deployment strategy necessitated a Joint Resource Council (JRC) program re-baseline decision for Phase 2a in September FY 2013. The re-baseline decision increased the SAS Phase 2a cost and schedule baselines by $38.9M (44 percent) and 28 months (47 percent) respectively. The key product of Phase 2a, the Safety Assurance System (SAS), is being fielded to approximately 110 sites across the National Airspace System starting in FY 2014 with completion planned for the second quarter of FY 2016. Completion of Phase 2a will satisfy the Safety Assurance component ("pillar") of the Safety Management System (SMS) for Title 14 CFR Parts 121 (air carriers), 135 (commuter and on-demand operators) and 145 (repair stations).

Phase 2b is the second segment of SAS development and implementation and covers FY 2015 thru FY 2019. During this phase, the remaining SAS functionality will be developed and implemented for all remaining Title 14 CFR Parts (20) regulated by the FAA's Flight Standards Service (AFS) along with development and implementation of the three remaining components ("pillars") of the AFS SMS; Safety Risk Management, Safety Policy, and Safety Promotion. Additionally, Phase 2b will result in the consolidation and decommissioning of several AFS Information Technology applications. A Phase 2b Final Investment Decision (FID) is planned for the first quarter of FY 2015.

What Is This Program?

The SASO program is one of several FAA initiatives to increase safety and control cost by adopting the International Civil Aviation Organization (ICAO) mandate to revise State Safety Programs to incorporate SMS principles. To accomplish the above, the SASO Program is reengineering AFS business processes and developing an oversight system based upon SMS principles. The difference between the current "regulatory compliance-based" approach and the reengineered SMS-based approach is the performance gap SASO is closing.

The SASO program will transform the FAAs Flight Standards Service to a national standard of system safety based upon SMS principles. The primary beneficiaries are to the flying public.

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

As the regulator of a major segment of the U.S. aviation industry, AFS must continually strive to improve aviation safety. AFS is responsible for oversight of nearly the entire civil aviation industry that uses the NAS. Today's safety oversight system is stove piped, reactive in nature, and "regulatory compliance-based." While many technical and human factors problems contributing to accident rates have been resolved, more complex organizational factors requiring additional systems-based, data-supported analysis and assessment for their resolution remain.

Increases in technical and operational complexity of aviation operations and introduction of new technologies further stress today's oversight system. SASO will make the system safer and anticipate future needs and challenges. It will implement a more structured, data-supported risk-based oversight system that will use hazard identification and risk assessment strategies to formulate surveillance plans and target FAA resources. The scope of the investment includes reengineering AFS business processes and consolidating 56 AFS applications into the appropriate number of enterprise systems that serve: 4,800 FAA Aviation Safety employees, in eight regions, at headquarters and approximately 110 field offices, and more than 25,000 aviation industry professionals managing aviation safety throughout the United States. It leverages technology instead of increasing oversight personnel as budgetary pressures constrain personnel growth. By implementing SASO via the SAS, AFS expects to contribute to reducing the commercial air carrier fatalities per 100 million persons on board by 24 percent over the nine-year period (2010 - 2018), no more than 6.2 in 2018.

How Do You Know The Program Works?

The SASO program sponsored five years of research and development from 2003 through 2007. The research resulted in capabilities adopted by the SASO Program that are currently being implemented to create a SMS. Phase 2a implements the SAS which completes the first of four pillars of the SMS, and Phase 2b implements the remaining three pillars. These capabilities are also recommended as best practice by the International Civil Aviation Organization (ICAO) and are being adopted by all member aviation authorities.

Why Do We Want/Need To Fund The Program At The Requested Level?

The success of the SASO program depends upon continued development funding through FY 2019 to achieve and sustain full benefits. Failure to continue funding at the requested level will limit the automation of oversight capabilities achieved through business process reengineering and require additional manpower (aviation safety inspectors) not currently budgeted to achieve aviation safety goals. Less than full funding will delay system implementation and threaten the FAA strategies and metrics achievement.

Detailed Justification for - 3A08 Aviation Safety Knowledge Management Environment (ASKME) – Segment 2

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aviation Safety Knowledge Management Environment (ASKME)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Aviation Safety Knowledge Management Environment (ASKME)	$12,800	$12,200	$10,200	-$2,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Program Management	---	$2,267.0
b. Application/Solution Requirements	---	525.0
c. Application/Solution Design and Development	---	4,851.0
d. Application/Solution Testing	---	307.0
e. Electronic File Service – Historical Scanning	---	2,250.0
Total	Various	$10,200.0

For FY 2015, $10,200,000 is requested to fund the following ASKME requirements:

- Electronic Filing Service (EFS) – Historical scanning activities - fourth year
- Airworthiness Directives Development (ADD) – Continue Design, Development, Test, and Deployment phases (follows System Specification Requirements)
- Airworthiness Certifications (AC) - Finalize the Documented Detailed System Specification Requirements phase
- Start the Design, Development, Test, and Deployment phases for the following ASKME applications:
  - Standard Airworthiness Certification (StdAC)
  - Special Airworthiness Certification (SpclAC)
  - Special Flight Authorizations (SFA)
  - Certification of Imported/Exported Products (CI/EP)
- Compliance and Enforcement Actions (CEA) – Starts FY 2015, Ends FY 2016 – Finalize the Documented Detailed System Specification Requirements phase

What Is This Program?

The ASKME is a suite of IT tools designed to support and enable the FAA Aircraft Certification Services (AIR) to more efficiently certify new aircraft and modifications to existing aircraft.

The program was established to provide a comprehensive automation environment for critical safety business processes for Aviation Safety (AVS) through deployment of 18 integrated business solutions/projects between FY 2008 and FY 2017. Phase 1 covered FY 2008 - FY 2012, and Phase 2 covers FY 2013 to FY 2017. ASKME Segment 2 was approved by FAA Joint Resource Council on September 23, 2011. Segment 2 projects started as planned during the first and second quarters of FY 2013.

ASKME deliverables will provide for the electronic storage and retrieval of FAA technical documentation and lessons learned from previous certifications that involve aircraft design and manufacturing safety issues so that they can be accessed and shared more easily. This technical data includes: rationale for design and production certification decisions, interpretations of rules and policies, and audits of aircraft industry manufacturers. ASKME will provide tools to improve the ability to identify potential unsafe conditions by analyzing this documentation along with safety information such as Service Difficulty Reports, National Transportation Safety Board safety recommendations and reports, accident reports, and Maintenance Difficulty Reports. ASKME will also provide electronic tools for capturing key safety related data resulting from its standard business activities for rulemaking and policy development, airworthiness directives, design certification, production/manufacturing certification, airworthiness certification, designee management, evaluation and audit, external inquiries, enforcement, continued operational safety management, and international coordination.

The current and projected/future AIR workload exceeds workforce capability. ASKME business process tools will help AIR to streamline work activity and oversight practices, enabling AIR technical staff to transfer non-safety critical work activities to its pool of designees, resulting in future cost savings by allowing staff growth to be maintained at minimal levels. Further, the work transfer will enable AIR technical staff to focus more on safety identification, risk management, resolution, and improvement activities.

The analytical tools produced by ASKME provide the basis for AVS technical staff to identify and pre-empt potential hazards and events through predictive analysis and subsequent decision-making and corrective action.

ASKME Sub-functions status for FY 2013 and FY 2014:

- Work Tracking Software-Budget Management (WTS-BMgmt) - Starts FY 2013, Ends FY 2014 – will Complete Design, Development, Test, and Deployment phases
- Airworthiness Directives Development (ADD) – Starts FY 2013, Ends FY 2015 - will continue Design, Development, Test, and Deployment phases
- Airworthiness Certifications (AC) - Starts FY 2014, Ends FY 2016 - will finalize the Documented Detailed System Specification Requirements phase
- Start the Design, Development, Test, and Deployment phases for the following four related ASKME applications Starts FY 2016, Ends FY 2016:
  - Standard Airworthiness Certifications (StdAC)
  - Special Airworthiness Certifications (SpclAC)
  - Special Flight Authorizations (SFA)
  - Certification of Imported/Exported Products (CI/EP)

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

Within the FAA AVS organization, AIR is responsible for ensuring that civil aircraft are designed and built to operate safely within the NAS.

In carrying out their responsibilities, FAA personnel perform numerous business activities that generate massive amounts of data and information used in making strategic aviation safety decisions. The data is also used throughout AIR to ensure standardized regulatory compliance, workforce education, trend analysis, and program reporting. As the aviation industry has grown in size and complexity, so has the requirement for additional resources to perform AIR services. Additionally, within AIR, new security requirements related to terrorist countermeasures have surfaced as a result of the September 11, 2001, terrorist events.

ASKME will provide current and accessible information, designee program effectiveness will be improved, designees better utilized, and AIR designee oversight and evaluation will be enhanced.

ASKME activities are as follows:

- Implement a proactive safety management system. This system is designed to identify and address safety risks and accident precursors throughout the product lifecycle of design, manufacturing, build, operations, and maintenance into the 'safety management process/automated lessons learned feedback' mechanisms. The risk assessment performed on the safety data may be used for risk management analysis, root cause analysis, corrective action, and follow-on work in the areas of standards, certification, maintenance, and operations
- Provide comprehensive, real-time, organization-wide access to current and historic digital and paper-based documentation aimed at supporting effective and timely decision making in standards, certification, and continued operational safety
- Enable real-time collaboration among AIR technical staff, industry, international aviation agencies, applicants, approval holders, and designees to facilitate effective and timely decision making
- Automate the integration of risk management processes into standards development, certification, and continued operational safety
- Provide tools to assist with designee oversight and delegation in certification through the use of automated risk management tools
- Provide tools to enhance resource utilization and performance management and monitoring

When integrated into our safety management approach and practices, these combined capabilities will enhance aviation safety and promote a culture of system safety.

In order to accomplish the objectives, the ASKME suite of tools will provide AIR a Web-based knowledge management portal. The integrated tools will be designed to store valuable knowledge assets, making the safety related assets accessible to facilitate management and workforce decision making while providing a proactive approach to systems safety.

How Do You Know The Program Works?

AIR is gaining the desired benefits of the ASKME program with the successful deployment of the ASKME sub-functions, Electronic Filing System and Project Monitor Safety Related Data- Monitor Safety Analyze Data and the imminent deployment of the WTS-RBRT sub-functions.

The measurement criteria for increasing the percentage of safety trends (i.e. identified and tracked by Monitor Safety Related Data (MSRD)-Monitoring and Analyze Data (MSAD)) and expanding accessibility to current and historical safety documents are the number of successfully executed and completed software tests, User Acceptance tests (UATs), and safety documents made available to safety workforce.

Currently, the AIR Regional Guidance Letter (RGL) provides access to 14 safety document types (FARs, SFARs, NPRMs, Final Rules, Make/Model Information, Type Certificate datasheets, Special TCs, Airworthiness Directives, Advisory Circulars, Orders and Notices, TSOs, Special Conditions, Exemptions, and Equivalent Levels of Safety).

ASKME will provide tools and technologies to enable expansion of Work Tracking Software-Risk Based Resource Targeting (WTS-RBRT) for all ASI and ASE activities.

The current ASKME performance baseline funding was estimated to the end of FY 2017.

Why Do We Want/Need To Fund The Program At The Requested Level?

A reduction in ASKME would impact completing the individual projects that are already in-progress and will impair the ability of AIR to remain responsive to industry growth. AIR would be unable to use current Information Technology (IT) to modernize its business practices and maximize the productivity of its workforce.

Detailed Justification for - 3A09 Next Generation Transportation System – System Safety Management Portfolio

What Is The Request And What Will We Get For The Funds?

FY 2015 – System Safety Management Portfolio
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
System Safety Management Portfolio	$20,811*	$22,555*	$18,700	-$3,855

*indicates a comparability adjustment to prior budget structure.

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. Aviation Safety Information Analysis Sharing (ASIAS)	---	$13,000.0
B. System Safety Management Transformation (SSMT)	---	5,700.0
Total	Various	$18,700.0

The System Safety Management Portfolio, as described in the NextGen Implementation Plan (NGIP), contains activities that enable development and implementation of policies, processes and analytical tools that the FAA and industry will use to ensure that changes introduced with NextGen enhancement or do not degrade safety while delivering benefits. This portfolio consists of two activity tasks: Aviation Safety Information Analysis Sharing (ASIAS) in the implementation phase and System Safety Management Transformation (SSMT) in the pre-implementation phase. For FY 2015, $18,700,000 is approved for the following:

Continue development of both the ASIAS and SSMT programs by expanding their capabilities to better manage, integrate and process aviation safety performance data. This request will enable the development of tools to convert both text and numeric data into safety information. It will also support the development of visualization capabilities to enable causal/contributing factor analyses and risk assessment. In addition, tools and methods will be developed to integrate safety data from a number of disparate sources into a suite of system level models. The models will deliver products that allow users to evaluate system performance in near-real-time. Models and tools are based upon ASIAS data inputs and modeling. This supports a federally required Safety Management System (SMS) process managed by the FAA's Aviation Safety Organization (AVS). Risk mitigation strategies to address potential system safety risks are evaluated by the emergent risk forecasting activities in this portfolio to ensure that NAS sustainment and NextGen implementation does not introduce hazards into the NAS, while supporting FAA Destination 2025 goals. Both the ASIAS and SSMT programs enable the Administrator's Strategic Initiative – Risk Based Decision Making.

A. Aviation Safety Information Analysis and Sharing (ASIAS)

- Establish initial ASIAS participation goals for US Corporate/Business General Aviation (GA) operators based upon risk-based, data quality/quantity standards
- Complete initial processing of data from international carriers that operate in US airspace
- Establish ASIAS data standards and the requirements for analysis tools for rotorcraft flight sharing data
- Incorporate available Surveillance and Broadcast Services (SBS) data into the ASIAS: Flight Information Services-Broadcast (FIS-B), Traffic Information Services-Broadcast (TIS-B), Automatic Dependent Surveillance–Broadcast (ADS-B)

- Incorporate Air Traffic Control (ATC) Voice and manufacturer data into the ASIAS data set to improve safety analysis
- Continue development of architectural enhancements (e.g., cloud computing) required to support use of ASIAS analytical capabilities by FAA and ASIAS participant for data ingestExpand the data storage capabilities available to support the improved access of the FAA and ASIAS participants to fused data sets and threaded track information
- Continue development of Architectural Enhancements to support the collection of GA data
- Deploy a risk model based upon an initial set of risk factors from ASIAS Vulnerability Discovery research that leverages ASIAS data fusion/linked data efforts
- Deploy enhanced Text Mining Tools which include an aggregating capability to allow for easier analysis of difference between groups of safety text reports
- Deploy an expanded Voice Data Analytical Capability to include a query interface for voice data and initial automated classification models of voice-to-text capabilities
- Expand data fusion to include the integration of voluntarily submitted text safety reports from both FAA and ASIAS participants with digital flight data and FAA surveillance data
- Enable NextGen safety analysis by making results available in a timely fashion, with "timely" determined by the specific safety need (e.g., to detect issues after implementing a new procedure) and the ability to monitor and act on NextGen proposed changes
- Continue development of an initial set of NextGen Known-risk monitoring metrics
- Develop and deploy two new Flight Operational Quality Assurance (FOQA) benchmarks and two new Aviation Safety Action Program (ASAP) trending metrics
- Complete directed studies as directed by the ASIAS Executive Board (AEB) and as driven by insights from Vulnerability Discovery for commercial operations
- Develop a plan for a full transition of ASIAS data analyses to the ASIAS cloud-based architecture
- Develop enhanced collaboration capabilities for FAA and ASIAS participants utilizing emerging technologies (e.g., smart phones, tablets)
- Develop expanded set of ASIAS analytical capabilities and portal based products in support of FAA Lines of Business (LOBs) based upon NextGen data and operation improvements

B. Systems Safety Management Transformation

- Develop and provide a nationwide monthly risk characterization report of airport operations at all core US airports
- Establish a data interchange process among the ASIAS capability, Integrated Safety Assessment Model (ISAM) Event Sequence Diagrams (ESD), and Fault Trees for baseline risk analysis
- Develop and publish an Annual NextGen portfolio assessment document of near-, mid-, and far-term enhancements
- Integrate hazard data and taxonomy into Event Sequence Diagrams /fault tree databases to link hazard risk management tracking software to the ISAM

What Is This Program?

The System Safety Management Portfolio contains an information safety analysis and data sharing collaboration program for industry and government to proactively analyze broad and extensive data to advance aviation safety. It also contains research to develop a comprehensive and proactive approach to aviation safety especially as it relates to the implementation of NextGen.

A. Aviation Safety Information Analysis and Sharing (ASIAS)

The primary objective of ASIAS is to provide a national resource for use in discovering common, systemic safety problems that span multiple airlines, fleets and regions of the global air transportation system. ASIAS leverages internal FAA datasets, airline proprietary safety data, publicly available data, manufacturers' data and other data. ASIAS fuses these data sources in order to identify safety trends in the NAS, leading to a comprehensive and proactive approach to aviation safety in conjunction with implementation of NextGen capacity and efficiency capabilities. Safety insights from ASIAS analyses are communicated to the FAA and ASIAS participants and to others in the aviation community and are applicable to a broad range of aviation communities (e.g., commercial, general aviation, helicopters, airport operators, airport authorities).

B. Systems Safety Management Transformation

Systems Safety Management Transformation (SSMT) enables safety assessments of proposed NextGen concepts, algorithms, and technologies and provides system knowledge to understand economic, implementation, operational and performance impacts (with respect to safety) of NextGen system alternatives. This project supports the development and implementation of integrated safety management systems across the air transportation system to ensure that safety risk throughout the system is managed to an acceptable level. The activities in the SSMT Program include an Airport and Terminal Risk Baseline and Forecast models for all 35 major airports, an Integrated Safety Assessment Baseline and Forecasting Model that includes baseline event trees, fault trees and hazard data. This tool will be used to provide annual safety metrics featuring the potential effect of NextGen initiatives. It also supports subject matter experts (SME) evaluation protocols for NextGen initiatives by providing linkages from SME estimates to actual historical accident and incident data. It also links these data to precursors that can be observed and tracked by ASIAS and a Hazard Risk Tracking system that supports the monitoring of safety baselines and forecasts for use by all FAA offices.

Why Is This Particular Program Necessary?

This research includes the expansion of information sharing and data analysis to identify and mitigate risks before they lead to accidents. New automated processes and models are required to facilitate advanced analysis of comprehensive data which will unlock new insight about potential safety risks.

ASIAS is developing the only industry-wide integrated analytical, forecasting, and decision support tool that addresses NextGen evolutionary procedures. The ASIAS program provides a unique capability to detect impacts of system performance anomalies around the NAS. Without the ASIAS program, manual processes would be required for detection of safety-significant events. Many of these events would grow in severity before they are detected, since some of the data that ASIAS collects cannot be manually processed, such as FOQA and surveillance data from radars.

Systems Safety Management Transformation (SSMT) provides the research and development required to improve system safety as air traffic grows to achieve the nation-wide goal of continuous safety improvement through implementation of an integrated safety management approach. This approach provides a proactive means for building safety into the air transportation system. By developing new analytical methodologies and leveraging state-of-the-art information technology, the FAA and its industry partners are able to monitor the effectiveness of implemented safety enhancements, establish baselines and trending capability for safety metrics, and identify emerging risks.

To meet these requirements the System Safety Management Portfolio has undertaken a dual development strategy: to develop the IT infrastructure and processes to collect, fuse and analyze locally collected information for risk identification and forecasting; and to develop NAS-wide models that can represent risk at the NAS level and account for traffic dynamics and system characteristics that will affect air vehicle occupant (passengers, operators or participants) risks in the current NAS and for future NextGen Operational Improvements. Capabilities will be integrated using multiple data sources and shared across the aviation community through the deployment of local system safety risk baseline tools, risk prediction tools and integrated forecasts. Ultimately, NAS stakeholders will use the tools to identify precursors and contributing factors to accidents, allowing interventions to be developed and implemented before system safety issues manifest as accidents.

Safety information discovered through this portfolio will be used across the FAA and industry to drive improvements and support Safety Management Systems (SMS). Stakeholders will leverage insight to identify risk-reducing alternatives or changes to operations or processes as NextGen capabilities are deployed.

How Do You Know The Program Works?

A. Aviation Safety Information Analysis and Sharing (ASIAS)

ASIAS has already discovered potential safety issues in the NAS that are being addressed in the near-term through procedural and airspace redesign. These issues have been used to assist in prioritization of NextGen systems to mitigate risk by the Optimization of Airspace & Procedures in the Metroplex (OAPM) program office and by the Commercial Aviation Safety Team (CAST) for the development of Safety Enhancements (SEs). Coordination efforts have ensured that throughout the NextGen evolution planning process, ASIAS results can be integrated into the airspace and design process and inform design tools.

B. Systems Safety Management Transformation

SSMT has developed and deployed a standardized methodology to use Airport Surface Detection Equipment, Model X (ASDE-X) radar data to detect anomalous surface movement on airports and is currently being used by the ATO, Safety and Technical Training (AJI) t to identify and investigate runway surface safety issues. This methodology is now in use to verify the risk baseline for all airport surface operations in the NAS, and to validate changes in the procedures required to implement NextGen changes for the ATO Safety organization. The ISAM is now the FAA official methodology for AVS and ATO's Safety and Technical Training Organization (AJI) to coordinate on risk assessment of NextGen. SME assessments with representatives of ATO, AVS, industry and airline operations have produced individual assessments of risk based upon the ISAM model environment.

This program has also successfully developed the requirements for integrated Hazard Risk Tracking Management System (HRTMS) within AVS and will publish requirements for integration across FAA lines of business within the next fiscal year. The results of the program are being used to identify and track hazard occurrences, link incident and accident data to hazard definition and identify precursor data monitoring requirements for risk management.

Why Do We Want/Need To Fund The Program At The Requested Level?

$18,700,000 is required to continue work in System Safety Management Portfolio in FY 2015 for the ASIAS and Systems Safety Management Transformation (SSMT) tasks.

Achievement of the ASIAS mission of a proactive data-driven approach to aviation safety will require development of capabilities to acquire access to existing and previously unattainable information sources, enhanced analytical methodologies and technical advancements to support the monitoring and identification of system level safety risks and enable risk based decision making, a core element of the Administrator's Strategic Initiative.

SSMT integrates the data from a number of disparate sources into system level models, and provides products that will allow users to evaluate system performance in near-real-time. SSMT links the hazard assessments to occurrence models and ASIAS data in a standard model that is available to the entire FAA safety community. These program efforts support the federally mandated Safety Management System (SMS) process, managed by AVS. Risk mitigation strategies to address potential system safety risks are evaluated by the emergent risk forecasting activities in this portfolio to ensure safety in the NAS and the safety of NextGen implementation.

Detailed Justification for - 3A10 National Test Equipment Program (NTEP)

What Is The Request And What Will We Get For The Funds?

FY 2015 – National Test Equipment Program (NTEP)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
National Test Equipment Program	$2,000	$3,000	$2,000	-$1,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Hardware and Software Engineering Program Support	---	$100.0
b. Corrective Maintenance	---	1,400.0
c. Program Planning and Control	---	500.0
Total	Various	$2,000.0

For FY 2015, $2,000,000 is requested to replace obsolete test equipment. The funding provided will be used for engineering support required to evaluate new products, to procure replacement test equipment used to accomplish corrective maintenance/installation, contractor support to administer the program, and disposing of obsolete test equipment.

What Is This Program?

The National Test Equipment Program (NTEP) manages the modernization, distribution, calibration, and inventory of test equipment required to perform preventive and corrective maintenance, equipment installations and modifications, and service certifications in support of numerous National Airspace System (NAS) systems.

DOT Strategic Goals – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The NTEP is charged with procuring and maintaining the test equipment that ensures the NAS are operating to set standards by troubleshooting, repairing, and re-certifying both new and legacy systems. These systems include communication, automation, surveillance, power, navigation, and weather platforms whose sensitivity must be maintained within specific tolerances. Failure to achieve certification of critical NAS systems at an FAA facility (due to poor performing test equipment) will result in the restriction of air traffic in the facility's air space potentially causing major flight delays. The NTEP supports test equipment used in nearly 27,000 facilities throughout the NAS. However, a large portion of the equipment is either damaged or rife with supportability and maintenance issues which affect Mean-time-to-restore (MTTR), safety, maintenance cost, and inventory management for practically every system within the NAS. No other FAA program office or initiative currently addresses this problem.

How Do You Know The Program Works?

NTEP is successfully fulfilling its mission when test equipment is available and functional. Working test equipment allows the technicians to evaluate the condition of NAS systems, identify and isolate defects, and correct and return the system to full operational capacity. Unfortunately, functioning test equipment has been in short supply for years as approximately 50 percent of test equipment in the NAS was procured prior to 1982 in support of what are now legacy systems. The majority of test equipment has reached the end of life phase and can longer be supported or maintained. Simply put when equipment breaks, it cannot be repaired. Conversely, functioning analog test equipment used to support the newer and faster NexGen systems cannot yield a measurement as precise as digital.

Why Do We Want / Need To Fund The Program At The Requested Level?

The level of required funding will allow the FAA to incrementally replace obsolete test equipment and continue to support the FAA's mission until NextGen is fully implemented.

Detailed Justification for – 3A11 Mobile Assets Management Program

What Is The Request And What Will We Get For The Funds?

**FY 2015 – Mobile Asset Management Program
($000)**

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Mobile Assets Management Program	$1,700	$3,000	$4,000	+$1,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Execute options on Mobile Towers Contract to acquire a minimum of three Mobile Air Traffic Control Towers (MATCTs) with electronic equipment	3	$3,000.0
b. Continue to upgrade/perform technology refresh of existing mobile assets	---	400.0
c. Continue establishment and outfitting of the Service Area Deployment Center(s)	---	350.0
d. Complete architectural studies for FAA mobile assets to determine the type and quantities of mobile assets needed by the FAA	---	150.0
e. Decommission assets that are beyond their useful life	---	100.0
Total	Various	$4,000.0

Mobile Assets Management Program (MAMP) is one of the 12 programs in the National Airspace System (NAS) Sustainment Strategy. For FY 2015, $4,000,000 is requested to ensure that a sufficient number of the FAA's mobile assets are available to maintain/restore continuity of aviation operations, such as:

- Replace or supplement facilities damaged/destroyed by natural or man-made disasters
- Support emergency or special event requirements
- Support scheduled maintenance and modernization programs

What Is This Program?

The MAMP was established in response to a visible inability to support the continuity of NAS operations in the event of natural or man-made disasters. The MAMP provides NAS operations continuality/restoral and risk mitigation at FAA operational facilities, such as air traffic control towers (ATCT), terminal radar approach control facilities (TRACON), remote transmitter/receiver (RTR) sites, remote communications air/ground (RCAG) sites, and other sites that experience unexpected or planned system outages. The program will acquire new, operational mobile facilities to replace existing assets that have exceeded their useful life and to fill capability gaps in the existing inventory. The program will provide lifecycle support that will consist of equipment repairs and needed upgrades to ensure conformance to FAA operational standards. Additionally, mobile assets provide temporary facilities to support air traffic operations when a fixed facility must be taken down during modernization projects and major equipment outages.

DOT Strategic Goals – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The FAA established the MAMP because there was no centralized national program to manage mobile assets. As a result, the FAA's mobile assets, specifically the Mobile Air Traffic Control Towers have deteriorated to the point where many are not operational as a result of inconsistent preventative, pre-deployment, or post deployment maintenance and insufficient funding and management oversight. Procedures that are currently followed for lifecycle support and management are not standardized across the FAA's Service Areas, leading to varying degrees of readiness and availability between the three Service Areas. This funding will help to ensure that mobile assets will be available and ready to meet emergency or special events requirements when they occur.

The inventory of significant mobile assets currently stands at 45 assets. Of these 45, 32 (71%) are fully operational and capable of performing their mission. Of the high cost, critical assets, the Large Mobile Air Traffic Control Towers (MATCTs), six (6) (60%) are currently inoperable and could not be deployed immediately to perform the mission for which they were designed, in a crisis. Additionally, nine of these critical large MATCTs are at or beyond the end of their lifecycle and are populated with equipment that is no longer supportable.

How Do You Know The Program Works?

The MAMP will be determined to work when the FAA is able to respond to NAS emergent requirements and outages on short notice and is able to restore air traffic control operations within hours of arriving on-site. The program will be working when it is able to ensure the availability and readiness of mobile assets to maintain or re-establish continuity of air traffic operations in response to emergencies and natural disasters. The FAA's mobile assets have been deployed to support relief efforts during natural disasters like the recent earthquake in Haiti or the hurricanes that hit the Gulf coast each year. These assets have played a significant role during disasters such as the recovery efforts following the space shuttle Columbia tragedy and forest fires in Colorado and on the West Coast. Mobile assets are currently deployed to support several tower renovation projects including Isla Grande, PR and Montgomery Field in San Diego, CA.

Why Do We Want/Need To Fund The Program At The Requested Level?

$4,000,000 is required to ensure that a sufficient number of the FAA's mobile assets are available to maintain/restore continuity of aviation operations, such as:

- Under FAA Order 6000.15, the agency is required to procure and maintain mobile assets that are capable of providing and supporting tactical ATC services that include communication, navigation, surveillance, infrastructure support, and mission support (e.g., Command Centers)
- Meet emergency or special event requirements
- Temporarily replace facilities destroyed by natural or man-made disasters

Detailed Justification for - 3A12 Aerospace Medicine Safety Information System (AMSIS) Program

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aerospace Medicine Safety Information System (AMSIS) Program
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Aerospace Medicine Safety Information System (AMSIS)	$0	$3,900	$3,000	-$900

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Shortfall Analysis	---	$450.0
b. System Engineering	---	575.0
c. Program Management	---	1,400.0
d. Cost Estimating and Benefit Analysis	---	575.0
Total	Various	$3,000.0

For FY 2015, $3,000,000 is requested for Shortfall Analysis, System Engineering, Program Management, and Cost Estimating and Benefits Analysis. This is the Rough Order of Magnitude funding requirement to support the Investment Analysis activities required for the Initial Investment Decision (IID) planned for the fourth quarter of FY 2014 as well as the Final Investment Decision (FID) planned for the fourth quarter of FY 2015.

What Is This Program?

The Office of Aerospace Medicine (AAM) is responsible for: the medical certification of airmen; the medical clearance of air traffic control specialists; oversight of aviation industry drug and alcohol testing programs; designation, training and oversight of aviation medical examiners; FAA employee substance abuse testing; airmen aviation physiology and survival training and education; the FAA Employee Health Awareness Program; and aerospace medicine and human factors research. These programs are carried out by AAM at FAA Headquarters, the Civil Aerospace Medical Institute, in the regional Aerospace Medicine divisions and at the three Industry Drug Abatement Compliance and Enforcement Centers. AAM has designed, developed and implemented information systems to efficiently process and manage safety, health and research information collected by FAA's regulatory programs. However, to ensure that these systems are maintained and kept up-to-date and/or replaced as necessary, lifecycle funding is needed. The information systems developed under ASAS are effective, mature systems, but the technology and architecture of these systems will, over time, no longer be supportable and will become obsolete.

AAM requires future systems funding to re-engineer AAM safety program business processes; design and develop new information systems architecture; and to design, procure and deploy next generation information systems. To support existing systems, technology, and develop replacement systems in the future, AAM proposes to establish the Aerospace Medicine Safety Information System (AMSIS) Program.

DOT Strategic Goal – Safety

- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

The Medical Systems have the following performance gaps and mission shortfalls, which must be remedied for the continued support of the regulatory programs that support aviation safety, employee health programs, and research programs:

- Data and Information Accessibility/Knowledge Management: Lack of ability to easily access all information sources for current and historical safety-related data and workforce knowledge
- Collaboration between AVS, Designees, and Applicants: Geographically dispersed personnel, designees, and applicants unable to work effectively together based on standard business processes
- Collaboration with International Aviation Community: No capability to interact with peers in the international community in real-time
- Data Analysis: Lack of automated analysis tools to manipulate data; identify trends, and problem areas
- Information Quality and Standards: Lack of record/audit tracking as required by medical or security record keeping demands
- Strategic Resource Optimization: Limited, inconsistent, cumbersome, and time consuming methods to track and allocate resources
- Technical Knowledge Transfer: Vast amount of information only available on paper or in local computer systems

The AMSIS program will address the following Mission Shortfalls within the current AAM subsystems:
- <u>Electronic Medical Records:</u> The Federal Government and private medical entities are moving towards electronic medical records. The AAM Subsystems are not architecturally equipped to be part of this network.
- <u>Technical Process Re-engineering</u>: The processes used within AAM are mature. An independent assessment of AAMs Business Processes is needed to redesign the way things are done to better support the organization's mission and reduce costs. This will include:
  - Discovering methods that simplify current processes and eliminate wasted efforts
  - Incorporating both technical and medical industry standards
  - Cutting operation costs
  - Improving customer service
- <u>Social Security Matching:</u> Ability to cross-reference AAM data with other government agencies, such as the SSA, Veterans Administration (VA), and the Department of Labor (DOL).
- <u>Outdated Pathology Coding Methodology:</u> AAM is using a non-standard pathology coding methodology. To be consistent with the rest of the international medical community, AAM needs to update its current pathology coding method to match the International Statistical Classification of Diseases and Related Health Problems (ICD) standard.

How Do You Know The Program Works?

The information technology will be aligned with OMB/DOT/FAA information systems architecture and security standards.

Because these are medical information systems AAM must also align these systems with the national health information technology standards and security requirements for medical information systems developed by the Federal government, private sector and voluntary standards organizations, including the International Organization for Standardization (ISO).

The systems will successfully and securely interface with approximately 4,500 health care providers designated by the FAA, known as Aviation Medical Examiners, who perform pilot and ATCS medical examinations.

Why Do We Want/Need To Fund The Program At The Requested Level?

The information systems currently in use today were developed in the 1990's. These information systems are becoming obsolete. The business processes that support the medical certification of airmen, and the other aviation safety programs, need to be re-engineered. The information technology must be aligned with OMB/DOT/FAA information systems architecture and security standards. AAM must also align these systems with the national health information technology standards and security requirements for medical information systems developed by the Federal government, private sector and voluntary standards organizations, including the International Organization for Standardization (ISO). The systems must successfully and securely interface with approximately 4,500 health care providers designated by the FAA, known as Aviation Medical Examiners, who perform pilot and ATCS medical examinations. AMSIS proposes to implement these changes in a 'Phased' approach.

Detailed Justification for - 3A13 Tower Simulation System (TSS) Technology Refresh

What Is The Request And What Will We Get For The Funds?

FY 2015 – Tower Simulation System (TSS) Technology Refresh
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Tower Simulation System (TSS) Technology Refresh	$0	$0	$3,000	+$3,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Variable Quantity/TSS Hardware and Software	10	$3,000.0

For FY 2015, $3,000,000 is requested to replace obsolete technology within the current Tower Simulation Systems (TSS) system to decrease ongoing support demands and costs.

What Is This Program?

The FAA developed a plan, "A Plan for the Future: The FAA's 10 - Year Strategy for the Air Traffic Control Workforce," which calls for greater efficiency in training procedures and identified a need to speed the training process while maintaining the high established standards. It is the goal of the TSS technology refreshment program to address these needs and continue to provide exceptional training while reducing time-to-certification. These goals depend on creating a more efficient training program.

According to the "Controller Staffing Plan", the agency aims to reduce the overall cost of training to Certified Professional Controller (CPC) status by 33 percent. This program results in a more efficient training process, which accounts for producing CPCs in less time and the Agency's fulfillment of its goals.

The TSS system provides an essential role within the NAS as well as satisfies the simulation training requirement identified in Joint Order 3120.4M. The TSS system is currently deployed at 26 sites and supports 133 tower facilities. These facilities provide support to both local and district Air Traffic qualification, contingency and skill enhancement training.

TSS provides realistic training for Tower Air Traffic Controllers in a non-operational environment. The Tower Simulator System is a full-scale ATCT simulator providing an interactive, highly realistic environment for controller training. The Tower Simulator System can support up to four simultaneous positions including local, ground and flight data/clearance delivery and coordinator. Trainees can prove initial proficiency at one of the four tower cab roles in the simulator and then work in that role as a developmental in the tower under the supervision of an on the job instructor (OJTI) and Front Line Manager (FLM) in preparation for certification. Realistic scenarios are generated, at the direction of an instructor. The simulator provides synthetic voice response and voice recognition to allow the student to talk to the simulator. The voice recognition system interprets the student's commands and translates them into actual aircraft movement depicted on the screen. The Tower Simulator acknowledges students' instructions using synthetic voice. Under certain complex traffic scenarios pseudo pilots respond directly to the student overriding the voice response capability. A recorded playback feature allows instructors to review and evaluate performance with the student after the training session.

The TSS is capable of displaying airport visual representations. For example, a simulator in Los Angeles can, within minutes, display and simulate operations at any airport for which a database has been created. The TSS is deployed in a hub and spoke methodology. Satellite facility within commuting distance of the hub can have a database on file at the TSS location. This allows one simulator to train developmental controllers from several nearby airports.

The impact to training operations is significant. Training no longer depends on the density or complexity of actual air traffic operations. Preemptive intervention on the part of an instructor to avoid a possible hazardous situation is eliminated. The student "works through" the scenario to an eventual successful, marginal or unsuccessful outcome. Scenarios can be repeated to build habits and reactions to potential operational errors with the ultimate goals improve safety and efficiency.

The TSS does not interact with live air traffic control operational systems and poses no threat to service interruption. The system creates an entirely new environment that operates away from and independently of ongoing air traffic operations. It realistically replicates operations that enable training in a safe environment. In addition to initial training, the TSS provides for refresher training to heighten awareness of controllers from repeated exposure to seldom seen operations and airport conditions. Before departing on a change of assignment, transferring certified controllers may prepare for and actually train on the operations they will encounter at their new assignment thereby greatly reducing the training time required when they arrive.

The TSS is also used in non-training applications. It aids in site surveys for proposed new construction on or near the airfield as well as assisting in the planning of new runways or changes in local arrival or departure procedures in an accurate and safe simulated environment.

DOT Strategic Goal – Organizational Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

TSS provides the following benefits:

- Reducing the time required to attain CPC status and achieving increasing levels of certification will reduce training costs
- Reducing the time to achieve CPC status by providing developmentals the opportunity to practice seldom-used skills and to take advantage of low traffic levels by practicing complex scenarios in the simulator
- Tower simulation training will provide increased flexibility in scheduling, more rapid response to facility staffing needs, and reduced stress on training resources, such as OJT instructors
- Enhanced simulation and inherent simulation capabilities also provide for more standardized instruction, unbiased assessment of performance, mitigation of weaknesses, and useful remedial and proficiency training
- Provide a functionally compatible and realistic simulation environment that closely duplicates traffic situations/conditions to teach and test required operational skills and procedures
- Provide the controller with the opportunity to experience and practice important skills, some of which are seldom used under normal air traffic conditions simulation training will take advantage of a broad variety of training scenarios in a constant and consistent manner
- Through enhanced voice recognition technology, a potential reduction in remote pilot/pseudo pilot costs can be achieved

In addition to supporting Air Traffic Training goals and strategic initiatives, the TSS provides additional benefits as follows:

- Systems are used to re-create procedures that may require recurrent training or communication of best practices in all facilities
- Systems used for safety studies to identify risk and mitigate hazards associated with new airport construction and development of new air traffic procedures

- Development of airport models can be utilized for technical operations ground program by providing airport familiarity of new airport changes

How Do You Know The Program Works?

TSS has been deployed at 25 operational locations in the NAS today. Initial data analysis indicates a decrease in On the Job training times ranging between 15-40 percent at specific locations. Data analysis reflects that facilities that have a TSS onsite have the highest utilization rates and the most time savings in training development times.

Surveys conducted by the program offices reflect qualitative benefits in training that are not logged through a data collection program. The benefits are familiarization of operations, phraseology and best practices for procedures. Facilities have also indicated the value of evaluating new procedure and communication with airports and airlines on the impacts of construction and new procedures.

Why Do We Want/Need To Fund The Program At The Requested Level?

Many challenges face today's air traffic controller workforce including a generational shift in learning methodologies, new technology based on air traffic management systems and an increase demand for air travel. These challenges are causing the FAA to adjust its training strategy and implementation plan to account for changing times and needs.

The TSS technology is an integral component of Air Traffic Controller training providing a higher level of training quality and effectiveness, while decreasing training times and costs at specific locations. Components need to be replaced as the demand of our controller workforce and ability to meet shifting geographical demand increases.

This ongoing demand requires an investment in training systems technology and infrastructure to deploy and maintain a higher quality of systems to meet training demands. The current technology deployed for TSS is becoming obsolete and support costs are increasing. Also the existing hub and spoke model is causing constraints to accessibility, which leads to underutilization of the systems. With new deployable technologies the FAA can train its workforce in a more effective and efficient matter supporting a higher quality workforce while meeting geographic demands.

The TSS Program office will procure hardware for 10 locations that includes transitioning the large rear/front projection screens to new LED technology to decrease footprint size, enabling system mobility and decrease resource staffing and maintenance costs.

Detailed Justification for: 3B01 Aeronautical Center Infrastructure Modernization

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aeronautical Center Infrastructure Modernization
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Aeronautical Center Infrastructure Modernization	$12,500	$9,000	$13,180	+$4,180

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Building #24 Phased Renovation Construction	1	$7,814.0
b. Replace Major Building Systems (Lighting, Heating, Ventilation, Air Conditioning /Direct Digital Controls (HVAC/DDC), Roofs	---	1,100.0
c. Telecommunications Replacement	---	1,700.0
d. NAS Integration and Technical Support Services	---	2,566.0
Total	Various	$13,180.0

For FY 2015, $13,180,000 is requested for the following:

- $7,814,000 is requested for phased renovation of MultiPurpose Building (Bldg 24); a 211,203 square foot building constructed in 1972 that has not had major renovation in 41 years. Renovation will provide for the addition of fire detection/suppression systems and the removal of asbestos. Requirements include the addition of seismic and wind bracing to the building structure, replacement of electrical distribution and lighting systems, replacement of mechanical systems (HVAC), boilers/chillers, telecom upgrade, installation of windows, replacement of interior doors, walls, ceilings, and floors.

- $1,100,000 to replace major building systems within leased and owned buildings that includes HVAC/DDC, electrical, plumbing, replacement of finishes due to installations, asbestos abatement/removal, utilities infrastructure (water, gas, sewer, high voltage, storm water), roofing, stairs, fire protection, elevators, roadways, parking lots, sidewalks, and paved surfaces to address a backlog of deferred requirements.

- $1,700,000 to replace telecommunications at the Aeronautical Center. Over a six year phased cycle, funding will replace the telecommunications network switches, routers, internet filtering hardware for redundancy, reliability, security and availability in a total of **61** buildings. The replacements in 45 of the buildings will be complete by FY 2015. Included among the tasks are security assessments, upgrades, disaster recovery testing, West campus fiber for redundancy on network routers and upgrades at the Mike Monroney Aeronautical Center (MMAC) network.

- $2,566,000 to provide NAS Integration Support Services and Technical Support Services Construction inspectors for construction renovation.

What Is This Program?

The Aeronautical Center Infrastructure Modernization program funds renovation and restoration of leased and owned facilities at the Aeronautical Center in Oklahoma City to ensure they remain viable for the mission of present and future FAA employees, students, and contractors. Funding from this program allows renovation of facility space used by Air Operations, Engineering Training (Radar/Navigational Aids (Navaids)), NAS Logistics, Airmen/Aircraft registration, Safety, and Business Services. Program funding will be used for facility renovation, building system and telecommunications infrastructure replacement.

The Aeronautical Center is the FAA's centralized location that supports the FAA National Airspace System (NAS) and comprises 1,100 acres of leased land with approximately three million square feet of space under roof, supporting the work of 7,300 FAA employees, students, and contractors on a daily basis; and approximately 11,000 visitors annually; the largest concentration of FAA personnel outside of Washington D.C. Many buildings are approximately 50 years old and in need of renovation and building system replacement.

Anticipated accomplishments to be completed by the end of FY 2015:

- Award renovation construction contracts for the Environmental Systems Support Building (Bldg 152) to replace mechanical systems, upgrade electrical wiring, plumbing, and provide energy efficiencies in lighting and insulation
- Complete Phase 2 (of 4) renovation construction of the Systems Training Building (Bldg 23) to add seismic and wind bracing to the building, replace mechanical systems, (HVAC, boilers, chillers), replace electrical systems, plumbing, and provide energy efficiency in lighting and insulation
- Complete installation of building system replacements from contracts awarded in prior year
- Complete telecommunications network design, test, reconfiguration, security assessments, firewall upgrades, disaster recovery testing and duct banks/fiber installation for approximately one quarter of the campus

DOT Strategic Goal - Organization Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

This program extends the service life of Aeronautical Center buildings through renovation and major building system replacement where FAA missions are performed: Eighty percent of the space at the Center directly supports the Air Traffic Organization (ATO). Thirteen percent of Center space supports DOT and FAA Business Services and includes DELPHI/Prism, Castle Data Center Operations, Accounting Operations, Acquisition, the ATO Data Center, and Aviation Safety/Research.

Some NAS support functions are conducted in outdated structures and in buildings that do not meet current building codes. Delays to renovation and replacement of building systems have consequences that include leaking roofs, deteriorating plumbing, malfunctioning heating, ventilation, air conditioning, and non-compliance with life safety codes that can disrupt work, cause NAS automation and technology failures, risk occupant health and safety, require emergency repairs, and loss of productivity.

The aging infrastructure, in combination with growth and improvements to the NAS and business services, affects Aeronautical Center personnel and facility requirements in which they work. This program extends the useful life of facilities at the Center for current and future generations.

How Do You Know The Program Works?

Renovating aging facilities at the Aeronautical Center allows space efficiencies for additional functionality, personnel, and systems. Center facilities are cost effective and lower in cost than comparable General Services Administration (GSA) metropolitan Oklahoma City leased facilities, FAA Headquarters, and other FAA facility locations.

Renovation of Center facilities extends the useful life of renovated buildings by 25 - 30 years, ensuring a viable future for FAA at these facilities. Renovation improves facility space and energy utilization, reduces maintenance costs of major systems within renovated buildings, provides for incremental upgrades of telecommunications infrastructure, and improves productivity of personnel using renovated facilities through space efficiencies and improved environmental controls.

This program benefits the NAS and avoided $14.6 million in FAA costs during FY 2012 through the following:

- Lower lease and operating cost (includes utilities (gas, water, electric), janitorial, cleaning, security) costs in FY 2012 than other alternates: $17.51 per net square footage (nsf) at MMAC, when compared with Oklahoma City GSA leased facilities at $25.20 per nsf
- Allowing flexibility and growth to support NextGen airspace requirements
- Supporting NAS operations/maintenance, current and future ATO initiatives
- Decreasing energy and repair operations costs

Enables ATO initiatives by providing infrastructure that supports new NAS facilities funded from other sources that include Operational Support Service (AOS) Precision Runway Monitor (PRM), Power Services Center and Lab (PSC/PSL), and others.

Why Do We Want/Need To Fund The Program At The Requested Level?

There is a significant backlog of facility improvements that need to be addressed to prevent further deterioration of buildings. The backlog can be addressed with systematic funding to improve facility conditions and assure the aging infrastructure remains viable in future years.

Delays to renovation/replacement of building systems have consequences that include leaking roofs, deteriorated plumbing, malfunctioning HVAC, and non-compliance with life safety codes that can disrupt work, cause NAS automation and technology failures, risk occupant health and safety, require emergency repairs and loss of productivity.

Underfunding introduces risk to multi-year renovation projects in progress by the program's inability to fully fund construction inspectors and safety (EOSH/Environmental) inspector contracts.

Underfunding affects the program's ability to fund telecommunication system replacements for routers and switches that are no longer supported by the manufacturer and at end of service life; that fail to meet security requirements for telecommunications at the Center, and introduces risk throughout the FAA. The Aeronautical Center provides facilities for telecommunications for 11 call centers that include Flight Inspection Central Operations (FICO), ATO National Service Center, Logistics NAS parts and repair, Airmen Certification, Aircraft Registration, AVS Medical Certification, and AVS IT Help Desk. The Center supports 35,000 FAA users for internet access including the Central Service Area, SW and NWM regions and Great Lakes, is one of three Super Core sites for FTI, one of three designated primary Internet Access Points for the FAA, the devolution (disaster) site for AFN, and provides telecommunications fail over for the Technical Center Atlantic City, NJ.

Detailed Justification for - 3B02 Distance Learning

What Is The Request And What Will We Get For The Funds?

**FY 2015 – Distance Learning
($000)**

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Distance Learning	$1,500	$1,000	$1,500	+$500

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Services to Support CBI Platform Procurement	---	$600.0
b. Purchase and Install CBI Platforms	---	900.0
Total	Various	$1,500.0

For FY 2015, $1,500,000 is requested to fund contract services and Computer-Based Instruction (CBI) Platform Hardware.

What Is This Program?

Distance learning provides FAA with state-of-the-art quality course delivery to geographically dispersed students with a reduced dependency on travel to centralized facilities.

The Distance Learning program will provide for technology refresh of CBI Delivery Platforms at all CBI Learning Centers, increase connectivity, and upgrade network multimedia support and services. The system consists of about 1,100 Learning Centers located at virtually every FAA facility around the world. The FAA is providing the technology refresh of the CBI Platforms for two reasons: (1) to support high-performance media and simulations required in many lessons; and (2) to replace hard to obtain, obsolete parts for current platforms.

The technology refresh is accomplished in a phased, multi-year approach. The FY 2013 technology refresh will complete the current refresh cycle (FY 2009 - FY 2013). A new technology refresh cycle will begin in FY 2014 and will run through FY 2017.

This program reduces the cost of training to maintain and operate the National Airspace System (NAS) and to perform Air Traffic operations. This program provides the infrastructure to deliver simulations and training to all FAA employees via CBI and FAA Academy Aviation Training Network (ATN). The largest groups of CBI users are Tech-Ops technicians and Air Traffic controllers. This program provides productivity improvements for ATO employees by shortening the time to achieve full performance and certified employees and to maintain performance and certification. The time reduction for training is based on reduced time for training and by delivery of training at the job site thus avoiding travel time to the Academy or factory schools.

Anticipated FY 2015 Accomplishments:

- Award contracts to support the development of software image and to maintain configuration control

- Procure and install 725 Technology Refresh CBI Platforms at field sites (Air Traffic Organization (ATO) and Federal Contract Towers)

DOT Strategic Goal - Organizational Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

All Air Traffic Controllers accomplish refresher/initial training on the CBI Platforms. For example, at the En-Route facilities, the CBI systems provided for approximately 300,000 course completions in FY 2012. Many facilities require a monthly refresher for specific local issues that are accomplished on the CBI systems. Most of the ATO Tech Ops Technical Training Resident courses offered at Mike Monroney Aeronautical Center (MMAC) require CBI courses as prerequisites. Additionally, the CBI, ATN, and web delivery systems are required to deliver initial operator, transition, and maintenance training for many NAS programs.

The FAA requires cost-effective distance learning alternatives to reduce the current resident-based training load, accommodate increases in training due to the introduction of new national airspace systems, continue personnel transition/refresher training, support succession training, and provide performance support. The requested funding is for the scheduled Technology Refresh cycle to replace CBI Platforms at the Air Traffic Terminal field sites and CBI system support.

The Distance Learning program supports the FY 2013 Destination 2025 Plan. Distance Learning supports the "Next Level of Safety" because it will strengthen and improve technology, infrastructure, and training, to reduce the risk of accidents from all causes in all phases of operation.

How Do You Know The Program Works?

This program reduces the cost of training required to maintain and operate the NAS and to perform Air Traffic operations. This program provides the infrastructure to deliver simulations and training to all FAA employees. The CBI program is currently providing well over $10 million per year in savings. The Aviation Training Network (ATN) is providing an additional $8 million in cost avoidance per year. The $8 million ATN figure was derived by averaging the last 12 years of savings in student travel costs.

Why Do We Want/Need To Fund The Program at the Requested Level?

The requested funding is needed to replace CBI Platform equipment for the scheduled life cycle upgrades to replace unsupportable equipment used for the CBI Training field sites. The Distance Learning Resource Center data shows hardware-related calls increase significantly in the last few months of a system's warranty period, which would likely continue past warranty expiration. If the program were to be funded at a lower level, CBI platforms would not be upgraded and system degradation would occur, resulting in a lack of available field training to employees and an increase in travel and per diem cost in order for training to be accomplished.

CBI platforms must be replaced when warranties expire for the following reasons:

- To decrease the risk of extended training platform downtime at field sites (75 percent of field sites are single CBI Platform sites)
- Less overall maintenance support cost vs. maintaining a stock of spare parts

Executive Summary – Facilities and Equipment, Activity 4.

What Is The Request And What Will We Get For The Funds?

The Facilities and Equipment (F&E) Activity 4 program is requesting $225,800,000 for FY 2015, an increase of $7,435,163 (3.4 percent) above the enacted FY 2014 level. Of this funding, $12,650,000 is requested to continue to transform current digital aeronautical information in conformance with international standards and NextGen objectives. This transformation will enable the near real-time processing of such data to improve mapping and flight planning, as well as the accuracy and timeliness of ATC instructions.

Key outputs and outcomes expected to be achieved in the budget year with the requested resources:

- Program Leases – Funds over 2,800 facility and land leases in support of essential NAS requirements.
- Mike Monroney Aeronautical Center Leases – Funds warehouse, administrative office space, and training facilities that support the mission of 7,300 employees, contractors, and students.

Activity 4 funding provides mission support services for the modernization of air traffic control, and safety, regulation, and security, and information security requirements. The funding for Activity 4 programs support:

- Major support contracts that cross programmatic, functional, and organizational lines
- System-engineering, logistics, requirements analysis, and systems management for the overall NAS, and safety, security functions throughout the FAA.

What Is This Program?

This Activity provides mission support services that cross FAA organization and functional lines. Funding for MITRE's Center for Advanced Aviation System Development (CAASD), one of FAA's Federally Funded Research and Development Center (FFRDC), is provided under Activity 4.

We request Activity 4 funding for leasing ATC facilities and related research and laboratory facilities (including those located at the Mike Monroney Center in Oklahoma City, Oklahoma and the William J. Hughes Technical Center in Atlantic City, New Jersey).

Activity 4 efforts contribute to the following DOT Strategic Goals:

- Safety: Reduction in transportation-related injuries and fatalities
- Economic Competitiveness: Maximum economic returns on transportation policies and investments
- Organizational Excellence: Diverse and collaborative DOT workforce

Why Is This Particular Program Necessary?

Activity 4 funds many of the mission support activities that FAA must perform to effectively operate and maintain its Air Traffic Control operation. FAA will use the funding to procure the additional systems engineering skills and lease facilities and equipment required to complete mission. Activity 4 can be viewed as an overhead account for the overall F&E budget.

How Do You Know The Program Works?

This program has been successfully implemented for over 15 years. We have demonstrated that this is an effective way to allocate program costs across functional and organizational lines. Under this approach, FAA has achieved management efficiencies while obtaining the expertise needed to augment in-house resources.

For example, FAA revalidates MITRE/CAASD requirements annually. Funding on various initiatives will change based on FAA priorities and requirements. MITRE has demonstrated a unique ability to quickly reallocate resources to support FAA needs based on its extensive knowledge and understanding of the overall mission and, in particular, the ATC operation.

Why Do We Want/Need To Fund The Program At The Requested Level?

Funds are requested for a variety of purposes under Activity 4 including equipment installation; research, development and demonstration of new technologies; facility leases; systems engineering support; and program management services. In many cases, it is more efficient for FAA to contract for a portion of support services and lease facilities to obtain the personnel and infrastructure needed to meet current requirements than to hire additional permanent staff and procure land and buildings. Activity 4 funding enables the agency to flexibly procure the additional resources needed to meet current demand while not substantially increasing fixed operating costs.

FAA would prioritize any reductions in Activity 4 programs with respect to the ATC operational requirements identified in Activity 1 and 2 programs. Activity 4 level-of-investment programs would be reduced in a manner that would enable FAA to sustain ATC safety and services at levels expected by the public, the military, and our other stakeholders.

Detailed Justification for - 4A01 System Engineering (SE2020) and Development Support

What Is The Request And What Will We Get For The Funds?

FY 2015 – System Engineering (SE2020) and Development Support
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
System Engineering and Development Support	$37,908	$34,315	$34,504	+$189

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. System Engineering (SE2020) Contract	---	$27,654.0
b. System Architecture/Other 8A Support	---	1,700.0
c. Program Evaluation	---	450.0
d. Computer Services	---	1,700.0
e. ATC/ANF Systems Support	---	3,000.0
Total	Various	$34,504.0

For FY 2015, $34,504,000 is requested to provide technical contract support services which will ensure sound systems engineering practices and business case development processes instrumental to the safety, efficiency, and securing the NAS. System Engineering (SE2020) and Development Support continues to provide an innovative, cost-effective, diverse contract workforce which supports FAA's agency-wide goal to enhance the National Airspace System (NAS) and improve the overall efficiency of the air traffic control system.

What Is This Program?

The SE2020 contract provides activities that lead to and complement Next Generation Air Transportation System (NextGen) programs. Vendors research emerging procedures and technologies, and perform systems engineering to determine the best way to develop and deploy the NextGen initiatives. These activities include demonstrating that NextGen procedures and operational changes will work on a large scale within the current and evolving air traffic system.

The FAA will issue tasks to SE2020 vendors covering a variety of research and engineering activities. These tasks will be carefully designed to advance multiple facets of aviation modernization efforts for the NextGen and other FAA missions.

The required engineering support consists of disciplines ranging from systems requirements and system modeling to transition and human resource planning. In addition, automated data processing and information resource support is required to support the development and/or enhancement of computer simulation models, miscellaneous software upgrades, databases, and program management tools. Program management, financial management and investment analysis support are provided to assist with planning, decision-making, and budgetary oversight of the activities involved in implementing newly acquired systems, components, and equipment in existing operational NAS facilities.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The SE2020 contract will procure the necessary technical expertise in order to provide Research, Systems Engineering, and Program management support to enhance the NAS in today's rapidly changing technology environment. The request will support air traffic control specialists, system engineers, acquisition specialists, computer operation/simulation operators, configuration management specialists, engineers, financial analysts, program analysts, human factors specialists, technical editor/writers, web designers, and information specialists. This unique knowledge and expertise will assist FAA in improving aviation safety, security, and efficiency of the air traffic control system while increasing the capacity and reliability.

How Do You Know The Program Works?

The SE2020 contract provides continuity, innovation, and cost-effective workforce necessary to support the agency's goals of improving aviation safety, security, and efficiency while increasing capacity and productivity reducing overall operating costs resulting in a cost savings. The SE2020s' creative and innovative workforce will develop and enhance software tools to help improve the efficiency of the agency's NAS.

Why Do We Want/Need To Fund The Program At The Requested Level?

The SE2020 contract support provides future enhancement of the Air Traffic System by establishing and documenting the FAA's Enterprise Architecture (EA) requirements. The NAS is the blue print for the future air transportation system and for complete, accurate, clear and concise roadmaps and views that must be identified and documented in the architecture. System Engineering 2020 assists in developing, delivering, and implementing guidance to move forward the engineering and prototyping effort for NextGen; establishing a NextGen Service Level Agreement Planning Group to assist in the identification of RE&D requirements necessary for the transition to NextGen; and providing support for the System Wide Information Management (SWIM) Evolution Strategy.

In addition, contract support services have ensured sound systems engineering practices and business case development processes. Also, the contract provides support to FAA's planning and budgetary processes ensuring consistent application of the AMS process.

Detailed Justification for - 4A02 Program Support Leases

What Is The Request And What Will We Get For The Funds?

FY 2015 – Program Support Leases
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Program Support Leases	$40,900	$42,100	$43,200	+$1,100

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Operational Leases	---	$43,200.0

For FY 2015, $43,200,000 is requested to pay the annual rent on leases for real estate (both land and space) to house facilities required to operate the National Airspace System (NAS). This program funds more than 2,800 leases along with other real estate requirements and will include:

- Payment of rents for land and space leases that directly support navigation, communication, weather observation and reporting, air traffic control, and other functions that support the NAS
- Funding for leased access roads and easements providing ingress and egress to and from leased facilities to include perpetual easements
- Costs associated with the rental and management of land and space for service/maintenance centers, deployment/development centers, laboratories, test beds, and other types of facilities that support the deployment and operation of technical facilities
- Funds for conversion of existing leases to fee ownership or perpetual easements
- Payments for condemnation (leasehold or fee) of real property interests
- Costs for real estate appraisals, market surveys, title reports, and other costs associated with the acquisition and management of real property assets
- Funds for costs to relocate offices, facilities, personnel, and equipment
- Fund the downsizing, consolidation, or combination of multiple offices when technically feasible and economically advantageous
- Fund the development of business tools to enhance real estate acquisition and management activities and for implementing program efficiency practices
- Funding for costs associated with real property lease terminations and equipment disposals
- Funding for testing and studies (environmental, suitability, sustainability, cost-effectiveness, etc.) in connection with the leasing, purchasing, usage, management, and disposal of real property
- Funding for real property costs associated with the transition to Next Generation (NextGen) facilities

What Is This Program?

The Program Support Lease budget provides funds to meet contractual obligations including rental payments or other necessary requirements to provide real property rights for land, tower space, aerial easements and technical operational space for more than 2,800 leases.

DOT Strategic Goal – Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

To operate the NAS, FAA utilizes more than 2,800 rentable real estate leases. Without these property rights, FAA could not operate the NAS since the majority of its facilities reside either on leased land or in leased building space. Leases for building space include those for planned, constructed, and newly finished Air Traffic Control Towers. The FAA must also obtain restrictive aerial easements or clear zones to prevent interference with electronic signals at certain facilities, such as very high frequency omni-directional ranges, airport surveillance radars, and air route surveillance radars.

The real property leases are legally binding contracts that usually require rents to be paid each year. The total rent amount for the leases portfolio increases each year due to the addition of leases for new facilities and the adjustment of expired lease costs due to the adjustment in market values through renegotiation.

How Do You Know The Program Works?

Sufficient funding is available to make rent payments for all the real estate leases for NAS operational facilities. The significant savings have been achieved through the implementation of the co-location, consolidation, and oversight measures which are an integral part of this program.

Why Do We Want / Need To Fund The Program At The Requested Level?

$43,200,000 is required to fund rent payments for the projected total real estate lease portfolio, pending judgments for fee condemnation court awards, and costs associated with real property lease terminations and equipment disposals. This program also pays costs for the reconfiguration of a space facility if a reduction in space reduces the footprint for better space utilization and cost savings. Many of the leases being renewed after 20 years are in areas targeted for development with escalating lease costs since the original lease was executed. Some of these increases for lease and purchase costs are the results of wind turbine development, sophisticated bankers and financial lessors, and commercial development in the area. Maintaining the status quo for lease costs is difficult. In some cases rental payments must continue even after decommissioning of the facility because the requirements for environmental reporting and site restoration have not been completed in accordance with the terms of the lease. Costs associated with real estate acquisition and disposal such as surveys, appraisals, appraisal reviews, environmental reports, and title work costs continue to rise. Large investors are moving into many areas and buying properties occupied by the FAA and as a result and are demanding higher rents.

According to the Acquisition Management System (AMS), purchase is the last option if a negotiation impasse exists. If this option is removed due to lack of funding, the Government will incur greater risk and expense through inverse condemnation or be forced to negotiate rates far above market values including possible legal actions. Funds required for this Program are budgeted to include rental costs, associated lease costs (appraisals and surveys), environmental costs, restoration costs, and purchases. These are all essential to continue with our contractual obligations.

Detailed Justification for - 4A03 Logistics Support Services (LSS)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Logistics Support Services (LSS)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Logistics Support Services (LSS)	$11,500	$11,500	$11,500	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Real Estate Acquisition, and Materiel Management Support Contract	Various	$11,500.0

For FY 2015, $11,500,000 is requested to fund contractor-supplied logistics and acquisition services.

What Is This Program?

Through the LSS program, the agency utilizes contractor-supplied services to perform real property acquisition, materiel management, contracting activities in support of FAA Capital Investment Plan (CIP) projects, and conduct capitalization and property control-related activities. These services currently provide a significant portion of the workforce for acquisition, real estate, and materiel management at regions and centers. The LSS program provides critical support personnel involved in the acquisition of new or upgraded facilities, including air traffic control towers and Terminal Radar Approach Control Facilities (TRACONs), throughout the National Airspace System (NAS). The LSS resources will continue to be used for asset tracking and documentation efforts to obtain and maintain a clean audit opinion.

The LSS program directly supports improved financial management while delivering quality customer service. Specifically, the program provides key support functions which enable the FAA to manage real property assets, maintain a clean audit opinion, and plan the execution of acquisition activities supporting the NAS. These functions are performed throughout the three Service Areas (Eastern, Central, Western), FAA Technical Center, and FAA Aeronautical Center.

Related project management goals include:

- Complete 80 percent of the annual real property inventory validation effort
- Designate 75 percent of the disposed real property assets as "retired" within 30 days of the date the disposal forms are received from Air Traffic Organization (ATO)
- Capitalize 92 percent of all personal and real property capital assets within 65 days of date placed in service
- Complete 90 percent of all purchase orders within 45 days and award 90 percent of all contracts (over $100,000) in less than 180 calendar days from the time a purchase request is received from the requiring organization

DOT Strategic Goal - Organizational Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

The FAA has a serious shortage of government logistics and acquisition personnel at regions and centers to manage real estate, acquisitions, and materiel for NAS modernization and capitalize agency assets as required by the agency's strategic plan. Without adequate logistics and acquisition services, real estate will not be acquired, contracts to buy or upgrade equipment and construct facilities will not be awarded, and modernized equipment and systems will not be efficiently installed and commissioned. Additionally, FAA will not be able to adequately document the capital cost of FAA facilities, or comply with accounting standards set by the Government Accountability Office (GAO) that could put the achievement of a clean audit opinion at risk.

How Do You Know The Program Works?

An example of the effectiveness of the LSS contract is the success of the clean audit opinions achieved by FAA from 2010 through 2012. During this time period, LSS resources were utilized across the three Service Areas (including the nine Regional Offices located within the Service Areas), the FAA Aeronautical Center, the FAA Technical Center, and FAA Headquarters to provide the technical support to process capitalized assets, which successfully supported the achievement of a positive outcome of the financial audit. It was as a direct result of the LSS staffing support, that these FAA assets were processed in a timely and accurate manner. Without such support, FAA might have missed the specified processing metric of 80 percent of the assets within 65 days potentially impacting the overall audit opinion rendered by the DOT Inspector General (IG).

Why Do We Want / Need To Fund The Program at the Requested Level?

Any funding reduction would directly impact recently achieved processing efficiencies within acquisition, real estate, and materiel management, significantly reducing or even eliminating the improvement gains made over the last several years.

Detailed Justification for - 4A04 Mike Monroney Aeronautical Center Leases

What Is The Request And What Will We Get For The Funds?

FY 2015 – Mike Monroney Aeronautical Center Leases
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Mike Monroney Aeronautical Center Leases	$17,500	$17,900	$18,350	+$450

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Aeronautical Center Lease Payment	1	$18,350.0

For FY 2015, $18,350,000 is requested to continue the Aeronautical Center Leases.

What Is This Program?

The Aeronautical Center is the FAA's centralized location that supports FAA National Airspace Systems (NAS) Air Operations/flight checks, engineering, system testing, training (Radar/Navigational Aids (Navaids)), NAS logistics, aviation regulation, registration, certification, aviation and transportation safety research, and Business Services in Oklahoma City.

The Center provides facilities that support the work of 7,300 employees, students, and contractors on a daily basis and is the largest concentration of FAA personnel outside of Washington D.C. In addition, approximately 11,000 visitors come to the Aeronautical Center annually.

The Aeronautical Center leases provide leased land/building rent and insurance that comprise approximately 80 percent of Aeronautical Center space: 2.8 million square feet of leased space and 1,100 acres of land, having a replacement value of $710 million.

The lease is comprised of:

- Master Lease land/building rent, sustainment and insurance
- Thomas Road warehouse lease
- Tower space for Terminal Doppler Weather Radar (TDWR) target generators
- Grounds Maintenance Building

The Aeronautical Center requires large parcels of land as NAS test sites for surveillance radar, communications, weather, and navigation/landing systems, as well as warehouse, administrative office space, and training facilities. It is a Level IV security site based on numbers of employees, facility square footage, sensitivity of records, volume of public contact, and mission essential facilities whose loss, damage, or destruction may have serious or catastrophic impact on the NAS.

Anticipated FY 2015 Accomplishments

- Annual rent for Mike Monroney Aeronautical Center real property leases

- No FAA personnel work stoppage due to unsafe/unusable facilities. Average age of leased buildings: 47 years

Funding for this program assures continuity of the Aeronautical Center facility and that it remains viable for current and future generations of FAA employees.

DOT Strategic Goal - Organization Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

Leased Aeronautical Center facilities support FAA missions that include:

- Aviation training for 90,000 FAA and international students per year in resident and distance learning, including approximately 1,000,000 hours of distance learning delivered annually
- Logistics services and supply support to the operational NAS to all FAA Airway Facility locations, Air Traffic, and approximately 70 Department of Defense (DoD) and international organizations
- Engineering services for NAS systems modification and repair
- Aviation research: medical and human factors for aviation personnel
- Standards and flight inspection services
- Regulation certification of safety related positions and equipment, airmen and aircraft records and registration
- Business services that include DOT/DELPHI/Prism/Castle Data Center Operations, Accounting Operations, Acquisition Services, Air Traffic Organization (ATO) Data Center, Aviation Safety/Research

How Do You Know The Program Works?

This program, combined with the Aeronautical Center Infrastructure Modernization, benefits the NAS and avoided $14,600,000 in FAA costs during FY 2012 through the following:

- Lower lease and operating cost (includes utilities (gas, water, electric), janitorial, cleaning, security) costs in FY 2012 than other alternates: $17.51 per net square footage (nsf) at MMAC, as compared with Oklahoma City (OKC) General Services Administration (GSA) leased space in Oklahoma City at $25.20 nsf, a cost avoidance of $14,600,000 in FY 2012
- Allowing flexibility and growth to support NextGen airspace requirements
- Supporting NAS operations/maintenance, current and future ATO initiatives
- Decreasing energy and repair operations costs
- Enables ATO initiatives by providing infrastructure that supports new NAS facilities funded from other sources that include Operational Support Service (AOS) Precision Runway Monitor (PRM), Power Services Center and Lab (PSC/PSL), and others

No work stoppages have been identified due to unsafe/unusable facilities even though the average age of leased facilities at the Center is 47 years.

Why Do We Want/Need To Fund The Program At The Requested Level?

Funding at the required level is necessary to pay rent under the long-term lease agreement.

Detailed Justification for - 4A05 Transition Engineering Support

What Is The Request And What Will We Get For The Funds?

FY 2015 – Transition Engineering Support
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Transition Engineering Support	$15,000	$16,500	$16,596	+$96

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
A. NAS Integration Support Contract (NISC)		
a. NISC Program Support	---	$2,500.0
b. NISC Contract Management	---	12,096.0
Total	Various	$14,596.0
B. Configuration Automation Management (CMA)	--	$2,000.0

For FY 2015, $16,596,000 is requested for the following:

A. (NAS) Integration Support Contract (NISC): $14,596,000 is requested for to support the modernization schedules for NAS programs. This budget level is necessary to provide continual NISC contract management and infrastructure support for the prime contractor for the NISC III contract valued at $1.4 billion. In addition, these funds will be utilized for program acquisition management, financial management, administrative support services, continued operation and IT support services for the NISC contract tracking system and reporting system, other indirect contractor costs and other program management support.

B. Configuration Management Automation (CMA): $2,000,000 is requested for CMA, to begin replacement of the outdated configuration management legacy systems (WebCM and Replacement Documentation and Configuration Identification System (RepCON)). These systems are currently used to provide NAS Change Proposal (NCP) process and provide users with visibility into the case file/NCP/CCD process, and delivers status accounting information relative to change activity for all configuration items in order to add, modify and decommission equipment into the NAS.

CMA is a vital component of the FAA's lifecycle management effort to proficiently manage the complexity of today's physical and virtualized IT environments. Properly managed CM is also essential to the ongoing effective success of the Agency's transition to the Next Generation Air Transportation System (NextGen). A contract award is anticipated in FY 2015. The successful implementation of the CMA solution will deliver to the Agency a closed-loop lifecycle management environment, with full lifecycle traceability, reportable business transactions based upon complete and accurate data, timely decision-making, and continuous process improvement opportunities.

What Is This Program?

NISC provides engineering and technical resources to FAA organizations responsible for NAS Transition and Implementation. The NISC team, working in partnership with these organizations, ensures that capital investments and regional projects are implemented in the most effective manner to support the NAS mission. The Transition Engineering Services program maps to organizational excellence by providing a highly skilled and experienced workforce at cost effective rates.

DOT Strategic Goal – Organizational Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

This program provides technical support to assist FAA's technical workforce in handling the surge in demand for short-term programs/projects that are vital to managing the volume of diverse systems and equipment associated with NAS modernization. As a result, FAA will experience significant NAS modernization scheduling delays if additional support services are not available to complete these projects.

How Do You Know The Program Works?

NISC will provide FAA organizations with support in the areas of program transition, implementation, and integration activities. It affords the FAA flexibility in obtaining the technical expertise required to meet demand surges with minimal lead time and without the need for long term commitments. All work is based on documented FAA requirements. Under this contract, NISC cannot provide inherently governmental functions. -

Since the award of NISC-I in 1991 and its successor contracts, this program has supplied from 500 to more than 1,000 supplemental personnel annually to various programs throughout the FAA in support of NAS modernization, transition planning, implementation, and integration. This level of support has varied significantly in amount of support as well as in skill type as FAA priorities and direction has changed. Additionally, the contractor supplying these services consistently received technical performance award fees in the 90 percent and above range. This support integrates equipment and systems into the NAS and ensures that the equipment functions properly once delivered. It improves facility reliability and availability to the NAS, which results in safe, efficient, and cost effective air traffic services.

Why Do We Want/Need To Fund The Program At The Requested Level?

$16,596,000 is required for Transition Engineering Services to support the modernization schedules for NAS programs by providing a cost effective contractual vehicle for meeting Capital Investment Plan (CIP) projects and FAA organizational technical requirements.

Detailed Justification for - 4A06 Technical Support Services Contract (TSSC)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Technical Support Services Contract (TSSC)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Technical Support Services Contract (TSSC)	$25,924	$23,000	$23,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Contractor Program Management		$11,600.0
b. Planning, Quality Control, Security, Safety	---	3,900.0
c. Award Fee	---	5,000.0
d. Program Management Support Contract	---	1,000.0
e. Defense Contract Audit Agency	---	500.0
f. Management Systems Support	---	1,000.0
Total	Various	$23,000.0

For FY 2015, $23,000,000 is to continue the Technical Support Services Contract infrastructure so other programs can use their funds to buy its services to accomplish more than $100 million of project work each year.

What Is This Program?

- The Technical Support Services Contract (TSSC) Program is the Agency's primary vehicle to provide a work force multiplier to install equipment and to support the myriad of Capital Budget improvements to the National Airspace System (NAS) in a timely, cost-effective manner. These activities include work planning, quality control, subcontracting, the contractor safety program, and award fee paid under the contract as well as the usual rent, telecomm and utility costs incurred under the contract
- Significant work is required to install, modify, and relocate equipment by personnel with electronic, mechanical, and civil engineering skills. Often, the engineering and technician support is of short duration and requires skills that FAA government employee work force does not have or exists in insufficient numbers for a specific type of installation need
- The TSSC program allows FAA to avoid hiring additional employees for a limited duration to handle surge demand such as when new equipment is installed at multiple locations and during compressed schedule periods

TSSC infrastructure activities include program and site specific work planning, quality control and assurance, legal compliance with subcontracting law, contractor safety programs, as well as invariable costs like office space rent, supporting telecommunication and utility costs. The TSSC program is used to fund DCAA audits of contractor accounting systems, labor invoices, and other processes to ensure technical and legal compliance.

TSSC infrastructure funding pays for:

- Project implementation safety, security and quality control which helps avoid worker's compensation claims and increased insurance costs that would be passed on to the FAA, and avoids costs to the FAA for rework that would be required to correct defects that occur when quality control efforts fail due to a lack of adequate funding
- The contractor's subcontractor administration capability which accomplishes award of construction subcontracts for public works projects of approximately $35 million of annual public works effort that is accomplished through TSSC sub-contracts

DOT Strategic Goal – Organizational Excellence

- Diverse and collaborative DOT workforce.

Why Is This Particular Program Necessary?

This program provides technical support to assist FAA's technical workforce in handling the surge in demand for short-term programs/projects that are needed to managing the volume of diverse systems and equipment associated with NAS modernization. As a result, FAA will experience significant NAS modernization scheduling delays if additional support services are not available to complete these projects.

- In a typical year, the vehicle is used to purchase more than $65 million in labor and accomplish more than $35 million in non-labor cost activities such as site preparation and other public works construction
- TSSC directly supports modernization of the NAS that ensures operational availability by replacing old equipment and sustaining the infrastructure
- TSSC supports activities such as the installation of electronic equipment to support the NAS infrastructure modernization to infrastructure work, for fiber optic installation and construction management, as part of the continuous investment of the FAA

How Do You Know The Program Works?

The TSSC program has an award fee, performance based acquisition contract vehicle to promote efficiency and FAA customer satisfaction. The TSSC customer award fee evaluation survey participation return rate is typically greater than 90 percent. Direct FAA customer award fee feedback rated contractor performance greater than 90 percent (out of 100 percent) in the excellent and good range across several hundred individual contractor performance evaluations in the past years of TSSC performance.

In a typical year, the TSSC vehicle is used to purchase more than $65 million in labor and accomplish more than $35 million in non-labor cost activities such as site preparation and other public works construction.

Why Do We Want / Need To Fund The Program At The Requested Level?

$23,000,000 is required to fund continuing contract operations. These operations, referred to as infrastructure costs, sustain FAA's basic national capability to supplement and leverage federal skills during site specific NAS implementation efforts. TSSC is the Agency's primary installation support service vehicle, and it is used by a myriad of Capital Budget improvement program customers to achieve timely and cost effective NAS modernization. Through TSSC, implementation of capacity and safety enhancements are achieved via approved and funded NAS capital projects that would otherwise be delayed.

A reduction would impact the program by:

- Disrupting funding for Program Management Support Contracts. Those contracts are used to assist the Program Office in its cost, schedule, and scope oversight on the national Technical Support Services Contract (TSSC)
- Significantly impacting the number of projects that are completed, the timeliness of completion, increase cost, and would degrade safety and quality assurance capabilities. The $100 million dollars of NAS implementation efforts TSSC staff support every year would be jeopardized by delay and associated cost increases
- Significantly impacting the contractor's subcontractor administration capability which would cause unacceptable delays in award of construction subcontracts for public works projects issued under the contract
- Delaying subcontracts will cause schedule delays for NAS project implementation which will adversely impact approximately $35 million of effort that is accomplished through TSSC subcontracts. Every delayed project equates to delays in capacity or safety enhancements and planned cost benefits

Detailed Justification for - 4A07 Resource Tracking Program (RTP)

What Is The Request And What Will We Get For The Funds?

FY 2015 – Resource Tracking Program (RTP)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Resource Tracking Program (RTP)	$6,000	$4,000	$4,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Program/Project Management	---	$4,000.0

For FY 2015, $4,000,000 is requested to continue to keep hardware and software licenses current, program/project management support in the National Airspace System (NAS), maintain Technical Support Services Contract (TSSC) and NAS Implementation Support Contract (NISC), upgrade training documentation, and continue to provide training to users and data administrators.

What Is This Program?

The RTP is a computer management system (including hardware, software, development, training, and support) used by the FAA Service Centers, the William J. Hughes Technical Center, and the Mike Monroney Aeronautical Center for identifying requirements, internal budget preparation, implementation planning, resource estimating, project tracking, and measuring performance of projects. The Corporate Work Plan (CWP) process is the Air Traffic Organization's (ATO) method to implement approved projects and to standardize National Processes in support of the NAS. The CWP system, which falls under the RTP program, enables users to share FAA's project data during the various stages of implementation (i.e., planning, scheduling, budgeting, execution, and closeout). The CWP toolset and its supporting data are continuously used for reporting project metrics to project managers, responsible engineers, program offices, and various other customers.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

The hardware and software for the CWP TOOLSET which is the key tool that makes up the Corporate Work Plan must be constantly maintained and upgraded, to support FAA and the processes that will be impacted as it continues to evolve into the ATO. The CWP TOOLSET is used to track all ATO Capital projects from cradle to grave. This system is also used to develop the CWP and work releases for the TSSC.

This system interfaces with DELPHI and Fund Control Module (FCM) and various other systems. The CWP TOOLSET is a centralized system with load-balanced servers residing in Oklahoma City, OK.

How Do You Know The Program Works?

The CWP TOOLSET continues to meet the FAA performance goal of Improving Efficiency of Mission Support.

Four of the primary achievements are:

- Providing reliable data with an automated tracking and reporting system for capital projects that will enable decision-makers to enhance the use of agency resources
- Keeping major acquisition programs on schedule and within costs by maximizing limited resources linked to budget information and processes. These achievements are reached by providing enhanced program and project management capabilities with cost accounting of capital expenses to FAA Managers and engineers have up-to-date reliable data on capital projects through CWP TOOLSET
- Improving productivity by more than 20 percent when a standardized project management process is supported and emulates current operating procedures
- Providing earned value management capability

Why Do We Want/Need To Fund The Program At The Requested Level?

$4,000,000 is required to keep current the CWP TOOLSET software and hardware. NAS Implementation Support Contract (NISC) and the Technical Support Services Contract (TSSC) will be maintained for contractor support, software development efforts, and technical support. Also, hardware and software licenses will be maintained to keep the cost of upgrades to a minimum. This maintenance will cover the Headquarters, Atlantic City and Oklahoma City sites. Documentation that is used to provide training to users and administrators of the system will also be maintained.

A reduction could result in licenses expiring which could result in increased costs for future upgrades. Also it could result in reduction of contractor support which would cause delayed in future enhancement of the CWP Toolset and support of the hardware maintenance.

The CWP system provides end-to-end management of programs and projects.

Detailed Justification for - **4A08 Center for Advanced Aviation System Development (CAASD)**

What Is The Request And What Will We Get For The Funds?

FY 2015 – Center for Advanced Aviation System Development (CAASD)
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Center for Advanced Aviation System Development (CAASD)	$71,000	$60,000	$60,000	$0

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Center for Advanced Aviation System Development (CAASD)	---	$60,000.0

For FY 2015, $60,000,000 is requested to fund technical, engineering, as well as research and development support for the CAASD program. The FY 2015 funding will support approximately 188 MITRE Technical Staff years (MTS) of research and systems engineering as well as technical and operational analyses. This staffing level is well below the Congressional ceiling of 600 MTS.

What Is This Program?

The CAASD is an FAA-sponsored Federally Funded Research and Development Center (FFRDC) operated under a Sponsoring Agreement with the MITRE Corporation. In June 2010 a new FFRDC contract was awarded to MITRE Corporation for program efforts starting in FY 2010 with a base period through FY 2015. The contract includes an option for five years of continuing coverage through FY 2020. CAASD high quality research, systems engineering, and analytical capabilities help FAA meet the technically complex challenges in the NAS. CAASD provides independent advanced research and development required by the FAA to obtain technical analyses, prototypes and operational concepts needed to fulfill goals and outcomes of FAAs NextGen Implementation Plan (NGIP), National Aviation Research Plan (NARP), and NAS Enterprise Architecture.

The CAASD Product Based Work Plan (PBWP) defines an outcome-based program of technically complex research, development, and system engineering activities. The Work Plan is categorized in the following areas:

NAS Concept of Operations, Architecture and Integration: Develop the NAS Concept of Operations, Architecture and NextGen System Integration; Improve understanding of the future environment, including anticipated demand at airports and for airspace; Anticipate the impact of planned improvements on future capacity; Develop and integrate the NextGen Enterprise Architecture (EA), operational concepts, capability action plans, and roadmaps to ensure an integrated evolution that aligns with the agencies enterprise architectures; and Analyze NAS-wide strategic issues (operational and technical) and the impact on the evolving NextGen architecture.

Air Traffic Management (ATM) Operational Evolution: Provide analysis of the NAS mission needs, system requirements and proposed system design to identify critical enhancement needs and to ensure that system enhancements will meet operational needs in a cost-effective manner. Provide an understanding of the benefits associated with capability enhancements. Provide assessments of concept maturity, operational feasibility and implementation risks, including identification of cross-domain dependencies. Advance the maturity of emerging ATM improvement concepts, and conducting Human-in-the-Loop (HITL) evaluations. Develop and evaluate new metrics to measure overall NAS operational performance. Develop and validate cross domain operational evolution plans.

Airspace and Performance-Based Navigation: Leverage the precision, reliability, predictably, and efficiencies of improved navigation and procedures through Area Navigation (RNAV). Research new concepts for achieving a performance-based NAS, including the closely spaced Paired Approach concept. Model and simulate operational improvements to address mid-term and far-term Performance-Based Navigation (PBN) requirements. Perform system-wide optimization analyses of airspace and procedures for NextGen. Design and execute technical analyses on airspace security incidents on the NAS. Perform airspace security concept development for mitigating airspace security incidents.

Safety and Training: Develop safety assurance processes as an integral part of normal operations. Perform technical analyses of NAS-wide accident and runway incursion risks to identify airports or specific types of operations with the highest risk. Develop metrics and processes that allow FAA to proactively identify potential safety issues. Identify and assess the feasibility of new or advanced capabilities and standards that mitigate safety issues in the NAS. Enhance the quality and efficiency of Terminal Radar Approach Control (TRACON) and En Route controller training.

Communications, Navigation, Surveillance, and Cyber-Security Infrastructure: Establish the Communications, Navigation, and Surveillance (CNS) foundation for FAAs mid-term and far-term evolution strategies. Develop and evaluate advanced NAS CNS system concepts and requirements, and assess alternative technological approaches to meeting requirements. Perform research, modeling, simulation, and demonstration of prototypes of technical and operational enhancements to the NAS CNS and cyber security systems. Conduct spectrum analysis focusing on strategic issues related to the availability of adequate spectrum resources. Participate in the development of international standards and harmonization. Develop transition strategies for the FAAs NextGen Voice Communications System (NVS).

Unmanned Aircraft Systems: Provide technical analyses supporting strategic solutions for coordinated UAS integration into the NAS and NextGen. Partner with other Government Agencies' FFRDCs in actively researching improved access for public UASs and facilitating cross-agency joint solutions. Implement standards for safe operation of UASs without compromising the safety or efficiency of the NAS.

Special Studies, Laboratory and Data Enhancements: Provide an integrated research environment that ensures individual research activities, prototypes, and capabilities can be brought together with the appropriate mixture of fidelity and flexibility to facilitate integrated investigations, compressed spiraling of operational concepts and procedure development. Develop and sustain the Aviation Integrated Demonstration & Experimentation for Aeronautics (IDEA) laboratory infrastructure. Provide a data repository system that allows efficient access to aviation data and associated tools.

Mission-Oriented Investigation and Experimentation (MOIE): Develop tools and techniques for studying NAS capacity, throughput, performance, system dynamics and adaptation to technology and policy-driven change. Identify opportunities for innovative solutions to NAS problems and enhancements to NAS capabilities and procedures. Explore new regimens including complexity theory, agent-based modeling, and productivity modeling.

DOT Strategic Goal - Economic Competitiveness

- Maximum economic returns on transportation policies and investments.

Why Is This Particular Program Necessary?

FAA relies heavily on CAASDs integrated knowledge of the National Airspace System (NAS) and long-term experience with ongoing efforts to plan and implement NextGen. The challenges the FAA faces in meeting established goals and charting an achievable course for the development and implementation of NextGen and the achieving of Destination 2025 goals are extensive and technically complex. Without CAASD, the FAA cannot address NAS and NextGen complexity challenges effectively. CAASD provides a unique system-wide integrated understanding, tools, labs, and other capabilities that are fundamental to FAAs ability to address these challenges. The required development of system architecture and comprehensive research, development, and system engineering services can only be provided by an FFRDC whose charter permits special access to sensitive Agency and Aviation Industry information and data, not normally available to support contractors. Numerous elements of the CAASD work program are highly specialized research and systems engineering activities that require extensive knowledge of the present and planned NAS systems. These capabilities are fundamental to the FAA's ability to meet its NextGen Implementation Plan goals and objectives.

Today CAASD Outcomes produce critical products that directly impact the successful maturing of the NAS under the NextGen program as it matures in Mid-term and on to Far-term under the NextGen Implementation Plan. CAASD research products directly contribute to the FAA's National Aviation Research Plan (NARP) Principles and their Goals. A detailed mapping of individual CAASD Outcomes to each NARP Principle and its Goals; and the FAA R&D program supported is provided in the CAASD Long Range Plan, Appendix TWO. The Qualitative Benefits of CAASD work are detailed in the CAASD Long Range Plan's (LRP), Section VI, for each Outcome in the Outcome Profile's annual "Accomplishments" and "Key Activities and Benefits" sections. A web-based copy of the CAASD LRP is available at:

https://ksn2.faa.gov/ajp/home/ANGA/ANGA121/Local Documents/2013 - 2018 LRP.pdf

How Do You Know The Program Works?

The two key components of the FAA CAASD management program are the FAA FFRDC Executive Board (FEB) and the Outcome Management Team (OMT). The FEB meets three times per year to: formulate and review goals and objectives of CAASD Outputs; approve the annual Work Plan; and review CAASD work performance. The OMT is comprised of senior managers responsible for ensuring the optimal allocation of resources under the CAASD Work Plan, maximizing benefits from CAASD products and ensuring that work performed by CAASD is consistent with the mission and criteria approved for the FFRDC.

Development and execution of the CAASD program's annual Work Plan includes up-front consideration for FAA cross-cutting "Special Emphasis Areas" (SEAs) by two senior management teams supporting the FEB. SEA Leads and "G4" FAA line-of-business (LoB) heads. The two teams play active direct roles in each year's Work Plan build as CAASD planners and new requirements screeners to ensure new/emerging work is identified, defined and annually proposed to the FEB for consideration under the Work Plan. This over-reaching direct senior management involvement illustrates the importance the FAA places on CAASD research efforts and its agency-wide focus on integrating CAASD work planning with FAA corporate planning activities.

Why Do We Want/Need To Fund The Program At The Requested Level?

The FAA, as sponsor of the CAASD FFRDC, entered into a new five year Sponsoring Agreement in December 2010 and a new contract with the MITRE Corp. in January 2011 to run the CAASD for the FAA through 2020. The new Sponsoring Agreement states that: "The FAA needs to provide sufficient physical and financial resources for CAASD to maintain and develop its personnel's technical skills and laboratory infrastructure, as well as sufficient financial resources to maintain a reasonably stable and effective staffing level." The establishment of a stable source of funding, along with a long-term contractual relationship, is in the best interest of the public and the FAA, because it permits economies that can only be supported with an established work force and provides continuity of services for an efficient and effective use of an experienced professional staff. Funding must be at a rate sufficient to accommodate inflation and necessary salary and COLA increases to retain this highly talented and professional workforce.

A reduction in CAASD's support will directly affect the FAA's ability to achieve its aggressive NAS performance objectives; and NextGen meeting, on schedule, the Mid-term Segment Alpha and Bravo objectives.

Detailed Justification for - 4A09 Aeronautical Information Management Program

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aeronautical Information Management Program
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Aeronautical Information Management Program	$2,000	$9,050	$12,650	+$3,600

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
a. Prime Mission Product	---	$6,283.7
b. Program Management	---	1,775.2
c. System Engineering	---	1,620.0
d. Test and Evaluation	---	431.0
e. Integrated Logistic Support	---	650.2
f. Implementation	---	1,889.9
Total	Various	$12,650.0

For FY 2015, $12,650,000 is requested to continue design, development and implementation of the Aeronautical Information Management Modernization Segment 2 (AIMM S2) program. AIMM S2 will provide Aeronautical Information Management (AIM) technologies and tools for Aeronautical Information exchange via the Aeronautical Common Services (ACS) infrastructure. ACS will support accuracy and timeliness of special activity airspace (SAA) and airport data and will deliver information across the National Airspace System (NAS) using standard System Wide Information Management (SWIM) compliant protocols. AIMM S2 will continue design and development efforts to support an Initial Operating Capability in the fourth quarter of CY 2015.

What Is This Program?

The AIM Modernization program provides aviation users with digital aeronautical information that conforms to international standards and supports NextGen objectives and meets the needs of AIM's customers, both in the short term, and in the future. Digital aeronautical data enables the timely processing of data to improve mapping, flight planning, and the timeliness and accuracy of air traffic control instructions. The program will re-engineer the business processes for the management and provision of key aeronautical information using digital technology that is consistent with FAA and international architecture standards. AIMM S2 will implement a Cloud Computing eligible software solution and with FY 2015 funding will include working with the selected vendor to design the Cloud solution via system engineering, security and safety activities.

AIMM S2 builds on pre-implementation efforts in the NextGen On Demand NAS portfolio - Common Status and Structure Data (CSSD) program to baseline and implement suitably mature AIM technologies and tools for Aeronautical Information (AI) exchange.

AIMM S2 will:

- Provide ACS as a single trusted source of aeronautical information
- Expand the distribution of Notices to Airman (NOTAMs) included as part of the Federal NOTAM System

- Support the future global air traffic management environment, expanding access to authorized NAS users by leveraging SWIM Common Support Services infrastructure
- Initial Customer: TFMS
- Follow-On Connections: TFDM, ERAM, and CCS-Wx
- Enable AI to be made available to all NAS users utilizing web services based system-to-system interfaces and a single portal
- Provide a fully compliant SOA to facilitate efficient development and implementation of enhancements

AIMM S2 received the Initial Investment Decision approval from the Joint Resources Council (JRC) on November 20, 2013. The Final Investment Decision (FID) is scheduled for approval in the fourth quarter of FY 2014.

DOT Strategic Goal – Safety
- Reduction in transportation related injuries and fatalities.

Why Is This Particular Program Necessary?

AIMM S2 is necessary because it delivers the solution development and implementation phase for services that deliver common status and structure data. These services are necessary to improve the accuracy and timeliness of SAA and airport information management and flow. They are realized through the development of the ACS and the integration of information flows, leveraging SWIM Core Services infrastructure. The ACS is a NextGen common service identified in the NextGen segment implementation plan to support multiple NextGen operational improvements. Most notably is the dependency of the On Demand NAS Information portfolio on the development and implementation of the SAA, NOTAM, and airport data services for consumption by NAS systems. In addition, this program standardizes and centralizes services for aeronautical data within the NAS to ensure improved quality and access of data.

How Do You Know The Program Works?

AIMM S2 utilizes the SWIM Core Services infrastructure. The efforts contained within this submission is for AIMM S2 development and implementation. The AIMM S2 pre-implementation activities is provided through the NextGen On Demand NAS portfolio (1A08) under Common Status and Structure Data (CSSD). An AIM Community of Interest has been created and systems engineering/investment analysis is being performed in the FY 2010, FY 2011 and FY 2012 timeframe to develop relationships and agreements with the stakeholders on requirements for the flow of aeronautical information. These sessions have and will continue to produce operational threads, shortfalls, key concepts of operation and use, performance and functional requirements and a robust business case for AIMM S2. In November 2013, the AIMM S2 acquisition program via the On Demand NAS portfolio (CSSD) received approval of the Initial Investment Decision to continue toward the FID milestone, slated for September 2014.

Why Do We Want/Need To Fund The Program At The Requested Level?

$12,650,000 is required to continue design, development and implementation efforts to support an Initial Operating Capability in the fourth quarter of 2015 and meet NextGen Operational Improvements milestones.

Detailed Justification for - 4A10 Cross Agency NextGen Management

What Is The Request And What Will We Get For The Funds?

FY 2015 – Cross Agency NextGen Managment
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Cross Agency NextGen Management	$0	$0	$2,000	+$2,000

COST ESTIMATE OF WORK TO BE FUNDED THIS YEAR

Activity Tasks	Locations/ Quantity	Estimated Cost ($000)
Cross Agency NextGen Management	---	$2,000.0

FY 2014 Appropriations removed all RE&D funding for the Joint Planning and Development Office (JPDO) and moved the personnel to the Ops account with direction to the FAA's ANG organization to absorb the functions. FAA requests that F&E funding support the Next Generation Air Transportation System (NGATS) Institute, the web-based view of Enterprise Architecture the Integrated Work Plan information, and managemt of cross-agency initiatives. For FY 2015, $2,000,000 is requested for:

- Cross Agency coordination on the future of the aviation transportation system through collaboration on architecture and work plans
- Management of inter-agency special studies and activities to mitigate risk and ensure that critical NextGen interoperability requirements are established for cross-agency harmonization.
- Budgetary documentation of the agencies funding for NextGen activities/interagency collaboration

DOT Strategic Goal - Economic Competitiveness
- Maximum economic returns on transportation policies and investments.

What Is This Program?

The development of NextGen is a priority for the Administration and active participation by the NextGen agencies partners, like Department Of Commerce (DOC), Department Of Homeland Security (DHS), National Aeronautics and Space Administration (NASA), and Department Of Defense (DOD), in this undertaking is necessary to modernize the air transportation system and safely meet the expected growth in air traffic. Activities conducted under Cross Agency NextGen Management project will continue to identify, facilitate, and integrate activities, commitments and contributions of Federal Partner Agencies and other key stakeholders to ensure the NextGen transformation is realized.

Why Is This Particular Program Necessary?

Support and planning for NextGen requires collaboration with industry and partner agencies. This effort will ensure efficient coordination between all Federal partners whose decisions impact NextGen. Without a dedicated interagency focus, the nation can expect increased costs due to continual delays in identifying data sharing requirements or defining Federal surveillance requirements for NextGen. The FAA's ability to leverage research and expertise would also be severely reduced.

How Do You Know The Program Works?

FY 2014 Appropriations removed all RE&D funding for JPDO and moved the functions to the FAA's ANG orgnization. While Ops is paying for the FAA personnel assigned ot those activities performed by JPDO, FAA requests that F&E funding support these idintifed JPDO activities - NGATS Institute, the web-based view of Enterprise Architecture and the Integrated Work Plan information.

Why Do We Want/Need To Fund The Program At The Requested Level?

$2,000,000 is required to continue execution of work related to cross agency planning and architecture development This level of funding is required to provide a foundation for managing the interagency NextGen portfolio.

Detailed Justification for – 5A01 Personnel and Related Expenses

What Is The Request And What Will We Get For The Funds?

FY 2015 – Personnel and Related Expenses
($000)

Activity/Component	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
Personnel and Related Expenses	$455,955*	$450,250	$463,000	+$12,750

*Includes transfer from the AIP grants program as authorized in P.L. 113-9, Reducing Flight Delays Act of 2013.

For FY 2015, $463,000,000 is requested to pay the personnel, travel and related expenses for the FAA F&E workforce performing work essential to FAA's efforts to modernize the National Airspace System (NAS).

This program funds the personnel, travel and related expenses of the Federal Aviation Administration (FAA) Facilities and Equipment (F&E) workforce. The FAA F&E workforce includes electronic, civil and mechanical engineers; electronics technicians; quality control and contract specialists; and safety inspection personnel. The F&E personnel provide oversight and management of the FAA's capital projects including the NextGen portfolio. F&E personnel and related expenses are distributed across FAA Organizations as follows:

FTE

Organization	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference From FY 2014
ATO	1,963	1,858	1,908	+50
AVS	82	77	77	0
ANG	611	579	592	+13
AFN	177	156	156	0
Total	2,833	2,670	2,733	+63

(Dollars in Thousands)

Organization	FY 2013 Actual	FY 2014 Enacted*	FY 2015 Request	Difference From FY 2014
ATO	$325,254	$313,668	$322,237	+$8,569
AVS	12,872	13,264	13,941	+$677
ANG	90,107	92,384	94,021	+$1,637
AFN	27,722	30,934	32,801	+$1,867
Total	$455,955	$450,250	$463,000	+$12,750

*FY 2013 Actual's for ATO includes IT. Base transfer from ATO to AFN occurred in FY 2014 and is reflected in FY 2014 Enacted.

What Is This Program?

This program sustains the current Facilities and Equipment (F&E) workforce and related expenses.

Why Is This Particular Program Necessary?

The F&E workforce ensures that new system enhancements, such as the Next Generation Air Transportation System (NextGen), contribute to the overall efficiency, safety, and reliability of the NAS. Civil, mechanical and electrical engineers are required to provide technical support for design reviews, perform site preparation and installation, conduct technical evaluations, and provide systems integration and in-service management.

How Do You Know The Program Works?

The F&E workforce succeeds in delivering F&E programs on specification and ensures that programs are completed successfully. In addition to oversight and management of F&E programs, F&E personnel completed 2,055 projects and installations of NAS systems in FY 2011 and 2,040 in FY 2012. The request will support a similar level of output in FY 2015.

Why Do We Want/Need To Fund The Program At The Requested Level?

In FY 2015 the agency requests $463,000,000 for the Activity 5 account. This includes increases of $1,055,000 for the annualized cost of the FY 2014 pay raise, $7,382,000 for the annualized cost of the FY 2014 FTEs, $2,988,000 for the FY 2015 pay raise, and $3,342,000 for the FERS contribution increase. These costs will be offset by reductions in non-pay expenditures.

INSERT TAB HERE:

3C. RESEARCH, ENGINEERING & DEVELOPMENT

RESEARCH, ENGINEERING, AND DEVELOPMENT
(AIRPORT AND AIRWAY TRUST FUND)

For necessary expenses, not otherwise provided for, for research, engineering, and development, as authorized under part A of subtitle VII of title 49, United States Code, including construction of experimental facilities and acquisition of necessary sites by lease or grant, $156,750,000, to be derived from the Airport and Airway Trust Fund and to remain available until September 30, 2017: Provided, That there may be credited to this appropriation as offsetting collections, funds received from States, counties, municipalities, other public authorities, and private sources, which shall be available for expenses incurred for research, engineering, and development.

PROGRAM AND FINANCING
($ in Millions)

Identification code: 69-8108-0-7-402	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
Obligations by program activity:			
Direct Program			
0011 Improve aviation safety	88	91	111
0012 Economic competitiveness	24	38	30
0013 Reduce environmental impact of aviation	35	30	43
0014 Improve the efficiency of mission support	6	6	6
0100 Subtotal, direct program	153	165	190
0799 Total direct obligations	153	165	190
0801 Reimbursable program	2	1	1
0900 Total new obligations (total)	155	166	191
Budgetary resources available for obligation:			
1000 Unobligated balance brought forward, Oct 1	75	83	53
1021 Recoveries of prior year unpaid obligations	5	.....	.....
1050 Unobligated balance	80	83	53
New budget authority (gross), detail:			
Appropriation, discretionary:			
1101 Appropriation (special or trust fund)	168	159	157
1132 Appropriations temporarily reduced	-9	.....	.....
1133 Unobligated balance of appropriations temporarily reduced	.....	-26	.....
1160 Appropriation, discretionary (total)	159	133	157
Spending authority from offsetting collections:			
1700 collected	3	3	3
1701 Change in uncollected payment, Federal sources	-1	.....	.....
1750 Spending auth from offsetting collections, disc (total)	2	3	3
1900 Budget authority (total)	161	136	160
1930 Total budgetary resources available	241	219	213
Memorandum (non –add) entries:			
1940 Unobligated balance expiring	-3	.....	.....
1941 Unexpired Unobligated balance, end of year	83	53	22
1950 Other balances withdrawn and returned to unappropriated receipts	3	.....	.....
1951 Unobligated balance expiring	3	.....	.....
1952 Expired Unobligated balance, start of year	6	8	8
1953 Expired Unobligated balance, end of year	5	.....	.....
1954 Unobligated balance canceling	3	.....	.....
Change in obligated balances:			
3000 Unpaid obligations, brought forward, Oct 1 (gross)	144	134	125
3010 Obligations incurred, unexpired accounts	155	166	191
3020 Outlays (gross)	-158	-175	-174
3040 Recoveries of prior year unpaid obligations, unexpired	-5	.....	.....
3041 Recoveries of prior year unpaid obligations, expired	-2	.....	.....
3050 Unpaid obligations, end of year	134	125	142
3060 Uncollected pyments, Federal Sources, brought forward, Oct 1	-8	-3	-3
3070 Change in uncollected payment, Federal sources, unexpired	1	.....	.....
3071 Change in uncollected payment, Federal sources, expired	4	.....	.....
3090 Uncollected payments, Federal sources, end of year	-3	-3	-3
Memorandum (non-add) entries:			
3100 Obligated balance, start of year	136	131	122
3200 Obligated balance, end of year	131	122	139

	Budget Authority and outlays, net:			
4000	Budget authority, gross	161	136	160
	Outlays, gross			
4010	Outlays from new discretionary authority	51	62	72
4011	Outlays from discretionary balances	107	113	102
4020	Outlays, gross (total)	158	175	174

	Offsets:			
	Against gross budget authority and outlays:			
	Offsetting collections (collected) from:			
4030	Federal sources	-6	-3	-3
	Additional offsets against gross budget authority only:			
4050	Change in uncollected pymts, Fed sources, unexpired	1	.....	.....
4052	Offsetting collections credited to expired accounts	3	.....	.....
4060	Additional offsets against gross budget authority only (total)	4	.....	.....
4070	Budget authority, net (discretionary)	159	133	157
4080	Outlays, net (discretionary)	152	172	171
4180	Budget authority, net (total)	159	133	157
4190	Outlays, net (total)	152	172	171

This account provides funding to conduct research, engineering, and development to improve the national airspace system's capacity and safety, as well as the ability to meet environmental needs. The proposed funding is allocated to the following performance goal areas of the Federal Aviation Administration: improve safety, economic competitiveness, and environmental performance of the National Airspace System. The request includes funding for several research and development activities of the Next Generation Air Transportation System (NextGen), as well as activities related to unmanned aircraft systems.

OBJECT CLASSIFICATION
($ in Millions)

	Identification code: 69-8108-0-7-402	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Direct obligations:			
	Personnel compensation			
11.1	Full-time permanent	28	25	28
11.3	Other than full-time permanent	1	1	. . . . .
11.9	Total personnel compensation	29	26	28
12.1	Civilian personnel benefits	8	8	8
21.0	Travel and transportation of persons	2	2	2
25.1	Advisory and assistance services	29	32	38
25.2	Other services from non-Federal sources	45	51	60
25.3	Other goods and services from Federal sources	1	3	3
25.5	Research and development contracts	18	19	23
25.7	Operation and maintenance of equipment	2	2	2
26.0	Supplies and materials	2	2	3
31.0	Equipment	2	2	3
41.0	Grants, subsidies, and contributions	15	17	19
99.0	Subtotal, obligations, Direct obligations	153	164	189
	Reimbursable obligations:			
99.0	Subtotal, obligations, Reimbursable obligations	2	2	2
99.9	Total new obligations	155	166	191

Employment Summary

	Identification code: 69-8108-0-7-402	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Direct:			
1001	Civilian full-time equivalent employment	248	249	249

EXHIBIT III-1

RESEARCH, ENGINEERING & DEVELOPMENT
Summary by Program Activity
Appropriations, Obligation Limitations, and Exempt Obligations
($000)

	FY 2013 Actual	FY 2014 Enacted	FY 2015 REQUEST	CHANGE FY 2014 - FY 2015
Improve Aviation Safety	84,642	87,244	94,484	7,240
Economic Competitiveness	32,387	24,329	22,286	-2,043
Environmental Sustainability	36,556	41,579	34,435	-7,144
Mission Support	5,207	5,640	5,545	-95
TOTAL	**158,792**	**158,792**	**156,750**	**-2,042**
FTEs				
Direct Funded	260	249	249	0
Reimbursable, allocated, other	0	0	0	0

Program and Performance Statement

This account provides funding for establishing and overseeing FAA's Research and Development (R&D) policies and plans. Its diverse scientific, engineering and technical workforce supports all aspects of aviation from research on materials to development of new products and procedures.

In partnership with both domestic and international entities within the aviation community, the FAA RE&D programs provide world leadership by conducting high-priority research and developing innovative technologies to support a safe, efficient, and environmentally acceptable global aviation system.

EXHIBIT III-1a

RESEARCH, ENGINEERING & DEVELOPMENT
SUMMARY ANALYSIS OF CHANGE FROM FY 2014 TO FY 2015
Appropriations, Obligations, Limitations, and Exempt Obligations
($000)

Item	Change from FY 2014 to FY 2015 $0	Change from FY 2014 to FY 2015 FTE
FY 2014 Request	**158,792**	**249**
Annualization of FY 2014 FTE	0	
Annualization of FY 2014 Pay Raise	86	
FY 2015 Pay Raise	258	
Subtotal, Adjustments to Base	**344**	**0**
New or Expanded Programs		
Improve Aviation Safety	6,959	
Economic Competativeness	-2,056	
Environmental Sustainability	-7,167	
Mission Support	-122	
Subtotal, New or Expanded Programs Increase/Decrease	**(2,386)**	
Total FY 2015 Request	**156,750**	**249**

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Detailed Justification for
A11.a Fire Research and Safety

What Is The Request and What Will We Get For The Funds?

FY 2015 – Fire Research and Safety

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.a Fire Research and Safety	$6,881,424	$8,000,000	$6,929,000	-$1,071,000

For FY 2015, $6,929,000 is requested for Fire Research and Safety. Major activities and accomplishments planned include:

Aircraft Fire Safety

- Examine and test fire hardening and fire suppression technologies to permit the safe air transport of current and future portable electrical power sources.
- Conduct testing to identify effective options to improve fire safety on freighter aircraft, including pallet fire containment covers, fire resistant containers, and main deck cargo fire suppression systems.
- Evaluate inflight smoke and odor events to help eliminate costly false alarms, determine safety deficiencies and identify state of the art technology and gaps for the detection of hidden inflight fires.
- Support the standardization of new fire test methods, advisory circulars and training guidance for unprecedented planned Notice of Proposed Rulemaking to completely revise and update the current FAA flammability regulations for interior materials.
- Develop a computer model to predict heat, smoke, combustion gas and fire suppression agent movement throughout the interior spaces of aircraft.
- Quantify the production of toxic combustion products during the burning of aircraft plastics containing flame retardants.

Research activities related to inflight fire protection will focus on the increasing proliferation of high energy density power sources for aircraft and personal electronic devices. These power sources include existing and emerging lithium battery chemistries and fuel cell technologies. The research will include practical and cost effective aircraft based fire detection and suppression systems and development of performance standards for fire resistant cargo containers and fire containment pallet covers. The outcome of this research will be improved safety for the air transport of these materials. Research will also be directed at eliminating or identifying inflight smoke and odors as causes for alarms through improved detection and characterization of these events.

Research activities related to aircraft material flammability will focus on providing necessary training support and guidance material for proposed new or improved tests methods. The support will involve research testing on a range of affected materials to identify scenarios that might require specific clarifications based on the behavior of the materials involved. Some materials that could produce unique behavior include leather seat cushions, magnesium seat frames and/or ducting, and lithium/aluminum alloy fuselage structure. This support is needed to ensure repeatability and reproducibility in the flammability test results among all labs that conduct the new certification tests.

Fire research to model fire growth and transport of combustion products and fire suppression agents will have applications in a variety of situations. A robust and validated model of the transport of heat, smoke and gases will supplement full scale testing to evaluate methods for the detection of fires in any location inside the fuselage and to evaluate options for applying fire suppression agents for a variety of fire scenarios. Fire research on potential toxic gas production will focus on how changes in the flame retardants used to satisfy environmental restrictions effect the survivability of both inflight and post-crash aircraft fires. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The purpose of this program is to conduct research to prevent accidents caused by in-flight fire (main emphasis of the current program) and to improve survivability during a post-crash fire. The program supports the FAA's Associate Administrator for Aviation Safety organization which is responsible for issuing regulations, standards and guidance material to ensure the highest level of safety in commercial aviation. It also supports the FAA's Office of Hazardous Materials which works with the Pipeline and Hazardous Materials Safety Administration (PHMSA), the Department of Transportation (DOT) organization responsible for hazardous materials transportation safety. The program also benefits the aviation industry by developing, validating and transferring cost-effective aircraft fire safety technology. Saving lives and preventing accidents caused by fire benefits the flying public, aircraft manufacturers, and airline operators.

The vast majority of the research is conducted in the Fire Safety facilities at the William J. Hughes Technical Center, Atlantic City, NJ, by internationally recognized experts in aircraft fire safety research. The FAA operates the most extensive civil aircraft fire test facilities in the world. Outputs from this research to increase aircraft fire safety are fire tests for interior materials, fire detection and extinguishment systems, fire-fighting procedures, minimum performance standards for mandated halon replacement extinguishing agents, safeguards to protect against hazardous materials, and technologies to render fuel tanks nonflammable.

The Program works closely with the aviation industry and foreign regulatory authorities. The main industry participants are the large aircraft manufacturers (Boeing, Airbus) and fire extinguishment companies and agent suppliers (Kidde Aerospace and American Pacific). The venues for reporting on and discussing research results are the International Aircraft Material Fire Tests Working Group and the International Aircraft Systems Fire Protection Working Group. Both working groups are chaired and administered by the FAA Fire Safety Branch. Research findings are presented by FAA and industry at working group meetings held in the US and abroad five times a year. The Cabin Safety Research Technical Group (CSRTG) works closely with foreign regulatory authorities, particularly Transport Canada, Civil Aviation Authority United Kingdom (CAAUK), and European Aviation Safety Agency (EASA). The CSRTG shares expertise and helps define, prioritize, and fund research. FAA and CAAUK also cooperate in cabin and fire safety research through a Memorandum of Cooperation (MOC). For example, this MOC recently produced a report that projected the number of future aircraft cargo fires. The projection was based on the increase in the percentage of air cargo that contains hazardous materials. The Program also shares resources with EASA to develop improved fire test methods for powerplant components. The FAA's expertise is employed by the National Transportation Safety Board in the investigation of fire accidents and incidents, sometimes resulting in cooperative testing that is not specific to the accident but is of a general fire safety nature. FAA also works with the Pipeline and Hazardous Materials Safety Administration to develop safe methods for the shipment of lithium batteries. The program has also significantly increased participation with ICAO in the areas of safe shipment of lithium batteries and for developing timelines for the replacement of the ozone depleting Halon in aircraft fire suppression systems.

In FY 2014, major accomplishments planned include:

Improve Aircraft Fire Protection and Occupant Fire Survivability

- Evaluated methods for the safe shipment of lithium batteries.
- Developed cost-effective fire suppression systems for the main deck cargo compartment of freighter aircraft.
- Determined viable and environmentally safe agents/systems to replace halon in cargo compartment fire suppression systems.

Improve Flammability Standards for Aircraft Materials

- Supported development of Advisory Circulars (ACs) for new fire test methods for interior materials (wiring, ducting, composite fuselage and magnesium seat components) and improved FAA-required material fire test methods.

Advanced Fire Research

- Developed numerical analysis of material hazards and survivability of in-flight fires in passenger and cargo compartments.
- Demonstrated a milligram-scale laboratory test to measure the effectiveness of environmentally friendly, halogen-replacement flame retardants for aircraft cabin materials.

The Fire Research and Safety Program supports the DOT Strategic Goal of Safety from the US DOT Strategic Plan FY 2012 – FY 2016, "Improve public health and safety by reducing transportation-related fatalities and injuries". It also supports the FAA Destination 2025 Next Level of Safety Goal, "By achieving the lowest possible accident rate and always improving safety, all users of our aviation system can arrive safely at their destinations. We will advance aviation safety worldwide".

Why Is This Particular Program Necessary?

This program is necessary because of the catastrophic consequences of an uncontrollable aircraft fire – the large loss of life and the destruction of the aircraft. The program is driven by accidents, incidents, NTSB recommendations, new technology, new fire threats, and environmental concerns. In the space of less than one year, two destructive fatal freighter accidents were caused by in-flight fire (UPS 747-400, 9/3/10 and Asiana 747-400, 7/28/11). In both accidents the presence of large quantities of lithium batteries were believed to be the source of the fire or a contributing factor. As many as six freighter fire accidents are predicted to occur over the next decade (http://www.fire.tc.faa.gov/pdf/TC-13-2.pdf). If the research is successful in developing new fire safety standards for freighters, and those new standards are implemented, it is likely that the 6 predicted future freighter fire accidents would not occur.

Additionally, more than 50 lithium battery fire incidents have occurred in aviation, primarily in cargo shipments where the fire fortunately occurred before take-off. Because of this growing threat, in 2013 the National Transportation Safety Board updated its Most Wanted List to include Improve Fire Safety in Transportation (http://www.ntsb.gov/news/2012/121114.html).

In passenger airplanes where the human toll is far greater, there is a real threat of an uncontrollable fire originating in a hidden area, as evidenced by the 900 or more incidents of unknown odor and smoke events each year in the United States. Although unknown to the crew, most of these events are not fire related, but there is a safety risk inherent in their action which is usually to return or divert to the nearest airport, and in some cases to initiate an emergency evacuation. If the research to evaluate inflight smoke and odor incidents and identify state-of-the-art detection technologies is successful and if those technologies are implemented, the improved detection capability would be able to discriminate between fire events and non-fire events. This would lead to a significant decrease in the incidents of declared emergencies and flight diversions with the accompanying reduction in hazards those actions create.

Another concern is the fire safety of new materials or new material applications. Structural composites are replacing metal alloys in the fuselage and wings, and proposed new aluminum-lithium alloys raise fire safety concerns. New fire resistant magnesium alloys were found to be fire-safe for seat structure, based on research results from this program, but future applications being proposed include air conditioning ducting in hidden areas which raises other fire risk considerations. The growing risk of lithium battery fires is due to the more than 2 billion lithium batteries annually shipped to the US by air, and the very significant increase in the air transport of large lithium batteries for automotive and power grid applications predicted for the near future. Fuel cells powered by compressed hydrogen are being developed for numerous aircraft applications in the future, including auxiliary power units. Finally, environmental restrictions are prohibiting the use of mainstays in aircraft fire protection, halon fire extinguishing agents employed in lavatories, hand-held extinguishers, engines and cargo compartments, and brominated flame retardants used to impart fire resistance in numerous interior materials in order to meet stringent FAA flammability criteria.

The benefit of this program will be the enabling technology to prevent accidents caused by fire in freighter aircraft and hidden in-flight fires in passenger-carrying airplanes. Also, new technology of interest to the aircraft manufacturers and operators will be introduced in a fire-safe manner or prohibited if warranted. In addition, safeguards will prevent fires from the growing threat of lithium batteries and protect the airplane from the dangers of hydrogen-fueled fuel cells. Finally, Halon replacement agents and non-brominated flame retardants will be required to maintain an equivalent level of fire safety as the technology is phased out because of environmental restrictions.

The main beneficiaries of this program will be the flying public due to the mitigation of emerging fire safety threats and the assurance that new materials used in aircraft structures and systems maintain a high level of fire safety.

How Do You Know The Program Works?

Over the past 30 years, every major improvement in aircraft fire safety that has been implemented by the FAA through the regulatory and advisory process was a product of this program. As previously discussed, a recent analysis of world-wide accidents has shown that the probability of a fatal aircraft fire has been reduced (improved) by a factor of three (http://www.fire.tc.faa.gov/pdf/10-16.pdf). Major recent examples of these regulatory products are (1) in-flight fire resistant thermal acoustic insulation (effective 9/2/05), (2) explosion prevention fuel tank inerting systems (effective 9/19/08), and (3) burnthrough resistant thermal acoustic insulation (effective 9/2/09). The future benefit of the first two rules was projected by FAA to be the prevention of two to three catastrophic aircraft accidents, which would have caused many hundreds of fatalities. More recently, based on or supported by FAA fire safety R&D, (1) Advisory Circular AC 20-178, "Flammability Testing of Aircraft Interior Panels after Alteration" was published on June 4, 2012, (2) Policy Statement No: PS-ANM-25.853-01, "Flammability Testing of Interior Materials" was issued on August 16, 2012, and (3) Improved Technical Instructions for the Safe Shipment of Lithium Batteries was adopted by the International Civil Aviation Organization (ICAO).

Although the primary implementation of Fire Safety R&D products into aviation is by the regulatory process, as summarized above, there are several noteworthy examples of FAA-developed fire safety technology transfer to the private sector. The first example is a fuel tank inerting system, which was developed and demonstrated by FAA researchers to be a practical (low weight, simple design requiring very little maintenance) and cost-effective method for preventing fuel tank explosions. It was described by the FAA Administrator as a technological break-though. For the past 5 years Boeing has installed over 1000 fuel tank inerting systems in production 737 and 777 aircraft. The Boeing inerting system is almost identical to the FAA design. A second example is the microscale combustion calorimeter, or MCC, invented and patented by FAA fire safety researchers as a tool to facilitate the development of ultra-fire resistant aircraft materials. The MCC became an American Society of Testing and Materials standard (ASTM D 7309) in 2007 and two companies are licensed to manufacture and sell the MCC. Over 100 units have been sold world-wide to several Fortune 100 companies and research institutions, including Boeing (5), Underwriters Laboratories, the National Institute of Standards and Technology (NIST), Dow Chemical and several fire test laboratories and universities. Additional technologies are transferred by FAA researchers through patents, dozens of peer reviewed journal articles, book chapters, FAA reports, and technical presentations.

The Congressionally-mandated Research, Engineering and Development Advisory Committee (REDAC) reviews and evaluates all programs in the FAA R&D portfolio, including this line item by its Subcommittee on Aircraft Safety (SAS) , on an annual basis. Over the years the SAS has been complimentary and supportive of the Fire Research and Safety Program. The following SAS commentary illustrates the generally positive assessment of this program by the SAS: "The Safety Subcommittee believes that fire facility and personnel at the FAA Tech Center are truly world-class, and it continues to provide meaningful benefits to the FAA, industry, and traveling public. The Safety Subcommittee believes that the FAA needs to ensure that this research capability is retained in the future and that its facilities are identified and maintained as critical national resources. The Ultra-fire Resistant Polymer program appears to be producing amazing results for very little resource expenditure. This is an excellent example of a proactive research approach and capability development." Another positive SAS commentary followed an in-depth program review: "The SAS was given a world class briefing, describing world class work, being done in world class facilities by a world class research team. The briefing contained a clear description of the issues and their significance, the research effort, results obtained or expected, what the results mean, when the results will be available, and how the results will be used. The SAS requests that this briefing format be considered as a model for inclusion in future briefings".

Why Do We Want / Need To Fund The Program At The Requested Level?

Reductions in program funding will delay improvements in fire safety and thereby increase the risk of an accident caused by fire, particularly in freighter aircraft where the growing threat of lithium battery cargo fires is a major concern. Safeguards are required to protect lithium battery shipping containers and to suppress lithium battery fires. Freighter standards must also be developed for fire containment covers, hardened cargo containers and full compartment fire suppression systems. In passenger aircraft, the source of over 900 smoke and odor incidents must be determined to initiate research on the early detection of hidden in-flight fires. New lightweight materials may be introduced into service without optimal safeguards. The same will be true for hydrogen-fed fuel cells. Unprecedented rulemaking to require more stringent fire test criteria for hidden area materials and to ensure the safe use of lightweight materials may be delayed, increasing the risk of fires and negating reduced fuel consumption/lower environmental exhaust emissions. Toxic flame retardants and ineffective halon replacement extinguishing agents could also be introduced into service. Computer models may not be developed that offer promise as design tools for the early detection of hidden in-flight fires and for effective hidden fire-fighting with hand-held extinguishers.

Detailed Justification for
A11.b Propulsion and Fuel Systems

What Is The Request and What Will We Get For The Funds?

FY 2015 – A11.b Propulsion and Fuel Systems

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.b Propulsion and Fuel Systems	$2,693,272	$1,800,000	$2,413,000	+$613,000

For FY 2015, $2,413,000 is requested for Propulsion and Fuel Systems. Major activities and accomplishments planned include:

Advanced Damage Tolerance and Risk Assessment Methods for Engine Life-Limited Parts (New Materials)

- Conduct research to develop advanced damage-tolerance methods for aircraft turbine engine life-limited parts that will improve engine certification standards and reduce the risk of turbine engine failure.

This program will develop advanced damage tolerance methods, risk assessment methods and tools, and incorporate them in the Design Assessment of Reliability with Inspection (DARWIN®) code and enhance its predictive capabilities. These advances are needed to assess damage mechanisms, new design practices, and classes of materials and components not previously addressed by FAA research or methods and tool development. The advances will extend the applicability of damage tolerance (as a supplement to conventional "safe life" methods) much more broadly throughout the engine, and will introduce an increased level of engineering rigor to the risk assessment process. The research will focus on improved fleet risk assessment methods, turbine engine blade fretting fatigue and edge contact issues, damage tolerance for other rotating and static structures, inherent defects in nickel-based superalloys turbine rotors, and increases in engine operating temperatures. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The FAA establishes rules for the certification and operation of aircraft engines, fuels, and fuel management systems that enhance the airworthiness, reliability, and performance of aircraft propulsion and fuel systems. The Propulsion and Fuel Systems Program conducts research on advanced damage-tolerance and risk assessment methods that provide the Office of Aviation Safety (AVS) with the basis for new or revised engine certification and continued airworthiness standards. This research also supports preparation of Advisory Circulars that provide industry with technical information on acceptable means of compliance with regulations. Benefits will accrue in the form of a reduced risk of engine failures and fewer accidents, which in turn will lead to fewer injuries and fatalities.

Propulsion research activities are coordinated with and supported by the Aerospace Industries Association (AIA) Rotor Integrity Sub-Committee (RISC).

In FY 2014, major accomplishments planned include:

Incorporate Damage Tolerance into the Safe Life Rotor Design Process

- Developed capability for Design Assessment of Reliability with Inspection (DARWIN®), to account for residual stresses.
- Enhanced DARWIN for COS (Continued Operational Safety) applications to accommodate new anomaly appearance on life-limited parts at shop visit or in service.

The Propulsion and Fuel Systems program supports the Department of Transportation (DOT) Strategic Goal of Safety by helping to reduce transportation-related fatalities and injuries on commercial aircraft. The program also supports Outcome 1 under the Next Level of Safety Goal in FAA Destination 2025: No accident-related fatalities occur on commercial service aircraft in the U. S.

Why Is This Particular Program Necessary?

The history of turbine engine operation in commercial aviation is a safe one, but the risk of an engine failure is always present and the potential consequences are enormous – the large loss of life in accidents and the destruction of the aircraft. Although they are very rare, accidents such as United Airlines Flight 232 on July 19, 1989 in Sioux City, Iowa, and Delta Airlines Flight 1288 on July 6, 1996 in Pensacola, Florida are noteworthy because they were caused by the failure of turbine engine components that caused catastrophic loss of life. Turbine engine research studies the causes of these failures and how to prevent them in the future.

Propulsion research, conducted in conjunction with the manufacturers, has shown that the primary failure modes in these accidents resulted from the presence of material and manufacturing anomalies that can degrade the structural integrity of high energy turbine engine rotors. The primary failure mode of the Sioux City accident was a fatigue crack that originated from an undetected titanium alloy melt-related defect. From the research, the FAA made recommendations related to the improvement of titanium metallurgical quality, nondestructive inspection, and turbine rotor structural design and lifing standards. This research yielded a probabilistic damage tolerant rotor design and life management code (DARWIN®) that determines the risk of fracture of turbine engine rotor disks containing undetected material anomalies. It is used by nearly all major engine manufacturers.

How Do You Know The Program Works?

Research results from this program helped develop the initial version of the DARWIN® code to address the subsurface defect known as hard alpha and to meet the requirements of AC 33.14-1 "Damage Tolerance for Turbine Engine Rotors". Recent output of this program supports the development of AC 33.70-3, "Damage Tolerance of Titanium Material Anomalies in Turbine Engine Rotors". Other supported versions of DARWIN® addressed surface damage in bolt holes, in-blade slots, and on-turned surfaces; and provided the basis for AC 33.70-2, "Damage Tolerance of Hole Features in Turbine Engine Rotors", AC 33.70-4 "Damage Tolerance for Blade Slots in Turbine Engine Rotors", and AC 33.70-5 "Damage Tolerance for Turned Surfaces in Turbine Engine Rotors". In addition to addressing the required level of safety, these Advisory Circulars also provide industry with an acceptable means of compliance to the new rule 33.70. A recent DARWIN workshop (April 16-18, 2013) sponsored by the FAA attracted over 100 participants from industry and government, including 30 participants from 12 aircraft engine companies. Several other U.S. government agencies, including the U.S. Air Force, the U.S. Navy, and NASA, are incorporating DARWIN into their own research and life management activities and providing supplementary funding for DARWIN development to address their unique needs.

Why Do We Want/Need To Fund The Program At The Requested Level?

Inadequate funding will delay and diminish the development of advanced damage tolerance and risk assessment methods that reduce the risk of failures of high-energy rotors and other life-limited engine components. Implementation of new and revised engine certification and continued airworthiness standards and Advisory Circulars will be postponed or cancelled and the risk of failures of high-energy rotors and other life-limited engine components will not be diminished and likely to rise due to increase aircraft population growth.

Detailed Justification for
A11.c Advanced Materials/Structural Safety

What Is The Request and What Will We Get For The Funds?

FY 2015 – Advanced Materials/Structural Safety

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.c Advanced Materials/Structural Safety	$2,064,784	$2,600,000	$2,909,000	+$309,000

For FY 2015, $2,909,000 is requested for Advanced Materials/Structural Safety. Major activities and accomplishments planned include:

Advanced Materials

- Damage Tolerance of Composite Structures
  - Develop tests and certification standards for sandwich structures to assure designs are resistant to damage.
  - Collaborate with industry and regulators from around the world to gain consensus on standard substantiation methodologies for fatigue and damage tolerance certification, and continued airworthiness.
  - Provide detailed background information on differences between high- and low-cycle fatigue on composite structures, impact threats, and performance characteristics.
  - Perform detailed literature surveys, review industry data, and perform preliminary tests and analyses to define more detailed research needs regarding new material forms, fabrication processes, and unique composite design details for newer aircraft.
- Composite Maintenance Practices
  - Collaborate with industry and regulators from around the world to gain consensus on standard substantiation methodologies for repair certification and continued airworthiness.
  - Provide detailed background research addressing gaps in available training information for structural composite repairs.
- Crashworthiness Issues Unique to Composite Materials
  - Evaluate the effects of structural scale and boundary affects using modeling and simulation.
  - Review and update composite crashworthiness safety awareness training course.
  - Develop dynamic test methods to determine composite material properties.
- Structural Integrity of Adhesive Joints
  - Perform detailed background research addressing gaps in testing and validation of durability of bonded structures.

The Advanced Materials program investigates damage tolerance and fatigue issues of composite structures, including the assessment of impact damage threats (e.g., in-flight hail, ground vehicle collisions), and fatigue effects of composite materials on structural strength. The program explores composite environmental and aging effects; control issues related to composite fabrication and continued operational safety; bonded joints; bonded and bolted repairs; and the characteristics of new materials and applications used in aircraft structures. The program develops safety awareness training for advanced composite materials and manufacturing processes for education of aviation workforces.

The Structural Safety program performs research to evaluate analysis and test procedures used by the industry to meet crashworthiness regulations. These regulations are evolving and are supplemented with special conditions for transport aircraft with composite fuselage and wing structures. The program ensures new aircraft structures demonstrate levels of safety equivalent to existing aircraft structures subjected to survivable crash conditions. The program develops dynamic test methods to determine composite material properties, accesses loading rates for emergency landing conditions including strain rates, typical material response rates at the component and system level; occupant survivability; identifies issues and limitations associated with structural scale and boundary effects, and develops crashworthiness safety awareness training materials. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

FAA establishes rules for the certification which assure the safety of aircraft designed and constructed using a variety of materials and design methods. The Advanced Materials and Structural Safety program conducts research activities to support the FAA safety and regulatory activities, such as rulemaking, guidance, and advisory circulars, in the technical areas of composite materials and aircraft dynamic impacts. This program is divided into two research areas: Advanced Materials and Structural Safety (Crashworthiness).

Advanced Materials

While the top level requirements for demonstrating safety of aircraft are the same for composite or metal materials, different characteristics of composite structural materials requires understanding of their unique response to the civil aircraft operational environment. Advisory Circular (AC) 20-107, "Composite Aircraft Structure" is the primary guidance for composite aircraft structures. It requires continual review and periodic update to assure civil aircraft continue to meet the applicable safety standards as changes in the materials and processes are introduced into their design. Advances in understanding of composite structural response leads to periodic updates and revision of safety requirements for composite structures. These updates are identified and requirements are investigated through the research performed by this program. Workshops and industry involvement provide timely information to the aviation community and focus the research on workable solutions to safety concerns. The FAA Aircraft Certification Service engineers, applicants, certificate and approval holders, parts manufacturers, material suppliers, maintenance, and repair organizations use the technical information developed in this program through direct involvement in the research, technical reports, handbooks (e.g. Composite Materials Handbook 17), guidance, policy, and training courses. This data exchange allows the regulatory process to address industry advances and assure the safety of state-of-the-art technology and design.

Structural Safety (Crashworthiness)

The FAA revises or updates crashworthiness-related regulations and standards to enhance the safety of airframe structures by studying and developing new information for overhead stowage bins; auxiliary fuel tanks and fuel systems; aircraft configurations; seat and restraint systems; and human tolerance injury criteria. It supports development of alternative methods to improve the certification process (e.g., certification by analysis and component tests in lieu of full-scale tests).

The program works with industry to maintain the Composite Materials Handbook 17 (CMH-17). This international reference tool provides the best available data and technology source for testing and analysis, guidance on data development, design, inspection, manufacturing, and product usage. It standardizes the statistical characterization data of current and emerging composite materials. Material data contained in the handbook are acceptable for use in the FAA certification process. The program also coordinates with standards organizations for advanced materials and crashworthiness issues (e.g., SAE P-17 for composite materials specifications, SAE Commercial Aircraft Composite Repair Committee (CACRC), ASTM D-30).

The program coordinates all current and future advanced composite research programs with other Government agencies to coordinate research activities and leverage resources by interchanging information,

identifying and filling technical gaps, and avoiding duplication. This is done through the Interagency Advanced Structures Working Group that includes FAA, NASA, and the Department of Defense.
The Advanced Materials and Structural Safety program has partnered with aircraft manufacturers (e.g. Boeing, Airbus, Bombardier, Cessna, Cirrus, Lancair) to assure that research efforts are focused on relevant topics. The Boeing, European Aviation Safety Agency (EASA), Airbus, and FAA working group is an example of a collaborative effort to address certification issues and guidance. In addition the FAA has partnered with NASA, through joint project reviews, workshops, and participation in research activities to apply advanced technologies developed to actual airframe structures. Through the FAA Joint Advanced Materials and Structures Center of Excellence (COE), the FAA takes advantage of facilities and expertise of the participating academic institutions.

In FY 2014, major accomplishments planned include:

Advanced Materials

- Damage Tolerance of Composite Structures
  - Developed tests and certification standards to assure designs are resistant to damage.
- Composite Maintenance Practices
  - Evaluated field bonded and bolted repair practices to provide recommended updates of related guidance and training materials for composite aircraft structures.
- Environmental and Aging Effects for Composite Structures
  - Developed information on the effect of environmental and heat exposure on structural properties and durability of composite structures.
- Structural Integrity of Adhesive Joints
  - Provided documentation and background data for regulatory action to assure reliable processing of adhesively bonded structures.
- Crashworthiness Issues Unique to Composite Materials
  - Reviewed composite crashworthiness safety awareness training course and ensure it is up-to-date.
  - Developed dynamic test methods to determine composite material properties.
  - Accessed loading rates for emergency landing conditions including strain rates, typical material response rates at the component and system level, and occupant survivability.
  - Identified issues and limitations associated with structural scale and boundary effects.

The Advanced Materials/Structural Safety program supports the Department of Transportation (DOT) strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carrier and general aviation. The program specifically supports Outcome 1, "No accident-related fatalities occur on commercial service aircraft in the U.S", and Outcome 3, "There is a reduction in the general aviation fatal accident rate" under the Next Level of Safety Goal in FAA Destination 2025.

Why Is This Particular Program Necessary?

The use of new materials, processes, and forms on aircraft continues to push the knowledge base for certification in providing safe aircraft for civilian applications. In the last decade, this has been accelerated due to the rapid expansion of the use of composites in increasingly larger structures. Dominating the rapid expansion has been the use of fiber-reinforced polymers to provide lighter, fuel efficient airframe components including, in recent applications, full fuselage barrels and wings. Understanding these emerging technologies is paramount to assure the safety of the civil aviation and the flying public. The current certification process for many advanced materials and structures was established for smaller, less critical components and service conditions. The difference in structural characteristics must be understood and incorporated in certification and operational plans to assure safety for new aircraft that incorporate these advances.

Advanced Materials and Structural Safety research requirements are driven by industry advancements in construction of airframes and related components presented for certification. The FAA must assure that the changes maintain an equivalent or improved level of safety compared to that achieved with current operational aircraft. Requests from the Aircraft Certification Offices and from the aircraft manufacturers seeking Type Certification (TC) approval are major influences that shape research requirements, as the FAA seeks to evaluate the safety of new concepts using advanced materials, processes, and forms. Additional requirements are developed from assessments of existing techniques, protocols, and service histories of previous advanced products. These are examined to determine if modifications to certification methods are required for novel materials, processes, and forms that are being introduced on civil aircraft. The National Transportation Safety Board review of accidents (e.g., AA587, R22) involving these structures provides additional impetus for research required to understand these emerging technologies.

How Do You Know The Program Works?

Research results from this program provide FAA certification engineers with valuable knowledge which would otherwise not be available in support of Part 23, 25, 27, and 29 aircraft design and airworthiness certification programs and continued operational safety. FAA participates with industry to identify the needs and priorities for updating policy, guidance (e.g. AC 20-107B), and training. This input is used by the FAA to identify and prioritize R&D requirements. There is constant dialog between the FAA Aviation Safety organization and this program to ascertain information needed related to structural safety issues and how to resolve concerns which arise from applications being presented for certification. This shows that the program is valued by the sponsoring organization.

During the past decade, the program developed guidelines for various aspects of composite structures concerning certification and safety issues. Research results are well documented in over 75 technical reports that are used as the basis for policy, guidance, and training on damage tolerance and fatigue; maintenance and repair; environmental and aging; materials and processing control; and bonded structure. It has also provided guidance information for certification programs. The program has developed background information on several sponsor policy and guidance documents that are used by them and the industry to establish certification basis of composite structures. This includes policy on bonded structures for civil aviation structures (PS-ACE100-2004010030) and many others. The FAA REDAC SAS has identified it as a model program which leverages capable internal resources; external partnerships; and industry support to provide a high value product.

Why Do We Want / Need To Fund The Program At The Requested Level?

A reduction in funding to the Advanced Materials/Structural Safety program would undermine the effectiveness of the program. This program depends on an exceptional combination of individuals from industry, academia, and regulators to develop focused research efforts where the products of the research are usable immediately in certification and other related safety programs. The engagement of industry in the process is contingent on the research reaching a specific level of development before industry review. If the program funding were to be reduced, the industry might not make their resources available due to a perceived reduced return on their investment. The program is responsible for maintaining a momentum that keeps all parties engaged without over burdening any of the partners. Lower funding levels would compromise the ability to determine the adequacy of the current composite structural certification protocols for the continued operational safety of the current fleet and the designs, materials, and processes of future aircraft certification projects.

Detailed Justification for
A11.d Aircraft Icing/Digital System Safety

What Is The Request and What Will We Get For The Funds?

FY 2015 – Aircraft Icing/Digital System Safety

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.d Aircraft Icing/Digital System Safety	$5,485,628	$7,500,000	$5,889,000	-$1,611,000

For FY 2015, $5,889,000 is requested for Aircraft Icing/Digital System Safety. Major activities and accomplishments planned include:

Aircraft Icing

- Research on Ice Crystal and Supercooled Large Drop (SLD) [Title 14 Code of Federal Regulations (14 CFR) Part 25 Appendix C Exceedance] Icing Conditions to Support Means of Compliance
  - Develop parameter scaling framework for testing of engines in static sea level facilities to evaluate their operation in ice crystal clouds at high altitude.
  - Analyze processed data from high ice water content (HIWC) flight research for evaluation of a potential new engineering standard for convective weather ice crystal icing conditions.
- Safe Operations and Take-off in Aircraft Ground Icing Conditions
  - Compile data and information package needed to update annual winter notice that provides guidance for formulation of ground de-icing plans for airlines as required by CFR 121.629.
  - Report on the capability of a snow generation system for determination of anti-icing fluid holdover times for heavy and light snow and for very cold temperatures
- Simulation Methods Development / Validation to Support Appendix C Icing Certification and Continued Operational Safety
  - Report on testing of simulated ice shapes with roughness on swept wing model at low to moderate Reynolds number.

Digital System Safety

- Onboard Network Security and Integrity
  - Investigate security control catalog(s) for use in the aircraft certification process.
  - Develop system requirements for the airborne network security simulator that can be used to access and identify network security threats in an airborne network environment.
- Software Development Techniques and Tools
  - Propose mitigation strategies for safe use of multicore processors, particularly when more than two processors, are used in networks in future NextGen and aircraft systems.
  - Investigate software verification techniques for assurance in the areas of model-based development and formal methods.
- Airborne Electronic Hardware Design Techniques and Tools
  - Develop criteria for determining effectiveness of safety and airworthiness assurance methods for airborne electronic hardware when using commercial off-the-shelf equipment.

- Propose an integrated reliability prediction methodology that includes a framework of standards for establishing and applying new models and an electronically-based implementation system.

The Aircraft Icing program will improve existing capabilities and develop new engineering tools to support improved means of compliance and new guidance material for engine and airframe certification and operations in SLD, mixed-phase, and ice crystal icing conditions. The outputs will support new guidance materials for advisory circulars. Research will study the effects of various winter weather conditions, including mixed conditions, on the performance and aerodynamic effects of anti-icing fluids, new non-glycol fluids, and ice phobic applications. Research will support holdover time determination and operational assessment of fluid effectiveness and will yield data packages for development of operational guidance and standards on their use. Finally, the FAA will enhance icing simulation methods for means of compliance; conduct swept-wing ice accretion experiments for a validation database and to better understand three-dimensional (3-D) iced aerodynamic flow phenomena. The outcome of this R&D will provide new test methods and a 3-D ice accretion database to support validation of computer codes and means of compliance for certification.

Digital System Safety researchers evaluate onboard network security and integrity, software development techniques and tools, and AEH design techniques and tools. Research activities include studies of airborne network security vulnerabilities, mitigation strategies, and potential safety impacts; partnering with industry and other Government agencies to assess and identify network security threats in airborne network environment; and assessment, validation, and clarification of software and airborne electronic hardware assurance standards. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The FAA establishes rules for the certification and operation of aircraft in icing conditions and for the use of digital systems. The agency uses research results to generate Advisory Circulars (ACs) and other forms of technical information to guide certification and airworthiness specialists and inspectors on acceptable means for meeting requirements.

The Aircraft Icing program develops and tests technologies that detect frozen contamination, predict anti-icing fluid failure, and ensure safe operations both during and after flight in atmospheric icing conditions. A major goal of the program is to reduce aviation's vulnerability to all in-flight icing hazards through the application of its research to improve guidance materials and technical standards, and develop databases and test methods that will support certification for operations in icing conditions. Commercial airplanes are not certified to fly in an icing envelope that includes SLD and ice crystal icing conditions. The program's researchers have contributed to the development of technical data and advisory materials to assist in certification. A study by the Engine Harmonization Working Group indicates that over 100 in-service engine events, many resulting in power loss. At least six multiple engine flameouts occurred in a High Ice Water Content (HIWC – high concentrations of ice crystals) environment from 1988 to 2003. A current international collaborative research effort between the FAA, NASA, Transport Canada, Environment Canada, and the Australian Bureau of Meteorology, and the European Union is addressing this issue. This joint effort brings together the expertise and facilities necessary to conduct the research and also facilitate harmonization of the resulting guidance and regulatory material. Other collaborative efforts include work with various committees and working groups within the Aerospace Industries Association. Partnering with industry provides an avenue for their inputs into potential FAA standards, guidelines, and means of compliance which expedites industry acceptance. In a similar vein, the FAA works with several committees within SAE International to take advantage of the members' technical expertise in developing standards and to expedite industry acceptance. For example, SAE G-12 Aircraft Ground Deicing Committee assists in updating holdover time guidelines and establishing standards for de/anti-icing methodologies, deicing fluids, and ground ice detection.

The Digital System Safety program supports development of new guidelines for testing, evaluating, and approving digital flight controls, avionics, and other systems during the certification of aircraft and engines. Additionally, the program supports development of policy, guidance, technology, and training needs of the Aircraft Certification Service and Flight Standards Service on airborne digital system safety and their safe applications to aircraft systems. These systems include fly-by-wire flight controls, augmented manual flight controls, navigation and communication equipment, autopilots, and so on.

The Digital System Safety program also works with industry, Government agencies, and aviation standards development bodies, such as RTCA, EUROCAE, and SAE, to establish consensus-based standards and improve the effectiveness of the FAA rulemaking and policy issuances in digital aviation systems. The program studies the airworthiness requirements of airborne cybersecurity and provides technical information in support of the FAA participation in the Certification Authorities Software Team, an international group of Civil Aviation Authorities (CAAs) that harmonize certification and regulatory positions on software and digital systems.

In FY 2014, major accomplishments planned include:

Aircraft Icing

- Research on Ice Crystal and SLD[14 CFR Part 25 Appendix C Exceedance] Icing Conditions to Support Means of Compliance
  - Conducted fundamental research work on ice crystal physics studies to determine physical parameters of importance for ice accretion formation mechanisms that will support simulating these conditions inside engine compressors.
  - Processed data from high ice water content (HIWC) flight research, satellites, and radar in preparation for analysis that will allow evaluation of an updated engineering standard for convective weather ice crystal icing conditions.
- Safe Operations and Take-off in Aircraft Ground Icing Conditions
  - Reported on sloped surface testing of fluid behavior on flaps, slats, and main elements of aircraft and on flat plates at angles simulating angles of aircraft surfaces.
- Simulation Methods Development and Validation to Support Appendix C Icing Certification and Continued Operational Safety
  - Conducted testing of simulated ice shapes with roughness on swept wing model at low to moderate Reynolds number.

Digital System Safety

- Onboard Network Security and Integrity
  - Provided technical information to support national policies, guidance, processes, and methods addressing airborne cybersecurity issues for aircraft safety.
- Software Development Techniques and Tools
  - Identified technical issues and proposed mitigation techniques when using revised industry standards for software process assurance.
  - Identified issues and proposed mitigation strategies when neural networks and artificial intelligence are used in safety-critical aircraft and NextGen systems.
- Airborne Electronic Hardware (AEH) Design Techniques and Tools
  - Assessed alternative approaches to AEH design assurances for complex custom micro-coded devices.
  - Conducted safety assessment and evaluated mitigation approaches of AEH designs and tools used.

The Aircraft Icing/Digital System Safety program supports the Department of Transportation (DOT) strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carrier and general aviation. The program develops and assesses ways to ensure airframes and engines can safely operate in atmospheric icing conditions and while using digital systems. The program also supports Outcome 1 under the Next Level of Safety Goal in FAA Destination 2025: No accident-related fatalities occur on commercial service aircraft in the U. S.

Why Is This Particular Program Necessary?

Aircraft Icing

Aircraft icing due to the freezing of supercooled water on aircraft surfaces is a continuing concern in all realms of aviation, due to the insidious nature of icing problems for takeoff, cruise, holding, and landing. Between 1982 and 1992, there was a series of accidents of large commercial transport aircraft taking off in icing conditions resulting in hundreds of fatalities. In 1982, the FAA joined with industry in creating a new regulatory framework for ground deicing and anti-icing and takeoff in icing conditions, and the Icing Research Program was tailored to this new framework. This approach made contributions to improve winter weather ground icing operations, with no fatal accidents since 1992 of large commercial transport aircraft taking off in icing conditions within the United States. In-flight accidents due to accretion of ice affect all phases of flight, but particularly holding and approach and landing. During the 1990s, there were approximately 100 fatalities from in-flight accidents of regional commercial transport aircraft in the United States. Since 2000, there have been no fatalities from accidents due to icing of these aircraft in the United States, although fatal accidents in general aviation aircraft continue to occur. The FAA, working with industry, has identified over 160 ice crystal turbine engine power loss events (a power-loss event is a surge, stall, rollback, or flameout of one or more engines) and engine damage events in reviewing 17 years of recent data. There were also 11 total power loss events from flameout and one forced landing due to ice crystals. Ice crystals have also caused engine thrust events due to ice crystal blockage of the inlet temperature probe. The FAA is also aware of events where pitot probes have stopped working in ice crystal conditions and the flight crew temporarily lost all indication of airspeed. Temporary inconsistency between the airspeed measurements, likely following obstruction of the pitot probes by ice crystals, was identified by the investigating authority as one of the causes of an airplane accident that occurred on June 1, 2009 in which there were 228 fatalities.

Digital System Safety

As the rapid advancement of electronic and computer technologies continue, their applications in aircraft systems and air traffic management (ATM) are getting more and more complex and dynamic. The implementation of various types of networks to support different airborne functions, such as flight controls, air navigations, digital communications, flight plans, on-board entertainment, and passenger Internet services, have further complicated the FAA certification requirements, airworthiness determinations, and their safety risk assessments. This research supports the FAA aircraft certification process that includes work to assure digital systems function properly, reliably, and safely. Research outputs include technical data, reports, compliance methods, verification methods, and certification techniques that aid development of policy, guidance, and training materials.

How Do You Know The Program Works?

Ground icing research results are used every year to develop guidance that is published annually in the FAA's ground deicing notice for use by airlines to formulate their required plans for the coming winter. In-flight atmospheric research results supported development of the envelopes included in the notice of proposed rulemaking, issued in June 2010, for SLD (freezing drizzle and freezing rain) icing conditions. A Government Accountability Office (GAO) report entitled "Improved Planning Could Help FAA Address Challenges Related to Winter Weather Operations" in July 2010, praised the FAA's research investment strategy with its icing research partners, NASA and National Center for Atmospheric Research.

The Digital System Safety research program is an integral part of the FAA Aviation Safety Office Aircraft Certification Services Program Management Plan for software and airborne electronic hardware (SW & AEH). Past research results have directly contributed to the development and issuance of a wide range of SW & AEH standards, policies, guidelines, training, and continued airworthiness initiatives.

Why Do We Want / Need To Fund The Program At The Requested Level?

A reduction in funding would result in effects on all three aircraft icing activities that would impact the safety benefits of these research investments. A reduction in funding for ice crystal research would create a shortfall in knowledge of HIWC ice crystal environments needed for evaluation of and guidance on certification envelopes, facility simulation capabilities, and the follow-on studies of the micro-physical processes on how turbine engines are affected by ice crystals, as well as the possibility of acquiring and analyzing additional atmospheric data that could be used to enhance the certification requirements. A reduction in funding for ground icing research would adversely impact testing to determine ground anti-icing allowance times and other guidance for ice pellet conditions, including ice pellets mixed with other forms of precipitation, and low speed rotation aircraft performance evaluations needed to promote safer winter weather ground operations. A reduction in funding for research supporting Appendix C icing certification would impact the ability to complete testing and studies on swept wing ice accretions that would provide guidance on acceptable practices for computer codes in evaluating 3-D wing and compound aircraft surfaces for certification. This would continue a significant gap in current knowledge on critical ice shape evaluations for modern aircraft designs.

If funding for Digital Systems Safety were reduced, the ability of the FAA and industry to evaluate emerging, highly-complex, digital hardware and software for use in advanced flight controls and aircraft systems would be negatively impacted. Consequently, certification specialists would find it difficult to properly assess proposed aircraft and systems designs which employ this technology for flight-essential and flight-critical applications. Further, the FAA would not be able to determine if certification policy, criteria, or training would be needed to accommodate new technologies or methodologies. A further risk of not performing this research is the reduced ability to develop, validate, and improve certification methods and the inability to reduce time and cost to both FAA and industry in certifying aircraft employing advanced digital airborne systems.

Detailed Justification for
A11.e Continued Airworthiness

What Is The Request and What Will We Get For The Funds?

FY 2015 – Continued Airworthiness

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.e Continued Airworthiness	$10,511,192	$8,000,000	$9,619,000	+$1,619,000

For FY 2015, $9,619,000 is requested for Continued Airworthiness. Major activities and accomplishments planned include:

Continued Airworthiness of Composite Structures

- Assess the performance of conventional and advanced nondestructive inspection methods to detect and characterize damage to composite laminates caused by a range of hardened impacts (e.g., ground support equipment, tools drops, etc.).
- Assess the effectiveness of industry training programs for composite repair technicians.
- Conduct initial assessments of available nondestructive inspection methods that characterize bond strength and remaining useful life of adhesively bonded repairs on composite and metallic aircraft.

Maintenance, Repair (and Overhaul) Organizations (MRO) Oversight Support

- Conduct research to develop a more efficient, risk-based oversight methodology for MROs.

Preventing Loss of Control in Part 23 by Safer Automation using Envelope Protection

- Investigate the potential benefits of using sensed Angle of Attack (AOA) in general aviation, with a key focus on whether derived AOA from modern Attitude Heading Reference Systems can provide information to prevent stall and loss of control accidents.

Nondestructive Evaluation (NDE) for critical Engine Components

- Investigate the unique capabilities of nonlinear ultrasonic c-scan and further develop these capabilities for the detection hidden interface imperfections at diffusion bonded titanium and nickel alloy components.

Health and Usage Monitoring Systems (HUMS)

- Develop and assess diagnostic and prognostic algorithms for usage credits to validate and enhance the HUMS AC 29-2C, MG-15.

Metallic Materials Properties Development and Standardization (MMPDS) Support and Design Values for Emerging Materials

- Develop, maintain, and distribute the annual update to the MMPDS Handbook and derivative products.

Damage Tolerance and Durability Issues for Emerging Technologies

- Complete testing to assess the fatigue and environmental durability of bonded repairs to metallic airframe structure.
- Submit draft report with technical data to assess the application of advanced aluminum-lithium alloys for aircraft primary structure.

- Investigate procedures and guidelines for establishing design values for highly process-dependent emerging metallic-based materials.

Risk Assessment and Risk Management Methods for Small and transport Airplane COS

- Develop a Probabilistic-Based Safe Life Fatigue Management Program for Small Airplanes to demonstrate the viability of using probabilistic approach in developing representative models with risk assessment and risk management tools that support AC 91-82A.

In FY 2015, the planned activities and accomplishments focus on five technical areas: Flight Controls and Mechanical Systems (FCMS), Maintenance and Inspections (M&I), Propulsion Systems (PS), Rotorcraft Systems (RS), and Structural Integrity Metallic (SIM). Funding will also provide for engineering, technical, and management support of overall research activities. Additionally, funding may provide for build-out of lab facilities to support test equipment.

In the FCMS effort, the research will focus on providing AOA information to the pilot to help reduce the number of fatal general aviation accidents. The number one cause of fatal accidents in GA is loss of control, usually preceded by dynamic stall at low altitude. The research will investigate how sensed and derived angle of attack systems can be incorporated into general aviation cockpits to prevent stall, and identify potential future certification requirements for AOA systems. The research will review pertinent loss of control accidents, pertinent fly-by-wire system failures, how sensed aircraft states have played a role in the system failures, and develop system architecture and design requirements to prevent similar events from occurring in the future.

The M&I research will evaluate current and advanced nondestructive inspection (NDI) methods for composite structures. It will include evaluation of NDI methodologies for determining bond strength, generation of reliability data on capabilities of various NDI methods, and support updating training materials as required by relevant parts of the rules for maintenance and repairs.

The engine nondestructive evaluation (NDE) research effort in the PS technical area will develop and evaluate inspection methods for critical engine components. It will generate technical information to support the development, validation, and issuance of standards for various NDE techniques to improve inspection and monitoring capabilities on manufacturing induced anomalies on critical high energy rotating components.

The RS research will focus on the continuation of HUMS and ACS as well as the initiation of Rotorcraft COS. In particular for HUMS, focus will be on the development/assessment of diagnostic and prognostic algorithms to determine usage credits for rotorcraft dynamic components and/or mechanical systems. Diagnostic/prognostic algorithms will be evaluated following the guidance of the Advisory Circular (AC) 29-2C, MG-15. The research findings will be used to recommend enhancements to the AC. For ACS, research will focus on the development and review of a Handbook for Advanced Control Systems use on Rotorcraft. The research findings will be used to develop regulatory/guidance materials for the use of ACS on Rotorcraft. The COS effort addresses and mitigates issues related to bird strikes and their potential effect on the pilot and on the structural integrity of the helicopter.

The SIM research area consists of research for both transport and small airplanes. Research will focus on emerging technologies such as damage tolerance and durability issues of new aluminum-lithium alloys, new and emerging alloys to be studied for inclusion in MMPDS, and risk management methods to support the Aircraft Certification Services Monitor Safety/Analyze Data (MSAD) initiative, which is a data-driven, risk-based continued operational safety decision-making process.

What Is This Program?

Aircraft are extraordinarily complex systems, operating in an unforgiving environment, with an extremely long design service life. Like most complex systems, continued operational safety is ensured in several phases: design and certification; operational maintenance; and timely discovery and repair of damage and unanticipated issues. FAA issues rules and advisory materials regulating all of these phases. As aircraft design and systems mature, operational data become available from several sources including Service Difficulty Reports, Aviation Safety Action Program reports, and the Aviation Safety Reporting System. FAA uses this information to fine tune these oversight instruments, continually increasing safety. However, as new technologies are introduced, FAA must work without this operational data to anticipate all potential problems, ensuring that issues do not become problems. The Continued Airworthiness Program supports this mission in a variety of ways.

The Continued Airworthiness program was created in response to a specific incident when a poorly understood aspect of aircraft aging caused Aloha Air Flight 243 to lose a large section of its crown in flight. While the airplane landed safely with the loss of a single life, investigation showed that a previously undetected problem threatened a large number of airlines. In response to that accident, research was performed to fully understand the particular aging phenomenon that was at play, determine effective find structural repairs, develop and validate inspection technologies to ensure timely discovery and repair of similar damage, and validate new design approaches to prevent similar issues on future aircraft. The results of this work have been used in the formulations of regulations, directives, and guidance as well as information and training for FAA personnel.

Since that initial work, the Continued Airworthiness Program has expanded to deal with issues of continued operational safety in other structural and systems areas. Proactive work is being performed in several areas including: emerging metallic structures to determine the appropriate FAA response to the introduction of the first new families of alloys and processes in decades; NDE of the new generation of composite and aircraft; advanced flight control systems; and active flutter suppression systems which are being introduced. Other work targets known issues such as; loss of control in Part 23 aircraft; operational safety of rotorcraft; management of fatigue in small airplanes; aging of electrical systems, the evolving use of Maintenance and Repair Organizations; and NDE of rotating engine components.

The program collaborates with NASA and DOD and partners with aircraft manufacturers, air carriers, and academic researchers through a series of cost-sharing grants and Cooperative Research and Development Agreements. Finally, the research program maintains a core technical capability comprised of technically competent people, vibrant research partnerships, and unique testing laboratories like the Full-Scale Aircraft Structural Test Evaluation and Research (FASTER) laboratory.

In FY 2014, major accomplishments planned include:

Flight Critical Systems Design Assurance

- Developed categorization of the faults in Flight Critical Systems that have resulted in accidents or incidents.

Preventing Loss of Control in Part 23 with Sensed Angle of Attack (AOA) and Better Automation

- Investigated new aircraft technologies to improve low speed awareness, stall prevention and recovery, and automated systems and controls.
- Developed report of results from accident study of past loss of control accidents to quantify how affordable sensed and derived AOA systems could have prevented loss of control accidents. Also performed a study of the feasibility and accuracy of derived AOA data from existing military and experimental systems.

Continued Airworthiness of Composite Structures

- Assessed the performance of both conventional and advanced inspection techniques to detect and characterize ground handling impacts on composite laminate aircraft panels.
- Assessed the performance of consistent composite laminates above minimum porosity levels, and inspection methods to detect varying degrees of porosity in composite laminates for the purpose of relating detectability for inspection assurance, damage tolerance requirements, and aging phenomena.
- Developed repeatable methods for generating weak bonds in various types of bonded joints to assist in the development and testing of bond strength inspection methods.

Nondestructive Evaluation (NDE) for Critical Engines Components

- Conducted the second phase of Machining Process Monitoring research work on broaching and turning processes.
- Prepared for production implementation of the Sonic Infrared inspection technique. One of primary objectives of this program is to provide an alternative inspection technique to FPI.
- Measured the grain size in dual microstructure components using ultrasonic inspection technique.

Health and Usage Monitoring Systems (HUMS)

- Provided technical data to validate and enhance the HUMS AC29-2C, MG-15 for a usage credit.

Risk Assessment and Risk Management Methods for Small and Transport Airplane Continued Operational Safety (COS)

- Drafted a report on use of probabilistic risk approach for transport airplane corrosion problems.
- Studied probabilistic based fatigue management program for small aircraft.

Metallic Materials Properties Development and Standardization (MMPDS) Support and Design Values for Emerging Materials

- Developed, maintained, and distributed update to the MMPDS Handbook and derivative products.

Damage Tolerance and Durability Issues for Emerging Technologies

- Developed technical data to assess the application of advanced aluminum-lithium alloys for aircraft primary structure.
- Conducted testing and analysis to assess the fatigue and environmental durability of bonded repairs to metallic airframe structure.

The Continued Airworthiness Program supports the Department of Transportation (DOT) strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carrier and general aviation. The program goal is to understand and develop methods to counter the effects of age and usage on the airworthiness of an aircraft over its lifetime, including potential effects of modifications and repairs.

The program also supports Outcome 1 under the Next Level of Safety Goal in FAA Destination 2025: No accident-related fatalities occur on commercial service aircraft in the U. S.

Why Is This Particular Program Necessary?

As aircraft age, the probability of failure of components and subsystems increases. Structures fatigue, corrode, and crack; moving parts wear; electrical systems fail; and aircraft suffer damage from myriad mishaps on the ground and in the air. The FAA uses regulations and guidance to prevent failures and sets certification requirements for redundancy and failsafe mechanisms to minimize the chance that a failure will result in catastrophe. Over the past 25 years, this program successfully addressed issues of continued airworthiness by providing the information and data that support those regulatory efforts that enable the current high level of safety of commercial aircraft.

New aircraft designs, materials, both metallic and composite, and fabrication techniques have entered service in recent years. Flight control, avionics, and other electrical and electromechanical systems have been rapidly evolving for some time and the newest aircraft share little in common with airliners of just a decade ago. These advanced aircraft are introducing new challenges and issues for continued airworthiness. One of the primary goals of this program is to anticipate those issues and plan and execute the necessary research to support appropriate regulatory policy and procedures.

Issues of continued operational safety are not limited to new aircraft types. Even older aircraft types are continuously being updated and new issues arise as the individual aircraft age. Recent in-flight incidents, such as Southwest Airlines flights 2294 in 2009 and 812 in 2011, both Boeing 373s, demonstrate the technical challenges of maintaining continued airworthiness, predicting potential failures, and determining inspection intervals.

The program focus is on the continuing operational safety of all aircraft throughout their lifecycle. It is based on requirements developed by the FAA Office of Aviation Safety. The requirements reflect the need of the regulatory office for technical data and information to support regulatory activities or for possible solutions to real world questions and problems. For example, the inspection of composite, metallic, and bonded structures in an accurate and reliable way presents a significant challenge the regulatory engineers and inspectors and the industry. The program investigates improved inspection technologies and procedures and quantifiable measures of accuracy. Research outputs include feasibility demonstrations of inspection technologies, characterization of new inspection methods and procedures, or proposed inspection standards for the aviation industry.

How Do You Know The Program Works?

Since the inception of the program in 1988, then known as the National Aging Aircraft Research Program, research results allowed the FAA to work with industry to complete several key rulemaking and regulatory initiatives, which include the implementation of damage tolerance concept to manage structure fatigue and aging airplanes, the widespread fatigue (WFD) rule, the electrical wiring interconnection system rule, and numerous guidelines and Advisory Circulars (ACs). The Program worked with aircraft and engine manufacturers, airlines, maintenance and repair organizations, as well as FAA certification and flight inspection offices to apply new technologies and to develop standards to support safety management systems (SMS) implementation.

Why Do We Want / Need To Fund The Program At The Requested Level?

This research supports the preparation of FAA regulatory instruments that ensure the continued operational safety of both the commercial and general aviation fleets. A reduction in research funds would lessen the content and delay the delivery of that research, thereby delaying and lessening the effectiveness of the FAA efforts to reach the next level of safety.

There is a risk profile associated with the life cycle of every aircraft type and every specific airframe. Older aircraft types tend to have a lower risk profile while older aircraft tend to have a greater risk profile. The introduction of new designs, materials, fabrication techniques, etc., increase the risk associated with new aircraft types. This is borne out by the fact that the structural and electrical problems already in the first years of service of the advanced aircraft far outstrips those seen on more mature aircraft types such as the Boeing 747. New aircraft technology also brings with it the near certainty of new problems which did not pertain to previous aviation technology and therefore are not anticipated or remediated. This increases the risk associated with aging airframes and reduces predictability of that risk.

This program supports the regulatory and certification process to reduce the risk associated with all phases of the lifecycle of traditional and advanced aircraft. A reduction in funding to the Continued Airworthiness Program would have several detrimental effects. It would delay the availability of data used both in the certification process and during operations to predict issues and prevent them from causing accidents. It would also reduce the ability to react to operational data and find timely solutions to issues as they appear in the field. A reduction in funding would undermine the effectiveness of the program in other ways as well. This program depends on an exceptional combination of individuals from industry, academia, and regulators to develop focused research efforts where the products of the research are usable immediately in certification and other related safety programs. The program also leverages its resources to obtain significant support from industry in funding, equipment, and manpower. If the program funding were to be reduced, industry would reduce their support due to a reduced return on their investment. The program also is responsible for maintaining a momentum that keeps all parties engaged without over-burdening any of the partners.

Detailed Justification for
A11.f Aircraft Catastrophic Failure Prevention Research

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aircraft Catastrophic Failure Prevention Research

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.f Aircraft Catastrophic Failure Prevention Research	$1,538,893	$1,500,000	$1,567,000	+$67,000

For FY 2015, $1,567,000 is requested for Aircraft Catastrophic Failure Prevention Research. Major activities and accomplishments planned include:

Advanced Analysis Methods for Impact of Composite Aircraft Materials in Rotor Burst and Blade Release

- Develop algorithms for the impact analysis of composite materials.
- Assemble material data for the development and validation of the composite model.
- Conduct mathematical analysis to support development of new material model for Inconel 718.

The program will develop test and analysis methods that produce publically available tools to better predict aerospace engine impact events. Past research focused on material characterization tests for titanium, aluminum, and Inconel 718 to develop unique, state-of-the art models in a general-purpose finite element program called LS-DYNA. LS-DYNA is widely used by industry and government for impact analysis and risk assessment related to engine containment issues. The material models greatly improve the accuracy of the analysis and the safety of aircraft designs. The process for developing these unique material models is used by automotive companies and aircraft companies in crash analysis studies.

In FY 2015, the program will initiate efforts related to composite materials including development of the framework by which impact and failure will be mathematically tracked during an impact event in composites. In parallel, test data will be developed for a publicly available composite material in each of the three principal directions for multiple loading conditions to populate the tabular data set that will be used by the new material model. As the composites effort is ramping up the final aspects of the metals work will be completed in terms of testing and developing material input curves from the test data. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

FAA engineers need publicly available tools to standardize the analysis of engine and aircraft for rotor burst and fan blade containment. An increasing number of engine and aircraft projects are relying on proprietary analysis tools to show compliance, complicating the FAA task of making compliance findings and allowing potential variation in the standard of safety. The goal of this research program is to have a public tool with standardized generic models, user guides, training, software quality control process, and validated public material models. This will allow engineers to validate the proprietary tools, streamline the certification process, and help mitigate fatalities and injuries when these events occur.

The program develops data and methods for uncontained engine fragment impact and provides analytical tools for engine containment systems and for protecting identified critical systems that may need shielding from uncontained engine debris. Through the LS-DYNA Aerospace Users Group, FAA works with industry to establish standards for finite element analysis and guidance for use in support of aircraft engine certification. The program provides technical information to establish certification criteria for aircraft and support for certification of new technologies and supports development of Advisory Circulars that outline acceptable means of compliance in meeting regulatory mandates.

The program also develops an Uncontained Engine Debris Damage Assessment Model (UEDDAM) which evaluates aircraft vulnerability and mitigates damage from uncontained engine events. Research will develop improvements to the UEDDAM model to address certification issues for the large numbers of small jet-powered aircraft with special challenges for engine rotor burst mitigation. These aircraft have composite fuselage sections with diameters on the same order as the engine diameters, limiting the traditional approach of using system separation to minimize the rotor burst effects.

The program will continue collaborating with NASA and the LS-DYNA Aerospace Users Quality Assurance Group to improve the aerospace guidelines and models used by the aircraft industry.

The program collaborates with other Government agencies and industry to establish an aircraft material database used by industry in aircraft modeling of engine contained and uncontained failures. Demonstrating the process in detail provides regulators and original equipment manufacturer (OEM) applicant's greater insight into the development of tabular databases for material classification. The FAA/NASA/Industry Quality Control Aerospace Working Group develops aerospace guidelines for dynamic modeling used in engine containment design, bird strikes, uncontained engine debris, etc., that will further enhance aviation safety and greatly benefit the industry and the FAA in assessing new aircraft designs.

For FY 2014, major accomplishments include:

Advanced Analysis and Risk Assessment Methods for Rotor Burst and Blade Release

- Developed and verified new material models for aluminum and titanium.
- Conducted Inconel 718 material testing to populate the tabulated material model.

The Aircraft Catastrophic Failure Prevention Research program supports the Department of Transportation (DOT) strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carrier and general aviation. The program also supports Outcome 1 under the Next Level of Safety Goal in FAA Destination 2025: No accident-related fatalities occur on commercial service aircraft in the U. S.

Why Is This Particular Program Necessary?

The Aircraft Catastrophic Failure Prevention Research program is largely driven by accidents, incidents, National Transportation Safety Board (NTSB) recommendations, and the introduction of new technologies. This program was initiated after the 1989 DC-10 Crash landing at Sioux City, Iowa. The major thrust of the program started in engine containment and uncontained engine failures mitigation. The program works closely with the Aviation Rulemaking Advisory Committee, Aerospace Industry Association (AIA) focus groups, Department of Defense (DOD), NASA, and academia to leverage existing work and develop data, analytical methods, and processes that make up the foundation for improved policy, regulation and advisory material.

Standardized methods and numerical tools to analyze effects of both engine rotor burst and fan blade releases assist the FAA certification offices and industry applicants in gaining a common understanding in demonstrating compliances of regulatory requirements. The current regulatory demonstration requirement by full-scale destructive tests of a single blade failure at the most critical location needs more robust and accurate analytical methods and predictive tools to assess safety risks and the possible need for increased margin of safety. With these methods and tools validated and available, the option for standardized compliance by analysis (for specified rules) for derivative designs of already certified engines will be possible. The analysis tools developed in this program will also help to mitigate aircraft damage from an uncontained engine failure and prevent potential aircraft catastrophic failures. It provides FAA engineers a means to validate proprietary tools currently used by engine manufacturers and streamline the certification process.

The new work in this program is moving away from the traditional aluminum structure and into composite structure. This is a significant increase in the model complexity. Metal alloys typically have the same properties throughout the material and in all directions, they are isotropic. Composites have very different properties depending on the fiber orientation in the resin. Industry trends indicate an increased use of composites for both engine containment and fuselage structure. Better algorithms to predict the failure of these materials are needed. Building on the recent success with metals, and the increasing capability of computer platforms thru parallel processing, we will develop a new generation of predictive anisotropic models.

How Do You Know The Program Works?

The program has a long history of achieving technical results that led to regulatory actions, issuances of improved guidance, and updates of advisory circulars related to uncontained engine rotor burst and blade release.

The UEDDAM tool kit, developed under the program, has been used to analyze new aircraft designs for vulnerability to uncontained engine fragments and can be used to demonstrate a means of compliance for multiple fragment vulnerability. UEDDAM is now available to industry and will continue to be improved by incorporating feedback from users. Currently, the military uses UEDDAM in the design of new aircraft and for engine retrofit programs, and there have been several requests from commercial business jet manufacturers for the code.

The program also produces improved design tools that enable safer aircraft through development of material models that allow for standardized certification by analysis of engine and aircraft for rotor burst and fan blade containment.

The LS-DYNA Aerospace Quality Control System has identified several problems and solutions in the LS-DYNA software and compatibility with different computer platforms and compilers that were causing errors in the results. In addition, an LS-DYNA aerospace user's guideline manual provides guidance to LS-DYNA aerospace users with recommended industry practices in the modeling. Strong industry and FAA certification support for this group is evidence that the program is working.

The new material models developed under this research program are extremely valuable to industry and the FAA in modeling impacts from engine uncontained failures. The MAT224 material model in LS-DYNA that was developed in this program is considered by government and industry alike as a major breakthrough in predictive capabilities for impact analysis. When used in conjunction with the UEDDAM model (or similar vulnerability model), the new material models can be used to better predict impact resistance in specific areas identified as needing protection. The new models are being used by industry and are gaining popularity in the automotive world. This is a strong indication that the models are working well and are very useful.

Why Do We Want / Need To Fund The Program At The Requested Level?

Inadequate funding will delay and diminish the development of test and analysis methods that produce publically available tools to better predict aerospace engine impact events. This will complicate the FAA task of making compliance findings for a number of engine and aircraft projects that rely on proprietary analysis tools to show compliance. In summary, advancement of aviation safety will not be achieved if program is not funded at the requested level.

Detailed Justification for
A11.g Flightdeck/Maintenance/System Integration Human Factors

What Is The Request And What Will We Get For The Funds?

FY 2015 – Flightdeck/Maintenance/System Integration Human Factors

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.g Flightdeck/ Maintenance/System Integration Human Factors	$4,416,163	$5,000,000	$9,897,000	+$4,897,000

For FY 2015, $9,897,000 is requested for the Flightdeck/Maintenance/System Integration Human Factors Program. Major activities and accomplishments planned include:

Enhancing Aviation Safety through Advanced Procedures, Training & Checking Methods, to include Loss of Control Detection, Avoidance, and Recovery

- Research report documenting the interim results of LOC model evaluations.
- Research report documenting industry product review of displays that show angle of attack or envelope protection information.

Human Factors Maintenance Risk Management

- Report best practices for Maintenance and Ramp Line Operations Safety Assessment (LOSA).
- Develop guidance materials for fatigue mitigations.

Avionics and New Technologies: Certification and Operational Approval Criteria

- Update report, "Human Factors Considerations for the Design and Evaluation of Electronic Flight Bags, Version 3".

Advanced Vision Systems (Enhanced Flight Vision System (EFVS), Enhanced Vision Systems (EVS), Synthetic Vision Systems (SVS), and Combined Vision System (CVS)), Heads Up Displays (HUD), Helmet Mounted Displays (HMD): Certification and Operational Approval Criteria

- Recommend items for inclusion in a human factors guide for certification and approval of Combined Vision Systems (CVS).
- Draft recommendation/training materials for operational issues associated with HUDs/HMDs.

Unmanned Aircraft Systems (UAS) Human Factors Considerations

- Report documenting ground control station requirements, describing reviews of applicable human factors research studies; results of incident and accident data analysis; and a review and gap analysis of regulations, standards, and guidance.
- Report documenting analyses of UAS human factors related incidents and accidents related to visual observers.

General Aviation Safety Improvements Research – A Multi-Method Approach to Accident Reduction

- Report to identify underlying causes of loss of control and stall events in general aviation and identify potential intervention points.

Human Factors R&D for Improved Rotorcraft Operational Safety

- Evaluate human performance factors to develop recommendations for regulatory guidance for single crew Night Vision Goggle (NVG) operational safety in unimproved landing areas.
- Develop recommended human factors guidance to improve helicopter pilot decision making relative to inflight weather avoidance and fuel management, as well as during single pilot RNAV/RNP operations.
- Assess pilot, procedure, and airport operational factors and develop recommendations for improved mitigation of runway incursion incidents involving helicopters.

The FY2015 research program develops human factors scientific and technical information to support the development of standards, procedures, training, policy, and other guidance material addressing human factors in safety-critical flight crew performance areas. For example, human factors efforts addressing Loss of Control and Recovery, as well as Flight Envelope Protection are intended to provide training and checking guidance that will reduce accidents and fatalities due to flight crew loss of aircraft control in air carrier and general aviation operations. Research will also continue to advance the scientific knowledge base supporting flight deck technologies such as advanced vision systems, ADS-B/CDTI symbology, electronic flight bags (EFB), and night vision goggles (NVG). Finally, the human factors R&D efforts supporting Unmanned Aircraft Systems (UAS) will produce guidance that could be critically valuable for the safe integration and efficient use of these new aircraft in the National Airspace System Additionally, funding will provide for engineering, technical, and management support of overall research activities.
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What Is This Program?

The Flightdeck/Maintenance/System Integration Human Factors program provides the research foundation for FAA guidelines, handbooks, orders, advisory circulars (ACs), Technical Standards Orders (TSOs), and regulations that help ensure the safety and efficiency of aircraft operations. It also develops human performance information that the agency provides to the aviation industry for use in designing and operating aircraft, and training pilots and maintenance personnel.

A major goal of the program is to improve pilot, inspector, and maintenance technician task performance. Research results support enhanced methods for training and evaluating performance especially associated with new technologies and aircraft systems. Performance and evaluation capabilities are also enhanced through research that facilitates an improved understanding and application of risk and error management strategies in flight and maintenance operations.

In FY 2014, major accomplishments planned include:

Enhancing Aviation Safety through Advanced Procedures, Training and Checking Methods, to Include Jet Upset

- Completed draft research report documenting the results of jet upset/loss of control simulation model development and evaluation.

Human Factors Maintenance Risk Management

- Developed report summarizing recommendations for guidance materials, fatigue risk management system requirements, and design/use of maintenance technical documentation.

The Flightdeck/Maintenance/System Integration Human Factors program supports the Department of Transportation (DOT) strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carriers and in general aviation.

Why Is This Particular Program Necessary?

The Flightdeck/Maintenance/System Integration Human Factors program focuses on the needs of pilots, inspectors, and aircraft maintainers. The revolution in digital avionics has changed flightdeck design and operational practices and enabled new head up display technologies, surface moving maps, electronic flight bags, advanced controls, communications, navigation, surveillance systems, and tools for aircraft system management. With these advances come important human performance and human factors implications which must be understood and applied in the appropriate guidance material developed for policy, procedures, operations, and training. The research supports the development of these products. Human error continues to be a major contributor to aircraft accidents and incidents both in commercial and general aviation. One goal of current research is to try to be proactive in identifying error tendencies and thereby enhance the safe and effective introduction of new technologies and procedures into the NAS.

How Do You Know The Program Works?

This research program has, over the years, identified human factors issues and developed training, mitigation, and guidance material used by government and industry to address problem areas. For example, Crew Resource Management (CRM) research supported the development of an FAA Advisory Circular as well as training for air carriers. The research program has provided substantial support for the FAA's Voluntary Safety Programs. One of these programs, the Line Operations Safety Audit, was a direct result of our research and is now mandated by ICAO as a worldwide safety monitoring requirement for airlines. Additionally, the Human Factors Aircraft Certification Job Aid provides guidance to the Aircraft Certification Flight Test Pilots, Engineers, and Human Specialists who must evaluate new aircraft and old aircraft with new displays and/or controls. The Job Aid compiles over 100 human factors research and reference reports and tied them to the regulations. This database tool is instrumental in providing a structured way to evaluate systems submitted for FAA approval. Similarly, the outputs of the electronic flight bag research provide a structured way to identify human factors issues with EFBs submitted for approval and provide the basis for human factors input to FAA regulatory and guidance material. Thus, the outputs of the Flightdeck/Maintenance/System Integration Human Factors research have provided human factors and human performance data on which FAA staff can make approval decisions.

Why Do We Want/Need To Fund The Program At The Requested Level?

This program directly supports the engineers, test pilots, human factors specialists, and inspectors within FAA Aviation Safety who are responsible for approving flight deck systems, equipment, procedures, and maintenance and also responsible for developing the regulatory and guidance material in these areas. The research ensures that the critical FAA decisions to approve a given system, operation, procedure, etc. are made based on data. Human error routinely appears as a critical safety risk. The research is aimed at identifying and mitigating the human factors issues. The research results feed into the Aviation Safety's regulatory and guidance material. Any current or future reduction in funding to the Flightdeck/Maintenance/System Integration Human Factors program would negatively impact the FAA's ability to identify and mitigate risks in the area of human factors, which directly impact Aviation Safety's ability to make key decisions on projects and policy. For 2015, we will also address additional human factors challenges affecting safety in rotorcraft operations. Failure to meet these challenges will result unnecessary injury and loss of life in such important areas as Helicopter Emergency Medical Services (HEMS) and Night Vision Goggle (NVG) operations.

Detailed Justification for
A11.h System Safety Management

What Is The Request And What Will We Get For The Funds?

FY 2015 – System Safety Management

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.h System Safety Management	$10,985,504	$11,000,000	$7,970,000	-$3,030,000

For FY 2015, $7,970,000 is requested for System Safety Management. Major activities and accomplishments include:

System Safety Management

Aviation Safety Information Analysis and Sharing (ASIAS)

- Incorporate new digital data sources, such as SBS, into ASIAS data set.
- Develop additional algorithms and processes for automated trend and/or anomaly detection from multiple data sources.

General Aviation (GA) and Rotorcraft Flight Data Monitoring (FDM) Data Gathering and Analysis for ASIAS

- Expand the aircraft and operation types in the National GA FDM database.
- Modify and expand ASIAS benchmarks to include GA and rotorcraft operations.

Facility Risk Assessment Tool (FRAT)

- Develop FRAT software requirements specification for migration and implementation into AOV working processes.

Terminal Area Safety

Develop Models that Enhance the Ability to Use Advanced Flight Simulators for Advanced Maneuvers

- Test mathematical stall model and validate flight simulator stall response with pilots who have stalled the aircraft.
- Evaluate training effectiveness of the stall model with type-rated line pilots.

Determining Runway Friction from Airplane Data

- Evaluate methods to estimate the real-time runway friction or slipperiness level by using recorded aircraft data during landing roll.
- Develop methods to communicate runway slipperiness information in a timely manner.

Simulator Motion Cueing Criteria

- Analyze the motion data and compare against subjective assessments and existing literature.

Development of Stable Approach Criteria

- Conduct sensitivity analysis of glideslope and tracking errors vs. proper go-around decision.

Helicopter Operational Safety Improvements Using Advanced Vision Systems

- Develop an experimental design for evaluating the benefits and limitations for helicopter Point-in-Space instrument procedure.

Research projects in the System Safety Management program are designed to increase system safety through the use of data and other safety information. This will occur with the development of enhanced methods of data collection and analysis spanning a wide range of operational areas (e.g., 14 Code of Federal Regulations (14 CFR) Parts 121, 135, 91), aircraft types (e.g., 14 CFR Parts 23, 25, 27, 29). This allows the FAA to (a) identify system-level vulnerabilities through evaluating and developing aggregate level data and metrics, (b) determine indicators of performance (safety metrics) and processes to reliably identify potential risk, and (c) identify and assess risks associated with anticipated changes in procedures or technologies. In addition, the research will produce tools that identify and prioritize risk areas in the NAS that warrant further analysis and intervention strategies.

The Terminal Area Safety research program aims to develop training solutions and identify effective technologies to mitigate the key causes of fatal accidents in the terminal area. Three research projects in the Terminal Area Safety program address loss of control and runway excursions/overruns, the number one and three leading causes of fatalities in the worldwide commercial jet fleet. The investigation of motion cueing in flight simulators will minimize the danger of inappropriate simulator training. In addition, human-in-the-loop simulation evaluation will be conducted to study the safety issues of helicopter operations in the terminal area. The output of the safety research will be new operational guidance and data packages in support of training and standards that mitigate risk in the terminal area. Funding will also provide for engineering, technical, and management support of overall research activities.

What Is This Program?

In 2013, System Safety Management research established an infrastructure that enabled the free sharing and analysis of de-identified safety information derived from government and industry sources. In the near future, this infrastructure will be enhanced with additional capabilities, such as vulnerability discovery, improved data fusion and expanded data sources and users. The research outputs include methodologies, case studies, and guidance material that provide the capabilities of systematically assessing potential safety risks and applying proactive solutions to reduce aviation accidents and incidents.

Terminal Area Safety research efforts will make operations safer at, or near, airports through (1) extending simulator models to allow for better upset training, (2) exploring alternatives to determine runway slipperiness, (3) developing motion criteria to minimize inappropriate simulator training, (4) proposing and testing specific unstable approach criteria, and (5) enabling safe helicopter approaches when using advanced vision systems. Overall, these projects not only address the principal causes of fatalities in the commercial jet fleet but also fill aviation safety research gaps identified in National Transportation and Safety Board's Safety Recommendations A-01-69, A-04-62, A-07-003, and A-07-64.

The program leverages resources by partnering with several aviation organizations. For example, Commercial Aviation Safety Team (CAST), an FAA/industry collaborative effort to develop and implement data-driven safety initiatives, provides guidance, resources and voluntary-submitted safety data for use in the ASIAS directed studies, safety metrics, anomaly detection capabilities and text mining capabilities. Results feed into the development and tracking of safety enhancements. The collaboration with industry assists in the implementation of the findings of the research studies. Additionally, Terminal Area Safety research conducts a joint study with Kongsberg Aeronautical Information Service (Norway) via a Cooperative Research and Development Agreement (CRDA) to investigate feasible methods of using aircraft landing data to identify real-time runway slipperiness. This study is one of the research initiatives that respond to the National Transportation Safety Board's (NTSB's) safety recommendations on the subject of runway friction determination in slippery runway condition.

In FY 2014, major accomplishments planned include:

System Safety Management

Aviation Safety Information Analysis and Sharing (ASIAS)

- Expanded ASIAS to include new ASIAS communities (general aviation (GA), helicopter, airport authorities, and manufacturers), as required by studies and vulnerability and risk assessment.
- Developed speech recognition technology and customized text mining and information extraction methods for use with voice data sources to determine things such as hearback/readback errors.
- Created new automated monitoring capabilities and several basic event detection capabilities along broad topic areas (undesirable states or precursors), such as loss of control and loss of airborne/ground separation.
- Developed automated methods to detect and flag anomalies such as high event rates, rapidly increasing event rates and anomalous change in event rates.

GA and Rotorcraft Flight Operations Quality Assurance (FOQA) Data Gathering and Analysis for ASIAS

- Expanded GA FOQA program to other segments of the GA and rotorcraft communities.
- Conducted analysis of other GA and rotorcraft safety data programs including the potential need for a GA Aviation Safety Action Program (ASAP).
- Researched the development of a stand-alone GA ASIAS in which directed studies, known risk monitoring and safety benchmarks can be conducted for issues specifically related to the GA community.
- Developed web-based tools that allow GA and rotorcraft communities to upload their flight data and return results of know safety risks based upon pre-defined analysis. These tools will also collect and upload the FDM datasets into ASIAS.

Transport Airplane Risk Analysis Evaluative Metrics

- Determined under-reporting rates for defined categories of transport airplane related failures and malfunctions.

Facility Risk Assessment Tool (FRAT)

- Developed a proof of concept to demonstrate the analysis framework that determines facility risk within National Airspace System (NAS) by using safety indicators and allow AOV field and headquarters personnel to target its oversight resources towards facilities posing the highest risk to air traffic safety.

Integrated Domain Assessment of Future Systems (referred to as Operational Safety Measurement of Future Systems in FY 2013)

- Developed a methodology for supporting AOV's evaluation of controls that are proposed by ATO to mitigate or eliminate initial or current high risk hazards.

Terminal Area Safety

Develop Models that Enhance the Ability to Use Advanced Flight Simulators for Advanced Maneuvers

- Developed modeling techniques that result in changes to the math model structure to match flight data in aerodynamic stalls.

Determining Runway Friction from Airplane Data

- Identified an acceptable method to efficiently estimate the runway friction level or slipperiness condition from airplane data recorded during landing.

Simulator Motion Cueing Criteria

- Collected simulator motion data at five training centers for three aircraft types per International Civil Aviation Organization (ICAO) Standard 9625 testing method.

Development of Stable Approach Criteria

- Completed review of accident databases to summarize path and track deviations for which a go-around was not conducted and ultimately led to an accident.

The System Safety Management program supports the Department of Transportation (DOT) strategic goal of Safety by reducing transportation related injuries and fatalities for both commercial air carrier and GA operations. The program also supports Outcome 2 under the Next Level of Safety Goal in FAA Destination 2025: Aviation risk is reduced through all phases of flight (gate-to-gate).

Why Is This Particular Program Necessary?

The System Safety Management program is designed to identify and analyze emerging threats in a cooperative nature with the aviation industry. Working cooperatively with aviation stakeholders provides the ability to analyze trends across the aviation community that is much more effective than monitoring individual airlines. Thus, the aviation community and FAA must have regular access to safety information to move toward a risk-based safety management approach. By creating a safety baseline and benchmarks, the program will produce products that regularly monitor safety enhancements to ensure the incorporation of new capabilities does not impact current levels of safety. Therefore, the program has direct impact in several areas that affect the incorporation of new technologies, NextGen capabilities, and evolution of the National Airspace System.

Along these lines, the System Safety Management program addresses issues identified in several GAO studies that call for the FAA to collect better data and improve its effort to identify and address safety issues. For FY 2015, research will continue to enhance ASIAS by developing capabilities, tools, and software that will improve safety oversight of the NAS, and through conducting analytical studies and safety assessments using ASIAS and other safety aviation data. Research will also continue developing empirically-derived transport airplane data for use by the Transport Airplane Directorate in developing safety metrics.

The Terminal Area Safety program improves the safety of operations near an airport. It provides solutions to reduce fatal accidents in the terminal area. The research efforts support the continued operational safety. In particular, one project addresses congressional mandate; four projects address NTSB recommendations; three projects address the number one and three causes of fatal accidents in the worldwide commercial jet fleet; and one project addresses Flight Safety Foundations top cause of accidents. Furthermore, three projects support either the certification or qualification of new technologies. All of the Terminal Area Safety projects have outputs aimed at changes in standards or policy.

How Do You Know The Program Works?

Through ASIAS, the FAA has been able to promote system-wide access and sharing of aviation safety data and analysis tools within the aviation community by providing safety resources that are integrated with the operations of aviation industry stakeholders. Directed studies commissioned by CAST have led to the development and implementation of intervention strategies that are currently being monitored for effectiveness.

Recent research outputs from the transport airplane risk analysis project include the development of injury ratios that are used by aircraft certification engineers in conducting risk assessment of manufacturers' proposed designs. This responds to the Aircraft Certification implementation of a safety management system program entitled "Monitor Safety Analyze Data".

Terminal Area Safety research results were used to provide effective response to Flight Crewmember Training section of Airline Safety Act of 2010 (i.e., Section 208 of Public Law 111-216). Landing distance studies were reviewed and used by the Takeoff and Landing Performance Analysis Rulemaking Committee in preparing their recommendations regarding a landing distance safety matrix.

Why Do We Want / Need To Fund The Program At The Requested Level?

Funding at the requested level is necessary to enable FAA to fully address safety issues. If funding was not possible at the requested level, the following initiatives may be compromised:

- A reduction in the System Safety Management budget will delay the completion of the FRAT tool, an automated capability that would optimize FAA resources in support of safety in the NAS. This would force the FAA Office of Aviation Safety to continue a more costly, less effective manual process of analyzing both operational and safety data with respect to NAS facilities.
- Within the TAS research, a reduction in funding will postpone research that would reduce motion deficiencies. These were identified as contributors to fatal accidents such as USAir 427 and American Airlines 587.

Detailed Justification for
A11.i Air Traffic Control/Technical Operations Human Factors

What Is The Request And What Will We Get For The Funds?

FY 2015 – Air Traffic Control/Technical Operations Human Factors

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.i Air Traffic Control/Technical Operations Human Factors	$9,821,778	$5,000,000	$5,898,000	+$898,000

For FY 2015, $5,898,000 is requested for Air Traffic Control/Technical Operations Human Factors. Major activities and accomplishments planned include:

Human Centered Design

- Develop a design standard for flight data presentation and management on air traffic control (ATC) radar/Automated Dependent Surveillance – Broadcast (ADS-B) displays.
- Develop design guidance for the display of time-based ATC information to enhance controller efficiency.
- Deliver recommendations for improving the effectiveness of ATC safety alerts by analyzing human factors data collected from field recordings, simulations, and modeling.
- Develop scenario elements and human performance metrics for system test and evaluation.
- Develop a Graphical User Interface (GUI) Style Guide to increase consistency in the design of GUIs used in future Technical Operations systems.
- Develop a standard for the use of color on ATC displays using a defined palette of colors recognizable, legible, and discriminable by controllers.

Increase Human Performance and Safety

- Conduct research and analyses, and recommend mitigations regarding human factors aspects of the top 5 ATC safety issues of FY 2015 to reduce their negative consequences to operations.
- Provide guidance on visual scanning methods used by radar controllers to improve academy and On-The-Job Training Instructor (OJTI) training.
- Provide best practices to mitigate impact from high levels of automation on maintainer performance.

Training Process Improvements

- Provide recommended techniques to support trainers in developing ATC problem solving skills in student controllers.
- Provide best practices for trainer behaviors that positively influence trainee development.

As the National Airspace System (NAS) moves toward modernization under NextGen, this program will emphasize reaching out to the operational ATC community to form an alliance with the objective of delivering benefits to users of the NAS through enhanced human performance and reducing the probability of human error in the NAS. The program will execute the Air Traffic /Technical Operations Human Factors Strategic Plan (http://go.usa.gov/gBKd). There will be continued emphasis on the development of human factors design standards for ATC systems. In the domain of technical operations, the program will evaluate the potential use of portable computers to enhance efficiency of the workforce and reduce the time to restore failed systems. Finally, the program will validate and improve methods to reduce the costs to the agency of training Air Traffic Control Specialists (ATCS).

For FY 2015, the program will emphasize the concept of Human System Integration (HSI) and safety aspects of the functions performed by air traffic controllers and technical operations (maintainer) personnel. The HSI concept will address how human error affects safety, workstation design, and training. The program will emphasize the creation of human factors standards that can be incorporated directly into the requirements documents and specifications of FAA acquisition programs. The program will also emphasize the creation of clear, well-supported, and actionable recommendations, based on human factors science and best practices, which will influence FAA decisions and policies. We will update human factors guidance for implementing Acquisition Management System (AMS) Policy as NextGen capabilities proceed through the development cycle. Our human factors practitioners will review and provide input to formal AMS policy and procedures that systematically incorporate human factors into agency acquisition activities.

The training of the next generation of Air Traffic Controller Specialists (ATCS) is a vital and continuous process that allows the agency to deliver its mission. The training research element of our program ensures that research and the subsequent output of these activities supports effective and safe training by improving the OJTI abilities to teach the complex cognitive skills of an ATCS. Of increasing importance will be the ability of an OJTI to train developmentals using technologically advanced ATC systems. By improving the effectiveness of training and providing improved methods to teach, the benefit to the agency is a reduction in the costs of training ATCS. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The Air Traffic Control/Technical Operations (ATC/TO) Human Factors program participates in all phases of the ATC system life cycle by generating requirements for human interface characteristics of future air traffic and technical operations workstations. Our research enhances the Air Traffic Organization's (ATO) understanding of the role that system design plays in mitigating human error, a major contributor to loss of separation events and runway incursions. Researchers are developing methods to train new air traffic controllers, instructors, and maintainers to minimize cost, increase the probability of success in training and on the job, and also to improve reliability and availability of the NAS. The ATC/TO Human Factors program includes the following research activities:

- Providing direct laboratory support to acquisition program offices through rapid prototyping of candidate ATC displays, human-in-the-loop simulations of systems under consideration, and providing human factors expertise during the development process
- Developing alternative solutions to human-system interface problems to reduce risk on acquisition programs
- Developing and evaluating potential mitigations for human error related to air traffic safety for implementation by safety and operational organizations in the ATO

The ATC/TO Human Factors program includes the following research outputs:

- Assessments of the effectiveness of fatigue risk management strategies implemented by the air traffic and technical operations elements of the ATO
- Advanced Air traffic workstations and concepts that increase workforce productivity by identifying key human performance factors that must be mitigated to enable the humans in the system to manage the future NAS traffic flow
- Guidelines and standards for design of computer-human interfaces used by Technical Operations and Air Traffic Control during system design

The research program works to improve safety by:

- Improving:
  - The ATO's ability to identify and arrest emerging trends in safety reports related to human performance
  - Methods to determine the effectiveness and utility of safety interventions and best practices at air traffic control facilities
  - Effectiveness of safety analyses that concentrate on detecting the potential for human error during the concept and research phases of the acquisition life cycle
  - Development of potential human factors safety mitigations for the ATO's Top Five Safety concerns.
  - Methods to train on-the-job-training instructors regarding defensive air traffic control.

The program works to improve the ATC and Tech Ops contributions to economic competitiveness by:

- Developing:
  - Integrated workstations that allow Technical Operations specialists to meet increased availability and service demand.
  - Methods to assess the value of proposed changes to workstations to determine if human-in-the-loop performance and efficiency is enhanced.
  - Advanced concepts for maintenance workstations that use automation and advanced technology to increase availability of the NAS, and decrease the probability of system outages.
- Improving:
  - Air-ground integration in a manner that allows controllers and pilots to cooperatively manage traffic loads as cockpit technology and air traffic workstations are more closely connected to efficiently move air traffic in the NAS.
  - Allocation and sharing of roles and responsibilities between controllers and pilots as technology evolves to meet future demands.

The ATC/TO Human Factors Program receives research requirements from internal FAA sponsoring organizations using a specified process (https://www.hf.faa.gov/ataf/docs/ATC_TO_HF_FY13_Research_Plan_v2.doc) that shows how resources to support sponsor requirements are allocated, and how research products are incorporated into air traffic practices, systems, and processes. Sponsoring organizations generate human factors research requirements: 1) for developing human factors standards, guidance, and recommendations to be applied during system design; 2) to identify needs involving fatigue, human error hazard identification, loss of separation errors, and runway incursion prevention; and 3) for NAS infrastructure operational and maintenance research, including ATC system maintenance displays, controls, and maintainability features specifications. The Human Factors Research and Development Laboratory assists stakeholders in developing research requirements by providing estimates, sample project plans, and literature reviews.

In FY 2014, major accomplishments planned include:

Advanced Air Traffic Systems

- Completed design standard for Airport Traffic Control Tower Alerts
- Developed human factors applications for air traffic systems increasing controller efficiency

Individual and Team Performance

- Analyzed air traffic human factors safety issues and data to mitigate loss of separation incidents

- Conducted research and analyses and recommended mitigations regarding human factors aspects of the Top 5 ATC safety issues of FY 2014 to reduce their negative consequences to operations.
- Analyzed the impact of controller aptitudes on training success
- Conducted research to evaluate OJT Instructor training and causes of attrition from field training to recommend activities to positively influence training success
- Defined profiles of the impact of selected levels of workload and time-on-task on controller performance

Advanced Technical Operations (Tech Ops) Systems

- Completed a Tech Ops Graphical User Interface Standard
- Developed electronic technical manual/interactive electronic technical manual standard for technical publications used in technical operations

The ATC/TO Human Factors Program supports the Department of Transportation (DOT) strategic goals of Safety and Economic Competitiveness by developing human factors research products applied during the development of air traffic systems to assure a human-centered design that achieves desired performance objectives, generating human factors maintenance standards and concepts to enhance the reliability and availability of NAS infrastructure, providing methods to mitigate human error in the NAS, and developing cost-effective methods to deliver air traffic training.

Why Is This Particular Program Necessary?

The safety and performance of the NAS is directly linked to the performance of human operators. Benefits from NAS modernization can only be achieved if the actors in the NAS deliver the services in a manner consistent with the concepts underlying the vision expressed by NextGen. The NAS actors must use the advanced systems emerging from the development process together with safe and effective procedures. Technology, data, procedures, and people must all work in concert to achieve the desired objectives. This human factors program is necessary to assure that the human component to NAS performance meets expectations. Human System Integration enables the agency to achieve its goals with respect to the human component of air traffic control. The program assures that the proper roles and responsibilities are assigned to the ATO work force to assure safety and efficiency when coupled with advanced technology and that the level of performance meets the needs of the flying public.

Among the most complex problems facing aviation today are those involving human error. To achieve quantifiable improvements in aviation safety and economic competitiveness, increasing emphasis is being placed on the human operator and those involved with the safe and efficient conduct of flight (e.g., supervisors, air traffic controllers, maintenance technicians). To achieve agency goals regarding safety this program is providing a means to pro-actively identify the potential for human error and mitigate the impact by reducing the probability that people will make errors, minimizing the impact of such errors, and enhancing the potential for human operators and maintainers to arrest the error and recover in a timely manner. Increasing economic competitiveness will involve the development of techniques and tools that increase controller efficiency. Some of these tools and techniques involve augmenting the human decision maker with a recommendation generated by automation. This program addresses the required balance between reliance on the automation and assuring that the human, who has a much better ability to make decisions in the presence of unforeseen situations, incomplete information, or multiple simultaneous competing priorities can and will take the correct action when necessary. We also assure that the automation does not lead the user into a complacent mode of blind acceptance or reduced vigilance. For the foreseeable future the controller will be held responsible for separation, which means that automation must support that function without inducing error or a loss of situation awareness.

The ATC/TO Human Factors program provides a valuable service for the ATO, the ATO Program Management Organization (PMO), and other FAA organizations. The program gathers the various organizations' research requirements and develops integrated research products. The personnel and laboratories funded by this program are unique national assets that have a proven track record of responding to PMO needs with high quality tangible and actionable products. FAA strives to include human factors research early in the development and implementation of new technologies to avoid cost and schedule overruns, particularly from unplanned changes to requirements.

How Do You Know The Program Works?

The over-arching theme of this research program is "Research to Practice". Examples include:

- The Air Traffic Color Vision Test is now in use during the medical screening process to assure that new controllers with job-related color vision deficiencies can properly discern critical color coding on ATC displays.
- The Front Line Manager Quick Reference Guide that is a recent output of this program has been strongly endorsed by the ATO service units and has been distributed by the ATO Safety organization to every front line manager in the ATO. It is also being used as course material in the FAA academy and other FAA management courses.
- The Human Factors Design Standard is a robust document containing human factors design criteria that is cited in every FAA acquisition contract that has a human interface.
- The results of our controller fatigue research are being implemented by the FAA fatigue risk management group to assure that safety is not compromised as a result of scheduling pressures.
- The prototype ATC workstations developed under the program are used by major ATC acquisition programs whenever they develop requirements or specifications for human-machine interfaces. Examples and interactive demonstrations of the prototype workstations have been transferred to FAA acquisition offices and system vendors to serve as visual specifications.
- Measurement and analysis techniques developed under the program are used throughout the FAA and by outside laboratories. Candidate ATC displays are routinely evaluated for readability, contrast, and usability following procedures developed under the program.
- Researchers sponsored under the program are frequently asked to serve as subject-matter experts to high-visibility, emergent efforts. The researchers apply their knowledge and technical capabilities to solve problems and influence short-turnaround, high-impact decisions. Recent examples include increasing the effectiveness of ATC safety alerts, developing a human-machine interface to indicate active voice communications, addressing acoustic and lighting problems at the Air Traffic Control System Command Center, and resolving readability problems on candidate ATC displays.

Why Do We Want / Need To Fund The Program At The Requested Level?

Air traffic control is a human-centered enterprise. This program is dedicated to enhancing human performance in the conduct of our mission. A reduction in the requested level of funding will force the closure of unique laboratory capabilities and the loss of critical research personnel. Since the requested level of funding only covers FAA personnel costs, benefits, and travel, any reduction would result in personnel reductions and program curtailment. For example, important research on controller safety would be cancelled, and the analysis of safety research data would be stopped. The Air Traffic Control/Technical Operations Human Factors program would stop making investments in fatigue research, the updated Human Factors Design Standard used during acquisition programs to reduce human factors risk would be stopped and force major ATC systems acquisition programs to use an outdated document. A reduction will require cancellation of any further human factors research regarding the role of automation in the future NAS.

One of the critical elements of this program relates to the human performance aspects of safety in the NAS. A review of the FAA ATC "Top Five" safety concerns shows that all the issues involve controller performance. Decisions on the acquisition of new systems to enhance safety and the application of new or modified procedures to reduce the likelihood of human error should be based on human performance research that is the output of this program. A reduction of funding to this program will have a negative impact on our ability to support these decisions and respond to the safety and human factors engineering needs of our sponsors in the ATO.

Detailed Justification for
A11.j Aeromedical Research

What Is The Request And What Will We Get For The Funds?

FY 2015 – Aeromedical Research

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.j Aeromedical Research	$8,849,187	$7,000,000	$8,919,000	+$1,919,000

For FY 2015, $8,919,000 is requested for Aeromedical Research. Major activities and accomplishments planned include:

Civil Aerospace Medical Institute (CAMI) Aeromedical Research Program

- Aeromedical Systems Analysis
  - Assess disqualifying pathologies relative to medical certification of pilots and related decision making processes over a pilot's entire aeromedical history.
  - Develop methods of forensic evidence collection in the investigation of the biomechanics and biodynamics of aircraft accident injuries and the determination of the mechanism of injuries in support of injury research and mitigation strategies.
- Accident Investigation and Prevention
  - Develop a liquid chromatography/mass spectrometry (LC/MS) method to confirm and quantitate the presence of synthetic and natural cannabinoids in postmortem fluids and tissues. Synthetic cannabinoids are more potent than marihuana, highly toxic, and readily available – representing a risk to aviation safety.
- Crash Survival
  - Assess passenger comprehension of onboard placards, pictorials, pictograms, and other safety briefing materials, in combination with and assessments of improved evacuation aids and way-finding systems, specifically the use of "persuasive technology" and its application to education of transport aircraft passengers with regard to emergency evacuation.
- Aviation Physiology
  - Assess the clinical effects of cabin altitude during air travel on patients with pulmonary disease such as Chronic Obstructive Pulmonary Disease (COPD); evaluate potential increased risks to compromised individuals and determine if there is an inflammatory response to hypoxia.
  - Identify the potential health risks to individuals exposed to toxic fumes during flight. This effort is in support of the FAA Modernization and Reform Act of 2012; Public Law 112-95, Section 320, Item 5.

Fire and Cabin Safety

- Injury Criteria for Obliquely Oriented Seats
  - Develop methods of predicting occupant injuries in obliquely facing seats during a survivable crash: test/analysis methods and injury criteria.
  - Develop techniques to use advanced occupant models to accurately simulate human response to impact and predict potential injuries for a range of occupant sizes and likely impact vectors.

  - Evaluate advanced anthropometric test dummies (ATD) to determine their ability to determine injury risk for a range of occupants exposed to likely impact vectors and severities.

- Evacuation Analytical Tools
  - Development of techniques and models to assess injury risk to support regulatory actions, standards development, accident investigations, and enhanced safety of airplane interior arrangements and emergency equipment/ operations – model validation.

The Aeromedical Research program will conduct aeromedical research pertaining to the human aspects of protection and survival from exposure to hazardous conditions relative to civil aerospace operations. Research activities will develop new and innovative ways to support FAA regulatory and advisory missions to improve the safety, security, health, and survivability of aviators, cabin crew, and the flying public. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The Aeromedical Research program supports FAA's regulatory and medical certification processes that develop safety and health regulations covering all aerospace craft occupants and their flight environments; Recommending and developing equipment, technology, and procedures for optimal (a) evacuation and egress of humans from aerospace craft, (b) dynamic protection and safety of humans on aerospace craft, and (c) safety, security, and health of humans on aerospace craft.

Research program outcomes include:

- Improving safety, security, protection, survivability, and health of aerospace craft passengers and aircrews
- Exploiting new and evaluating existing bioaeronautical guidelines, standards, and models for aerospace craft cabin equipment, procedures, and environments
- Providing research data to serve as the basis for new regulatory action in evaluation of existing regulations to continuously optimize human performance, health, and safety at a minimum cost to the aviation industry
- Analyzing pilot medical and flight data, information from accidents and incidents, and advanced biomedical research results to propose standards and assess certification procedures that optimize performance capability
- Evaluating the complex mix of pilot, flight attendant, and passenger activities in a wide range of environmental, behavioral, and physiological situations to propose standards and guidelines that will enhance the health, safety, and security of all aerospace travelers

In FY 2014, major accomplishments planned included:

Civil Aerospace Medical Institute (CAMI) Aeromedical Research Program

- Aeromedical Systems Analysis
  - Assessed the aeromedical, accident investigation, and other safety issues related to civil aviation pilots with diabetes - application of the Scientific Information System (SIS) III.
  - Evaluated the use of over-the-counter antihistamines by general aviation pilots involved in fatal aircraft accidents and the implications to aviation safety – application of the Medical ANalysis TRAcking (MANTRA) System.

- Accident Prevention and Investigation
  - Developed more comprehensive and sensitive screening methodology for the identification of pain management drugs. New pain medications are more potent and efficient, yet may cause significant flight performance decrements.
  - Examined the prevalence of abused drugs by region, drug type, pilot certificate type, and other factors to support rulemaking on drug abatement.
  - Identified biomarkers for disqualifying pathologies to aid the development of methods to facilitate disease diagnosis and development of decision support tools for medical certification and accident investigation processes.
- Crash Survival
  - Supported the certification of innovative aircraft unique child restraints. The project included impact tests and model development. It investigated and developed test procedures for unusual devices (e.g., straps) towards standardizing testing methodologies.
  - Evaluated the state-of-the-art inflatable flotation device performance and alternative water landing survival strategies. (e.g., different markings, handles, functional testing, floatation characteristics, and assembly parts).
- Aviation Physiology
  - Developed a model of the kinetics of metabolic rundown in loss of consciousness resulting from hypobaric anoxia and a positive gravitational force that is applied to the vertical axis of the body, (i.e., +Gz acceleration).
  - Developed a version of CARI (CARI-NAIRAS) that uses NASA's near real time Nowcast of Atmospheric Ionizing Radiation System.

Fire and Cabin Safety

- Evacuation Analytical Tools
  - Developed and maintained analytical tools, empirical data, and scientific expertise to support regulatory actions, standards development, accident investigations, and enhanced safety of airplane interior arrangements and emergency equipment and operations, as they relate to the ability to evacuate an airplane.

The Aeromedical Research program supports the DOT strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carrier and general aviation.

Why Is This Particular Program Necessary?

The human component of the aviation system is simultaneously the strongest and the weakest link in aerospace safety. Thus, the Aeromedical Research program conducts research to maximize the strengths of the human link and minimize inherent human weaknesses to prevent accidents and improve safety and health in both commercial and general aviation aircraft. The Aeromedical Research program investigates and analyzes injury and death patterns in civilian flight accidents and incidents to determine their cause and develop preventive strategies. This research supports FAA regulatory and medical certification processes that develop safety and health regulations covering all aerospace craft occupants and their flight environments. The program combines toxicological and medical aspects of all fatal and high priority aircraft accidents to provide accident investigators, medical certification managers and researchers with near real time data to rapidly identify issues and support for safety information systems.

The Aeromedical program recommends and develops equipment, technology, and procedures for optimal (a) evacuation and egress of humans from aerospace craft and (b) crash protection and safety. National Transportation Safety Board reports show the survivability of commercial aircraft accidents including serious accidents is quite high – greater than 94 percent; thus, research to ensure occupants can survive crash impact and safely evacuate the aircraft is essential. The implementation of this research was evidenced on January 15, 2009 by the successful water evacuation of all occupants in U.S. Airways Flight 1549 in the Hudson River.

How Do You Know The Program Works?

The Aeromedical Research program is exclusive in its focus of the most important aspect of the National Airspace System: the human operator and the public which s/he serves. Evidence of the Aeromedical Research program's success includes advances in four critical human safety areas:

- Aeromedical Systems Analysis - Aeromedical reviews of fatal accidents in direct real time support of accident investigators; assessments of very large datasets concerning aircrew, their appropriate medical certification, and their involvement in aviation accidents and incidents.

- Accident Prevention and Investigation - CAMI serves as the primary national site for toxicology testing relative to accident investigation fatalities and is at the forefront of functional genomics research in the identification of biomarkers for environmental stressors, disease, and other factors that affect human performance (e.g., alcohol, fatigue, and hypoxia).

- Crash Survival – Aeromedical assessed crash environments including head impact, seat deformation, occupant restraint performance, and emergency procedure effectiveness; all key issues in aircraft certification processes and protection of human life. The following accidents resulted in several survivors likely because of implementation of the work done at CAMI: British Airways 777-200 in London, England, 1/17/08; American Airlines 737-800 in Kingston Jamaica, 12/22/09; US Airways A320 in New York, NY, 1/15/09; Merpati 737-300 in Manokwari-Rendani Airport Indonesia, 4/13/10; Caribbean Airlines 737-800, Guyana, 7/30/11; Lion Air 737-800, Bali Indonesia 4/13/13 were all hull loss and 100% survivors. In all cases the seat requirements and in some the access to Type III exits likely contributed to these results.

- Aviation Physiology – Aeromedical assessed human performance at altitude, adequacy of protective breathing equipment, aircraft environmental control systems, cabin air quality, and methods of detection and protection from chemical, biological, and radiological threats.

Why Do We Want / Need To Fund The Program At The Requested Level?

A reduction in funding will extend research time to assess critical human protection and survival aeromedical issues that affect the safety and health of airline crewmembers and the flying public.

Detailed Justification for
A11.k Weather Program

What Is The Request And What Will We Get For The Funds?

FY 2015 – Weather Program

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.k Weather Program	$15,203,852	$14,200,000	$17,800,000	+$3,600,000

For FY 2015, $17,800,000 is requested for the Weather Program. Major activities and accomplishments planned include:

Aviation Weather Forecasting

- In-Flight Icing
  - Complete development of Alaska Icing Forecast and Diagnosis capability.
- Model Development and Enhancement
  - Develop higher resolution rapid refresh model ensembles with longer lead times to support aviation forecasts.
- Turbulence
  - Complete development of global turbulence forecast capability.
- Convective Weather
  - Complete development and coordinate with Flight Standards on recommended procedures for ramp closures due to lightning for all sizes of airports to improve safety of personnel and gain efficiencies in terminal operations.
  - Complete quality assessments of probabilistic 2-12 hour forecast of new thunderstorm development; transition algorithms to PMO.
- Ceiling and Visibility
  - Transition Alaska C&V analysis capability to National Weather Service (NWS) for operations.
- Volcanic Ash
  - Complete evaluation of use of a prototype common platform for posting volcanic ash products from multiple Volcanic Ash Advisory Centers (VAAC).
  - Complete initial prototype volcanic ash reverse modeling capability.
- Quality Assessment
  - Complete assessment of icing diagnosis and forecast capabilities for Alaska.
- Advanced Weather Radar Techniques
  - Complete development of initial Terminal Doppler Weather Radar (TDWR) data quality control algorithm.
- Aviation Weather Demonstration and Evaluation Services
  - Conduct assessment of convective weather uncertainty measures.

- Wind Compression for NY Metro Terminals
  - Develop process for using an algorithm that forecasts the onset and cessation of wind compression conditions in an operational setting, considering benefits vs. current process, ease of use and utility of Human-Over-The-Loop.
- NAS Weather Information Requirements to be met by NWS
  - Identify NAS Weather Information Functional Requirements
  - Develop modeling and simulation methodologies for weather information performance requirements validation
  - Commence identification and validation of NAS weather information performance requirements for decision support

Aviation Safety Weather Research and Development

- Safety-Driven Weather Requirements for Wake Mitigation
  - Extend existing Flight Standards Service models to include weather observation errors to determine impact on wake encounter probability for gate to gate operations.
- Terminal Area Icing Weather Information System
  - Conduct laboratory development and evaluation of system and prepare for field testing of system.
- Mitigating the Ice Crystal Weather Threat to Aircraft Turbine Engines
  - Evaluate proposed certification envelopes for high ice water content ice crystal conditions using research flight data and other relevant data.
  - Improve and evaluate diagnosis and nowcasting tools for high ice water content ice crystal conditions using research flight data and other relevant data.
- Using Data Linked Aircraft Sensed Weather Information to Determine Probability of Icing Conditions Aloft
  - Collect and analyze necessary data and establish dataset of applicable airborne sensed data.
- Mountain Pass Weather in the United States (CONUS)
  - Conduct a comparative study of mountain pass observed and sensed weather data to known or reported conditions.
  - Develop draft report with results and recommendations for mountain pass camera location.

The Weather Program will continue to develop and enhance forecast capabilities and weather translation techniques to meet emerging NextGen requirements and operational improvements (OIs). This will include applied research in naturally occurring atmospheric hazards including turbulence, convective activity, icing, and restricted ceiling/visibility. Additional forecast capabilities to address convectively-induced turbulence will be developed to enhance en route safety and capacity. Alaska in-flight icing diagnosis and forecast capabilities and oceanic convective weather forecasts needs for NextGen will also be developed. FAA national and international partnerships will continue in addressing mitigation of ice crystal weather threats to aircraft turbine engines. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The Weather Program performs applied research to minimize the impact of weather on the NAS. It consists of specific initiatives that support NextGen weather OIs and transition legacy capabilities to meet NextGen requirements, often through collaborative and complementary initiatives with NWS; as well as focused initiatives to help mitigate safety and/or efficiency issues associated with well documented weather problems. The National Oceanic and Atmospheric Administration (NOAA)/NWS platforms and forecasters also use algorithms developed by the Weather Program to provide regulatory forecast products and NAS decision aids. Research is an integral element in providing the advanced forecast information that can be integrated into aviation decision-support tools.

The Weather Program will develop advanced forecast capabilities and weather translations as detailed in the NextGen Implementation Plan. To support transition of these advanced capabilities to operations, the Weather Program will evaluate and assess them to verify their performance. The advanced capability requirements for NextGen include the following:

- Advanced convective weather forecast - high-resolution, deterministic and probabilistic 0 to 8hour forecasts of convection for air traffic management (ATM) to enhance capacity.
- Hourly (nowcasts) and 0- to 18-hour probabilistic forecasts of turbulence for use by ATM, Aviation Operations Centers (AOC), and the pilot in the cockpit to enhance safety and capacity.
- Hourly (nowcasts) and 0- to 12-hour probabilistic forecasts for in-flight icing, including its severity for use by ATM, AOC, and the pilot in the cockpit for preflight planning to enhance safety and capacity.
- Analysis and 0- to 12-hour probabilistic forecasts of ceiling, visibility, and flight category for use by ATM, AOC, and the pilot in the cockpit, and to support estimation of capacity resources at airports as well as increased general aviation safety.

The weather capabilities developed by the FAA provide the following benefits:

- Depiction of current and forecasted in-flight icing areas – enhances safety and regulatory adherence.
- Interactive data assimilation, editing, forecast, and dissemination tools – improves aviation advisories and forecasts issued by the NOAA/NWS as well as accessibility to users of aviation weather information.
- Depiction of current and forecast precipitation type and rate – enhances safety in the terminal area.
- Depiction of current and forecast terminal and en route convective weather – enhances terminal and en route capacity.
- Short-term prediction and forecast of ceiling and visibility in the national area – enhances en route safety.
- In-situ, remote detection, and forecast of en route turbulence, including clear-air turbulence – enhances en route safety and capacity.
- Modeling and simulation capability to validate performance requirements.

The Weather Program leverages research activities with members of industry, academia, and other government agencies through interagency agreements, university grants, and Memorandums of Agreement.

The Weather Program partners with the NOAA Earth System Research Laboratory (ESRL) and the NOAA National Centers for Environmental Prediction (NCEP) Environmental Modeling Center to develop high resolution, rapidly updating models that have and continue to be implemented operationally into NOAA/NWS operations. These modeling efforts result in enhanced diagnosis and forecasts of weather hazardous to aviation, including en route turbulence, convective weather, ground and in-flight icing and more. Future model development and implementation efforts in partnership with NOAA are planned to address these hazardous aviation weather phenomena on a global scale which will include coverage of oceanic airspace operations. Weather Program radar technique development efforts, in partnership with the NOAA National Severe Storms Laboratory (NSSL) have developed radar applications implemented onto NexRad that are enhancing in-flight icing, turbulence, and convective weather forecast capabilities. The Weather Program in partnership with NSSL is developing a multi-radar multi-sensor capability that provides high resolution 3-D radar grids for advanced weather detection and aviation forecast applications.

AWRP icing efforts have developed in-flight and ground diagnosis and forecast capabilities, including the capability to differentiate between freezing rain and freezing drizzle. These results are being used in current research efforts to develop a terminal area ground and in-flight capability to provide icing and precipitation type information for use by air traffic management. These efforts are being coordinated and leveraged with radar technique development at NOAA NSSL as well as the NASA Glenn Research Center (GRC) Icing Remote Sensing System program.

AWRP turbulence research efforts have developed en-route CONUS turbulence forecast capabilities. These efforts have been coordinated with the radar technique development efforts at NOAA NSSL. Planned efforts will address the expansion of the turbulence capabilities over the global domain.

Additionally, using much of the research outlined above, the FAA is coordinating and leveraging with NOAA/NWS to develop a consistent set of gridded weather information for use in evolving NextGen ATM decisions and decision support tools.

In FY 2014, major accomplishments planned include:

Aviation Weather Forecasting

- In-Flight Icing
  - Completed experimental version of Alaska Icing Forecast and Diagnosis capability for evaluation.
- Model Development and Enhancement
  - Completed enhancements to High Resolution Rapid Refresh resulting in improvements to ceiling and visibility (C&V), convective weather, turbulence and icing forecasts.
- Turbulence
  - Completed mountain wave turbulence forecast capability from surface to flight level 450.
- Convective Weather
  - Completed development of initial prototype to provide oceanic convective weather hazard guidance out to 36 hours.
  - Completed development of initial probabilistic 2-12 hour forecast of large-scale convective initiation.
- Ceiling and Visibility
  - Developed initial prototype of Alaska Analysis capability in coordination with the National Weather Service.
- Volcanic Ash
  - Completed assessment of performance and operational requirements as a basis for model improvement.
- Quality Assessment
  - Completed development of verification plans and data sets for Alaska icing forecast and diagnosis capabilities.
- Advanced Weather Radar Techniques.
  - Completed development of real-time Winter Surface Hydrometeor Classification algorithm.
- Aviation Weather Demonstration and Evaluation Services
  - Completed capability evaluation of verification and validation toolsets targeting operational impact and meteorological verification of aviation weather forecasts. Completed concept evaluation of convective weather forecast uncertainty measures.

- Wind Compression for NY Metro Terminals
  - Developed a prototype algorithm to forecast the onset and cessation of terminal wind compression conditions.

AVS Weather Research and Development

- Safety-Driven Weather Requirements for Wake Mitigation
  - Quantified wake vortex encounter probabilities as a function of weather parameter observations.
- Terminal Area Icing Weather Information System (TAIWIS)
  - Commenced initial laboratory development and prototype field tests of capabilities needed for research system based on TAIWIS conceptual model/definition.
- Mitigating the Ice Crystal Weather Threat to Aircraft Turbine Engines
  - Continued processing and analysis of ice crystal data from real-time nowcasting exercise, commercial events, research flights, satellites, radar, etc., to support improvement and verification of nowcasting capability.
  - Conducted joint flight program with European High Altitude Ice Crystal (HAIC) project in Darwin, Australia.
- Lower Visibility for CAT 1 Approaches and RVR Conversion
  - Completed report on adequacy of simulator data to validate equivalency of visibility measurements to specific RVR values.
- Using Data Linked Aircraft Sensed Weather Information to Determine Probability of Icing Conditions Aloft
  - Completed concept of use and system design documents.
- Mountain Pass Weather in the United States (CONUS)
  - Obtained and documented actual reports of icing and turbulence conditions to conduct a comparative study of observed/sensed weather data to known or reported conditions.

The Weather Program supports the DOT strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carrier and general aviation flights. To reduce the number and severity of accidents, or potential accidents associated with hazardous weather, the Weather Program provides accurate, accessible, and high resolution advanced weather forecast information that can be used by Air Traffic Management, dispatchers, and pilots, and to meet current and planned regulatory requirements.

The Weather Program will perform research to improve and enhance the process by which weather needs and requirements are derived, validated and eventually levied to weather information providers, including the NWS. This will include innovative modeling and simulation techniques to validate emerging performance requirements spanning from today's operations to expected NextGen capabilities.

The Weather Program develops and then manages the transition of advanced research capabilities to the FAA's weather provider, the NWS, for their use as input to aviation weather product development or for direct dissemination to NAS users as mandated by the FAA. This transition process includes joint Weather Program, NWS and industry stakeholder participation on strategic planning teams to collaboratively develop Research Evolution Plans which align and prioritize research.

Why Is This Particular Program Necessary?

Weather has been identified as a causal factor for 70 percent of delays and 20 percent of accidents. The NextGen Implementation Plan and Weather Functional requirements documents identify improvements needed in the areas of weather detection and forecasting as well as product creation and dissemination. The weather program supports NextGen Segment Implementation Plan Weather Operational Improvements and Destination 2025 goals related to efficiency, capacity, safety, and environmental impacts. It facilitates transition of legacy weather requirements and products to meet emerging NextGen needs. Weather is frequently cited as a primary or secondary cause in accidents and injuries (per the NTSB, turbulence is the leading cause of inflight injuries) and the general aviation (GA) fatality rate in weather related accidents, on average is 75% (GA accounts for 88% of weather related accidents). There was more than 1M air carrier delay hours in 2012 due to weather resulting in more than $200M in delay costs. Continued evolution of improved forecasting algorithms with applicability to achieving higher aviation safety and capacity during hazardous weather is needed. The Weather Program also supports the need to provide high quality weather nowcasts and forecasts uniquely designed to allow for rapid and effective decision making by air traffic management, dispatchers and pilots to proactively select safe and optimal routes. As espoused in the NextGen Concept of Operations, weather is an essential element to be integrated into traffic flow management safety and capacity tools.

How Do You Know The Program Works?

Forecast capabilities as a result of the development of in-flight icing, turbulence, ceiling and visibility, and convective weather algorithms have been transitioned into operational or experimental use and have led to improved short-term and mid-term forecasts of these naturally occurring atmospheric hazards. Specifically the Graphical Turbulence Guidance 2 (GTG2), which was operationally implemented at the NOAA Aviation Weather Center in FY 2010, is providing 0-12 hour forecasts of turbulence above 10,000 feet enhancing NAS safety and capacity. GTG2 also uses as an input, in-situ eddy dissipation rate (EDR) data downlinked from aircraft which provides enhanced forecast accuracy. The EDR metric, a result of AWRP funded efforts, was approved as an International Civil Aviation Organization standard. Additionally the Forecast Icing Product with severity, which was operationally implemented at the AWC in FY 2011, provides 0-12 hour forecasts of atmospheric conditions conducive to inflight icing including severity and the probability of supercooled large drops, enhancing NAS safety and capacity.

The Weather Program has developed an advanced storm forecast capability known as Consolidated Storm Prediction for Aviation (CoSPA). During the summers of 2010 and 2011, CoSPA was used and evaluated in a live operational setting by air traffic managers at the Air Traffic Control System Command Center, as well as multiple other FAA facilities and airlines. CoSPA forecasts were found to be equal or better than current operational forecast capabilities and provided information critical for air traffic management. CoSPA was transitioned in FY 2012 to the FAA Air Traffic Organization's Program Management Office for test and evaluation prior to operational implementation. It has been estimated that CoSPA will save 10,000 hours of delay annually, which equates to $26.8 million in delay cost savings.

Weather Program research capabilities are also transitioned to the NWS upon completion of a rigorous process including scientific, performance quality, safety, and operational suitability assessments. The NWS is incorporating these Weather Program research capabilities to improve the delivery of the FAA required services that they provide. Improvements in available weather information that are enhancing general aviation safety have been provided to the NWS by the Weather Program.

Why Do We Want / Need To Fund The Program At The Requested Level?

A reduction in the Weather Program budget would impact the program's ability to move forward effectively and provide capabilities needed to meet safety and capacity requirements. Funding would be reduced in the following areas, with impacts are described:

Turbulence - There were more than 4,000 encounters of severe turbulence in 2012. Implementation of an enhanced turbulence forecasting capabilities for all flight levels has been estimated to provide annual safety and capacity benefits in excess of $20M. Reducing turbulence funding will delay completion of a convectively-induced turbulence forecast for all flight levels resulting in continued high numbers of encounters with severe turbulence and passenger and flight attendant injuries.

Ceiling and Visibility (C&V) in Alaska - There are on average nine accidents per year due to adverse C&V conditions in Alaska within the general aviation (GA) and air taxi communities resulting in more than $40M per year in fatalities, injuries, and aircraft damage. An Alaskan ceiling and visibility analysis capability is currently under development in collaboration with the NWS. Reduced funding would delay completion of this capability and delay the anticipated reduction in the high rate of fatalities, injuries, and aircraft damage due to adverse C&V conditions in Alaska.

In-flight Icing - The in-flight icing accident rate for GA and air taxi operations in Alaska is four times higher than in the continental United States (CONUS) (based on the accident rate/million hours of operations) and results in more than $1M per year in fatalities, injuries, and aircraft damage. Forecast and diagnosis capabilities for Alaska are currently under development. Reduced funding would delay completion of an Alaskan in-flight icing capability and delay the anticipated reduction in the high rate of fatalities, injuries, and aircraft damage.

Convective Weather - Convective weather is the leading cause of weather delays in the NAS (75%). Avoidable delays due to thunderstorms provide a $16 billion (FY 2009 dollars) benefits pool for a 20-year life cycle. Reduced funding would delay the development of a 2 – 12 hour probabilistic forecasting capability that is critical to enhanced ATM decision making.

Volcanic Ash - Assessment of a common platform for volcanic ash products across multiple Volcanic Ash Advisory Centers and developing an initial reverse modeling capability in coordination with NOAA and ICAO, critical to the development of improved warning and forecast tools for enhanced safety and capacity, would be delayed. This will impact the capability to decrease the safety risk to enroute aircraft during a volcanic eruption and to increase the efficiency and capacity by minimizing restricted airspace.

Mountain Pass Weather Study - After weather cameras were installed throughout Alaska, GA accidents decreased an average of 15% below FAA safety targets (2008-2011 accident statistics). Additionally, the FAA expects an NTSB safety recommendation asking for mountain wave cameras, similar to the Alaska program, in both the CONUS and Hawaii. Reduced funding would delay possible mountain camera installation in the CONUS and a missed opportunity to provide increased GA safety in hazardous mountain terrain regions.

TAIWIS - A new certification rule for supercooled large drop (SLD) conditions, which includes freezing rain and freezing drizzle, is currently scheduled to take effect in 2013. The information currently available on SLD in the terminal area is not sufficient for efficient and safe operations in the terminal area by aircraft certified under the new rule. It is necessary for pilots to have reliable information on the intensity of the icing conditions not only at the ground but aloft, and this requires further development of remote sensing capability in the terminal area which TAIWIS will provide. Reduced funding could result in a less robust remote sensing capability, and consequently impact the efficiency and safety of operations under the new rule.

Detailed Justification for
A11.l Unmanned Aircraft Systems Research

What Is The Request And What Will We Get For The Funds?

FY 2015 – Unmanned Aircraft Systems Research

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.l Unmanned Aircraft Systems Research	$4,228,004	$8,644,000	$8,974,000	+$330,000

For FY 2015, $8,974,000 is requested for Unmanned Aircraft Systems (UAS) Research. Major activities and accomplishments planned include:

Collect and Analyze UAS Safety Data from the Congressionally Mandated Test Sites

- Gather and analyze UAS test site data to document key issues related to the safe, efficient, and timely integration of UAS in the National Airspace System.

Sense and Avoid (SAA) System Multi-sensor Surveillance Data Fusion Strategies

- Evaluate proposed surveillance sensors and data fusion strategies to support SAA functions.

Sense and Avoid (SAA) System Certification Obstacles

- Develop comprehensive list of operational and airworthiness approval issues based on applicable 14 CFR 91 compliance.

Surveillance Criticality for SAA

- Conduct safety evaluation of separation and collision avoidance functions supported by airborne surveillance systems and equipment.
- Identify operational (e.g. separation standards) or aircraft systems and equipment design standards shortcomings to meeting safety NAS operational safety objectives.
- Recommend proposed mitigation strategies to compensate for the lack of a pilot in the aircraft.

Integration of ACAS-X into SAA for UAS

- Develop metrics, methods, and analytical models to evaluate effects of functional independence between self-separation and collision avoidance.
- Conduct simulation(s) to develop and validate concepts, displays, and procedures for implementing avoidance maneuvering.

Evaluation of Communications Strategies in the Context of UAS Operations

- Conduct human-in-the-loop (HITL) experiments to assess lost link procedures and impacts of UAS lost link events on the NAS.

Simulating UAS in NAS Operations

- Provide oversight capability through modeling and simulation to assist the FAA's Air Traffic Safety Oversight Service in performing and evaluating safety assessments of proposed UAS operations in the NAS, enabling the safe integration of UAS.

UAS System Safety Criteria

- Document key UAS safety characteristics and the method(s) proposed to identify criteria to determine whether or not a particular UAS would be incapable or unlikely of causing harm in the air or on the ground.

FY 2015 funding will support the UAS program to conduct research on UAS technologies which directly impact the safety of the NAS. The FY 2015 portfolio of work will be focused on sense and avoid, control and communications, system safety criteria, modeling and simulation requirements, and research that will support the safe, efficient, and timely integration of UAS in the NAS within the 14 CFR regulatory framework. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The UAS Research program supports FAA efforts in implementing the Next Generation Air Transportation System (NextGen) by studying safety implications of new aircraft operational concepts and technology to the NAS and supporting the development of new and modified regulatory standards to support these new technologies. The program's research activities focus on new technology assessments, methodology development, data collection and generation, laboratory and field validation, and technology transfer.

Researchers are developing methodologies and tools to establish regulatory standards on UAS design and performance characteristics while operating in the NAS. They are evaluating technologies, conducting laboratory and field tests, performing analyses and simulations, and generating data to support standardization of UAS civil operations. New standards are being developed to establish UAS certification procedures, airworthiness standards, operational requirements, inspection and maintenance processes, and safety oversight responsibilities. Policies and guidance materials are also being published to provide FAA certification engineers and safety inspectors with the knowledge and tools they need to ensure the safe integration of UAS into the NAS.

Safe, efficient, and timely integration of UAS into the NAS requires the FAA to partner with other agencies, academia, and industry to support the FAA's mission and allow the FAA to leverage our partner's research.

The FAA has partnered with NASA to determine how UAS research, expertise, and assets can be leveraged between the two agencies and duplication of effort can be minimized. The FAA is providing subject matter experts to support NASA's UAS Integration in the NAS Project to review research objectives and assumptions. The FAA and NASA have shared UAS research project plans and analysis results. Several team meetings have already been held and are scheduled to continue on a recurring basis. FAA and NASA established an umbrella Interagency Agreement for UAS Research that will allow the FAA to centralize and focus its collaboration with NASA while leveraging expertise across all NASA research centers.

The FAA is collaborating with the Department of Defense (DoD) Office of the Secretary of Defense (OSD) Technology & Logistics (AT&L) on the DoD Unmanned Aircraft Systems – Airspace Integration (UAS – AI) Joint Test (JT) and Quick Reaction Test (QRT) projects. These projects will provide an excellent opportunity for the FAA and the DoD to collaborate on the evaluation of the DoD Joint Concept of Operations (CONOP) for UAS-AI which focuses on near-term advanced accommodation of the UAS into the NAS. The suite of proposed flight profile tests will potentially serve as an incremental step to inform the FAA's roadmap for integration.

FAA researchers continue to establish and build dialogue with industry (e.g. Insitu and AAI) and academia through Cooperative Research and Development Agreements (CRDAs), grants, and Other Transaction Agreements (OTAs) to leverage UAS research collaboration and opportunities.

In FY 2014, major accomplishments planned include:

Sense and Avoid (SAA) System Certification Obstacles

- Developed a comprehensive list of operational and airworthiness approval issues based on 14CFR 91 compliance.
- Identified and documented examples from other systems that have been approved for use in the NAS to determine similarities.

Evaluation of UAS Communications Strategies

- Conducted assessment of research and literature related to ground-to-ground communications architectures within the context of UAS operations. Determined challenges, risks, and/ or limitations these may impose on UAS operations.
- Conducted a human-in-the-loop (HITL) experiment to assess lost link procedures and impacts of UAS lost link events on the NAS.

Sense and Avoid System Multi-sensor Surveillance Data Fusion Strategies

- Recommended data fusion strategies based on review (and validation where necessary) of existing SAA research and documentation.
- Identified a representative mix of surveillance sensors and data fusion strategies to be considered in next phase of research.

UAS System Safety Criteria

- Reviewed available literature on UAS hazard severity studies to determine applicability of previous research to current task.
- Documented key UAS safety characteristics and the method(s) proposed to identify criteria to determine whether or not a particular UAS would be incapable or unlikely of causing harm in the air or on the ground.

Simulating Oversight of UAS in NAS Operations

- Conducted literature review of current status of UAS and safety issues.
- Selected and acquired software to build base capability of simulation model.
- Conducted simulation(s) to exercise and assess model.

The Unmanned Aircraft Systems Research program supports the Department of Transportation (DOT) strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carrier and general aviation. To safely integrate UAS into the NAS, FAA needs to conduct research to develop airworthiness standards, devise operational requirements, establish maintenance procedures, and conduct safety oversight activities.

Why Is This Particular Program Necessary?

Safe, efficient, and timely integration of UAS into the NAS poses substantial technical challenges not only to the FAA, but also to the aviation industry as a whole. UAS use the most advanced technologies to achieve operational capabilities far exceeding the expectations of current NAS users. These unique capabilities have demonstrated potential commercial applications as well as scientific research needs. Data from the recently completed UAS technology survey initiated within the UAS Research program shows that integrating UAS in the NAS will potentially affect the entire NAS due to the various sizes of UAS (less than a foot up to the size of a commercial jet), wide ranges of maximum take-off weight (less than a pound to the weight of a large jet), large performance disparities in reference to the existing certificated aircraft, and capabilities of operating in all classes of airspace (even the ones weighing less than 100 pounds are capable of operating in Class A airspace), which could potentially disrupt normal aircraft traffic flow and induce unknown safety hazards while interacting with other NAS users.

Research activities within the UAS Research program will generate technical information to support development of policies, guidance materials, and advisory circulars on using advanced technologies to demonstrate regulatory compliances while operating UAS in the NAS. UAS-specific technical issues, such as sense and avoid, control and communications with air traffic control, and emergency response requirements, will also require research. UAS will also be integral to NextGen development.

How Do You Know The Program Works?

The research sponsor, the AVS UAS Integration Office, and the research performer, the UAS matrix team within the NextGen R&D Integration Division, conduct monthly program management reviews to report progress of research execution and to make adjustments to task execution plans as needed. Each research area includes detailed milestones, schedules, and success criteria that are tracked and reported on a monthly basis. Each research area includes an implementation plan that describes how results may be implemented into usable products that support the safe, efficient, and timely integration of UAS in the NAS. Furthermore, research reports are distributed to the FAA's UAS research partners to ensure that the UAS community is informed of results, and that the research is considered in the development of UAS standards, guidance, and regulatory products.

Why Do We Want / Need To Fund The Program At The Requested Level?

Delays in FAA UAS safety research will impede the safe, efficient, and timely integration of UAS into the NAS and jeopardize the congressionally-mandated UAS integration schedule. Such delays or reductions in funding will impact planned research and procurements necessary to meet congressional mandates. Demand for NAS access is growing from multiple operators including DoD, public use agencies, and the private sector. To standardize the certification processes and ultimately limit restrictions associated with UAS certification, the FAA needs to determine the parameters, operations, and procedures that define acceptable UAS behavior while maintaining the highest level of safety. Many challenges remain that must be overcome before the basis for certification and operations of UAS are standardized and made routine. This includes developing methods to support the integration of UAS into the NAS without causing delays, capacity reduction, or placing the public at risk. Extensive research is required to produce the appropriate safety case evidence.

Detailed Justification for
A11.m NextGen – Alternative Fuels for General Aviation

What Is The Request and What Will We Get For The Funds?

FY 2015 – NextGen – Alternative Fuels for General Aviation

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A11.m NextGen – Alternative Fuels for General Aviation	$1,962,674	$6,000,000	$5,700,000	-$300,000

For FY 2015, $5,700,000 is requested for NextGen – Alternative Fuels for General Aviation. Major activities and accomplishments planned include:

- Conduct laboratory, rig, and fit-for-purpose standardized fuel testing (Phase 1).
- Conduct material compatibility evaluation of candidate fuels with key airplane and engine fuel system components (Phase 1).
- Conduct toxicological evaluation of candidate fuels (Phase 1).
- Begin developing standardized engine and aircraft test procedures (Phase 2).
- Begin establishing aircraft and engine test articles (Phase 2).

This research supports the transition from current aviation gasoline (AVGAS) 100 low-lead (100LL) to an unleaded replacement fuel that will have the least impact on the fleet. The Unleaded AVGAS Transition Aviation Rulemaking Committee (UAT ARC) plan defined a process for the fuel transition called the Piston Aircraft Fuel Initiative (PAFI). The PAFI process defines a framework to evaluate potential candidate fuels in two distinct phases. In Phase 1, up to ten fuels will be evaluated for laboratory and fit-for–purpose (FFP) properties. In Phase 2, in-depth engine and airframe testing will be conducted on the two best candidate fuels. Many of the current laboratory methods are not applicable to new fuels, and additional fit-for-purpose (FFP) issues arise with use of new fuels. To evaluate all candidate fuels equally, standardized test procedures will be used to evaluate these laboratory and FFP issues.

The standardized fit-for-purpose (FFP) properties, test methods, and procedures developed for specific candidate fuels will consist of current ASTM D910 specification laboratory test methods, and recently developed specific fuel-related laboratory tests, material compatibility, toxicology, and rig tests. These standardized tests will be used to identify the potential impact and limitations of the particular proposed fuel specification.

Under Phase 2, standardized engine and aircraft test methods for candidate test fuels will be developed and test facilities will be established to allow testing of best candidate fuels.

The candidate fuels to be tested will be developed by industry representing the best possible options with the least impact on the general aviation (GA) fleet. Depending upon the chemical composition of successful candidate fuels, significant testing may be required on all phases of the fuel from production, distribution, and storage in bulk form, to the aircraft issues related to materials compatibility and fuel handling. Research will investigate fuel toxicological issues and exhaust emissions. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

Previous research attempted to find a drop-in (no impact to the existing fleet) unleaded replacement fuel for 100LL. The approach was to facilitate industry evaluation of the anti-detonation performance of unleaded avgas alternatives by investigating the interaction of various chemical and metal additives with various base fuel formulations. Over 279 fuel formulations were evaluated for their octane properties in laboratory experiments and anti-detonation performance in test engines. While none met the criteria to be a drop-in replacement for 100LL, valuable data was collected on the interaction of the tested additives and base fuels, on the performance differences between leaded and unleaded fuels, and on the actual octane levels of 100LL fuel. The prior research resulted in the development of industry standard detonation analysis techniques, including sensor equipment, data acquisition systems, and analysis algorithms that will be incorporated into standard detonation testing procedures. Knowledge gained regarding the detonation performance between leaded and unleaded fuels will be used in the development and application of test methods, procedures, and standards to evaluate and certify new candidate fuels.

The research has now shifted from the search for a drop-in fuel to developing solutions that will minimize the impact of a new fuel on the existing fleet. In response to the rapidly increasing concerns regarding the future availability of 100LL expressed by the GA community, the UAT ARC was chartered on January 31, 2011, by the Federal Aviation Administration (FAA) Administrator to investigate, prioritize, and summarize the current issues relating to the transition to an unleaded avgas; and to recommend the tasks necessary to investigate and resolve these issues. The committee was also tasked to provide recommendations for collaborative industry-government initiatives to facilitate the development and deployment of an unleaded avgas with the least impact on the existing piston-engine aircraft fleet. The committee was comprised of key stakeholders from the GA community including aviation trade and membership associations, aircraft and engine manufacturers, petroleum and other fuel producers, the Environmental Protection Agency (EPA), and the FAA.

The UAT ARC Final Report provided 5 key recommendations and 14 additional recommendations to facilitate the transition to a fleet-wide replacement avgas. The five UAT ARC recommendations are:

1. Implementation of the "Fuel Development Roadmap – AVGAS Readiness Levels (ARL)" developed by the UAT ARC that identifies the key milestones in the avgas development process and the information needed to support assessment of the viability of candidate fuels in terms of impact upon the existing fleet, production and distribution infrastructure, environment and toxicology, and economic considerations.
2. Centralized testing of candidate unleaded fuels at the FAA William J. Hughes Technical Center funded by government and industry in-kind contributions. Centralized assessment and testing would generate standardized qualification and certification data that can be used by the fuel developer/sponsor to support both ASTM specification development and FAA fleet-wide certification eliminating the need for redundant testing.
3. The establishment of a solicitation and selection process for candidate unleaded aviation gasolines for the centralized fuel testing program. This process should include a FAA review board with the technical expertise necessary to evaluate the feasibility of candidate fuels.
4. Centralized FAA fuel certification office with sufficient resources to support unleaded aviation gasoline projects.
5. Establishment of a collaborative industry-government initiative referred to as the Piston Aviation Fuels Initiative (PAFI) to implement the UAT ARC recommendations in this report to facilitate the development and deployment of an unleaded AVGAS with the least impact on the existing piston-engine aircraft fleet. The overall objective of this initiative is to identify candidate unleaded aviation gasolines, to provide for the generation of qualification and certification data on those fuels, and to support fleet-wide certification of the most promising fuels.

The FY 2015 request will support the implementation of UAT ARC Recommendation 2. Specifically, the funding will support laboratory testing, rig testing, and FFP testing of candidate fuels using standardized test procedures. Funding will also support developing Phase 2 engine and aircraft standardized test procedures, and establishing test vehicles. The testing will evaluate the safety impacts of deviating from the current leaded avgas specification and FFP properties. It will also provide data to support the industry qualification and FAA certification of the tested fuel. Research will address any safety impacts from using fuels that deviate from the traditional experience of the GA fleet including the reduction and removal of lead additives in avgas.

The FAA will work with the EPA and the GA community while evaluating the safety, environmental impacts, and the performance of alternatives to 100LL. Near-term research will evaluate the safety and performance of unleaded aviation gasoline and provide data to support the qualification and certification of candidate unleaded fuels.
The research program will also provide data, knowledge, and support to update or create new certification methodologies, standards and Advisory Circulars (ACs) that promote continued airworthiness of aircraft engines, fuels, and airframe fuel management systems.

In FY 2014, major accomplishments planned include:

- Developed standardized test procedures to evaluate laboratory and fit-for-purpose (FFP) properties for candidate fuels.
- Developed standardized rig test procedures to evaluate FFP properties for candidate fuels.
- Developed standardized test procedures to evaluate candidate fuel material compatibility with key airplane and engine fuel system components
- Developed standardized test procedures to evaluate toxicological effects of candidate fuels.

The NextGen – Alternative Fuels for General Aviation Program supports the Department of Transportation (DOT) strategic goal of Safety by reducing transportation related injuries and fatalities on commercial air carrier and general aviation. The FAA's Destination 2025 includes the following performance metric for 2018: A replacement fuel for leaded aviation gasoline is available by 2018 that is usable by most general aviation aircraft.

Why Is This Particular Program Necessary?

Approximately 167,000 aircraft in the United States and 230,000 worldwide rely on 100LL avgas for safe operation. 100LL is also the only remaining transportation fuel in the United States that contains the additive tetraethyl lead (TEL). TEL creates the very high octane levels required to prevent detonation (engine knock) in high power aircraft engines. Operation with inadequate fuel octane can result in engine failure and aircraft accidents.

Potential use of alternative fuels poses a significant challenge to maintaining the safety of the legacy fleet. The impact on performance, operability, and compatibility with fuel system materials must be carefully evaluated before approving an alternative fuel. Research will initially focus on enhancing existing capabilities to establishing core competencies and to develop standard test methods. This will be followed by laboratory, rig, engine and aircraft testing on alternatives to the current 100LL aviation fuel to develop test data to support industry qualification and certification of the tested fuel.

Petitions and potential litigation from environmental organizations regarding avgas containing lead are pressuring the EPA to consider regulatory actions to eliminate or reduce lead emissions from aircraft. Similar regulatory actions are being considered around the world. In response to rapidly increasing concerns expressed by the GA community, the FAA Administrator chartered the UAT ARC in January 2011. The UAT ARC issued their findings in a final report dated February 17, 2012. The UAT ARC was tasked with investigating, prioritizing, and summarizing the current issues relating to the transition of the GA community to an unleaded avgas and to recommend tasks necessary to investigate and address these issues. The UAT ARC was also tasked to provide recommendations for collaborative industry-government initiatives to facilitate the development and deployment of an unleaded avgas with the least impact on the existing piston-engine aircraft fleet.

The UAT ARC identified the following issues that they felt must be considered in any effort to transition the aviation industry to an unleaded avgas:

- An unleaded replacement fuel that meets the needs of the entire fleet does not currently exist.
- No program exists that can coordinate and facilitate the fleet-wide evaluation, certification, deployment, and impact of a fleet-wide replacement avgas.

- No market driven reason exists to move to a replacement fuel due to the limited size of the AVGAS market, diminishing demand, specialty nature of avgas, safety, liability, and the investment expense involved in a comprehensive approval and deployment process.
- No FAA policy or test procedures exist to enable fleet-wide assessment and certification of a replacement unleaded fuel.

Research is needed to develop standardized test procedures, to use those standardized procedures to evaluate proposed unleaded fuels, and to understand and mitigate any safety impact on the existing fleet. Further, test methods and procedures necessary to support legacy fleet recertification on a new avgas do not exist.

Research to date has documented and characterized the effects of engine deposits containing elemental lead on the antiknock performance of replacement fuels. This research found significant improvement in antiknock performance of unleaded fuels in an engine containing lead deposits. This quantitative effect, if not understood by engine certification officials, could result in a significant reduction of approved fuel operating safety margin.

The program team completed initial full-scale engine tests on reduced-lead aviation gasoline. Unleaded and leaded aviation gasoline with similar specification properties will perform differently in full-scale aircraft engines. This research addresses mis-fueling concerns related to performance differences of the two fuels.

An engine parametric study of the current FAA registered piston engine fleet is underway that is using physical and operational engine parameters to assess the fleet impact from use of reduced octane unleaded aviation fuels. This is follow-on research to the minimum approved fuel study that was previously completed. Currently, only the minimum approved fuels are known for the legacy fleet, not the actual fleet unleaded fuel requirement. With the complexity of unleaded fuel related safety issues being directly proportional to the quality of the unleaded fuel required, it is necessary to know the impact of reduced octane on the fleet. The research will primarily be used to identify a portion of the fleet that could operate on the replacement fuel. This research is needed to assist efforts for fleet certification on reduced octane unleaded fuels.

How Do You Know The Program Works?

The proposed research program supports the comprehensive plan developed by the UAT ARC and is considered the most viable path towards addressing this pressing national environmental issue by all the stakeholders who participated in the committee. The success of the program relies on partnerships with industry consultants and subject matter experts, aviation technical research groups and standards bodies, and GA industry companies. These industry groups, many of whom participated in the UAT ARC, include the GA AVGAS Transition Coalition, CLEAN 100, the Coordinating Research Council Aviation Fuels Committee, the American Petroleum Institute, the Society of Automotive Engineers committees, and the ASTM D0.J aviation fuels committees. Members of these industry groups will contribute expert knowledge, test fuels, engines, parts, technical documentation, and access to engineering personnel to support the successful completion of the research. Cooperative Research and Development Agreements (CRDAs) will be used to share resources between fuel manufacturers and engine and airframe manufacturers for successful completion of research. Future close working relationships with the GA industry will be necessary to ensure successful outcomes from the research program.

Why Do We Want / Need To Fund The Program At The Requested Level?

The requested funding level has resulted from a thorough review of the UAT ARC final report. The funding is the minimum necessary to meet the recommendations of UAT ARC and to meet the FAA Destination 2025 performance metric for unleaded AVGAS. The FAA funding requested in this program is a complementary element of a wider industry initiative that depends on the FAA participation. Consequently, the success of the industry program to develop and deploy an unleaded replacement avgas with the least impact on the existing fleet depends on the FAA successfully completing the research program at the requested level of funding.

A reduction in funding for the NextGen - Alternative Fuels for General Aviation Program will delay the testing and assessments necessary to produce data to determine the certification impact and safety assessment of whether the near-term reduction in lead content of aviation gasoline could meet the estimated EPA target. Reductions in funding will also delay the completion of standardized test procedures and candidate fuel testing needed to support fleet-wide certification and will result in FAA's inability to meet the Administrator's Destination 2025 performance metric to have a replacement fuel available for leaded aviation gasoline that is usable by most GA aircraft by 2018.

Detailed Justification for
A12.a NextGen – Wake Turbulence

What Is The Request and What Will We Get For The Funds?

FY 2015 – NextGen - Wake Turbulence

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A12.a NextGen - Wake Turbulence	$9,860,615	$9,000,000	$8,541,000	-$459,000

For FY 2015, $8,541,000 is requested for NextGen - Wake Turbulence research. Major activities and accomplishments planned include:

Wake Standards for New Aircraft Designs

- Complete recommendations for the Airbus A320-Neo series aircraft, working with European Aviation Safety Agency and the Airbus Company.

Analysis of Airports for Characteristics That Allow Reduction of Required Wake Separations between Aircraft

- Get approval of capacity enhancing wake turbulence mitigation procedures for two additional Core airports' closely spaced parallel runways (CSPR).

Development of NextGen Wake Procedure/Decision Support Tool Concepts

- Complete initial wind prediction algorithm for use with the Wake Turbulence Mitigation for Single Runways decision support tool feasibility prototype.
- Evaluate air traffic control (ATC) procedures for providing wake mitigation separations between unmanned aeronautical systems and piloted aircraft.

Develop Statistical Wake Encounter Frequency/Severity Risk Assessment Capability

- Gather wake encounter (minor or less impact on flight) frequency and severity statistics using an aircraft flight data recorder screening tool that that is able to detect for further study likely wake encounters that occurred during an aircraft's flight.
- Gather wake encounter (major or more severe impact on flight) frequency and severity statistics from NASA Aviation Safety Reporting System and from the ICAO safety reporting system.

Develop Models, Data Bases and Data Sources

- Create data collections and analyses required for determining wake mitigation safety buffers to be applied in NextGen eraair traffic control decision support tools

The program provides solutions to support the nation's airspace structure and airports in meeting today's and NextGen era's air traffic throughput demands. More capacity efficient ATC wake separation mitigation procedures and processes for terminal area and en-route operations will enable more flight throughput in today's constrained, high demand airspace and increase the operational throughput capacity of our present airport runways.

Development of capacity-efficient ATC wake turbulence mitigation separation minima, procedures and processes along with associated ATC decision support tools (DSTs) will directly fill some of the gap between expected demand and National Airspace System capacity. NextGen era potential solutions to solve congested airspace and runway issues are constrained by the current wake mitigation procedures and static wake separation minimum separations applied in the en-route and terminal airspace. High level analyses have indicated that some additional runway throughput capacity could be obtained at airports if the wake turbulence separation processes could be optimized to consider the performance characteristics of the aircraft generating the wake, the weather conditions along the approach and departure paths to and from the runway, and the wake encounter performance characteristics of the aircraft following the generating aircraft. The NextGen era enhanced aircraft surveillance, positioning and data sharing infrastructure will allow less required separation between aircraft in constricted en-route airspace – allowing more flight throughput. Wake mitigation procedures, enabled by the NextGen era infrastructure, need to be developed to safely allow reduced en-route separations between aircraft. The outputs from this R,E&D project will provide various levels of separation standard and procedure complexity and technology applications to help fill the runway and high demand airspace needed throughput capacity. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The NextGen - Wake Turbulence program conducts applied research to improve, in terms of flight efficiency and safety, aircraft separation processes associated with today's generalized and static air navigation service provider (ANSP) wake turbulence mitigation separation standards. For example, during periods of less than ideal weather or visibility conditions, implementation of an ANSP DST that adjusts required wake separations based on wind conditions would allow the ANSP airport to operate at arrival rates closer to their visual flight rule arrival throughput capacity. Additionally, the research program is developing wake-mitigation application solutions that safely enable reduced aircraft separations in congested air corridors and during arrival and departure operations at our nation's busiest airports.

This research addresses the needs of the FAA Air Traffic Organization and works with the agency's Aviation Safety Organization to ensure new capacity-efficient procedures and technology solutions are safe and that the airports and air routes targeted for their implementation are those with critical needs to reduce airport throughput capacity constraints and air route congestion. The research program works with controllers, airlines, pilots, and aircraft manufacturers to include their recommendations and ensure training and implementation issues are addressed in the program's research from the start. Customers include pilots, air traffic control personnel, air carrier operations, and airport operations. Stakeholders include the commercial pilot unions, FAA unions, other International Civil Aviation Organization (ICAO) air navigation service providers, and aircraft manufacturers.

The requested funding for FY 2015 will support the accomplishment of the following NextGen Operational Improvements (OIs):

- Automated Support for Separation Management – OI# 102137
- Reduce Horizontal Separation Standards, En Route – 3 miles – OI# 102177
- Dynamic, Pairwise Wake Turbulence Separation – OI# 102152
- Reduce Separation- High Density Terminal Less Than 3-miles – OI# 102150
- Single Runway Departure and Arrival (Wake Turbulence Mitigation – Single Runway – WTMSR) – OI # 102151 (Arrival) and 102145 (Departure)
- Wake Turbulence Mitigation for Departures (enhancement) – OI# 102140
- Improved Parallel Runway Operations (7110.308) - OI# 102141
- Wake Turbulence Mitigation for Arrivals – System – OI# 102144
- Efficient Metroplex Merging and Spacing - OI# 102142

These OIs all need safe reductions in the wake mitigation minimum separations currently required between aircraft to gain the needed flight throughput capacity in the National Airspace System. The NextGen – Wake Turbulence research FY 2014 projected accomplishments listed below will continue to provide the information, procedures, and operational concepts that are required to achieve these desired separation reductions.

In FY 2014, major planned accomplishments include:

Wake Standards for New Aircraft Designs

- Developed wake separation recommendations for the Airbus A-350 series aircraft working with the European Aviation Safety Agency, EUROCONTROL, and the Airbus Company.

Analysis of Airports for Characteristics That Allow Reduction of Required Wake Separations between Aircraft

- Obtained approval of capacity enhancing wake turbulence mitigation procedures and associated Safety Risk Management Document for the Phoenix and Las Vegas airports' closely spaced parallel runways (CSPR) via Change 4 of FAA Order 7110.308.

Development of NextGen Wake Procedure/Decision Support Tool Concepts

- Completed initial alternatives tradeoff analysis on potential development approaches for the Wake Turbulence Mitigation Single Runway decision support tool.

Determination of Statistical Wake Encounter Frequency/Severity

- Delivered to the Flight Standards Service an aircraft flight data recorder screening tool that is able to detect likely wake encounters (minor or less) for further study that occurred during an aircraft's flight. Will be used to help establish the statistical frequency of wake encounters occurring in today's operating environment.

Develop Algorithms, Models, Data Bases and Data Sources

- Continued support of RTCA Special Committee 206 as it progressed in the development of avionics design standards for the transmission of aircraft weather observations to the ANSP and to surrounding aircraft. Real time wind data observed by aircraft along its flight path is vital to the beneficial functioning of future ATC decision support tools supporting the dynamic wake mitigation separations between aircraft – both in the terminal area and in the en-route portion of flight.
- Designed initial Enhanced Wind Forecast Model that will ingest aircraft observed wind information in addition to inputs from the airport ASOS and the NWS Rapid Refresh forecast model

The NextGen - Wake Turbulence program supports the Department of Transportation (DOT) strategic goal of Economic Competitiveness as well as the FAA's Destination 2025 goals of Delivering Aviation Access through Innovation and Improved Global Performance through Collaboration through obtaining greater flight capacity.

Why Is This Particular Program Necessary?

NextGen - Wake Turbulence research analyzes and collects the data to establish the wake mitigation separations that are to be applied by ATC to new series of aircraft entering operational service. The program's analysis capability was used to establish separations for the Airbus A380, Boeing 747-800, and the Boeing 787 series aircraft. Analysis work is currently underway for the Airbus A350 series aircraft and will be needed for the Airbus A320-Neo and Boeing 737-Max series of aircraft. Without this work, FAA will not be able to execute its regulatory role in establishing wake separation standards.

NextGen - Wake Turbulence research provides the data, analysis, modeling and aircraft wake turbulence information collection systems that are needed to bring to market wake turbulence mitigation standards, procedures, and processes that allow safe but more capacity efficient aircraft-to-aircraft wake separations. The research has produced airport specific procedures and safety analyses to bring a new air traffic control wake mitigation capacity enabling procedure into everyday operation at airports with closely spaced parallel runways (CSPR). More airports are requesting similar analysis support to allow their use of the dependent 1.5 nm diagonal approach procedure on their CSPR when instrument approach procedures are required.

NextGen – Wake Turbulence research has produced validated concepts for applying aircraft performance characteristics and runway crosswind information to reduce the required wake mitigation separations applied to aircraft arriving to and departing from an airport's runways. The research products have been transitioned into the FAA F&E projects: Wake Re-Categorization, Wake Turbulence Mitigation for Departures, and Wake Turbulence Mitigation for Arrivals. These F&E projects, when implemented, will provide air traffic control with decision support tools that will allow them to safely reduce the wake separations between aircraft when crosswinds blow the wakes out of the way of trailing aircraft. Reduced wake separations equate to more airport operations per hour when the airport is busiest. Aircraft manufacturers, airports and air carriers agree that squeezing in more operations onto an airport's existing runway structures results in major savings in flight delays during bad weather and the time period directly following a major weather event and have been reflected in the RTCA requested Operational Improvements 102137, 102140, 102141, 102142 and 102144.

How Do You Know The Program Works?

Recent evidence that the research program works are the following:

- The publishing of FAA Order 7110.308, "1.5-Nautical Mile Dependent Approaches to Parallel Runways Spaced Less than 2,500 Feet Apart" in CY2008 with subsequent changes (change 2, September 2010; change 3, October 2012) that allows airports with certain CSPR configurations to use this airport capacity enhancing wake separation procedure when weather and/or visibility conditions require the use of instrument flight rule operations. Use of the order's procedure could increase the airport's CSPR throughput arrival rate up to 10 more landings per hour. The order is based on this program's wake data collection and analysis work at Lambert – St. Louis International Airport and other airports in the US and Europe.
- NextGen – Wake Turbulence research constructed the operational concept for the decision support tool plus generated the crosswind prediction and monitoring logic for the decision support tool that will be used by controller's to know when they can safely more rapidly depart aircraft on the airport's closely spaced parallel runways. This tool began operation at San Francisco International Airport in May 2013 and will begin operation at Houston George Bush Intercontinental Airport, and Memphis International Airport later in FY 2013.
- FAA adopted revised, safe, and more capacity-efficient wake separation standards at Memphis International Airport on November 1, 2012, based on results of this research program. These more capacity efficient standards are highly desired by air carriers, with FedEx realizing a 10+% reduction in departure delays at Memphis International Airport when they are running their peak departure operation.
- The FAA, working with the Boeing Company and the European Aviation Safety Agency (EASA), determined the ATC wake separations to be applied to the new Boeing 747-8 series aircraft and the Boeing 787 series aircraft. All the aircraft performance data was furnished by the Boeing Company to the FAA and EASA. The FAA's NextGen – Wake Turbulence research project provided the analysis and modeling required to validate the Boeing-provided data and establish the required wake separation for the aircraft series. The wake separation recommendations were then provided to ICAO who then transmitted them to its member states in FY 2011. These wake separation standards determinations were needed for the Boeing aircraft to enter global operational service.

Why Do We Want / Need To Fund The Program At The Requested Level?

The NextGen – Wake Turbulence research addresses both the FAA's near term need (capacity enhancing wake mitigation procedures/processes) for enhancing current operations and developing wake mitigation solutions that will be required as FAA transitions to trajectory based and flexible terminal operations. The FY 2015 requested funding will provide the needed wake solution concepts and underlying technology, collected data, and analyses in a timeframe to meet NextGen expectations. The highest priority for the research is developing wake separation capacity enhancing changes for today's air traffic control operational environment. A significant reduction in funding would impact the next highest priority for wake research, research that must be completed before the three to five year NextGen mid-term wake decision support tool full scale development cycle can begin. Specifically, a reduction in funding would delay the NextGen benefit of reduced flight delays during weather events at the NextGen core airports. The NextGen – Wake

Turbulence R,E&D program, if fully funded in FY 2015, would be developing the technology and applications that would allow, if significant crosswinds or headwinds are present, for reductions in the wake separations applied by ATC during instrument flight rule operations to and from an airport's runways - which equates to higher runway throughput without the major cost of adding more "concrete."

Detailed Justification for
A12.b NextGen - Air Ground Integration Human Factors

What Is The Request and What Will We Get For The Funds?

FY 2015 – NextGen - Air Ground Integration Human Factors

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A12.b NextGen – Air Ground Integration Human Factors	$9,699,874*	$11,329,000	$9,697,000	-$1,632,000

*includes the previous NextGen – Self-Separation Human Factors budget item

For FY 2015, $9,697,000 is requested for NextGen - Air Ground Integration Human Factors. Major activities and accomplishments planned include:

Error and Automation

- Complete draft report providing information for the development of methods to support evaluation processes. This report will also contain data to support methods of compliance so that regulators can determine if a particular automated function meets the necessary requirements.
- Complete research report and research plan examining pilot roles in human – automation interaction, including recommendations on what information needs to be shown to pilots and what does not (e.g., should pilots be shown information about things that they cannot change).
- Complete report documenting lessons learned and best practices from experiences and research data with new human error regulation 14 CFR 25.1302.

Air Carrier Training

- Complete report identifying NextGen competencies for pilots and dispatchers.
- Complete report reviewing scientific, technical, and regulatory literature on procedures and procedure development and that describes systems approach for developing procedures.

Avionics, New Technologies, and Procedures

- Complete report documenting operational issues associated with surface indication/alerts.
- Complete report documenting operational Human Factors performance issues with low visibility flight and ground operations using EFVS/SVS.
- Complete research plan based on accidents/incidents data of NextGen ADS-B/CDTI applications.
- Provide recommendations for improvements to flight deck and ATC procedures for DataComm. Identify human factors issues and recommend actionable mitigations such as improvements to procedures, training, certification, and guidance materials.
- Document recommendations for research on design and evaluation of flight crew procedures for PBN operations.

The FY 2015 research program develops human factors scientific and technical information to support the development of standards, procedures, training, policy, and other guidance material addressing human factors in ADS-B/CDTI enabled applications, data communications, NextGen advanced instrument procedures, flight deck automation, and low visibility operations using advanced vision systems.

The human factors research on flight crew error will advance scientific and technical information to enable successful implementation of the new human error regulation, 14 CFR 25.1302, Installed Systems and Equipment for Use by the Flightcrew, and will provide recommended guidance that is intended to aid Aircraft Certification personnel in their evaluation of automated functions against certification requirements.

Likewise, research on pilot roles in human-automation interaction will inform guidance updates for flight deck information display requirements.

Air carrier training research will focus on NextGen flight crew and dispatcher competencies including tasks, skills, knowledge, and will identify flight crew performance requirements to address operational applications. Research will also address the development of flight crew procedures and provide recommendations for suitable approaches for developing procedures enabling NextGen capabilities.

Avionics, New Technologies, and Procedures human factors research will lead to recommendations allowing FAA to continue to progress operational benefits for users of advanced vision system technologies and ADS-B/CDTI NextGen applications, data communications, and advanced RNAV/RNP instrument procedures under NextGen Performance Based Navigation initiatives.

Funding in the amount of $1.0M is provided for the Commercial Space COE. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The research program develops human factors scientific and technical information to address human performance related to error and automation; avionics, new technologies, and procedures; and air carrier training. As part of this effort, research addresses coordination among pilots and air navigation service providers (air traffic controllers), human system integration, and error management strategies to implement NextGen capabilities. The results of research are intended to support the development of standards, procedures, training, policy, and other guidance material required to implement the operational improvements anticipated by NextGen.

In FY 2014, major accomplishments planned include:

Error and Automation

- Drafted report characterizing information automation and documenting the results of an empirical study to identify recurring issues in the design of impact of information automation.
- Drafted report documenting initial recommendations on finding compliance with human error regulation 14 CFR 25.1302.

Air Carrier Training

- Completed draft research report describing internal and external non-normal checklist design factors, common errors committed by flight crews during non-normal checklist and procedure execution with proposed recommendations for the ways in which checklist design might mitigate these errors.

Avionics, New Technologies, and Procedures

- Completed a research report with recommendations for LVO/SMGCS symbology.
- Surveyed pilot responses- responding to advisories and alerts associated with ADS-B and airport moving map.
- Initiated follow-on research to provide recommendations for displays, alerts, procedures and training associated with data communications.
- Conducted human factors evaluation of current low visibility procedures for approach, landing, and takeoff using EFVS/SVS to identify operational and human performance issues and recommendations for mitigation.
- Completed instrument procedures report documenting results of research on electronic chart usability and recommended certification guidance.

- Developed plans for research to develop guidance on charting of taxi routes for low visibility operations, depiction of area navigation (RNAV) airways, and continued research to develop recommended design and evaluation guidance for flight crew procedures for Performance Based Navigation (PBN) operations.

Research supports development of policy, standards and guidance required to design, approve, and operate NextGen equipment and procedures. Flight crew training for NextGen is also addressed. Additionally, this research will include integrated demonstrations of NextGen procedures and equipment in the context of ongoing NextGen - Air Ground Integration Human Factors research.

The NextGen - Air Ground Integration Human Factors program supports the Department of Transportation (DOT) strategic goal of Safety and addresses flight deck and air traffic service provider integration for each operational improvement or NextGen application considered, with a focus on those issues that primarily affect the pilot side of the air-ground integration challenge. Through use of modeling, simulation, and demonstration, the program assesses interoperability of tools, develops design guidance, determines training requirements, and verifies procedures to support certification, flight standards, and Air Traffic Organization (ATO) service units for ensuring safe, efficient and effective human system integration in transition of NextGen capabilities.

Why Is This Particular Program Necessary?

NextGen involves implementation of new complex systems and flight crew procedures. The NextGen - Air Ground Integration Human Factors program supports the FAA Aviation Safety (AVS) certification and operational approval processes and also provides tools to address flight crew procedures, maintenance procedures, training development, and continuous safety monitoring. Specific human factors research activities in this R&D program address advanced flight deck automation and air ground digital data communications technologies.

Planned human factors R&D efforts are addressing flight deck displays, message content, and procedures for disseminating data communications to support transfer of routine ATC clearances, route clearances and negotiations, reroute requests, transfer of voice frequency channels, exchange of near term hazardous weather information, and flight crew reports for appropriately equipped aircraft. Specific research plans are developed in coordination with FAA stakeholders including those in the AVS line of business including Aircraft Certification Service and Flight Standards Service, and ATO program offices such as Data Communications, Surveillance and Broadcast Services, and offices within the NextGen organization (ANG).

The FAA's aviation safety mission dictates that we ensure those systems are reliable and safe, even when they fail, and that we address the operational aspects of these systems. The research program supports the AVS certification and operational approval processes and also provides tools to address flight crew procedures, maintenance procedures, training development, and continuous safety monitoring. Specific human factors research activities in this R&D program address NextGen procedures such as RNAV and required navigation performance (RNP), and NextGen capabilities such as those derived from the use of ADS-B.

How Do You Know The Program Works?

The evidence that the program works in addressing shortfalls in scientific and technical information is measured by success of incorporating research results (reports and findings) into FAA's regulatory and guidance material. Each research project is requested to provide data needed to update specific FAA regulatory and guidance documents to ensure human factors issues are identified and addressed. The continual request and advocacy for human factors research from AVS end-users/sponsors across field offices and headquarters are key indicators that this research successfully addresses critical needs. For example, the research requested by FAA groups responsible for evaluating and approving new NextGen Avionics (the Avionic Systems Branch, the Technical Programs and Continued Airworthiness Branch, and the Flight Technologies and Procedures Division) ensures that the key human factors issues with Electronic Flight Bags, DataComm, etc., are identified and addressed. The results of previous years research have been directly folded into the respective FAA Advisory Circulars (e.g., the EFB Advisory Circular 120-76B and for DataComm the Advisory Circular 20-140). Each research requirement submitted by FAA end-users/sponsors clearly identifies the FAA regulatory and guidance documents that will benefit from the research.

Why Do We Want / Need To Fund The Program At The Requested Level?

This research provides human factors recommendations using scientific and technical information to assist Aircraft Certification Service and Flight Standards Service personnel in their evaluation of new technology and operational procedures that are necessary to achieve flight deck and integrated air-ground capabilities supporting NextGen applications. A reduction in funding to the NextGen - Air Ground Integration Human Factors program has two potential impacts. First, the reduction could result in a safety risk, where the NextGen technologies, operations, and procedures are implemented without substantiating regulatory research to ensure safety issues are mitigated. In this case, the FAA regulatory and guidance material would be released, but would not include sufficient human factors material. Without appropriate guidance, the FAA runs the risk of approving things they should not approve or not approving systems, etc., that they should approve. Second, a funding reduction could impact or delay anticipated ADS-B, Data Communications, and Synthetic and Enhanced Vision Systems efficiencies.

Detailed Justification for
A12.c NextGen – Weather Technology in the Cockpit

What Is The Request And What Will We Get For The Funds?

FY 2015 – NextGen - Weather Technology in the Cockpit

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A12.c NextGen - Weather Technology in the Cockpit	$4,826,000	$4,000,000	$4,048,000	+$48,000

For FY 2015, $4,048,000 is requested for NextGen - Weather Technology in the Cockpit (WTIC). Major activities and accomplishments planned include:

Flight Deck Information

- Develop a preliminary concept for presenting uplinked or cross linked meteorological (MET) information on a legacy display or electronic flight bag (EFB) to evaluate the feasibility and utility of providing a strategic forward looking composite weather presentation.
- Improve characteristics of MET information such as format, latency, accuracy, etc., so that the information is ready for direct integration into select decision support tools (DSTs).
- Develop concept for presenting probabilistic and uncertainty information to the cockpit and complete a preliminary assessment of the impact of the probabilistic and uncertainty information on decision making relative to adverse weather conditions.
- Develop recommended implementations for adverse weather alerting functions in Pat 121/135 cockpits in the cockpit.
- Develop functional requirements from the WTIC Program Concept of Operations to disseminate MET information to 14 CFR Parts 121 and 135 aircraft.

Human Factors Standards

- Complete demonstrations and make data available to support the development of human factors standards, guidance, and procedures for the presentation and use of MET information in Part 121 and 135 cockpits. Specific measurable performance objectives verified for human factors design elements.
- Develop standards and guidance for time stamping of cockpit composite weather presentations (e.g., NEXRAD).
- Develop recommended implementation and performance requirements for presenting reroute options in the cockpit and for ground-air negotiations of reroute options.
- Develop human factors design guidance and standards for rendering enhanced MET information on general aviation (GA) cockpit displays to reduce variability in pilot interpretations of the information and decision making resulting from this information.
- Update GA training modules to include enhanced flight deck MET information and technology.
- Develop recommended implementations for GA weather alerting functions in the cockpit to enable effective decision making relative to adverse weather hazards

Air-Ground Integration

- Verify the impacts and benefits to cockpits of recommended mobile and portable devices and application capabilities and technologies via a demonstration using a fielded beta capabilities prototype.
- Release eddy dissipation rate (EDR) technical transfer package to enable airlines to independently implement an EDR processing capability. Note that EDR is a real-time objective measure of atmospheric turbulence that is downlinked by aircraft equipped with proper software to measure it.

In FY 2015, the WTIC program will identify MET information requirements to support various NextGen operational improvements and recommended an implementation strategy to bring this MET information into the cockpit for presentation to the pilot and flight crew or for direct integration into DSTs. In FY 2015, end to end evaluations of the impacts of the resulting WTIC technologies, information, and policies on the associated NextGen operations will be completed to verify that expected benefits are achieved and that NextGen program goals have been met.

Due to the collaborative decision making concept in NextGen for weather avoidance, WTIC program research will continue to increase focus on air-ground integration issues and evaluations in FY 2015 as information gaps in the cockpit should be fully identified by the end of FY 2014 except for far term NextGen concepts.

The WTIC program will continue to perform research related to assessing the impacts of specific weather conditions (e.g., winds) on various NextGen operations and the associated MET information needs in the cockpit to reduce weather impacts. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The WTIC program addresses NextGen Implementation Plan (NGIP) weather-related goals including reducing weather delays via increasing capacity and efficiency under adverse weather conditions, enhancing air traffic management (ATM) and aircraft re-routing flexibility to avoid adverse weather, reducing the number of weather-related accidents and incidents, and reduction of emissions through lower fuel consumption resulting from optimized routing and rerouting during adverse weather (Reference NGIP pages 4, 7, 8 and 11). WTIC will develop, verify, and validate requirements to support aircraft standards and certification for enabling availability and improving the quality and quantity of MET information available to the aircraft to enhance safety and efficiency in commercial, business, and GA operations.

The WTIC program addresses the need to enable better weather decision making and use of MET information in the transformed NAS. This includes identifying MET information requirements and a recommended architecture for disseminating the MET information to aircraft for pilot use or direct integration into NextGen cockpit decision support tools and systems. The program will define the necessary MET information and its presentation to safely and efficiently incorporate it into collaborative decision making relative to adverse weather decisions and performance based navigation. WTIC requirements to support airworthiness standards will establish common situational awareness between pilots, controllers, air traffic managers, local aircraft, etc. The program will define human factors guidance for effective rendering of MET information to pilots and define required MET-related pilot training. The WTIC program will work closely with multiple Radio Technical Commission for Aeronautics (RTCA) special committees and other industry/stakeholder committees to further the program objectives. Demonstrations and flight evaluations will also be conducted to verify and validate WTIC-developed MET information content for airworthiness standards.

In FY 2014, major accomplishments planned include:

Flight Deck Information

- Completed wind quality and forecasting simulations using high fidelity models, complex environmental metrics, and matured NextGen applications and procedures (e.g., multiple Required Time of Arrival (RTAs)).
- Completed simulation analyses to identify wind information quality metrics and required values to optimize realized benefits under varying wind scenarios for simulated NextGen applications and operations.
- Collected data to fill gaps identified in the WTIC concept of operations (ConOps) for direct integration into decision support tools, thereby providing their full capability to support MET-related decisions.
- Completed planning for cloud top data flight demonstration, including methodology to assess the impacts of this data on pilot decision making in oceanic and remote regions.
- Completed Quantification Benefits Analysis for providing Turbulence Eddy Dissipation Rate (EDR) to the cockpit.

Human Factors Standards

- Developed a recommended rule set (standardized guidance) for GA pilots on how to avoid adverse weather in congested (and other selected) airspace.
- Developed training modules and test questions incorporating new enhanced flight deck MET information and technology for GA pilots
- Identified design elements in GA MET information rendering that are most attributable to pilot interpretation errors and variability in pilot adverse weather decision making

Air-Ground Integration

- Completed benefits and feasibility assessments of providing selected adverse weather (e.g., icing, turbulence, etc.) alerts to pilots.
- Completed updating the WTIC Concept of Operations (ConOps) document for Part 121, 91, and 135 aircraft.
- Completed analysis comparing various concepts for formatting and "geo carving" 4D Cube MET information to enable efficient use of existing data like bandwidth to uplink MET information to support NextGen operations. Developed preliminary "geo carving" requirements. "Geo carving" is used to cover the entire process of formatting, compressing, and segmenting data and information for dissemination over a data link. It is anticipated that "geo carving" (pre-processing) will be required to enable efficient use of the commercial data links.

The NextGen - WTIC Program supports the Department of Transportation (DOT) strategic goal of Economic Competitiveness by creating a competitive air transportation system which is responsive to customer needs through NAS on-time arrivals.

Research will enable the development of policy, standards, and guidance needed to safely implement weather technologies in the cockpit to provide shared situational awareness and shared responsibilities.

Why Is This Particular Program Necessary?

The NAS mid-term concept of operations and numerous NextGen operational improvements have identified a need for additional or higher quality MET information in the cockpit or integrated with decision support tools. This MET information will enable NextGen operations and performance based navigation to achieve planned benefits in adverse weather conditions.

The WTIC program research will develop standards and recommended guidance on the adoption of cockpit, ground, and communication technologies, practices, and procedures to enhance common situational awareness. Common situational awareness will be enhanced by reducing latency in cockpit MET information, standardizing MET information presentations, and recommending an efficient architecture to improve dissemination of MET information for uplink, downlink, and crosslink so that ground and air users will have access to the same information. The enhanced common situational awareness supports NextGen goals for improved NAS efficiency.

Specific gaps being addressed by WTIC research are:

- A lack of consistent MET information rendering in cockpits and of common weather situational awareness with air traffic managers that may be causing inconsistent adverse weather decision making due to varying interpretations of weather conditions.
- Inadequate pilot training on MET information, its use, and new MET technology.
- Inefficiencies in weather related decision making that may be due to the lack of appropriate and optimized MET information in the cockpit or deficient cockpit MET information specifications (accuracy, latency, required quality of service, etc.).
- Quantification of MET information bandwidth needs to support industry's development of a recommended architecture for disseminating MET information.
- Reducing unnecessary air space avoidance and associated capacity reductions resulting from turbulence reports which currently lack quantified and objective turbulence measures

WTIC also supports the goal to reduce greenhouse emissions by reducing fuel consumption resulting from increased NAS capacity and enhancing adverse weather decision making to enable more efficient routing and rerouting during adverse weather conditions.

How Do You Know The Program Works?

The WTIC program plans to conduct end-to-end demonstrations of WTIC technology, information, and policy to verify that program goals and goals of supported NextGen programs are met. These end-to-end evaluations will be conducted in coordination with associated NextGen programs to assess the overall capacity or safety benefit of operations in adverse weather while attempting to quantify the WTIC specific portion of the benefit. An example of this indicator would be demonstrated improvement in trajectory based operations in the terminal area under adverse wind conditions compared to earlier flight trials and demonstrations.

Why Do We Want/Need To Fund The Program At The Requested Level?

A WTIC funding reduction will result in incomplete or insufficient inputs to the standards and guidance documents necessary to implement NextGen operational improvements and concepts of operation. In addition, information necessary for industry's technology development and aircraft equipage decisions will be unavailable.

One of the main objectives of the WTIC program is to provide for a common MET situational awareness between the air and ground. A reduction in funding could result in a divergence of MET situational awareness that may prove to be more costly, and potentially unsafe, in the future.

WTIC is a cross cutting research program that makes every effort to ensure research is relevant to a variety of stakeholders. Reduced WTIC funding may force some internal stakeholders (e.g., NextGen Decision Support Tool developers) to conduct their own MET-related weather research which may be more expensive, duplicative, less relevant, and lead to competing weather forecast solutions.

Detailed Justification for
A13.a Environment and Energy

What Is The Request And What Will We Get For The Funds?

FY 2015 – Environment and Energy

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A13.a Environment and Energy	$14,285,537	$14,600,000	$14,921,000	+$321,000

For FY 2015, $14,921,000 is requested for Environment and Energy. Major activities and accomplishments planned include:

Noise and Emissions Analyses and Interrelationships

- Refine the publicly-available Aviation Environmental Design Tool (AEDT), which can perform integrated fuel burn, noise, and emissions analyses from airport to global scales.
- Expand the ability of the Aviation environmental Portfolio Management Tool (APMT) for regional and global environmental analyses.
- Enhance communication among and interconnectivity of aircraft design, alternative fuels, and environmental impact assessment tools and databases for cost benefit analysis.

Aircraft Noise

- Assess technological, scientific, environmental, and economic bases to establish aircraft noise standards, related metrics, and certification requirements.
- Conduct studies to better quantify health and social welfare impacts of aircraft noise.
- Advance analytical methods for estimating aircraft noise for all phases of flight.
- Advance analytical methods for estimating helicopter noise and its impact.
- Identify effective methods for aircraft noise mitigation.
- Update guidance and policies in support of current noise standards and to improve the certification processes.

Aircraft Emissions

- Develop technological and scientific basis to support a future International Civil Aviation Organization (ICAO) aircraft carbon dioxide and particulate matter standard.
- Develop measurement/sampling protocol and expand database for aircraft engine emissions.
- Assess methodologies to evaluate the health and welfare impact of aviation emissions on climate change and air quality.
- Identify effective methods for aircraft emissions mitigation.
- Update guidance and policies in support of current aircraft standards and to improve the certification process.

In FY 2015, the Energy and Environment (E&E) program will continue to focus on multiple fronts to support the Destination 2025 goal of sustaining our future. These include (1) develop and enhance analytical capability for integrated aviation environmental assessment for noise, emissions, and fuel burn; (2) compile and collect necessary data and develop data interconnectivity across analytical tools; (3) perform analyses for noise and emissions standard setting and streamline certification, sampling, and measurement processes; (4) research aviation noise and emissions related environmental, human, and welfare impacts and develop measures of associated risks; and (5) develop annual inventory of noise exposure and fuel burn. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The program is developing and validating methodologies, models, metrics, and tools to characterize and assess the effects of aircraft noise and aviation emissions while considering all interdependencies and tradeoffs. It is also developing computer models and impact criteria for use by civil aviation authorities in assessing proposed actions. Researchers are also developing a better science-based understanding and characterization of the impacts of aircraft noise and aviation emissions.

The E&E program helps achieve the FAA's environmental compatibility goal and supports the FAA Destination 2025. The program also provides fundamental knowledge and tools to support the NextGen Implementation Plan. The efforts complement activities in aircraft technology, alternative fuels, and efficient operations-based mitigation solutions, environmental operational assessments, and environmental management systems development that are being carried out under NextGen investments.

The E&E program specifically supports the following four performance metrics for Destination 2025:

- The U.S. population exposed to significant aircraft noise around airports has been reduced to less than 300,000 persons.
- Improve NAS energy efficiency (fuel burned per miles flown) by at least two percent annually.
- Aviation emissions contribute 50 percent less to significant health impacts and are on a trajectory for carbon neutral growth using a 2005 baseline.
- One billion gallons of renewable jet fuel is used by aviation by 2018.

Specific activities include:

- Conducting research and development on analytical tools to better understand the relationship among noise fuel burn and emissions, and different types of emissions, and to provide the cost-benefit analysis capability necessary for data-driven decision-making.
- Leveraging a broad cross-section of stakeholders through the Center of Excellence for Alternative Jet Fuels and Environment to foster breakthrough scientific, operations, policy, and work force advances to mitigate noise and emissions impacts.
- Minimizing the impact of aircraft noise and emissions with actions that include: advancing the state of science/knowledge concerning effects of aircraft noise and emissions; and assessing the need to refine noise and emissions impact criteria and metrics; and improving operational procedures and technical guidance for aircraft noise and emissions certification standards.

The E&E program fosters international environmental standards, recommended practices, and guidance material which are technically feasible and economically reasonable to provide a measurable environmental benefit while taking interdependencies between noise and emissions into account. Specific activities include:

- Working with the international aviation community to reduce aircraft noise and emissions.
- Improving aircraft noise and engine exhaust emissions certification standards and operational procedures.
- Promoting compatible land use.
- Characterizing the benefits of abatement measures to reduce population impacted by aircraft noise and analyzing measures to improve fuel efficiency and reduce aviation emissions, and the potential to reduce health and climate impacts.
- Assessing the interrelationships and tradeoffs between measures to reduce aircraft noise and engine exhaust emissions.

The E&E program also contributes to the foundation for the NextGen investments that help achieve and manage the NextGen goal to promote environmental stewardship by reducing significant community noise and air quality emissions impacts in absolute terms, limiting or reducing the impact of aviation greenhouse gas emissions on global climate, and balancing aviation's environmental impact with other societal objectives. Specific activities include:

- Developing fundamental knowledge to aid in better science-based understanding of impacts of aircraft noise and aviation emissions on air quality and climate change to enable the NextGen goal of sustained aviation growth as envisioned by Destination 2025, while reducing significant community noise and air quality emissions in absolute terms.
- Achieving carbon neutral growth by 2020 relative to aviation CO_2 emissions in year 2005 as the base year.
- Developing tools to assess the ability of technologies for airframes, more efficient engines, advanced propulsion concepts, alternative fuels, new materials, market-based options, environmental standards and policies to reduce source noise and emissions.

FAA works closely with other federal agencies, industry, academia, and international governments and organizations (e.g. ICAO/CAEP (Committee on Aviation Environmental Protection)) to design research and development efforts that can mitigate the environmental impact of aviation. This unified regulatory approach to research identifies and influences technologies, models, regulations, certification criteria, and policies that can improve our present and future global environment. The E&E program activities are closely coordinated with support from other FAA program offices (e.g., the Air Traffic Organization and the NextGen Office) and federal agencies (the National Aeronautics and Space Administration (NASA), the Department of Defense (DoD), and the Environmental Protection Agency (EPA)) to understand and mitigate aviation noise and emissions. The E&E program also supports the close working relationship of FAA with FICAN (Federal Interagency Committee on Aviation Noise), which comprises all federal agencies concerned with aviation noise, to better understand, predict and control the effects of aviation noise. A number of E&E projects are executed by the Aviation Sustainability Center (ASCENT), the FAA Center of Excellence for Alternative Jet Fuel and Environment (an FAA/NASA/Transport Canada/DoD/EPA-sponsored Center of Excellence). The ASCENT Advisory Board brings together industry, academia, local government, and community groups.

The E&E Program also supports the close working relationship of FAA with FICAN (Federal Interagency Committee on Aviation Noise) to better understand, predict and control the effects of aviation noise. FICAN offers a forum for partnership, as it comprises all federal agencies concerned with aviation noise.

In FY 2014, major accomplishments planned include:

Noise and Emissions Analyses and Interrelationships

- Released the Aviation Environmental Design Tool (AEDT) publicly with capability to perform integrated fuel burn, noise, and emissions analyses from airport to global scales.
- Forecasted future aircraft emissions and noise.
- Enhanced communication among and interconnectivity of aircraft design and environmental impact assessment tools such as the Environmental Design Space (EDS), Global and Regional Environmental Analysis Tool (GREAT), AEDT, and the Aviation environmental Portfolio Management Tool (APMT).
- Performed integrated environmental analyses using aircraft design and environmental impact assessment tools such as EDS, GREAT, AEDT, and APMT.
- Developed generic fleet for aircraft noise, fuel burn, and emissions assessment.
- Refined air quality and climate change impact computation methodologies.

Aircraft Noise

- Collected data to support socio-economic and welfare noise impacts and metrics to guide mitigation options and policy making.

- Updated guidance and policies in support of current noise standards and to improve the certification processes.
- Completed annual assessment of noise exposure.
- Conducted studies to better quantify human and social welfare impacts of aircraft noise.
- Advanced analytical methods for propagation of aircraft noise for all phases of flight.
- Identified effective methods for source- and receptor level aircraft noise mitigation.

Aircraft Emissions

- Assessed technological and scientific basis to support future International Civil Aviation Organization (ICAO) aircraft CO2 standards.
- Assessed technological, scientific, environmental, and economic bases to establish aircraft emissions standards, related metrics, and certification requirements.
- Assessed methodologies to evaluate the impact of aviation emissions on climate change, air quality, and health.
- Updated guidance and policies in support of current aircraft standards and to improve the certification process.
- Developed measurement and sampling protocol and expanded the database for aircraft engine emissions.
- Developed annual aircraft fuel burn inventory.
- Refined multi-scale pollutant dispersion and transformation capability.

The E&E program supports the DOT strategic goal of Environmental Sustainability by reducing transportation related pollution and impact on ecosystems through the mitigation of noise exposure.

Why Is This Particular Program Necessary?

Despite the technological advancements achieved during the last 40 years, aircraft noise still affects people living near airports, and aircraft emissions continue to be an issue at local, regional, and global scales. While energy efficiency and local environmental issues have traditionally been primary drivers of aeronautics innovation, the current and projected effects of aviation emissions on our global climate are a serious long-term environmental issue facing the aviation industry. Aside from their associated health and welfare impacts, aircraft noise and aviation emissions are a considerable challenge in terms of community acceptance of aviation activities and this challenge is anticipated to grow. Environmental impacts are often the number one cause of opposition to airport capacity expansion and airspace redesign. We must deal with these impacts if aviation is to meet increased demand while operating with flexibility and efficiency.

To efficiently mitigate the environmental health and welfare impacts associated with aviation, policymakers need to understand the potential environmental impacts of aviation and to have these impacts quantified. The research funded by this program will ensure issues are identified, impacts measured, and appropriate mitigation measures instituted. In the 1990s, this research effort was focused on regulatory issues regarding noise and later on emissions. However, these were treated as separate subjects. In trying to assess health and welfare impacts of aviation while also optimizing energy efficiency and developing environmental mitigation strategies, it has become evident there are important interrelationships and potential trade-offs. Taking an interdisciplinary approach to enhance energy efficiency and minimize aviation environmental impacts by developing data, analytical tools and models that characterize and quantify the interdependencies between energy use, aircraft noise, and various air pollutant emissions is a key element for this research program. The goal is to develop a more complete understanding of the complex interdependencies that exist among aircraft noise, fuel burn, and emissions as well as their health and welfare impacts such that this knowledge can be used for designing and regulating aircraft.

How Do You Know The Program Works?

The E&E program has had considerable success in advancing our scientific understanding of the environmental impacts of aviation, developing tools to quantify these impacts, and then using the tools to inform policy making regarding the environmental impacts of aviation. Much of the research in this program to improve the underlying science has been carried out via the PARTNER Center of Excellence (http://web.mit.edu/aeroastro/partner/), a leading aviation cooperative research organization, with a broad portfolio of contributions as highlighted in their 10 year Symposium (http://web.mit.edu/aeroastro/partner/reports/public-symposium-2013.pdf). In 2013, the FAA established the Aviation Sustainability Center (ASCENT), the FAA Center of Excellence for Alternative Jet Fuel and Environment (http://ascent.aero) to continue the research efforts of PARTNER while also expanding university research efforts on alternative jet fuels.

The program has enabled the development of AEDT, which can quantify the integrated fuel burn, noise, and emissions consequences of aviation as well as APMT, which can convert these consequences into impacts on the community. AEDT version 2a was released in March 2012 and is now the FAA's standard regional noise model replacing the Noise Integrated Routing System (NIRS). During the ICAO CAEP/8 and CAEP/9 meetings, which took place in 2010 and 2013, respectively, AEDT and APMT were used to inform the U.S. positions on the internationally negotiated NOx and noise stringencies, respectively.

Why Do We Want / Need To Fund The Program At The Requested Level?

A reduction in funding to the E&E program would significantly affect activities that support the US leadership position on international environmental negotiations for standard setting and policy making. Several programs that provide the scientific foundation for this leadership position would be affected. These include, but are not limited to, the development and release and subsequent support of AEDT for integrated noise, emissions, and fuel burn analysis; APMT development and analyses to inform the development of an aircraft CO2 emissions standard; and sampling and measurement program for aircraft particulate matter (PM) emissions. Furthermore, the AEDT model is needed to address the White House Council on Environmental Quality requirements for environmental assessments; absent this capability, projects to enhance airport capacity would be delayed. A budget reduction would also limit our understanding of source level aircraft noise and emissions as well as their impacts which will in turn compromise our ability to inform the development of environmental mitigation solutions.

Detailed Justification for
A13.b NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics

What Is The Request And What Will We Get For The Funds?

FY 2015 – NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A13.b NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics	$22,270,805	$26,979,000	$19,514,000	-7,465,000

For FY 2015, $19,514,000 is requested for NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics. Major activities and accomplishments planned include:

Technology Maturation

- Assess the environmental benefits of the first round of Continuous Lower Energy, Emissions and Noise (CLEEN) airframe and engine technologies.
- Initiate the second round of CLEEN activities (CLEEN II) to demonstrate aircraft and engine technologies that can reduce energy use, emissions, and noise.
- Initiate an assessment of the environmental benefits of CLEEN II airframe and engine technologies.

Alternative Turbine Fuels

- Evaluate novel future drop-in alternative jet fuels to ensure their compatibility with existing aircraft and fueling infrastructure.
- Evaluate the environmental and economic sustainability of future drop-in alternative jet fuels.

Metrics, Goals, and Targets

- Refine the estimates of aircraft contribution to climate change and develop metrics using the latest methods and knowledge through second phase of the Aviation Climate Change Research Initiative (ACCRI).
- Examine metrics that quantify the impact of aircraft noise on human health and social welfare.

In FY 2015, the NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics program will continue to advance system design, integration, and testing of CLEEN aircraft technologies for accelerated progress towards flight demonstration and system-wide assessments within the second phase of the CLEEN program. For alternative fuels, activities will focus on safety, performance, and environmental assessments for qualification of renewable alternative fuels to secure ASTM International approval. Activities will also be conducted to assess production capacity and fleet infusion of alternative fuels. On the Metrics, Targets and Goals front, activities will continue to refine and evaluate metrics for NextGen environmental impacts, advance capability for and assessment of environmental noise, air quality, and climate impacts. This will also include improved climate impacts assessment under the second phase of ACCRI activities. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

The program is protecting the environment by reducing significant aviation environmental impacts associated with noise and exhaust emissions, and increasing energy efficiency and availability to enable mobility and scalable capacity growth. Collaborating with industry, the program will advance and mature engine and airframe technologies to reduce aviation noise, air quality impacts, greenhouse gas emissions, and energy use. It will also provide data and methodologies to assess environmental sustainability including life-cycle environmental impact and support certification of alternative aviation fuels that could serve as drop-in replacements for today's petroleum-derived turbine engine fuels. This will lead to faster deployment of these fuels, and accompanying reductions in greenhouse gas emissions and aviation emissions that impact air quality. Ultimately, the program will demonstrate advanced technologies and alternative fuels in integrated ground and flight demonstrations. The program is also helping to achieve NextGen goals by improving metrics to define and measure significant aviation environmental impacts. The program will improve the fundamental understanding of aviation environmental health and welfare and climate impacts, and translate impacts into improved metrics that can be used to better assess and mitigate aviation's contribution.

The NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics program helps achieve NextGen goals to increase mobility by reducing environmental impacts of aviation in absolute terms, including those relating to community noise, air quality and global climate change. The program is focused on maturing aircraft technologies that can reduce aircraft noise, emissions that degrade air quality, greenhouse gas emissions, and energy use and advancing alternative jet fuels.

The Program supports the following four performance metrics for Destination 2025:

- The U.S. population exposed to significant aircraft noise around airports has been reduced to less than 300,000 persons.
- Improve NAS energy efficiency (fuel burned per miles flown) by at least two percent annually.
- Aviation emissions contribute 50 percent less to significant health impacts and are on a trajectory for carbon neutral growth using a 2005 baseline.
- One billion gallons of renewable jet fuel is used by aviation by 2018.

The program specifically supports the following outcomes:

Demonstrate aircraft and engine technologies that reduce noise and air quality and greenhouse gas emission at the source level, to a developmental level that will allow quicker industry uptake of these new environmental friendly technologies to produce a fleet that will operate more efficiently with less energy usage and permit expansion of airports and airspace capacity in a scalable manner consistent with the environmental goals of NextGen.

Specific activities include developing and demonstrating:

- Certifiable aircraft technology that reduces aircraft fuel burn by 40 percent compared to current technology, reducing energy consumption and greenhouse gas (CO_2) emissions.
- Certifiable engine technology that reduces landing-and-takeoff-cycle nitrogen-oxide emissions by 60 percent, without increasing other gaseous or particle emissions, over the International Civil Aviation Organization (ICAO) standard adopted at the sixth meeting of the ICAO Committee on Aviation Environmental Protection.
- Certifiable aircraft technology that reduces noise levels by 32 decibels at each of the three certification points, relative to Stage 4 standards.
- Determination of the extent to which new engine and aircraft technologies may be used to retrofit or re-engine aircraft so as to increase the level of penetration into the commercial fleet.
- Demonstrate alternative fuels for aviation to reduce emissions affecting air quality and greenhouse gas emissions and increase energy supply security for NextGen.
- The feasibility of the use of alternative fuels in aircraft systems, including favorable environmental qualification, successful demonstration and quantification of benefits, and internationally agreed criteria to quantify relative carbon content.
- Processing capability and technical data to support certification and assured safety of a drop-in replacement for petroleum-derived turbine engine fuels.

Note that the reduction targets for fuel burn, nitrogen-oxide emissions, and noise are tentative and subject to revision based on ongoing work that is being conducted to develop plans for CLEEN II.

The Federal Aviation Administration (FAA) works closely with other federal agencies, industry, Aeronautical Science and Technology Subcommittee, academia, and international governments, organizations (e.g. ICAO/CAEP (Committee on Aviation Environmental Protection)) and coalitions (e.g. CAAFI, Commercial Aviation Alternative Fuels Initiative) to design research and development (R&D) efforts that can mitigate the environmental impact of aviation and explore alternative jet fuels. The program uses a series of Memoranda of Agreements to work closely with the National Aeronautics and Space Administration (NASA), the U.S. Department of Agriculture (USDA), the Department of Defense (DoD), and the Environmental Protection Agency (EPA). FAA is also pursuing collaborative agreements with the Department of Energy to leverage resources to address aviation's environmental impact. FAA coordinates regularly with NASA, EPA, DoD, Department of Commerce (DOC), Council on Environmental Quality, and the Office of the Secretary of Transportation (OST), as well as industry, academia, local governments, and community groups. A number of E&E projects are executed by the Aviation Sustainability Center (ASCENT), the FAA Center of Excellence for Alternative Jet Fuel and Environment (an FAA/NASA/Transport Canada/DoD/EPA-sponsored Center of Excellence). The ASCENT Advisory Board brings together industry, academia, local government, and community groups.

In FY 2014, major accomplishments planned include:

Technology Maturation

- Characterized and tested aircraft and engine technologies for noise, fuel burn, and emissions reduction.
- Developed plans for demonstration and environmental assessment of additional aircraft and engine technologies in a second phase of Continuous Lower Energy, Emissions and Noise (CLEEN II).

Alternative Turbine Fuels

- Conducted engine demonstrations for additional drop-in alternative fuels.
- Completed environmental and economic sustainability assessment of drop-in alternative fuels.

Metrics, Goals, and Targets

- Improved estimates of aviation climate impacts through second phase of the Aviation Climate Change Research Initiative (ACCRI).
- Performed initial examination of metrics that quantify impacts of aircraft noise on human health and social welfare-being.

The NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics program supports the Department of Transportation (DOT) strategic goal of Environmental Sustainability by increasing the use of environmentally sustainable practices in the transportation sector. Those practices will improve capital projects that include environmental management systems, context sensitive solutions, or use a sustainable transportation project evaluation to manage the environmental impacts of construction and operations.

Why Is This Particular Program Necessary?

The NextGen environmental strategy includes efforts to better understand the extent of the problem associated with aviation emissions and the development and fielding of new operational enhancements, aircraft and air traffic management (ATM) technologies, alternative fuels, and policies to achieve near-term and long-term solutions. The NextGen Environmental Research – Aircraft Technologies, Fuels, and Metrics program supports research to develop new aircraft technologies and sustainable fuels and to develop metrics to quantify NextGen environmental impacts and inform performance targets.

The vast majority of improvements in environmental performance over the last three decades have come from enhancements in engine and airframe design. Although major contributors, improved technologies and air traffic management will not be enough to reduce aviation's carbon dioxide (CO_2) footprint. Sustainable alternative fuels with lower overall carbon foot prints are critical to reducing aviation's climate impact to enable mobility. The main focus of this R&D effort is the CLEEN program. The CLEEN program is focused on technology maturation to reduce current levels of aircraft noise, emissions that degrade air quality, GHG emissions, and energy use while also advancing sustainable alternative fuels for aviation use.

Embedded in energy and environmental issues are several scientific uncertainties concerning aviation energy issues and aviation environmental impacts, particularly on climate. There are large uncertainties in our present understanding of the magnitude of climate impacts due to aviation non-CO_2 emissions. Understanding the relative impacts of different emission (including impacts of emissions produced during cruise on surface air quality) is vital for informing NextGen EMS's implementation. ACCRI is an element of the R&D program focused on addressing these uncertainties. In addition, noise is the most immediately objectionable impact of aviation, and an impact demanding considerable Federal resources (e.g., AIP grant set aside of up to $300 million annually). Research is outdated that underpins determinations of aircraft noise impacts, land use compatibility guidelines, and federally funded noise mitigation. New noise metrics research effort is needed to reflect public sensitivity and current air traffic conditions, guide mitigation funding and local land use planning near airports, and assure the U.S. response to aircraft noise keeps pace with NextGen needs and international efforts.

How Do You Know The Program Works?

The NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics program has had considerable success in transitioning technologies that will reduce the environmental impact of aviation. In the area of alternative jet fuels, this program has directly contributed to the certification by ASTM International of alternative jet fuels made using Fischer-Tropsch (F-T) synthesis and the Hydroprocessed Esters and Fatty Acids (HEFA) fuel process. It has also funded the development of research that quantified the life cycle greenhouse gas emissions benefit of alternative jet fuels made from these processes. This research was subsequently used by the EPA as a part of their rulemaking to include HEFA fuels within their Renewable Fuel Standard (RFS) Program. Finally, this program also provides funding to the Commercial Aviation Alternative Fuels Initiative (CAAFI), which is focusing the efforts of commercial aviation to engage the emerging alternative fuels industry. It enables its diverse participants - representing all the leading stakeholders in the field of aviation - to build relationships, share and collect data, identify resources, and direct research, development and deployment of alternative jet fuels.

In the area of technology maturation, the CLEEN Program, which is a key component of the NextGen – Environmental Research – Aircraft Technologies, Fuels, and Metrics Program, has matured numerous technologies to Technology Readiness Level (TRL) 6 and demonstrated them in engine ground tests. These include the demonstration of Boeing's ceramic matrix composite core exhaust nozzle for reduced weight and fuel burn; General Electric's TAPS II advanced lean burn combustor, which exceeded goals for landing and takeoff nitrogen oxide emissions reduction; and high temperature engine core components from Honeywell that will enable more efficient engine design. Additionally, the CLEEN Program has demonstrated Boeing's wing adaptive trailing edge technology at a TRL of 7 through flight testing, demonstrating aerodynamic benefits that will lead to fuel burn savings and potentially aircraft noise reduction. Efforts continue in CLEEN's development of technologies to enhance the benefits of Pratt & Whitney's geared turbofan architecture through continued fan model wind tunnel testing. Finally, CLEEN has completed wind tunnel testing with General Electric to mature the blade designs for open rotor engine architectures, which hold large fuel burn reduction potential. These successful maturation and demonstration efforts have moved each of these technologies closer to successful transition into commercial products that will provide environmental benefit in the fleet.

Why Do We Want / Need To Fund The Program At The Requested Level?

Any reduction in the requested budget would reduce and delay the development of technologies that could mitigate the environmental impacts of aviation. This includes maturation of aircraft technology under the

CLEEN (Continuous Lower Energy, Emissions and Noise) program and the advancement of sustainable alternative jet fuels. These programs play critical roles in enabling us to meet the Destination 2025 environmental goals and to provide a basic foundation for the U.S. government's approach, as outlined in the U.S. Aviation Climate Action Plan, to reduce aircraft CO2 emissions through a balanced approach that includes technology. Further, it would also delay the development of metrics including reducing climate impact uncertainties under ACCRI. Delays in these areas would severely limit our ability to meet NextGen environmental goals and prepare for international negotiations. Finally, reductions would cause delays in understanding the environmental potential of these mitigation solutions. In total, reductions could lead to billions of dollars of operational, human health, social well-being, and opportunity costs to government, industry, and the public.

Detailed Justification for
A14.a System Planning and Resource Management

What Is The Request and What Will We Get For The Funds?

FY 2015 – System Planning and Resource Management

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A14.a System Planning and Resource Management	$1,627,190	$2,200,000	$2,135,000	-$65,000

For FY 2015, $2,135,000 is requested for System Planning and Resource Management. Major activities and accomplishments planned include:

R &D Portfolio Development

- Prepare the FY 2017 R,E&D budget submission.
- Manage FAA's R,E&D portfolio to meet efficiency goals.
- Obtain Research Engineering, and Development Advisory Committee (REDAC) recommendations on planned R &D investments for FY 2017.
- Support the REDAC in its preparation of other reports, as requested by the FAA.
- Deliver the 2015 National Aviation Research Plan (NARP) to the Congress with the President's FY 2016 Budget.

Research Collaboration

- Plan the 2015 International ATM Research Development Conference.

FAA will continue supporting the work of the REDAC in its task to advise the Administrator on the R&D portfolio. In particular, it will seek the counsel and guidance of the committee for the FY 2017 R&D portfolio, review the proposed FY 2017 portfolio prior to submission of the budget requirements to the DOT, and seek the committee's guidance during the execution of the R&D portfolio. The agency will publish, as required by Congress, the NARP and submit it to Congress concurrent with the FY 2016 President's Budget Request.

The program will review the President's R&D criteria, ensuring that the agency's R&D program remains viable and meets national priorities. It will also publish program activities and accomplishments, as well as foster external review of and encourage customer input to the R&D program. Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

This activity produces the National Aviation Research Plan (NARP), an annual strategic plan for FAA R&D; administers the congressionally mandated R,E&D Advisory Committee (REDAC); and provides program advocacy and outreach.

Ongoing activities will manage FAA's Research, Engineering and Development (R,E&D) portfolio, meet the President's criteria for R&D, increase program efficiency, and maintain management and operating costs.

The REDAC reviews FAA research commitments annually and provides guidance for future R,E&D investments. The members of this committee and its associated subcommittees are subject matter experts drawn from various associations, user groups, corporations, government agencies, universities, and research centers. Their combined presence in the REDAC fulfills a congressional requirement for FAA R&D to be mindful of aviation community and stakeholder input.

In FY 2014, major accomplishments planned include:

R &D Portfolio Development

- Prepared the FY 2016 R,E&D budget submission.
- Managed FAA's R,E&D portfolio to meet efficiency goals.
- Obtained Research Engineering, and Development Advisory Committee (REDAC) recommendations on planned R &D investments for FY 2016.
- Supported the REDAC in its preparation of other reports, as requested by the FAA.
- Delivered the 2014 National Aviation Research Plan (NARP) to the Congress with the President's FY 2015 Budget.

Research Collaboration

- Conducted the 2014 International Conference on Research in Air Transportation (ICRAT)

The System Planning and Resource Management program supports the Department of Transportation (DOT) strategic goal of Economic Competitiveness in maintaining cost control and audit on R&D budget portfolio.

Why Is This Particular Program Necessary?

This program provides the support for the FAA to formulate their annual R,E&D portfolio and submit the mandatory plan for the FAA research and development to Congress each year.

How Do You Know The Program Works?

The FAA maintains an R,E&D management workforce of no more than 10 percent of the total R,E&D workforce, sustains the System Planning and Resource Management budget at 2 percent or less of the total R,E&D budget, and operates the REDAC at 0.1 percent of the total R,E&D budget. The program has consistently met these criteria.

Additionally, each year the program conducts lessons learned sessions where we evaluate the processes used for developing the NARP and annual FAA R,E&D budget submission. In the lesson learned process we obtain comments and feedback from our stakeholders on areas for process improvements, assess the comments, and implement their suggestions as appropriate. The number of comments identifying needed improvement has been decreasing each year. In the last cycle, there were no problem areas identified.

Why Do We Want / Need To Fund The Program At The Requested Level?

Funding decreases would jeopardize the timely delivery of the NARP to Congress. Any funding decreases would also negatively impact the support of the REDAC, possibly cutting the number of REDAC and subcommittee meetings held during the year in half.

Detailed Justification for
A14.b William J. Hughes Technical Center Laboratory Facility

What Is The Request and What Will We Get For The Funds?

FY 2015 – William J. Hughes Technical Center Laboratory Facility

Program Activity	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Enacted
A14.b William J. Hughes Technical Center Laboratory	$3,579,440	$3,440,000	$3,410,000	-$30,000

For FY 2015, $3,410,000 is requested for the William J. Hughes Technical Center (WJHTC) Laboratory Facility. Major activities and accomplishments planned include:

Simulation Facilities

- Demonstrate enhanced distributed simulation capability with government and industry using Aviation SimNet and Test & Training Enabling Architecture (TENA).
- Demonstrate distributed government and industry simulation capability for ATC, AOC, and fight deck FMC, in support of 4DT and TBO R&D.

Flight Program's Airborne Laboratories

- Perform R&D flight tests in support of the NextGen - Alternative Fuels for General Aviation research program.
- Perform R&D flight tests in support of programs such as Advanced Collision Avoidance System, Ground Based Augmentation System, and Automatic Dependent Surveillance-Broadcast (ADS-B).
- Conduct required 10-year maintenance actions on the Bombardier Global 5000 test aircraft.

Concepts and Systems Integration – Human Factors

- Support the Data Communication Research Project with human-in-the-loop simulations.
- Conduct follow-on research for two human-in-the-loop simulations that were completed in 2012 and 2013 in the En Route and Tower environment.
- Conduct data collection and analysis on three NextGen-related human-in-the-loop simulations in support of the Human Factors Division.

The Simulation Branch supports development and test programs at the WJHTC by generating realistic traffic for engineering, operational, and human factors evaluations of NAS equipment, procedures, and operations. The Target Generation Facility (TGF) simulates air traffic equipment including the radar and interfacility interfaces for end-to-end gate-to-gate configuration controlled test capability. TGF generated targets can operate under pilot control or prescribed paths depending on study needs. Simulation pilots are provided by the Simulation Branch and include a cadre of current and retired airline and commercial pilots. The Simulation Branch also maintains several cockpit simulators of transport category and general aviation aircraft. At present, simulators for the B-737-800, A-321, and Embraer 175 are operational.

The Flight Program Branch accepts flight test missions from various research, development, test, and evaluation (RDT&E) Agency programs. These efforts include aircraft modifications, testing equipment integration, aircraft maintenance, data collection, detailed flight test planning, and mission risk analysis; along with actual flight tests.

The FAA R&D Flight Program serves many customers throughout the FAA and encompasses aircraft operations, aircraft maintenance, aircraft engineering and modifications, and aircraft tracking. The program currently operates, modifies, and maintains six aircraft that act as airborne laboratories. These aircraft are operated under Federal Aviation Regulations (FAR) 91 and maintained by an in-house FAA certificated repair station. The R&D Flight Program is equipped to perform flight test anywhere in the United States and can and has, under the appropriate circumstances, conducted flight tests anywhere in the world.

The R&D Flight Program continues to support the multiple programs, including, but not limited to: NextGen, ADS-B, Global Positioning System (GPS), GPS-SBAS, GPS-GBAS, Unmanned Aircraft Systems (UAS), Aircraft Surveillance, Navigation, Communications, and Safety.

The mission of the R&D Human Factors Laboratory (RDHFL) is to perform research to acquire a better understanding of the part that a human plays in current and future aviation systems. This research environment is specifically designed to measure and assess human performance and workload. Additionally, the RDHFL investigates how new technologies should be integrated into air traffic control (ATC) and airway facilities (AF) systems. The cost of funding human factors research during the design and development phase of a project is offset by the significant reduction in cost during implementation.

The RDHFL supports a number of NextGen projects in many areas of research including NextGen TRACON (Human Factors Division), En Route Data Comm (Human Factors Division), Modular NextGen TRACON Facilities (NextGen Facilities Program), Separation Management (Advanced Operational Concepts Division), and Tower ground surveillance (Human Factors Division). Additionally, funding will provide for engineering, technical, and management support of overall research activities.

What Is This Program?

R&D programs require specialized facilities to emulate and evaluate field conditions. Human factors projects require flexible, high-fidelity laboratories to perform full-mission, ground-to-air human-in-the-loop simulations. Researchers measure baseline human performance using existing ATC configurations and changes in performance when new systems or procedures are introduced to evaluate human factors issues. These laboratories are comprised of integrated cockpit and ATC workstation simulators, and the performance issues they delve into reflect the perspectives of the pilot and flight crew. Airborne and navigation projects require flying laboratories, aircraft used for research and development, which are specially instrumented and reconfigurable to support a variety of projects.

The William J. Hughes Technical Center (WJHTC) Laboratory Facility program supports research facilities located at the WJHTC. These facilities consist of the Flight Program's Airborne Laboratories; Simulation Facilities, including the Target Generation Facility and the Cockpit Simulators; and the Concepts and Systems Integration Facilities, the Research and Development Human Factors Laboratory, and the Airborne Laboratories.

The WJHTC facilities directly support agency projects and integrated product teams in the following areas:

- FAA's Air Traffic Organization (ATO) – The WJHTC laboratories support the ATO in the areas of capacity and air traffic management; communications, navigation, and surveillance; NextGen concept validation; weather; airport technology; aircraft safety; human factors; information security; and environment and energy.
- Communications, Navigation, and Surveillance – The Flight Program Team supports on-site flight tests of the GPS Local Area Augmentation System (GBAS) in Newark to aid in the development of the precision landing system.
- NextGen – The WJHTC laboratories support concept validation and system integration.
- Automated Dependent Surveillance-Broadcast (ADS-B) – Numerous flight test hours have been expended in support of field testing the new ITT system in Louisville, KY. Each test leads to improvements made to enhance the overall system.
- Terminal Instrumentation Procedures (TERPS) – Routine flight tests are ongoing in the development of Global Positioning System (GPS) Helicopter precision approaches to a heliport.

- Wide Area Augmentation System (WAAS) – The Flight Program Team has been working with the WAAS program, Bombardier Aircraft, Canadian Marconi, and Honeywell to design, test and certify a WAAS installation into a Bombardier Global 5000 aircraft.
- Facilities supporting R&D goals at FAA's WJHTC and funded by this program are the Target Generation Facility, the Cockpit Simulation Facility, the Research and Development Human Factors Laboratory, and the Airborne Laboratories (actual R&D aircraft) located in the Hangar Facility.

In FY 2014, major accomplishments planned include:

Simulation Facilities

- Demonstrated distributed simulation capability over Aviation Simnet between the Cockpit Simulation Facility and Target Generation Facility.
- Conducted R&D support for ERAM deployment.
- Conducted R&D support for UAS, 4DT, TBO, and System-of-Systems Assessment Platform (SoSAP).

Flight Program's Airborne Laboratories

- Performed R&D flight tests in support of the NextGen - Alternative Fuels for General Aviation research program.
- Performed R&D flight tests in support of programs such as Advanced Collision Avoidance System, Ground Based Augmentation System, and Automatic Dependent Surveillance-Broadcast (ADS-B).

Concepts and Systems Integration – Human Factors

- Performed the NextGen Terminal Radar Approach Control (TRACON) Project complete validation using human-in-the-loop simulation.
- Completed data collection and analysis on four NextGen-related human-in-the-loop simulations in support of the Human Factors Group.

The William J. Hughes Technical Center Laboratory Facility program supports the Department of Transportation (DOT) strategic goals of Safety, Economic Competitiveness, and Environmental Sustainability. Safety is supported through integration of the Target Generator facility for runway incursion testing, which reduces transportation related injuries and fatalities; Economic Competitiveness by leading U.S. transportation interest in target markets around the world through full-mission demonstrations on NextGen technology integration; and Environmental Sustainability through testing of transportation evaluation tools to manage the environmental impacts of construction and operations.

FAA will work to provide an integrated laboratory platform for the purpose of demonstrating operational procedures, defining human and system performance requirements, full-mission demonstrations integrating NextGen air and ground capabilities for pilot separation responsibility and controller efficiencies, and analysis, evaluation, and validation of R&D milestones.

Why Is This Particular Program Necessary?

The program sustains research facilities located at the WJHTC to support R&D program goals. These programs require specialized facilities to emulate and evaluate field conditions. The R&D programs require flexible, high-fidelity laboratories to perform full mission, ground-to-air, human-in-the-loop simulations. The R&D laboratories are comprised of a human factors laboratory, integrated cockpits and ATC workstation simulators, and flying laboratories consisting of aircraft specially instrumented and reconfigurable to support a variety of projects.

The R&D laboratories are fully integrated with the WJHTC field support laboratories. This allows for an extremely high fidelity environment supporting R&D of current day, NextGen, and transitioning current to future. For example mixed equipage and adjacent site deployment.

It is necessary to modify, upgrade, and sustain the R&D laboratory infrastructure and provide support services to support the R&D program goals.

How Do You Know The Program Works?

The RDHFL has performed numerous experiments on human factors issues affecting the performance of pilot, air traffic controller, and airway facilities maintenance work forces. This research is helping to decrease human error through user-centered evaluation activities and by an integrated consideration of the role humans play in the increasingly automated National Airspace System. The RDHFL has been instrumental in research supporting NextGen and continues to support NextGen projects.

From 2007 to 2012, the RDHFL conducted a series of human in the loop simulations looking at concepts for a Future En Route Workstation (FEWS). The Future En Route Workstation (FEWS) research program was designed on the principles of integrating currently independent automation tools, providing information when and where needed, and reducing the number of housekeeping tasks that controllers currently perform. The FEWS interface resulted in a near 50% reduction in the number of data entries that controllers must make with Display System Replacement and voice communications only. Findings from the FEWS simulations are currently being implemented as upgrades to ERAM.

The WJHTC Laboratory Facility has been performing experiments with the UAS program to address the many issues with flying UAS in the NAS. Some of the results of this research are being used by the UAS program in the areas of spacing, sense and avoid ATC phraseology, and maintenance.

Why Do We Want / Need To Fund The Program At The Requested Level?

Any reductions in funding provided to this program will delay the development of air traffic control simulation software which is vital to the human in the loop simulations. Funding reductions will also delay the development of various air models for simulations used in the TGF high fidelity ATC simulation environment. Additionally, the TGF provides the connectivity for the laboratories at the William J. Hughes Technical Center to interface and work together. Any funding reduction to the support for the TGF will directly correlate to a reduction in the availability of the TGF which will negatively impact testing and support of NextGen research at the WJHTC.

A major asset of the RDHFL is the simulation software that was developed in house. It takes six months for a new controller to become proficient once they join the team. Further cuts to our contract support would make meeting our customer's timeline for support impossible.

Additionally the flight program requires both routine and non-routine maintenance of its aircrafts to support the NextGen flight test missions. Bombardier Global 5000 aircraft will require a 10 year maintenance cycle in FY 2015 and the flight program anticipates a maintenance cost of approximately $1M. The flight program continuously provides support to many NextGen programs including ADSB and the Alternative Fuels for general aviation research program and the maintenance of these aircrafts is necessary. If R&D funds to the flight program are reduced, required maintenance to the Bombardier Global 5000 aircraft will not be completed and the flight program will be unable to support many NextGen critical programs.

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3D. GRANTS-IN-AID FOR AIRPORTS

GRANTS-IN-AID FOR AIRPORTS

(LIQUIDATION OF CONTRACT AUTHORIZATION)

(LIMITATION ON OBLIGATIONS)

(AIRPORT AND AIRWAY TRUST FUND)

For liquidation of obligations incurred for grants-in-aid for airport planning and development, and noise compatibility planning and programs as authorized under subchapter I of chapter 471 and subchapter I of chapter 475 of title 49, United States Code, and under other law authorizing such obligations; for procurement, installation, and commissioning of runway incursion prevention devices and systems at airports of such title; for grants authorized under section 41743 of title 49, United States Code; and for inspection activities and administration of airport safety programs, including those related to airport operating certificates under section 44706 of title 49, United States Code, $3,200,000,000 to be derived from the Airport and Airway Trust Fund and to remain available until expended: Provided, That none of the funds under this heading shall be available for the planning or execution of programs the obligations for which are in excess of $2,900,000,000 in fiscal year 2015, notwithstanding section 47117(g) of title 49, United States Code: Provided further, That none of the funds under this heading shall be available for the replacement of baggage conveyor systems, reconfiguration of terminal baggage areas, or other airport improvements that are necessary to install bulk explosive detection systems: Provided further, That notwithstanding any other provision of law, of funds limited under this heading, not more than $107,100,000 shall be obligated for administration, not less than $15,000,000 shall be available for the Airport Cooperative Research Program, not less than $29,750,000 shall be for Airport Technology Research.

(CANCELLATION)

Of the amounts authorized under sections 48103 and 48112 of Title 49, United States Code, $256,000,000 are hereby permanently cancelled from amounts authorized for the fiscal year ending September 30, 2015 and prior years.

GRANTS-IN-AID FOR AIRPORTS
Program and Financing
(in millions of dollars)

Identification code: 69-8106-0-7-402	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
Obligations by program activity:			
Direct Program:			
0001 Grants-in-aid for airports	3.326	3,193	2,749
0002 Personnel and related expenses	100	107	107
0003 Airport technology research	29	30	29
0005 Small community air service	6	5	. . . .
0006 Airport Cooperative Research	15	15	15
0100 Total direct program	3,476	3,350	2,900
0799 Total direct obligations	3,476	3,350	2,900
0801 Reimbursable program	. . . .	. . . .	1
0900 Total new obligations	3,476	3,350	2,901
Budgetary Resources:			
1000 Unobligated balance carried forward, Oct 1	14	15	146
1001 Discretionary unobligated balance brought fwd, Oct 1	14	1	
1021 Recoveries of prior year unpaid obligations	133	. . . .	. . . .
1050 Unobligated balance (total)	147	15	146
Budget Authority:			
Appropriations, discretionary:			
1101 Appropriation (special or trust fund)	3,435	3,200	3,200
1137 Appropriation applied to liquidate contract authority	-3,435	-3,200	-3,200
1160 Appropriation (total discretionary)	. . . .	. . . .	. . . .
Contract authority, discretionary:			
1500 Contract Authority	. . . .	. . . .	126
1520 Contract authority and/or unobligated balance of contract authority permanently reduced	. . . .	. . . .	-130
1520 Contract authority and/or unobligated balance of contract authority permanently reduced	. . . .	. . . .	-126
1540 Contract authority, discretionary (total)	. . . .	. . . .	-130
Contract authority, mandatory:			
1600 Contract authority (P.L. 112-95)	3,350	3,350	3,350
1600 Contract authority (49 USC 48112)	. . . .	130	. . . .
1620 Contract authority and/or unobligated balance of contract authority permanently reduced	7	. . . .	. . . .
1640 Contract authority, mandatory (total)	3,343	3,480	3,350
Spending authority from offsetting coll., Discretionary:			
1700 Collected	1	1	1
1750 Spending authority from offsetting coll., disc (total)	1	1	1
1900 Budget authority (total)	3,344	3,481	3,221
1930 Total Budgetary Resources Available	3,491	3,496	3,367
Memorandum (non-add) entries:			
1941 Unexpired unobligated balance, end of year	15	146	466
Change in obligated balances:			
Obligated balance, state of year (net):			
3000 Unpaid obligations, brought forward, Oct 1	5,428	5,117	4,699
3010 Obligations incurred, unexpired accounts	3,476	3,350	2,901
3020 Outlays (gross)	-3,654	-3,768	-3,610
3040 Recoveries of prior year unpaid obligations, unexpired	-133	. . . .	. . . .
Obligated balance, end of year (net):			
3050 Unpaid obligations, end of year	5,117	4,699	3,990
Memorandum (non-add) entries:			
3100 Obligated balance, start of year	5,428	5,117	4,699

3200 Obligated balance, end of year	5,117	4,699	3,990
Budget authority and outlays, net:			
Discretionary:			
4000 Budget authority, gross	1	1	-129
Outlays, gross:			
4010 Outlays from new discretionary authority	589	673	591
4011 Outlays from discretionary balances	3,065	3,095	3,019
4020 Outlays, gross (total)	3,654	3,768	3,610
Offsets against gross budget authority and outlays:			
Offsetting collections (collected) from:			
4030 Federal Sources	-1	......	......
4033 Non-federal sources	. . . .	-1	-1
4040 Offsets against gross budget authority and outlays (total)	. . . .	. . . .	. . . .
4070 Budget authority, net (discretionary)	. . . .	. . . .	-130
4080 Outlays, net (discretionary)	3,653	3,767	3,609
Mandatory:			
4090 Budget authority, gross	3,343	3,480	3,350
4180 Budget authority, net (total)	3,343	3,480	3,220
4190 Outlays, net (total)	3,653	3,767	3,609
Memorandum (non-add) entries:			
5052 Obligated balance, SOY: contract authority	3,556	3,464	3,744
5053 Obligated balance, EOY: contract authority	3,464	3,744	3,764
5061 Limitation on obligations (Transportation Trust Funds)	3,343	3,350	2,900

Summary of Budget Authority and Outlays

(in millions of dollars)

	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
Enacted/Requested:			
Budget Authority	3,343	3,480	3,220
Outlays	3,653	3,767	3,609
Legislative proposal, not subject to PAYGO:			
Budget Authority	. . . .	. . . .	-450
Total:			
Budget Authority	3,343	3,480	2,770
Outlays	3,653	3,767	3,609

Subchapter I of chapter 471, title 49, U.S. Code provides for airport improvement grants, including those emphasizing capacity development, safety and security needs; and chapter 475 of title 49 provides for grants for aircraft noise compatibility planning and programs. The FY 2015 budget request proposes to lower funding for the airport grants program to $2.9 billion, offset in part by eliminating passenger and cargo entitlement funding for large hub airports. To assist those airports that need the most help, the Administration proposes to focus Federal grants to support smaller commercial and general aviation airports that do not have access to additional revenue or other outside sources of capital. The Budget also proposes to allow all commercial service airports to increase the non-Federal Passenger Facility Charge, thereby giving airports greater flexibility to generate their own revenue. The combination of these changes to the AIP and PFC programs will allow airports to effectively transition to a reduced AIP level without hindering their ability to meet existing capital needs of the national airport system.

Object Classification
(in millions of dollars)

Identification code: 69-8106-0-7-402		FY 2012 Actual	FY 2014 Estimate	FY 2015 Request
	Direct obligations:			
	Personnel compensation			
1111	Full-time permanent	61	64	65
1113	Other than full-time permanent	1	1	1
1115	Other personnel compensation	. . . .	2	1
1119	Total personnel compensation	62	67	67
1121	Civilian personnel benefits	18	20	19
1210	Travel and transportation of persons	2	3	3
1232	Rental payments to others	1	1	1
1251	Advisory and assistance services	16	15	27
1252	Other services from non-fed sources	6	5	25
1254	Operation and maintenance of facilities	19	24	1
1257	Operation and maintenance of equipment	7	7	5
1260	Supplies and materials	1	1	1
1310	Equipment	2	1	1
1320	Land and Structures	6	1	1
1410	Grants, subsidies, and contributions	3,330	3,200	2,749
1940	Financial Transfers	6	5	. . . .
1990	Subtotal, direct obligations	3,476	3,350	2,900
2990	Reimbursable obligations	. . . .	. . . .	1
9999	Total new obligations	3,476	3,350	2,901

Employment Summary

Identification code: 69-8106-0-7-402		FY 2012 Actual	FY 2014 Estimate	FY 2015 Request
1001	Direct: Civilian full-time equivalent employment	555	605	608
2001	Reimbursable: Civilian full-time equivalent employment	. . . .	1	1

GRANTS-IN-AID FOR AIRPORTS
(Legislative proposal, not subject to PAYGO)
Program and Financing
(in millions of dollars)

Identification code: 69-8106-0-7-402	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
Budgetary Resources:			
Budget authority:			
Contract authority, mandatory:			
1600 Contract Authority (P.L. 112-95)	....	....	-450
1640 Contract authority, mandatory (total)	....	....	-450
1930 Total budgetary resources available	....	....	-450
Memorandum (non-add) entries:			
1941 Unexpired unobligated balance, end of year	....	....	-450
Budgetary Resources and outlays, net:			
Discretionary:			
Offsets against gross budget authority and outlays:			
Offsetting collections (collected) from:			
Mandatory:			
4090 Budget authority, gross	....	....	-450
4180 Budget authority, net (total)	....	....	-450
Memorandum (non-add) entries:			
5053 Unexpired unobligated balance, end of year	....	....	-450

EXHIBIT III-1

GRANTS-IN-AID FOR AIRPORTS
Summary by Program Activity
Appropriations, Obligation Limitations, and Exempt Obligations
($000)

	FY 2013 ACTUAL	FY 2014 ENACTED	FY 2015 REQUEST	CHANGE FY 2015-2014
Grants-in-Aid for Airports	3,192,352	3,193,900	2,748,150	-445,750
Personnel & Related Expenses	100,798	106,600	107,100	500
Airport Technology Research	29,192	29,500	29,750	250
Airport Cooperative Research	14,970	15,000	15,000	0
Small Community Air Service	5,988	5,000	0	-5,000
TOTAL	**3,343,300**	**3,350,000**	**2,900,000**	**-450,000**
FTEs				
Direct Funded	605	605	608	3
Reimbursable	1	1	1	0

Program and Performance Statement

This account provides funds for planning and developing a safe and efficient national airport system to satisfy the needs of the aviation interests of the United States, with due consideration for economics, environmental compatibility, local proprietary rights and safeguarding the public investment.

EXHIBIT III-1a
GRANTS-IN-AID FOR AIRPORTS
SUMMARY ANALYSIS OF CHANGE FROM FY 2014 TO FY 2015
Appropriations, Obligation Limitations, and Exempt Obligations
($000)

ITEM	Change from FY 2014 to FY 2015 ($000)	Change from FY 2014 to FY 2015 FTE
FY 2014 BASE	**3,350,000**	**605**
Annualization of FY 2014 Pay Raise	219	
Annualization of FY 2014 FTE	434	3
2015 Pay Raises	657	
SUBTOTAL, ADJUSTMENTS TO BASE	**1,310**	**3**
NEW OR EXPANDED PROGRAMS		
Grants	(450,174)	
Contracts changes - ACRP, ATR, and Admin	4,814	
Safety related contract increase	750	0
SOAR redevelopment (removing one time increase for 2014)	(1,700)	
Small Community Air Service Development Program	(5,000)	
SUBTOTAL, NEW OR EXPANDED PROGRAMS	**(451,310)**	**0**
FY 2015 REQUEST	**2,900,000**	**608**

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Executive Summary: Grants-in-Aid for Airports

What Is The Request And What Will We Get For The Funds?

For FY 2015, FAA requests $2.7 billion to fund the Grants-in-Aid for Airports program, also known as the Airport Improvement Program (AIP). The Budget focuses the traditional Federal grants to support smaller commercial and general aviation airports that do not have access to additional revenue or other outside sources of capital. At the same time, the budget proposes to increase the Passenger Facility Charge (PFC) limit from $4.50 to $8.00 and eliminates passenger and cargo entitlement funding for large hub airports but maintains discretionary eligibility. The Budget also proposes to allow all commercial service airports to increase the non-Federal Passenger Facility Charge, thereby giving airports greater flexibility to generate their own capital funding sources. The grants-in-aid program enables FAA to advance important safety, capacity, efficiency, and environmental improvements at more than 500 airports supporting commercial service airports and more than 2,800 general aviation airports that provide critical functions at the national, regional, and local level.

What Is The Program?

The AIP provides grants to local and state airport authorities to help ensure the safety, capacity, efficiency, and environmental stewardship of U.S. airports. Through the AIP, the agency funds a range of activities to assist in airport development, preservation of critical facilities, economic competitiveness, and environmental sustainability.

Why Is This Particular Program Necessary?

Through the AIP, the agency funds a range of activities to ensure the safety, security, capacity, and environmental mitigation of U.S. airports. The FAA identifies public-use airports for the national transportation system and the National Plan of Integrated Airport Systems (NPIAS). These public use airports support scheduled air carrier service at more than 500 commercial service airports. In addition to the scheduled passenger and cargo service, the airport system serves a diverse range of functions at approximately 2,800 general aviation airports that support emergency medical services and disaster response, flight training, law enforcement support, agricultural activities, and business/corporate activities. The proposed AIP funding level will provide sufficient funding for all high priority safety, security, preservation, capacity, and environmental projects.

How Do You Know The Program Works?

The FAA has a very high level of confidence in the effectiveness of the program. The investment of AIP funds in the national system of airports improves the safety and enhances the capacity and sustainability of the system. We work closely with airports and the state aeronautical agencies to monitor the condition of critical airfield infrastructure, and can draw direct connections between our efforts and improvements in safety, capacity, efficiency, and environmental responsibility.

Why Do We Want/Need To Fund The Program At The Requested Level?

The principal tool FAA uses to establish the Airports Capital Improvement Program (ACIP) is the 5-year development needs identified in the NPIAS. The latest NPIAS, which was published in September 2012, identified over $42.5 billion in capital needs over the 5-year period from 2013-2017. The FAA funds capital projects that support system safety, capacity, and environmental projects and the highest priority needs in the NPIAS. The NPIAS reflects a 19% decrease from the preceding NPIAS report (published in September 2010 and covering the 5-year period from 2011-2015); however, even at the lower level, it still reflects an average annual need of more than $8.3 billion.

At the requested AIP funding level in 2015, based on current law the FAA would be able to fund capital needs that support system safety, capacity, and environmental projects. This follows the assumption that the formula guidelines in the Authorization are permitted to take effect when the funding level is below $3,200,000,000. Should adjustments be made to preserve formula calculations similar to a program that is more than $3,200,000,000, it would have a detrimental impact to the amount of AIP Discretionary funds available. Subsequently, this would hinder FAA's ability to fund the highest priority needs in the NPIAS. The proposed approach is to reduce the funding level responsibly, by allowing the formula changes to take effect as currently written in law.

GRANTS-IN-AID FOR AIRPORTS

Grants-in-Aid for Airports (AATF)
($ in Thousands)

Item Title	Dollars	FTP
FY 2014 Enacted	**3,193,900**	**0**
Reduced Program Level with PFC reforms		
1. Grants-in-Aid for Airports	(445,750)	
Increases/Decreases	**(445,750)**	**0**
FY 2015 Request	**2,748,150**	**0**

Detailed Justification for Grants-in-Aid for Airports

What Is The Request And What Will We Get For The Funds?

FY 2015 Grants-in-Aid for Airports Budget Request ($000)

Program / Component	FY 2013 Enacted	FY 2014 Enacted	FY 2015 Request	Difference from FY 2014 Request
Grants-in-Aid for Airports, (AATF)	$3,192,353	$3,193,900	$2,748,150	-445,750

For FY 2015, FAA requests $2.7 billion to fund the Grants-in-Aid for Airports program (AIP). This is an decrease of $445 million (14 percent) below the FY 2014 level.

The Budget focuses the traditional Federal grants to support medium hub, smaller commercial service and general aviation airports that have more limited access to additional revenue or other outside sources of capital. At the same time, the budget proposes to increase the Passenger Facility Charge (PFC) limit from $4.50 to $8.00 and eliminates passenger and cargo entitlement funding for large hub airports but maintains discretionary eligibility. The Budget proposes to allow all commercial service airports to increase the non-Federal Passenger Facility Charge, thereby giving airports greater flexibility to generate their own capital funding sources. The grants-in-aid program enables FAA to advance important safety, capacity, efficiency and environmental improvements at more than 500 airports supporting commercial service airports and more than 2,800 general aviation airports that provide critical functions at the national, regional and local level.

The request allows the agency to continue supporting the following key initiatives:

- Improve Runway Safety Areas (RSA) that do not conform to FAA standards;
- Reduce the risk of runway incursions by reconfiguring taxiways, perimeter service roads and other facilities;
- Preserve or enhance the safety of critical airfield and other airport infrastructure at airports nationwide;
- Continue to conduct wildlife hazard assessments and develop wildlife hazard management plans;
- Implement Safety Management Systems;
- Preserve or enhance airfield capacity and efficiency at airports nationwide;
- Mitigate the environmental impacts of aviation including noise mitigation, land use compatibility planning and air quality improvements;
- Support airport sustainability programs and projects; and
- Continue to support airport security improvements where applicable.

The FAA continues to award AIP grants that enable airports to conform to our RSA standards. The agency's long-term goal is to eliminate airport conditions that contribute to accidents and enhance the margin of operating safety by improving RSAs. By the start of FY 2015, we will have brought 97 percent of the AIP funded RSAs and 52 percent of the F&E funded RSAs at certificated airports up to meet standards or to the extent it is practicable to meet the standard. Our goal remains to complete all the airport AIP funded RSAs improvements by the end of 2015 and the F&E funded RSA improvements by the end of 2018. We are also working closely with the FAA units administering the Facilities & Equipment (F&E) budget to relocate FAA-owned Navigational Aid Systems (NAVAIDS) from RSAs or making them frangible.

We have a special emphasis to direct AIP investments to reduce accidents in Alaska for general aviation and all Part 135 operations[1]. AIP funding will be directed, where practical, to continue improving access-

1 Part 139 Airports are regulated by federal airport certification regulation [Title 14, Code of Federal Regulations (CFR), Part 139]. This regulation establishes certification requirements for airports that serve scheduled air carrier aircraft with more than 9 seats and unscheduled air carrier aircraft with more than 30 seats.

deficient airports to provide 24 hour Visual Flight Rules (VFR) access at a minimum. An originally-identified list of 63 airports in Alaska were designated as access-deficient. Of those 63 airports, 30 have been provided 24-hour VFR access.

AIP will continue to support funding for capacity and efficiency enhancements throughout the system, including the full range of commercial service (primary) airports and smaller (nonprimary) airports nationwide. AIP will accomplish this by providing financial and technical support to regional and metropolitan system plans, airport master plans and environmental reviews, and by directing funding toward the construction and preservation of runways, runway extensions, and airfield reconfigurations. We will also strive to increase the safety, security, and capacity of the global civil aerospace system in an environmentally sound manner.

AIP funds will continue supporting environmental mitigation measures including noise mitigation and emission reduction through:

- Residential and school sound insulation programs;
- Property acquisition;
- Land use compatibility planning; and
- Air quality improvement projects as part of the Voluntary Airport Low Emission (VALE) and Zero Emission Vehicle (ZEV) programs.

Additional environmental AIP activities include supporting sustainability initiatives including:

- Energy efficiency projects;
- Recycling, waste reduction, and reuse studies; and
- Airport environmental management system (EMS) studies.

In FY 2015, the Office of Airports (ARP) will continue to implement environmental streamlining provisions for capacity enhancement projects at congested airports, aviation safety projects, and aviation security projects as specified by Congress in 49 U.S.C. 47171 et seq. Commissioning of new commercial service runways is dependent on the timely completion of environmental reviews.

Funding will be used to mitigate significant aviation noise impacts through the purchase and relocation of residences and businesses, soundproofing residential homes or buildings used for educational or medical purposes, and purchase and installation of noise barriers or monitoring systems.

Security projects required by statute or regulation carry a high priority for AIP funding. Projects providing for the security of passengers and other persons in the terminal, as well as the terminal buildings themselves, are treated equally with projects to secure aircraft and the aircraft operations area. ARP will continue to work with both airport owners and Transportation Security Administration (TSA) representatives in identifying airport security requirements and discussing appropriate funding sources. The most common type of security project supported by AIP funding is the installation of access control equipment. This includes perimeter fencing, security gates, security lighting, and cameras.

Funding in FY 2015 will support the following key outputs and outcomes:

- Improved 31 AIP funded RSAs and 82 F&E funded RSAs to increase the margin of operating safety in the event of runway excursions;
- Reconfigured taxiways, perimeter service roads and other facilities reduce the risk of runway incursions;
- Conducting wildlife hazard assessments and developing wildlife hazard management plans;

- Implementing Safety Management Systems (SMS) by funding airport SMS manuals and implementation plans;
- Reconstructed and rehabilitated runways, taxiways and aprons will preserve the nation's critical aviation infrastructure and prevent the risk of foreign object debris damage to aircraft from cracked or broken pavement surfaces; and
- Air quality improvement and noise mitigation projects that reduce air and noise pollution.
- The incorporation of sustainability as a core function of airport planning.

What Is This Program?

The Grants-in-Aid for Airports program supports the Department of Transportation's (DOT) State-of-Good Repair goal, contributing toward the outcome of an increased proportion of infrastructure assets in good condition. We also support DOT's Safety goal through our efforts to "reduce transportation-related injuries and fatalities." We additionally support DOT's Economic Competitiveness goal, with resources dedicated to two outcomes: "Maximum economic returns on transportation policies" and "A competitive air transportation system responsive to consumer needs." This program also significantly contributes toward DOT's Environmental Sustainability goal, contributing toward the reduction of transportation-related pollution and impacts on ecosystems.

State of Good Repair

The AIP provides grants to local and state airport authorities to maintain critical facilities, including runways, taxiways, aircraft parking areas (aprons) as well as many other airport facilities, systems and equipment. For example, AIP provides funds to ensure that no less than 93 percent of runways at more than 3,300 airports included in the NPIAS are maintained in excellent, good or fair condition.

Safety

The AIP provides grants to local and state airport authorities to help ensure the safety, capacity and efficiency of U.S. airports. Through the AIP, the agency funds a range of activities to assist in airport development, preservation of critical facilities, economic competitiveness, and environmental sustainability. The AIP also supports the DOT Safety goal by providing funding for safety-related development at airports that benefit both commercial service and general aviation operations. For example, AIP provides funds to airports to make improvements that help reduce runway incursions caused by vehicle/pedestrian deviations or by pilot error due to confusing geometry; to accelerate improvements to RSAs that do not meet current standards; and other similarly high priority projects.

Economic Competitiveness

The AIP supports the DOT Economic Competitiveness through the following outcomes:

- Maximum economic returns on transportation policies and investments; and
- A competitive air transportation system responsive to consumer needs.

By funding airport infrastructure projects that provide access to the National Aviation System in order to maintain a competitive air transportation system responsive to consumer needs, AIP contributes to economic competitiveness. For example, the AIP directs funding investments toward capacity development projects at airports ranging from the largest and most congested airline hubs serving some of the largest metropolitan areas to smaller urban areas and down to airports that enable critical access for emergency medical services to isolated communities.

Environmental Sustainability

The AIP supports the DOT Environmental Sustainability goal, "Reduction in transportation-related air, water and noise pollution and impacts on ecosystems" outcome by funding projects and programs that help reduce transportation-related impacts on air quality, water quality, noise, and other impacts on ecosystems. For example, the AIP supports projects to reduce ozone emissions in Environmental Protection Agency-designated nonattainment areas; to support sustainability planning; support airport sustainability initiatives and developing sustainability best practices; implement Environmental Management Systems to ensure that FAA operations protect the environment and meet statutory and regulatory environmental requirements;

and reduce the number of people exposed to significant noise. The FAA will also be taking steps to address energy reduction, solid-waste recycling and other enhancements to environmental sustainability.

Anticipated accomplishments for the AIP grant program in 2015 include:

- Improve 31 AIP funded nonstandard RSAs;
- Fund infrastructure development projects to meet airport safety and design standards;
- Ensure that 93 percent of runways at more than 3,300 airports in the NPIAS are maintained in excellent, good or fair condition;
- Fund all approved Runway Safety Action Team (RSAT) recommendations identified in the ACIP;
- Fund capacity projects identified in the ACIP;
- Fund continued support of the Military Airport Program;
- Fund Voluntary Airport Low Emission (VALE) and Zero-Emission Vehicle (ZEV) program initiatives to improve air quality by helping airports reduce emissions from mobile and stationary ground sources; and
- Incorporate sustainability principles into airport master planning guidance and continue funding sustainable airport master planning
- Fund eligible energy efficiency projects.
- Fund airport recycling plans as an element of airport master plans or master plan updates.

Why Is This Particular Program Necessary?

The aviation system plays a critical role in the success, strength, and growth of the U.S. economy. Approximately 590,000 active pilots, 232,000 general aviation aircraft, and 4,520 air carrier jets rely upon the U.S. airport system. The economic impacts of the air traffic control system are well-documented in FAA's report on "The Economic Impact of Civil Aviation on the US Economy," published in August 2011. It states that, in 2009, aviation accounted for over 10 million jobs, $1.3 trillion toward the gross domestic product output, and 5.2 percent of gross domestic product.

Airport infrastructures, particularly airfield facilities, are exposed to constant heavy use and harsh environmental conditions. Runways, taxiways, and aprons are designed to withstand the heavy equipment that operates on them, but even so these facilities require frequent maintenance and rehabilitation in order to remain in good working condition. Runways and taxiways have to be kept clear of snow, ice, and ponding water that can jeopardize aircraft directional control or braking action. Chemicals and plowing, as well as freeze-thaw cycles, all take a toll on runways, taxiways, and other paved areas. The smallest bit of broken asphalt or concrete can represent a major safety hazard to aircraft accelerating on takeoff or maintaining directional control after landing.

The vast majority of public-use airports in the United States are owned and operated by municipal, county or state government agencies, or by independent public authorities. They are required to follow strict rules in establishing rates and charges for the airlines and other users in order to recover their operating and maintenance costs.

Through AIP, the agency funds a range of activities to ensure the safety and capacity of U.S. airports. The FAA identifies public-use airports that are important to the national transportation system, including those airports in the federal plan known as the NPIAS. These public use airports support scheduled air carrier service at approximately 500 airports (known as commercial service airports). In addition to the scheduled passenger and cargo service, the airport system serves a diverse range of functions at approximately 2,800 general aviation airports. These airports support emergency medical services and disaster response, flight training, law enforcement support, agricultural activities, and business/corporate activities.

The 64 Large and Medium hub airports account for about 88 percent of all passenger enplanements. Much of the delay to air traffic can be traced to inadequate capacity or efficiency at some of these airports. With the critical support of AIP, constructing new or extended runways, taxiways, and airfield reconfiguration continues to be an important part of FAA's NextGen Implementation Plan. Arrival and departure rates at the nation's busiest airports are constrained by the limited number of runways that can be in active use simultaneously. Since FY 2000, 16 new runways, 3 runway extensions, and 1 airfield reconfiguration have opened with Phase I of another airfield reconfiguration to be completed in October, allowing more than 2 million additional annual operations.

AIP supports vital technical and financial assistance for planning, environmental analysis, and construction/rehabilitation of runways, taxiways, and aprons as well as other measures to expand and make more efficient use of airports. The AIP funding plan will reflect a special emphasis to increase capacity and improve the airport arrival efficiency rate. AIP funding of the following airport projects contributes to these projects:

- Construct, rehabilitate or overlay existing runways, taxiways, and aprons;
- Extend runways, taxiways, and aprons;
- Construct/improve terminal buildings;
- Acquire and install visual approach aids;
- Acquire and install Instrument Landing Systems (ILS);
- Acquire and install weather-reporting equipment;
- Bring pavement and other facilities up to design standards; and
- Construct new airports/heliports.

How Do You Know The Program Works?

The FAA works closely with commercial service airports and with state aeronautical agencies to monitor the physical condition of airport infrastructure, particularly the critical airfield facilities. This gives FAA real-time information about capital funding needs and priorities, the effectiveness of funded projects, and the utilization of the airports. One of the core performance objectives of AIP is to maintain at least 93 percent of the runways at NPIAS airports in good, fair or excellent condition. The FAA's funding decisions consider a number of factors including the physical condition of airport facilities as well as historical, current and projected activity levels. The FAA also reports annually to Congress on how the funds have been used and the benefits of those investments in terms of increased safety, capacity, efficiency, and environmental compatibility.

The investment of AIP funds in the NAS has direct benefits, improving the safety and capacity of the system. The AIP program also assists airports to become more environmentally friendly and reduces the impact of airport activities on its communities.

Safety

We have several metrics that show the AIP investment is improving or maintaining safety. For example, we have a target to maintain 93 percent of the runway pavement in excellent, good, or fair condition for the paved runways in the National Plan of Integrated Airport Systems through 2016. Periodic maintenance of runways, particularly resurfacing, has proven a cost effective way to delay the need for major runway rehabilitation. The FAA funds a broad range of capital infrastructure development at most NPIAS airports; however, airports are generally responsible for funding periodic and ongoing maintenance. More significant rehabilitation, resurfacing or reconstruction projects may be funded through a variety of funding sources, including AIP grants, PFC revenues, airport revenues and/or other funding sources. Deferred or delayed maintenance creates an increased risk of damage to aircraft and is a safety concern for the travelling public, increasing both the scope and cost of eventual rehabilitation or reconstruction.

The installation of the enhanced taxiway centerline marking, the use of end-around taxiways, and improvements in surface geometry all are addressing the need to maintain a focus on reducing runway incursions. The investment in improving RSAs and installing Engineered Materials Arresting Systems (EMAS) beds has also shown to be effective in safely stopping aircraft when they overrun the runway. EMAS installations have already enabled nine successful overrun arrestments with minimal or no damage to the aircraft, and no injuries to over 240 total occupants. The latest arrestment came at Key West International, Florida in November 2011 when an overrunning Cessna Citation was safely stopped.

Economic Competitiveness

Since FY 2000, 24 airfield projects have opened at 20 of the 35 major airports. These include 16 new runways, 3 taxiways, 3 runway extensions, 1 airfield reconfiguration, and Phase 1 of another airfield reconfiguration to be completed by October 2013. The projects have provided these airports with the potential to accommodate more than 2 million additional annual operations and decrease average delay per operation at these airports by about 5 minutes.

Environmental Sustainability

AIP funds have assisted airports to become more environmentally friendly. AIP funds assist airport owners to improve land use compatibility near airports through the acquisition of non-compatible residences and sound insulation of residences, schools, and hospitals. From 2005 through 2012, nearly 129,000 people have benefited by their relocation from a noise impacted area or through sound attenuation programs designed to reduce the noise exposure on residences, schools, or hospitals.

The VALE Program addresses air quality by helping airports reduce emissions from all mobile and stationary ground sources. The FAA has funded 57 VALE projects through the AIP program from 2005 through 2012. Through 2012, a total of $116 million has been invested in VALE clean airport technology. In 2013, FAA expects to fund 13 additional VALE projects totaling approximately $26 million. Over the long-run, VALE initiatives will reduce ozone forming pollutants (Nitrous Oxides and Volatile Organic Compounds) at airports by 10,000 tons. The smog-reducing benefits of VALE projects are equivalent to removing over 25,000 cars and trucks from the road each year for the next decade. In the long run, the ZEV program will provide air quality benefits by providing funds for airports to purchase zero emission vehicles.

Why Do We Want/Need To Fund The Program At The Requested Level?

Every other year, FAA is required to develop a five-year prospective analysis of capital needs and submit it to Congress as part of the NPIAS. The capital projects included in the NPIAS consistently exceed the annual available funding for the AIP. Projects are routinely broken into smaller phases or deferred to a future year until funding can be identified. The latest NPIAS, published in September 2012, identified over $42.5 billion in capital needs over the 5-year period from 2013-2017. The FY 2015 request of $2.8 billion would fulfill less than 7 percent of these identified capital needs.

At the requested level of AIP funding, and assuming the existing statutory provisions are allowed to function as currently written in the law, the FAA would be able to fund capital needs that support system safety, capacity, and environmental projects. Should this not occur, the primary impact would be on AIP Discretionary funds—the funding category over which FAA has the greatest degree of control to address the highest priority system needs. Any reduction would impact FAA's ability to fund the highest priority needs in the NPIAS.

Explanation of Funding Changes for Grants-in-Aid for Airports

	Dollars ($000)	FTE
Grants-in-aid for Airports (Net change from FY 2014 Request)	**($445,750)**	**0**
Overview: For FY 2015, the Associate Administrator for Airports requests $2.7 billion to meet the mission of planning and developing a safe and efficient national airport system. This represents an decrease of $445 million from the FY 2014 level.		
Discretionary increases/decreases		
Grants-in-Aid for Airports The $2.7 billion requested for AIP will enable FAA to meet all national priorities for safety, security, capacity, and environmental mitigation across all size airports. The Budget focuses the traditional Federal grants to support Medium hub, smaller commercial service and general aviation airports that have more limited access to additional revenue or other outside sources of capital. At the same time, the budget proposes to increase the Passenger Facility Charge (PFC) limit from $4.50 to $8.00 and eliminates entitlement funding for large hub airports but maintains limited discretionary eligibility. Thereby, the Budget envisions giving the large hub airports greater flexibility to generate their own revenue and providing a PFC increase to all other commercial service airports as well. The $445M decrease is the amount to meet the AIP target of $2.7B.	($445,750)	0

GRANTS-IN-AID FOR AIRPORTS

Personnel and Related Expenses

($ in Thousands)

Item Title	Dollars	FTP	FTE
FY 2014 Enacted	**106,600**	**583**	**580.0**
Unavoidable Adjustments			
1. Annualization of FY 2014 FTP request	434		3.0
2. Annualization of FY 2014 Pay Raise	208		
3. FY 2015 Pay Raise	623		
Total Unavoidable Adjustments	**1,265**	**0**	**3.0**
New or Expanded Programs			
1. Removing one time increase in 2014 for SOAR Redevelopment	(1,700)		
2. Contract increase	935		
Total Discretionary Increases	**-765**	**0**	**0.0**
FY 2015 Request	**107,100**	**583**	**583.0**

Detailed Justification for Personnel and Related Expenses

What Is The Request And What Will We Get For The Funds?

FY 2015 Personnel and Related Expenses Budget Request ($000)

Program / Component	FY 2013 Enacted	FY 2014 Enacted	FY 2015 Request	Difference from 2014 President's Budget
Personnel and Related Expenses	$101,798	$106,600	$107,100	$500

For FY 2015, the Associate Administrator for Airports requests $107.1 million, 583 positions and 583 FTEs to cover the administrative expenses for the ARP, an increase of $0.5 million over the FY 2014 Request. The request allows ARP to fulfill its mission of leadership in planning and developing a safe and efficient national airport system to satisfy the needs of the aviation interests of the United States, with consideration for economics, environmental compatibility, local proprietary rights, and safeguarding the public investment. The administrative request includes the following discretionary increases:

What Is The Program?

ARP provides leadership in planning and developing a safe and efficient national airport system to satisfy the needs of the aviation interests of the United States, with consideration for economics, environmental compatibility, local proprietary rights, and safeguarding the public investment.

This program supports DOT's State-of-Good Repair goal (maintaining the percentage of airport runways in excellent, good, or fair condition); Safety goal (Reduction in transportation related injuries and fatalities), Economic Competitiveness goal (Maximum economic returns on transportation policies and investments and Competitive air transportation system responsive to consumer needs); and Environmental Sustainability goal (Reduction in transportation-related air, water and noise pollution and impacts on ecosystems).

ARP is responsible for the regulatory oversight and inspection of certificated commercial service airports. In FY 2015, we will continue emphasizing efforts to reduce runway incursions caused by vehicle/pedestrian deviations. This will require ensuring airports maintain effective driver training programs as well as implementing approved RSAT recommendations. We also have a special emphasis program to complete improvements to RSAs that do not meet current standards. Another significant initiative is implementation of SMS at airports to harmonize with International Civil Aviation Organization (ICAO) standards. Further, AIP provides priority consideration for funding safety-related development for airports that benefit both commercial service and general aviation operations.

ARP will continue to support capacity and efficiency enhancements throughout the system, including the full range of commercial service (primary) airports and smaller, nonprimary airports nationwide, by providing financial and technical support to regional and metropolitan system plans, airport master plans and environmental reviews, and by directing AIP funding toward the construction and preservation of runways, runway extensions, and airfield reconfigurations. In FY 2014, ARP expects to issue approximately 2,000 new AIP grants to airport sponsors and continues to administer the AIP to ensure the timely and efficient use of federal funds. ARP would also continue to administer the Passenger Facility Charge (PFC) program, which we anticipate will involve a significant increase in activity if the proposed PFC increase is approved. We will also strive to increase the safety, security, and capacity of the global civil aerospace system in an environmentally sound manner.

Anticipated 2015 accomplishments include:

- Administer the AIP by issuing new grants and continuing to administer existing grants at airports nationwide in support of safety, capacity, efficiency and environmental objectives;
- Administer the PFC program by monitoring the consultation process, reviewing applications and amendments for projects at commercial service airports nationwide in support of safety, capacity, efficiency and environmental objectives;
- Publish 6 Advisory Circular (AC) updates;
- Continue publishing and updating guidance on environmental sustainability initiatives;
- Improve 31 RSAs;
- Continue implementation of Airport SMS;
- Continue to support airports in conducting Wildlife Hazard Assessments and Wildlife Management Plans;
- Develop plans for improving airports with nonstandard geometry such as taxiway separation;
- Limit serious Runway Incursions by vehicles or pedestrians (category A and B) to 3 or less;
- Continue implementation of AGIS;
- Manage and execute Part 139 Airport Safety Certification program;
- Meet Part 16 compliance schedules;
- Integrate SMS into FAA airport planning and environmental processes and guidance;
- Support the President's initiative for E-Government by participating and providing resources to the Grants.gov and DOT grants portal initiative;
- Establish and implement ARP performance target for administering AIP based on identified Best Practices and Program Review; and
- Maximize the return on AIP investments by increasing the disbursement rate for AIP grants.
- Manage and execute the Part 150 (noise compatibility) program.

Why Is This Particular Program Necessary?

ARP is responsible for all airport program matters pertaining to standards for airport design, construction, maintenance, operations, safety, and data, including ensuring adequacy of the substantive aspects of FAA rulemaking actions relating to the certification of airports. We also provide national airport planning and environmental requirements, airport grants, property transfers, Passenger Facility Charge (PFC) program administration, and ensure adequacy of the substantive aspects of FAA rulemaking actions relating to these programs. ARP ensures compliance with federal airport grant and surplus property obligations, economic regulatory oversight, and executive direction and oversight of regional activities. This office serves as the first level decision maker for adjudication of complaints filed against airports under 14 C.F.R. Part 16. Additionally, this office has oversight of strategic planning, performance and technical training for headquarters and field operations.

How Do You Know The Program Works?

ARP has established a number of measures to monitor and optimize performance and efficiency. We make extensive use of customized labor reporting codes in order to track how much time we spend on each of our technical programs and administrative responsibilities. Then we combine that labor data with other direct and indirect costs compared against key output measures in order to analyze our organizational efficiency. We periodically review our progress against efficiency goals, and we review the metrics and target levels to ensure that we are continuing to evaluate our own efficiency.

In addition, ARP actively monitors the actual outcomes of our various program areas. For example, we consistently see a strong correlation between our efforts related to runway safety and a reduction in runway incursions caused by vehicle or pedestrian deviations. As another example, we can draw a direct connection between the efforts of our personnel and the condition of critical airfield infrastructure (runways and taxiways).

Why Do We Want/Need To Fund The Program At The Requested Level?

The FY 2015 requested funding amount is required to continue supporting the establishment and maintenance of high safety standards for U.S. airports. High standards reduce risks and contribute directly to a reduction in fatal accidents.

The number of airports receiving AIP grants and PFC application and amendment approvals significantly increased while staffing levels remained constant. Staffing for field offices remained the same throughout that period and to accommodate, field operations have relied upon airport sponsors to complete grant documentation and maintain compliance with grant assurances. Compliance audits, user complaints, and sponsor action increasingly unearth problems leading to corrective action which may take years to complete and create additional work for both sponsors and FAA staff.

Many airports have confusing geometry intersections with runways or other taxiways that lead to loss of pilot situational awareness, and result in runway incursions. Often these confusing intersections have multiple taxiways involved. There are also instances where taxiways do not have the required separation from runways, increasing the risk of surface operations. Contract support will be obtained to analyze confusing taxiway geometry, prioritize hotspots, and develop costs estimates for mitigating confusing taxiways. Specifically, the contract funds used in FY 2015 will be used to develop an inventory of airports that have confusing or non-standard taxiways, and to prioritize those airports according to risk level. Subsequently, work will begin in FY 2016 to address the issues with confusing and non-standard taxiways using AIP grants.

The cost for the analysis was based on the workload to identify and inventory confusing and non-standard taxiways, develop databases, and analyze taxiway risk at approximately 5,000 public use airports. Continuing contractor support will be required to develop improvement plans and schedules for all the projects, and to track and report on progress. This project will be a long term effort (ten or more years) to improve taxiways and eliminate hot spots where runway incursions occur.

Explanation of Funding Changes for Personnel & Related Expenses

	Dollars ($000)	FTE
Personnel and Related Expenses (Net change from FY 2014 Request)	**500**	**3**
Overview: For FY 2015, the Associate Administrator for Airports requests $107.1 million to meet its mission of providing leadership in planning and developing a safe and efficient national airport system to satisfy the needs of the aviation interests of the United States, with consideration for economics, environmental compatibility, local proprietary rights, and safeguarding the public investment. Covering the administrative expenses for the Office of Airports, this request represents an increase of $500,000 from the FY 2014 Request level.		
Unavoidable Adjustments		
Annualization of FTE 2014 Enacted: The FY 2014 Budget Requested 6 additional safety-related positions. The 3 FTE represent the amount not already reflected in the FY 2014 Request	434	3
Annualization: This adjustment represents the annualized cost of the FY 2014 pay increase (October to December) The factor used is 1.0 percent.	208	
Pay Inflation: This 1.0 percent increase is required to provide for costs associated with base salary increases. (January to September)	623	
Discretionary Increases/Decreases		
SOAR Redevelopment: This decrease represents the adjustment for removing the one-time investment requested in 2014 from the 2015 base.	-1,700	
Contract Support: This increase represents initiation of a program to analyze confusing taxiway geometry, prioritize hotspots, and develop cost estimates for mitigating confusing taxiways. The contract funds are required in FY 2015 to complete the analytical work that will identify the taxiways and taxiway intersections that will be improved in FY 2016 using AIP grants. The cost was developed based on workload to identify key data and analysis of about 5,000 public use airports. Continuing contractor support will be required to develop improvement plans and schedules for all the projects and to track and report on progress.	935	

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GRANTS-IN-AID FOR AIRPORTS

Airport Technology Research
($ in Thousands)

Item Title	Dollars	FTP	FTE
FY 2014 Enacted	**29,500**	**23**	**23.0**
Unavoidable Adjustments			
1. Annualization of FY 2014 Pay Raises	9		
2. FY 2015 Pay Raise	28		
Total Unavoidable Adjustments	**37**	**0**	**0.0**
Discretionary Increases/ Decreases			
Contract increase	213		
Total Discretionary Adjustments	**213**		
FY 2015 Request	**29,750**	**23**	**23.0**

Detailed Justification for Airport Technology Research

What Is The Request And What Will We Get For The Funds?

FY 2015 Airport Technology Research Budget Request ($000)

Program / Component	FY 2013 Enacted	FY 2014 Enacted	FY 2015 Request	Difference from 2014 President's Budget
Airport Technology Research	$29,191	$29,500	$29,750	$250

For FY 2015, the Associate Administrator for Airports request $29.75 million, 23 positions and 23 FTE to fund the Airport Technology Research program. The request will fund research in the areas of airport pavement, airport marking and lighting, airport rescue and firefighting, airport planning and design, wildlife hazard mitigation, runway surface technology, aircraft noise annoyance data and sleep disturbance around airport, problematic runway geometry, heated pavements, and visual guidance. The results of this research are used in updating Advisory Circulars, manuals, and technical specifications that airports rely on when expending AIP grant funds. We will also continue the program to conduct noise measurements across airport communities and concurrent public surveys and sleep disturbance studies to collect data that will be used to guide national aviation noise policy, determinations of community impacts from aircraft noise, federal land use compatibility guidelines around airports, and noise mitigation funding.

The table below summarizes the research activities funded by this request.

FY 2014 ATR Research Projects ($000)

Research Project	FY 2015 Request
Advanced Airport Pavement Design	200
Pavement Design & Evaluation Methodology	3,000
National Airport Dynamic Tests	2,900
Airport Pavement Test Vehicle	750
Field Instrumentation & Testing	450
Improved Paving Materials and Lab	1,700
Non-Destructive Pavement Testing	1,650
Center of Excellence	0
Airport Planning	500
Airport Design	700
Operation of New Large Aircraft (NLA)	600
Composite Materials Firefighting	750
Airport Wildlife Hazards Abatement	2,500
Airport visual guidance/runway incursions reduction	2,400
Airport Technology Research Taxiway	1,500
Aircraft Braking friction	500
Innovative Measurement Techniques	1,250
Heated Pavements	500
Aircraft Noise Annoyance Data and Sleep Disturbance Around	750
Surface Operations	1000
Rescue and Fire Fighting	800
Problematic Runway Geometry	1000
Runway Simulator	400
Data Mining Database	500
Subtotal--Contracts	**26,300**
FTE's/ Other Misc	3,450
TOTAL	29,750

The FY 2015 request reflects completion of several projects, continuation of most projects, and modification in the research direction as necessary.

Funding in FY 2015 will support the following key outputs and outcomes:

- Continue the refinement of a searchable airport pavement database to provide pavement engineers with a national airport pavement registry to assess how pavements constructed of specific thickness and materials and exposed to known climate and traffic loads performed over the life of the pavement;
- Continue the development of a Life Cycle Cost Analysis (LCCA) airport pavement standard to be used for all phases of pavement life. The pavement engineer will have the capability to evaluate the pavement construction and maintenance costs over the life of the pavement as part of the initial pavement design;
- Continue the research of airport pavement technologies to develop a procedure to use the technologies to provide airport managers and pavement engineers a dependable method to assess the condition of the pavement from the surface to the subgrade and estimate the remaining pavement life;
- Continue research into geometric gradients and sight distance on runways to review and modify for inclusion into Advisory Circulars as necessary. Improved runway intersection design grading criteria will be developed based on the collected longitudinal and transverse profiles;
- Complete a recognized definition of pavement life and pavement failure;
- Continue research to study the effects of high tire pressures on the pavement surface using the High Temperature Pavement Test Facility (HTPTF), and also develop pavement mix design procedures to produce mixes that can withstand very high tire inflation pressures;
- Continue to upgrade of FAA PAVEAIR by integrating it with other FAA software programs;
- Continue to upgrade the FAA NextGen pavement materials research lab;
- Continue to evaluate green technologies for use in airfield pavements;
- Develop green material specifications for use in airfield pavements;
- Continue study of emerging technologies for detecting and deterring hazardous wildlife species on or near airports;
- Continue to implement habitat modification strategies for reducing and controlling hazardous wildlife species at airports;
- Continue to conduct research on new technologies and techniques that can improve airport lighting, signs, and markings to help improve situational awareness and help reduce surface incidents, accidents, and incursions while improving capacity;
- Continue major effort on the pavement life extension project, started in FY 2013, as a core activity doubling the expected life of runway pavements at large hub airports from current standard of 20 years to 40 years;
- Continue rehabilitation of the decommissioned Taxiway C at Cape May County Airport as well as conduct testing of new lighting systems technologies and bring the taxiway into compliance for standard airport operations when not being utilized for research and development;
- Continuing surveying airport communities to collect noise annoyance and sleep disturbance data;

- Analyze the aircraft noise annoyance and sleep disturbance data and create new dose-response curves for annoyance;
- Continue to collect data for taxiway centerline deviation for airplanes in design group II and analyze data collected for airplanes in design group III;
- Continue to maintain the safety database and update the mitigation plan for the top 5 risk areas;
- Continue research into the performance of aircraft Anti-Skid Brake Systems (ASBS) on contaminated runway surfaces. This research will include utilizing the ASBS Simulation Lab, Braking Research Aircraft testing on contaminated runway surfaces, and Boeing 737-800 Full-Motion Simulator testing. The anticipated product from this research will be development of Mathematical Models capable of processing performance data from operating aircraft, landing on contaminated runways, for prediction of landing distances of follow-on aircraft;
- Continue research into development of technology for effectively heating of airport runway and taxiway surfaces to prevent snow and ice accumulation. This research will include continued evaluation of alternative power sources (e.g. geothermal and solar) and methods of heat transfer. The anticipated product from this research will be development of feasible and practical alternatives for heating of airport runways and taxiways for prevention of snow and ice accumulation;
- Continue to improve aircraft rescue and firefighting tactics to combat fires involving aircraft with multiple passenger decks carrying up to 800 passengers. The product of this research will be a simulation model for predicting fuel dispersion in survivable accidents and improved firefighting agent discharge technologies. Provide improved Aircraft Rescue and Fire Fighting (ARFF) training material for firefighting tactics for the unique characteristics of cargo aircraft fires. The data from the full-scale live fire testing of cargo aircraft will be utilized to update the existing FAA produced training DVDs and Advisory Circulars.

What Is The Program?

Safety

The research conducted within the Airport Safety Technology Research Program directly supports FAA's Advisory Circular system, which is the principal means by which FAA communicates with the nation's airport planners, designers, operators, and equipment manufacturers. These Advisory Circulars commonly referred to as an AC, present the standards used in the design, construction, installation, maintenance, and operation of airports and airport equipment. Additionally, the AC provides current advice on airport operational and safety topics. To date, the research conducted within the Airport Safety Technology Research Program has provided the necessary technical data to support hundreds of ACs that have been published on a wide range of technical subjects. These technical subjects include airport design standards, visual guidance aids such as lighting marking, or navigational aids, airport rescue and firefighting equipment and procedures, pavement surface conditions, wildlife mitigation and detection, airport capacity enhancements, pavement friction, and snow and ice mitigation. Some examples of the research include:

- **Foreign Object Debris** (FOD) detection research efforts will be conducted to evaluate new detection technologies, conduct a FOD characterization study, and also develop a national FOD database that can be used to track safety issues related to FOD.
- **Taxiway Deviation** research efforts will be conducted to better understand the behavior of larger design group aircraft on smaller airport design group airports, in support of the projected increase in levels of travel at smaller airports as part of the NextGen program.
- **Cargo Aircraft Interior Fire Suppression** research program will develop better tactical guidance for ARFF departments responding to interior fire emergencies on cargo aircraft. This will

be accomplished through full-scale, live fire testing of various Unit Load Devices (ULDs) types and configurations in aircraft main deck and lower deck holds.

- **Advanced Composite Material Cutting** is a project to determine the effectiveness of the fire service rescue saw and a variety of available blades on traditional and new commercial aircraft skin materials. With this shift toward advanced material structures over traditional aluminum structures the tools firefighters use must be evaluated to ensure they will continue to be as effective as they are now.

- **New Airfield Lighting Infrastructure** is an effort focused on identifying an efficient and standardized airfield lighting infrastructure that supports the operation of new light sources including Light Emitting Diodes (LEDs). The new system architecture will provide potential resolutions to issues that have arisen with the implementation of the LED fixtures in the current airfield lighting infrastructure.

- **Low Cost Surface Surveillance Framework** is a research effort initiated to assess the efficacy of using localized surveillance sensors to provide real-time situational awareness of aircraft and vehicle movements in the non-movement area at airports without the use of Surface Movement Radars (SMR). This effort is focused on how these systems can be employed to enhance operational capability and safety.

- **Heated Pavements initiative** promises that if runway surfaces can be efficiently and economically heated, the buildup of snow can be avoided, thereby eliminating the need for snow removal operations. Promising methods include geothermal heat exchangers, solar energy, nano-technology, and other innovative techniques to generate heat.

- **Airport Noise and sleep Annoyance** research has been initiated to expand the scope of an airport noise and sleep annoyance study to redefine the Schultz Curve, which is dated analysis tool that the FAA uses to determine the noise levels around an airport at which the public perceives that the noise from aircraft become a nuisance.

Wildlife habitat management research results are published in a widely distributed manual. The FAA's wildlife strike database and website provides information about wildlife habitat management and hazardous species control and serves as a repository of incidents and accidents involving wildlife strikes around the nation. The FAA continues to evaluate emerging and adapted technologies, to detect and deter birds and provide timely alerts to airport personnel regarding hazardous bird activity. Research will continue to develop improved FOD detection and management techniques. Ongoing research is also conducted in aircraft rescue and firefighting technology leading to more efficient firefighting techniques for post-crash fire protection of both the conventional aluminum constructed aircraft as well as newer advanced composite material construction.

Past research also led to the development of EMAS that have been installed at more than 40 airports and have safely stopped overrunning aircraft in at least 5 separate instances.

State of Good Repair

The pavement research leads to updates in pavement design and constructions standards and improvements in pavement maintenance techniques that keep airport runways and taxiways in good or better condition.

The research conducted is producing significant benefits in increased safety and potential cost savings. In support of capacity, the research results from the NAPTF and HTPTF are providing technical data needed to validate new design standards and to assure compatibility between aircraft and airport runways worldwide. The cooperative research and development agreement and collaboration with international research organizations has led to the creation of many innovative, FAA-developed software programs that have changed the way airport pavements are designed and evaluated. Some examples include:

- **FAARFIELD 1.40**, or FAA Rigid and Flexible Iterative Elastic Layer Design, provides a simpler way for airport designers to determine the needed thickness of airport pavements. It also helps meet the standards for different airplanes, and models the thicknesses needed to handle the mix of aircraft traffic. It has the potential to save FAA and airport authorities tens of millions of dollars in airport pavement redesign efforts;

- **ProFAA**, a runway profile data analysis software program, is an innovative method that allows users to calculate roughness and simulate aircraft response to obtain a better understanding of overall pavement life and aircraft fatigue;

- **COMFAA** computes Aircraft Classification Numbers following the internationally mandated ICAO standard. A library of common aircraft types is provided and the user can also define arbitrary gear configurations. The program is valuable for computing the Pavement Classification Number (PCN) for any mix of aircraft traffic, which an airport may currently or in the future experience; and

- **BAKFAA** 2.0 is a program designed to be used with falling-weight deflectometer (FWD) equipment as part of a pavement evaluation program. BAKFAA reads the data from a variety of FWD devices and returns back calculated layer properties. The computational engine in BAKFAA is LEAF (Layered Elastic Analysis – FAA). LEAF is built into FAARFIELD, but can also be downloaded and run separately under BAKFAA. The FAA has made the Visual BasicTM source code for BAKFAA and LEAF available for programmers to run LEAF from their own applications.

- **FAA PAVEAIR** is a web-based airport pavement management system that provides users with historic current information about airport pavement construction, maintenance and management. The program offers users a planning tool capable of modeling airport pavement surface degradation due to external effects such as traffic and the environment. The program can be used with other FAA pavement applications, such as BAKFAA and COMFAA, to give users input to determine repair scheduling and strategies. It has been developed for installation and use on a stand-alone personal computer, a private network, an intranet and the internet. An implementation of the internet version of FAA PAVEAIR is hosted and supported on a server at the William J. Hughes Technical Center and is accessible from the FAA PAVEAIR website.

- **High Tire Pressure Testing (HTPT)** - NAPTF has completed three cycles of testing the effects of tire pressure on asphalt pavement in conjunction with the Airport Technology group of Boeing Commercial Airplanes. The full scale tests determined that by increasing tire pressure from 210 psi (1.45 MPa) to 245 psi (1.66 MPa) had an insignificant effect on the amount of rutting caused by trafficking at two different wheel loads on two different asphalt mixes but increasing wheel load caused a significant increase in rutting on asphalt pavements. This testing is helping to support a revised tire pressure classification for ICAO standards.

- **Design of Pavements for 40-year Life** project – The current 20-year design life for pavements is specified in FAA AC. In order to accomplish the required extension of pavement life the R&D effort to modify the existing pavement design program, FAARFIELD, to accommodate the new pavement life standard. This modification will include better modeling of pavement remaining life, quantification of design reliability based on available pavement management data, estimation of fatigue life, and revised procedures for reporting PCN.

- **"Green" Pavement Technology** research will examine several technologies, such as, warm mix asphalt, recycled asphalt pavement mixes and asphalt mixes with recycled asphalt shingles. The results will offer long-lasting and low-cost pavements.

Environmental Sustainability
In FY 2015, FAA will continue to investigate the effects of aircraft noise near representative U.S. airports. The results of this work will be used to guide national aviation noise policy, determinations of community noise impacts, land use guidelines around airports, and mitigation funding. FAA will also advance guidance related to energy reduction and solid-waste recycling programs.

Anticipated 2015 accomplishments include:

- Complete evaluation to determine feasibility of implementing bird radar displays in Air Traffic Control towers;
- Continue collection of taxiway deviation data at a design group I airport;
- Complete research program on cargo aircraft interior fire suppression to include full-scale live fire testing;
- Complete Advanced Composite Material Cutting study;
- Complete evaluation of proposed new lighting infrastructure utilizing the Airport Technology Research Taxiway;
- Conduct demonstration of baseline Low Cost Surface Surveillance Framework project;
- Continue analyzing full-scale data from the NAPTF;
- Continue improvements upon and update the pavement design procedures (FAARFIELD) based on full scale data from NAPTF and airport instrumentation sites;
- Continue conducting technical workshops of all FAA analysis design and programs (PROFAA, FAARFIELD, BAKFAA, LEDFAA and FAA PAVEAIR);
- Continue development of increasing pavement design life from 20 to 40 years for large hub airports;
- Continue full-scale tests on reflective cracking of flexible pavement at the NAPTF;
- Development of a web-based application for FAA PAVEAIR as a suite of FAA analysis tools (PROFAA, FAARFIELD, BAKFAA, LEDFAA);
- Continue full scale testing of "green" paving materials with Accelerated Pavement Test (APT) machine;
- Complete construction of High Temperature Pavement Test Facility (HTPTF); and
- Continue the population of the airport pavement data warehouse.
- Continue the development of the LCCA airport pavement standard and incorporate into the pavement data warehouse.

- Continue to assess airport pavement technologies to estimate remaining pavement life.
- Complete a draft improved runway intersection design grading criteria standard.
- Complete in-service testing of New LED lighting circuits at a large and a small airport.

Why Is This Particular Program Necessary?

The Airport Technology Research Program is essential as it leads to improvements in airport safety and marking, airport design, airport lighting, aircraft rescue and firefighting, mitigation of wildlife hazards and improvements in pavement design and construction. The new technology developed from the research such as the EMAS and the penetrating firefighting nozzles have been implemented and are improving airport safety. EMAS technology alone has safely arrested six overrunning aircraft with no fatalities or injuries.

How Do You Know The Program Works?

The Airport Technology Research Program is reviewed every six months by FAA's Research, Engineering and Development Committee's (REDAC) Subcommittee on Airports. The Subcommittee has members from airports, aircraft manufacturers, Airline Pilots Association (ALPA) and airport associations. The Subcommittee is briefed on both ongoing research and planned research and offers recommendations to ensure the research program is responsive to the needs of FAA and the airport community.

Each research project is sponsored by a Headquarters engineer that prepares the research requirements, reviews the research plan, and approves the completed deliverables. The success of the research is reflected in our ability to issue updated and new program guidance. For example, based on research and evaluation we issued performance specifications for bird radars and FOD detection systems.

Why Do We Want/Need To Fund The Program At The Requested Level?

The funds are requested to continue the ongoing research and the new research activities programmed for FY 2015. A reduction in funding would mean decreased contract support and would defer some project activities.

Explanation of Funding Changes for Airport Technology Research (ATR)

	Dollars ($000)	FTE
Airport Technology Research (Net change from FY 2014 Request)	**250**	
Overview: For FY 2015, the Associate Administrator for Airports requests $29.75 million, 23 positions and 23 FTE to conduct research in the areas of airport pavement, airport marking and lighting, airport rescue and firefighting, airport planning and design, wildlife hazard mitigation, runway surface technology, and visual guidance. The results of this research are used in updating Advisory Circulars, manuals, and technical specifications that airports rely on when expending AIP grant funds.		
Unavoidable Adjustments		
Annualization: This adjustment represents the annualized cost of the FY 2014 pay increase (October to December) The factor used is 1.0 percent.	9	
Pay Inflation: This 1.0 percent increase is required to provide for costs associated with base salary increases. (January to September)	28	
Discretionary Increases/Decreases		
Program Adjustments: Increase contract costs for ongoing research activities	213	

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GRANTS-IN-AID FOR AIRPORTS

Airport Cooperative Research
($ in Thousands)

Item Title	Dollars	FTP	FTE
FY 2014 Enacted	**15,000**	**2**	**2.0**
Unavoidable Adjustments			
1. Annualization of FY 2014 Pay Raises	2		
2. FY 2015 Pay Raise	6		
Total Unavoidable Adjustments	**8**	**0**	**0.0**
Discretionary Increases/ Decreases			
1. Decrease in contracts	(8)		
Total Discretionary Adjustments	**(8)**	**0**	**0.0**
FY 2015 Request	**15,000**	**2**	**2.0**

Detailed Justification for Airport Cooperative Research Program

What Is The Request And What Will We Get For The Funds?

FY 2014 Airport Cooperative Research Program ($000)

Program / Component	FY 2013 Enacted	FY 2014 Enacted	FY 2015 Request	Difference from 2014 President's Budget
Airport Cooperative Research Program	$14,970	$15,000	$15,000	$0

For FY 2015, FAA requests $15 million, 2 positions and 2 FTE. Pay inflation will be absorbed within the requested level.

Funding in FY 2015 will support the following key outputs and outcomes:

- Airport Cooperative Research Program (ACRP) will select approximately 30 research topics to fund in FY 2015. Research reports will be for research studies that develop handbooks and best practices and other research that will provide information for airport owners, operators, and consultants in the areas of airport safety, airport management and financing, airport environmental and sustainability, airport planning.

What Is The Program?

This program supports DOT's Safety goal (Reduction in transportation-related injuries and fatalities), Economic Competitiveness goal (Maximum economic returns on transportation policies and investments), and Environmental Sustainability goal (Reduction in transportation-related air, water and noise pollution and impacts on ecosystems).

ACRP was authorized by section 712 of Vision 100 – Century of Aviation Reauthorization Act. The Secretary of Transportation signed a Memorandum of Agreement among DOT, FAA, and National Academy of Sciences to implement the ACRP. The Secretary also appointed the 13 members of the ACRP Oversight Committee. The Transportation Research Board (TRB) of the National Academy administers the program. The ACRP Oversight Committee has met every six months to review progress and select additional topics to fund. Over 100 submitted topics will be reviewed at the July 2013 meeting and the most promising topics selected for subsequent contract award. The ACRP Oversight Committee selects the highest rated topics, subject to the funds available, to proceed to contract solicitation and award. The TRB appoints expert technical panels for each selected project. The technical panels convert the topics into requests for proposals to select contractors to perform the research. The panels also monitor each project to ensure it stays on track and meets project deliverables.

ACRP conducts research studies that provide information to airports in the form of handbooks and best practices among other research on issues of interest to airports in the areas of safety, airport management, airport financing, airport sustainability, and airport planning. Recent ACRP reports published included such studies as:

- Incorporating sustainability into Airport Projects;
- Guidelines for Airport Sound Installation Programs;
- Assessing Opportunities for Alternative Fuel Distribution Programs;
- Regulatory Compliance Costs and the impact on Small Airports;
- Integrating GIS in Emergency Management at Airports; and
- Evaluating Terminal Renewal Versus Replacement Options; and
- Published a Guidebook on Airport Irregular Operations Contingency Planning.

Anticipated FY 2015 accomplishments include:

- ACRP awards contracts for the topics selected for funding in FY 2014;
- ACRP Board of Governors will meet to select projects to fund in 2015; and
- TRB will appoint project technical panels for new projects selected in FY 2014.

Why Is This Particular Program Necessary?

The ACRP was established by Congress to conduct research on issues common to airports but that is not being done under other federal research programs and is not capable of being done by individual airports. The research is selected from topics submitted by airports and the aviation community. The ACRP Oversight Committee consists of airport executives, airport associations, and federal agencies that ensure the projects selected will benefit airports and will not duplicate ongoing federal research.

How Do You Know The Program Works?

We know the program works by the interest of the airport community that submits over 100 topics for research each year. We also track the ACRP performance by the number of research studies underway and the number of reports published. We have also initiated a dissemination project to improve the methods used to make the published reports available to airports and consultants using electronic methods and web based availability, and to develop statistics on the number of requests for ACRP reports.

Why Do We Want/Need To Fund The Program At The Requested Level?

The airport community and the airport associations have been strong supporters of ACRP. Congress approved increasing ACRP in FY 2009 by $5 million to a total of $15 million with the additional money being focused on airport environmental research.

Each year ACRP receives approximately 150 suggested topics for research. Each study costs on average about $300,000. Reducing funds below the $15 million request will result in fewer studies.

Explanation of Funding Changes for Airport Cooperative Research Program (ACRP)

	Dollars ($000)	FTE
Airport Cooperative Research Program (Net change from FY 2014 Request)	**0**	
Overview: For FY 2015, we maintain the Airport Cooperative Research Program at the FY 2014 Request level of $15 million. There is a discretionary reduction in contracts to offset inflation.		
Unavoidable Adjustments		
Annualization: This adjustment represents the annualized cost of the FY 2014 pay increase (October to December) The factor used is 1.0 percent.	2	
Pay Inflation: This 1.0 percent increase is required to provide for costs associated with base salary increases. (January to September)	6	
Discretionary increases/decreases		
ACRP Discretionary Decrease in contracts: There is a discretionary reduction in contracts to offset pay raise.	-8	

AIRPORT IMPROVEMENT PROGRAM
Grants-in-Aid to Airports Planned Distribution
$000

	FY 2013 Enacted	FY 2014 Enacted	FY 2015 Request
Formula Grants*			
Primary Airports	850,254	831,932	386,056
Cargo Service Airports	111,732	111,787	96,185
Alaska	21,345	21,345	10,673
States (General Aviation)	638,471	638,780	494,667
Carryover (from Formula Grants)	702,708	725,736	637,274
Subtotal, Formula Grants**	2,324,510	2,329,580	1,624,855
Discretionary Grants			
Discretionary Set-Aside: Noise Compatibility	133,503	133,246	261,734
Discretionary Set-Aside: Reliever	2,517	2,513	0
Discretionary Set-Aside: Military Airport Program	15,258	15,228	29,912
C/S/S/N (Capacity/Safety/Security/Noise)	172,620	172,286	342,123
Discretionary -- AATF	57,540	57,429	114,041
Subtotal, Discretionary Grants	381,438	380,702	747,810
Small Airport Fund***	486,404	483,618	375,485
Total Grants	**3,192,353**	**3,193,900**	**2,748,150**

*FY 2013 Enacted level includes $253M expenditure transfer per PL 113-9

** Per the Reducing Flight Delays Act of 2013, $253 million of this amount that was eventually reported as "carryover" by the receiving airport sponsor was transferred to other FAA accounts.

*** The proposed FY-2015 budget does not propose any changes that would eliminate the Small Airport Fund, as was proposed for FY-2013. Instead, the proposed FY-2015 budget reflects the existing structural provisions of the authorizing legislation, consistent with the FAA Modernization and Reform Act of 2012.

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Passenger Facility Charge (PFC) Approved Locations
As of February 01, 2014
(Whole Dollars)
PFC APPROVED LOCATIONS

State	Associated City	Airport Name	LOC ID	Hub size	Level	Total Approved	Duration	Start Date	Est. Expir. Date
AL	Birmingham	Birmingham - Shuttlesworth International	BHM	S	$3.00	$24,548,436	6y3m	8/1/1997	11/1/2003
AL	Birmingham	Birmingham - Shuttlesworth International	BHM	S	$3.00	$15,646,592	4y10m	12/1/2003	10/1/2008
AL	Birmingham	Birmingham - Shuttlesworth International	BHM	S	$4.50	$172,582,438	22Y4M	10/1/2008	2/1/2031
AL	Dothan	Dothan Regional	DHN	N	$3.00	$5,515,948	3y6m	2/1/1998	8/1/2001
AL	Dothan	Dothan Regional	DHN	N	$4.50	**	19y4m	8/1/2001	12/1/2020
AL	Huntsville	Huntsville International - Carl T. Jones Field	HSV	S	$3.00	$15,237,907	12y3m	6/1/1992	9/1/2004
AL	Huntsville	Huntsville International - Carl T. Jones Field	HSV	S	$4.50	$47,068,122	19y1m	9/1/2004	10/1/2023
AL	Mobile	Mobile Regional	MOB	N	$3.00	$4,715,747	6y7m	12/1/1997	7/1/2004
AL	Mobile	Mobile Regional	MOB	N	$3.00	$7,536,316	8y2m	3/1/2005	5/1/2013
AL	Mobile	Mobile Regional	MOB	N	$3.00	$3,702,049	4y4m	6/1/2013	10/1/2017
AL	Montgomery	Montgomery Regional (Dannelly Field)	MGM	N	$4.50	$28,599,933	21y8m	5/1/2005	1/1/2027
AL	Muscle Shoals	Northwest Alabama Regional	MSL	CS	$3.00	$267,600	11y4m	6/1/1992	10/1/2003
AL	Muscle Shoals	Northwest Alabama Regional	MSL	CS	$3.00	$54,730	4y5m	12/1/2004	4/1/2009
AL	Muscle Shoals	Northwest Alabama Regional	MSL	CS	$4.50	$261,208	6y	4/1/2009	4/1/2015
AK	Anchorage	Ted Stevens Anchorage International	ANC	M	$3.00	$91,243,173	26y2m	10/1/2000	12/1/2026
AK	Fairbanks	Fairbanks International	FAI	S	$3.00	$5,196,252	3y6m	10/1/2000	4/1/2004
AK	Fairbanks	Fairbanks International	FAI	S	$4.50	**	2y6m	4/1/2004	10/1/2006
AK	Fairbanks	Fairbanks International	FAI	S	$4.50	$33,217,000	20y	10/1/2006	10/1/2026
AK	Juneau	Juneau International	JNU	N	$3.00	$1,520,391	2y4m	10/1/1998	2/1/2001
AK	Juneau	Juneau International	JNU	N	$4.50	$15,211,781	15y9m	8/1/2001	5/1/2017
AK	Ketchikan	Ketchikan International	KTN	N	$3.00	$6,644,400	2y6m	2/1/1999	8/1/2001
AK	Ketchikan	Ketchikan International	KTN	N	$4.50	**	16y8m	8/1/2001	4/1/2018
AK	Sitka	Sitka Rocky Gutierrez	SIT	N	$4.50	$1,365,000	6y2m	7/1/2007	9/1/2013
AS	Pago Pago	Pago Pago International	PPG	N	$3.00	$950,000	4y11m	7/1/1995	6/1/2000
AS	Pago Pago	Pago Pago International	PPG	N	$4.50	$765,000	4y	9/1/2001	9/1/2005
AS	Pago Pago	Pago Pago International	PPG	N	$4.50	$5,848,954	14y6m	6/1/2006	12/1/2020
AZ	Bullhead City	Laughlin/Bullhead International	IFP	N	$2.00	$954,132	4y5m	5/1/2008	10/1/2012
AZ	Bullhead City	Laughlin/Bullhead International	IFP	N	$2.00	$1,477,531	11y	1/1/2014	1/1/2025
AZ	Flagstaff	Flagstaff Pulliam	FLG	N	$3.00	$2,984,285	19y9m	12/1/1992	9/1/2012
AZ	Flagstaff	Flagstaff Pulliam	FLG	N	$4.50	**	2y7m	9/1/2012	4/1/2015
AZ	Mesa	Phoenix-Mesa Gateway	IWA/ AZA	S	$4.50	$53,451,561	14y2m	11/1/2008	1/1/2023

State	Associated City	Airport Name	LOC ID	Hub size	Level	Total Approved	Duration	Start Date	Est. Expir. Date
AZ	Peach Springs	Grand Canyon West	1G4/ PGS	N	$3.00	$308,210	2y	9/1/2004	9/1/2006
AZ	Peach Springs	Grand Canyon West	1G4/ PGS	N	$3.00	$9,614,736	15y7m	6/1/2008	1/1/2024
AZ	Phoenix	Phoenix Sky Harbor International	PHX	L	$3.00	$241,106,516	6y	4/1/1996	4/1/2002
AZ	Phoenix	Phoenix Sky Harbor International	PHX	L	$4.50	$2,574,593,2 77	28y1m	7/1/2002	8/1/2030
AZ	Tucson	Tucson International	TUS	S	$3.00	$100,461,860	8y8m	2/1/1998	10/1/2006
AZ	Tucson	Tucson International	TUS	S	$4.50	**	6y6m	10/1/2006	4/1/2013
AZ	Tucson	Tucson International	TUS	S	$4.50	$44,194,512	4y5m	4/1/2013	9/1/2017
AZ	Yuma	Yuma MCAS/Yuma International	NYL/ YUM	N	$3.00	$2,390,423	12y10m	12/1/1993	10/1/2005
AZ	Yuma	Yuma MCAS/Yuma International	NYL/ YUM	N	$4.50	**	1y6m	10/1/2005	4/1/2007
AZ	Yuma	Yuma MCAS/Yuma International	NYL/ YUM	N	$4.50	$3,077,035	14y7m	11/1/2007	6/1/2022
AR	Bentonville	Northwest Arkansas Regional	XNA	S	$3.00	$125,025,221	2y4m	12/1/1998	4/1/2001
AR	Bentonville	Northwest Arkansas Regional	XNA	S	$4.50	**	39y2m	4/1/2001	6/1/2040
AR	Fayetteville	Drake Field	FYV	GA	$3.00	$2,221,887	5y	1/1/1996	1/1/2001
AR	Fort Smith	Fort Smith Regional	FSM	N	$3.00	$4,011,641	13y6m	8/1/1994	2/1/2008
AR	Fort Smith	Fort Smith Regional	FSM	N	$4.50	**	1y1m	2/1/2008	3/1/2009
AR	Fort Smith	Fort Smith Regional	FSM	N	$4.50	$3,722,645	10y9m	3/1/2009	12/1/2019
AR	Little Rock	Bill and Hillary Clinton National/ Adams Field	LIT	S	$3.00	$24,383,919	6y4m	5/1/1995	9/1/2001
AR	Little Rock	Bill and Hillary Clinton National/ Adams Field	LIT	S	$4.50	$63,314,419	13y8m	9/1/2001	5/1/2015
AR	Texarkana	Texarkana Regional-Webb Field	TXK	N	$3.00	$649,532	6y7m	2/1/1995	9/1/2001
AR	Texarkana	Texarkana Regional-Webb Field	TXK	N	$4.50	$258,861	3y6m	9/1/2001	3/1/2005
AR	Texarkana	Texarkana Regional-Webb Field	TXK	N	$4.50	$1,414,137	10y2m	7/1/2008	9/1/2018
CA	Arcata/Eureka	Arcata	ACV	N	$3.00	$169,564	1y1m	2/1/1993	3/1/1994
CA	Arcata/Eureka	Arcata	ACV	N	$3.00	$767,300	3y	11/1/1994	11/1/1997
CA	Arcata/Eureka	Arcata	ACV	N	$3.00	$1,084,184	5y2m	4/1/1998	6/1/2003
CA	Arcata/Eureka	Arcata	ACV	N	$4.50	$619,009	1y9m	6/1/2003	3/1/2005
CA	Arcata/Eureka	Arcata	ACV	N	$4.50	$336,981	3m	7/1/2005	10/1/2005
CA	Arcata/Eureka	Arcata	ACV	N	$4.50	*	4m	12/1/2005	4/1/2006
CA	Arcata/Eureka	Arcata	ACV	N	$4.50	$2,468,475	5y4m	4/1/2006	8/1/2011
CA	Arcata/Eureka	Arcata	ACV	N	$4.50	$1,851,818	4y10m	10/1/2011	8/1/2016
CA	Bakersfield	Meadows Field	BFL	N	$3.00	$1,562,876	6y11m	6/1/1995	5/1/2002
CA	Bakersfield	Meadows Field	BFL	N	$4.50	$9,086,000	12y8m	5/1/2002	1/1/2015
CA	Burbank	Bob Hope	BUR	M	$3.00	$107,029,194	8y7m	9/1/1994	4/1/2003
CA	Burbank	Bob Hope	BUR	M	$4.50	**	4y9m	4/1/2003	1/1/2008
CA	Burbank	Bob Hope	BUR	M	$4.50	$100,588,421	8y7m	1/1/2008	8/1/2016
CA	Burbank	Bob Hope	BUR	M	$3.00	$19,931,292	2y7m	8/1/2016	3/1/2019
CA	Burbank	Bob Hope	BUR	M	$4.50	$3,937,000	7m	3/1/2019	10/1/2019
CA	Carlsbad	McCellan-Palomar	CRQ /CLD	N	$4.50	$4,947,065	34y1m	1/1/2009	2/1/2043
CA	Chico	Chico Municipal	CIC	N	$3.00	$211,117	4y9m	12/1/1993	9/1/1998
CA	Chico	Chico Municipal	CIC	N	$3.00	$19,822	1y8m	6/1/1999	2/1/2001
CA	Chico	Chico Municipal	CIC	N	$3.00	$468,782	8y1m	11/1/2001	12/1/2009
CA	Chico	Chico Municipal	CIC	N	$4.50	$590,000	5y	12/1/2010	12/1/2015

State	Associated City	Airport Name	LOC ID	Hub size	Level	Total Approved	Duration	Start Date	Est. Expir. Date
CA	Crescent City	Jack McNamara Field	CEC	N	$3.00	$53,752	1y9m	9/1/1998	6/1/2000
CA	Crescent City	Jack McNamara Field	CEC	N	$3.00	$223,807	2y5m	1/1/2001	6/1/2003
CA	Crescent City	Jack McNamara Field	CEC	N	$4.50	**	3y10m	6/1/2003	4/1/2007
CA	Crescent City	Jack McNamara Field	CEC	N	$4.50	$358,578	7y6m	4/1/2007	10/1/2014
CA	Fresno	Fresno Yosemite International	FAT	S	$3.00	$55,936,482	8y	12/1/1996	12/1/2004
CA	Fresno	Fresno Yosemite International	FAT	S	$4.50	**	15y1m	12/1/2004	1/1/2020
CA	Imperial	Imperial County	IPL	CS	$4.50	$892,781	11y	4/1/2003	4/1/2014
CA	Inyokern	Inyokern	IYK	CS	$3.00	$420,931	10y	3/1/1993	3/1/2003
CA	Inyokern	Inyokern	IYK	CS	$3.00	$51,000	6m	4/1/2004	10/1/2004
CA	Inyokern	Inyokern	IYK	CS	$4.50	$89,999	2y5m	9/1/2006	2/1/2009
CA	Inyokern	Inyokern	IYK	CS	$4.50	$502,105	10y	3/1/2009	3/1/2019
CA	Long Beach	Long Beach/Daugherty Field	LGB	S	$3.00	$69,493,089	4y9m	8/1/2003	5/1/2008
CA	Long Beach	Long Beach/Daugherty Field	LGB	S	$4.50	**	7y6m	5/1/2008	11/1/2015
CA	Long Beach	Long Beach/Daugherty Field	LGB	S	$4.50	$97,377,700	14y8m	11/1/2015	7/1/2030
CA	Los Angeles	Los Angeles International	LAX	L	$3.00	$166,593,784	2y6m	7/1/1993	1/1/1996
CA	Los Angeles	Los Angeles International	LAX	L	$3.00	$700,000,000	5y5m	2/1/1998	7/1/2003
CA	Los Angeles	Los Angeles International	LAX	L	$4.50	**	2y5m	7/1/2003	12/1/2005
CA	Los Angeles	Los Angeles International	LAX	L	$4.50	$1,637,779,968	13y3m	12/1/2005	3/1/2019
CA	Los Angeles	Los Angeles International	LAX	L	$3.00	$34,089,058	3m	3/1/2019	6/1/2019
CA	Mammoth Lakes	Mammoth Yosemite	MMH	N	$3.00	$0	10y	9/1/1995	9/1/2005
CA	Mammoth Lakes	Mammoth Yosemite	MMH	N	$4.50	$665,010	6y	11/1/2009	11/1/2015
CA	Modesto	Modesto City County-Harry Sham Field	MOD	N	$3.00	$400,757	10y7m	8/1/1994	3/1/2005
CA	Modesto	Modesto City County-Harry Sham Field	MOD	N	$4.50	$689,834	7y4m	8/1/2008	12/1/2015
CA	Monterey	Monterey Regional	MRY	N	$3.00	$5,607,775	9y6m	1/1/1994	7/1/2003
CA	Monterey	Monterey Regional	MRY	N	$4.50	$2,155,077	2y9m	7/1/2003	4/1/2006
CA	Monterey	Monterey Regional	MRY	N	$4.50	$7,164,248	9y	5/1/2006	5/1/2015
CA	Oakland	Metropolitan Oakland International	OAK	M	$3.00	$72,971,180	6y9m	9/1/1992	6/1/1999
CA	Oakland	Metropolitan Oakland International	OAK	M	$3.00	$49,772,681	3y8m	9/1/1999	5/1/2003
CA	Oakland	Metropolitan Oakland International	OAK	M	$4.50	**	4m	5/1/2003	9/1/2003
CA	Oakland	Metropolitan Oakland International	OAK	M	$4.50	$496,506,257	17y7m	9/1/2003	4/1/2021
CA	Oakland	Metropolitan Oakland International	OAK	M	$3.00	$70,259,000	2y1m	4/1/2021	5/1/2023
CA	Ontario	Ontario International	ONT	M	$3.00	$27,333,931	3y5m	7/1/1993	12/1/1996
CA	Ontario	Ontario International	ONT	M	$3.00	$118,454,000	9y4m	7/1/1998	11/1/2007
CA	Ontario	Ontario International	ONT	M	$4.50	$96,648,998	5y2m	11/1/2007	1/1/2013
CA	Ontario	Ontario International	ONT	M	$2.00	**	8y9m	1/1/2013	10/1/2021
CA	Oxnard	Oxnard	OXR	GA	$4.50	$631,115	9y2m	1/1/2002	3/1/2011
CA	Palm Springs	Palm Springs International	PSP	S	$3.00	$88,415,656	9y4m	9/1/1992	1/1/2002
CA	Palm Springs	Palm Springs International	PSP	S	$4.50	**	27y6m	1/1/2002	7/1/2029
CA	Redding	Redding Municipal	RDD	N	$3.00	$1,009,264	5y	4/1/1997	4/1/2002
CA	Redding	Redding Municipal	RDD	N	$4.50	**	8m	4/1/2002	12/1/2002
CA	Redding	Redding Municipal	RDD	N	$4.50	$1,124,987	4y4m	12/1/2002	4/1/2007
CA	Redding	Redding Municipal	RDD	N	$4.50	$1,223,858	7y1m	8/1/2007	9/1/2014
CA	Sacramento	Sacramento International	SMF	M	$3.00	$103,766,639	8y9m	4/1/1993	1/1/2002

State	Associated City	Airport Name	LOC ID	Hub size	Level	Total Approved	Duration	Start Date	Est. Expir. Date
CA	Sacramento	Sacramento International	SMF	M	$4.50	**	1y1m	1/1/2002	2/1/2003
CA	Sacramento	Sacramento International	SMF	M	$3.00	$172,897,776	6m	2/1/2003	9/1/2003
CA	Sacramento	Sacramento International	SMF	M	$4.50	**	7y10m	9/1/2003	7/1/2011
CA	Sacramento	Sacramento International	SMF	M	$4.50	$676,588,317	23y4m	7/1/2011	11/1/2034
CA	San Diego	San Diego International	SAN	L	$3.00	$149,301,528	7y10m	10/1/1995	8/1/2003
CA	San Diego	San Diego International	SAN	L	$4.50	$1,363,961,305	34y3m	8/1/2003	11/1/2037
CA	San Francisco	San Francisco International	SFO	L	$4.50	$1,443,594,323	21y8m	10/1/2001	6/1/2023
CA	San Jose	Norman Y. Mineta San Jose International	SJC	M	$3.00	$165,981,988	8y7m	9/1/1992	4/1/2001
CA	San Jose	Norman Y. Mineta San Jose International	SJC	M	$4.50	**	10m	4/1/2001	2/1/2002
CA	San Jose	Norman Y. Mineta San Jose International	SJC	M	$4.50	$901,950,859	27y3m	2/1/2002	5/1/2029
CA	San Luis Obispo	San Luis County Regional	SBP	N	$3.00	$615,677	2y	2/1/1993	2/1/1995
CA	San Luis Obispo	San Luis County Regional	SBP	N	$3.00	$7,432,277	7y3m	6/1/1995	9/1/2002
CA	San Luis Obispo	San Luis County Regional	SBP	N	$4.50	**	8y9m	9/1/2002	6/1/2011
CA	San Luis Obispo	San Luis County Regional	SBP	N	$3.00	$1,057,676	3y	6/1/2011	6/1/2014
CA	San Luis Obispo	San Luis County Regional	SBP	N	$4.50	$3,758,461	3y7m	6/1/2014	1/1/2018
CA	Santa Ana	John Wayne Airport -Orange County	SNA	M	$4.50	$321,351,002	15y6m	7/1/2006	1/1/2022
CA	Santa Barbara	Santa Barbara Municipal	SBA	S	$3.00	$8,746,624	4y10m	1/1/1998	11/1/2003
CA	Santa Barbara	Santa Barbara Municipal	SBA	S	$4.50	**	1y6m	11/1/2003	5/1/2005
CA	Santa Barbara	Santa Barbara Municipal	SBA	S	$4.50	$27,641,741	34y2m	5/1/2005	7/1/2039
CA	Santa Maria	Santa Maria Public/Capt G Allan Hancock Field	SMX	N	$4.50	$5,380,346	21y	10/1/2007	10/1/2028
CA	Santa Rosa	Charles M. Schultz - Sonoma County	STS	N	$3.00	$711,232	7y11m	5/1/1993	4/1/2001
CA	Santa Rosa	Charles M. Schultz - Sonoma County	STS	N	$4.50	**	4y	4/1/2001	4/1/2005
CA	Santa Rosa	Charles M. Schultz - Sonoma County	STS	N	$4.50	$1,319,049	4y11m	5/1/2008	4/1/2013
CA	Santa Rosa	Charles M. Schultz - Sonoma County	STS	N	$4.50	$425,000	11m	7/1/2013	6/1/2014
CA	South Lake Tahoe	Lake Tahoe	TVL	GA	$3.00	$928,747	14y7m	8/1/1992	3/1/2007
CA	Stockton	Stockton Metropolitan	SCK	N	$4.50	$322,665	2y6m	2/1/2007	8/1/2009
CA	Stockton	Stockton Metropolitan	SCK	N	$4.50	$821,814	3y	9/1/2009	9/1/2012
CA	Stockton	Stockton Metropolitan	SCK	N	$4.50	$792,000	2y9m	9/1/2013	6/1/2016
CO	Alamosa	San Luis Valley Regional/Bergman Field	ALS	CS	$3.00	$288,836	27y2m	3/1/1997	5/1/2024
CO	Aspen	Aspen-Pitkin County/Sardy Field	ASE	N	$3.00	$3,869,200	7y10m	7/1/1995	5/1/2003
CO	Aspen	Aspen-Pitkin County/Sardy Field	ASE	N	$4.50	$713,146	1y3m	5/1/2003	8/1/2004
CO	Aspen	Aspen-Pitkin County/Sardy Field	ASE	N	$4.50	$9,216,708	10y1m	1/1/2005	2/1/2016
CO	Colorado Springs	City of Colorado Springs Municipal	COS	S	$3.00	$70,152,689	22y8m	3/1/1993	11/1/2015
CO	Cortez	Cortez Municipal	CEZ	CS	$3.00	$200,078	8y4m	11/1/1999	3/1/2008
CO	Cortez	Cortez Municipal	CEZ	CS	$4.50	$339,072	8y	3/1/2008	3/1/2016
CO	Denver	Denver International	DEN	L	$3.00	$3,137,099,200	8y9m	7/1/1992	4/1/2001
CO	Denver	Denver International	DEN	L	$4.50	**	25y9m	4/1/2001	1/1/2026
CO	Denver	Denver International	DEN	L	$4.50	$80,386,000	3y1m	1/1/2026	2/1/2029
CO	Durango	Durango-La Plata County	DRO	N	$3.00	$534,282	2y6m	2/1/1995	8/1/1997
CO	Durango	Durango-La Plata County	DRO	N	$3.00	$1,289,455	5y6m	9/1/1997	3/1/2003
CO	Durango	Durango-La Plata County	DRO	N	$4.50	$3,130,691	5y10m	6/1/2005	4/1/2011
CO	Durango	Durango-La Plata County	DRO	N	$4.50	$953,500	9m	11/1/2011	8/1/2012

State	Associated City	Airport Name	LOC ID	Hub size	Level	Total Approved	Duration	Start Date	Est. Expir. Date
CO	Durango	Durango-La Plata County	DRO	N	$4.50	$10,400,800	2y7m	9/1/2013	4/1/2016
CO	Eagle	Eagle County Regional	EGE	N	$3.00	$8,855,961	7y7m	9/1/1993	4/1/2001
CO	Eagle	Eagle County Regional	EGE	N	$4.50	**	8y2m	4/1/2001	6/1/2009
CO	Eagle	Eagle County Regional	EGE	N	$3.00	$300,000	1m	6/1/2009	7/1/2009
CO	Eagle	Eagle County Regional	EGE	N	$4.50	$13,713,255	15y	7/1/2009	7/1/2024
CO	Fort Collins-Loveland	Fort Collins-Loveland Municipal	FNL	N	$3.00	$307,046	5y7m	10/1/1993	5/1/1999
CO	Fort Collins-Loveland	Fort Collins-Loveland Municipal	FNL	N	$4.50	$1,112,585	7y4m	8/1/2004	12/1/2011
CO	Fort Collins-Loveland	Fort Collins-Loveland Municipal	FNL	N	$4.50	$804,048	3y1m	2/1/2012	3/1/2015
CO	Grand Junction	Grand Junction Regional	GJT	N	$3.00	$4,879,574	13y5m	4/1/1993	9/1/2006
CO	Grand Junction	Grand Junction Regional	GJT	N	$4.50	$15,857,760	17y4m	9/1/2006	1/1/2024
CO	Gunnison	Gunnison-Crested Butte Regional	GUC	N	$3.00	$1,089,036	7y5m	11/1/1993	4/1/2001
CO	Gunnison	Gunnison-Crested Butte Regional	GUC	N	$4.50	$3,125,482	21y9m	4/1/2001	1/1/2023
CO	Hayden	Yampa Valley	HDN	N	$3.00	$2,190,009	7y8m	11/1/1993	7/1/2001
CO	Hayden	Yampa Valley	HDN	N	$4.50	**	7m	7/1/2001	2/1/2002
CO	Hayden	Yampa Valley	HDN	N	$4.50	$7,179,111	16y5m	2/1/2002	7/1/2018
CO	Montrose	Montrose Regional	MTJ	N	$3.00	$1,422,535	9y9m	11/1/1993	8/1/2003
CO	Montrose	Montrose Regional	MTJ	N	$4.50	$821,694	2y10m	8/1/2003	6/1/2006
CO	Montrose	Montrose Regional	MTJ	N	$4.50	$1,386,487	4y	8/1/2006	8/1/2010
CO	Montrose	Montrose Regional	MTJ	N	$4.50	$2,046,975	5y1m	11/1/2010	12/1/2015
CO	Pueblo	Pueblo Memorial	PUB	CS	$3.00	$395,322	21y1m	11/1/1993	12/1/2014
CO	Steamboat Springs	Steamboat Springs/Bob Adams	SBS		$3.00	$159,576	4y2m	4/1/1993	6/1/1997
CO	Telluride	Telluride Regional	TEX	CS	$3.00	$778,287	9y2m	2/1/1993	4/1/2002
CO	Telluride	Telluride Regional	TEX	CS	$4.50	$6,268,750	16y9m	4/1/2002	1/1/2019
CT	New Haven	Tweed-New Haven	HVN	N	$3.00	$983,636	4y4m	12/1/1993	4/1/1998
CT	New Haven	Tweed-New Haven	HVN	N	$4.50	$567,286	3y9m	10/1/2001	7/1/2005
CT	New Haven	Tweed-New Haven	HVN	N	$4.50	$2,626,681	14y2m	5/1/2006	7/1/2020
CT	Windsor Locks	Bradley International	BDL	M	$3.00	$8,607,831	2y2m	10/1/1993	12/1/1995
CT	Windsor Locks	Bradley International	BDL	M	$3.00	$3,263,971	6m	7/1/1996	1/1/1997
CT	Windsor Locks	Bradley International	BDL	M	$3.00	$27,749,445	2y11m	9/1/1997	8/1/2000
CT	Windsor Locks	Bradley International	BDL	M	$4.50	$257,534,407	18y10m	5/1/2001	3/1/2020
CT	Windsor Locks	Bradley International	BDL	M	$3.00	$4,152,000	4m	3/1/2020	7/1/2020
CT	Windsor Locks	Bradley International	BDL	M	$4.50	$19,753,032	1y5m	7/1/2020	12/1/2021
FL	Daytona Beach	Daytona Beach International	DAB	N	$3.00	$29,469,817	8y1m	7/1/1993	8/1/2001
FL	Daytona Beach	Daytona Beach International	DAB	N	$3.00	*	3y8m	2/1/2002	11/1/2005
FL	Daytona Beach	Daytona Beach International	DAB	N	$4.50	**	14y4m	11/1/2005	3/1/2020
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	FLL	L	$3.00	$221,507,827	10y10m	1/1/1995	10/1/2005
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	FLL	L	$4.50	$1,699,155,818	26y4m	10/1/2005	2/1/2032
FL	Fort Myers	Southwest Florida International	RSW	M	$3.00	$109,252,734	11y	11/1/1992	11/1/2003
FL	Fort Myers	Southwest Florida International	RSW	M	$4.50	**	2y10m	11/1/2003	9/1/2006
FL	Fort Myers	Southwest Florida International	RSW	M	$4.50	$212,369,381	13y4m	9/1/2006	1/1/2020
FL	Gainesville	Gainesville Regional	GNV	N	$3.00	$484,900	1y7m	7/1/2000	2/1/2002
FL	Gainesville	Gainesville Regional	GNV	N	$4.50	$5,668,584	10y1m	1/1/2003	2/1/2013

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FL	Gainesville	Gainesville Regional	GNV	N	$4.50	$1,250,942	2y7m	1/1/2014	8/1/2016
FL	Jacksonville	Jacksonville International	JAX	M	$3.00	$39,343,583	9y1m	4/1/1994	5/1/2003
FL	Jacksonville	Jacksonville International	JAX	M	$4.50	$310,577,713	21y6m	5/1/2003	11/1/2024
FL	Key West	Key West International	EYW	S	$3.00	$1,922,283	3y5m	3/1/1993	8/1/1996
FL	Key West	Key West International	EYW	S	$3.00	$3,634,125	5y7m	12/1/1997	6/1/2003
FL	Key West	Key West International	EYW	S	$4.50	$745,867	2y1m	6/1/2003	7/1/2005
FL	Key West	Key West International	EYW	S	$4.50	$13,523,000	11y3m	10/1/2005	1/1/2017
FL	Marathon	Marathon	MTH	GA	$3.00	$390,001	5y3m	3/1/1993	6/1/1998
FL	Melbourne	Melbourne International	MLB	N	$3.00	$11,080,917	12y7m	5/1/1997	12/1/2009
FL	Melbourne	Melbourne International	MLB	N	$4.50	**	9y3m	12/1/2009	3/1/2019
FL	Miami	Miami International	MIA	L	$3.00	$176,730,162	7y2m	11/1/1994	1/1/2002
FL	Miami	Miami International	MIA	L	$4.50	**	1y2m	1/1/2002	3/1/2003
FL	Miami	Miami International	MIA	L	$4.50	$2,420,400,341	34y7m	3/1/2003	10/1/2037
FL	Naples	Naples Municipal	APF	GA	$3.00	$899,685	6y	2/1/1995	2/1/2001
FL	Naples	Naples Municipal	APF	GA	$3.00	$91,651	2y3m	2/1/2002	5/1/2004
FL	Orlando	Orlando International	MCO	L	$3.00	$538,040,022	14y2m	2/1/1993	4/1/2007
FL	Orlando	Orlando International	MCO	L	$4.50	$1,133,733,269	12y2m	4/1/2007	6/1/2019
FL	Orlando	Orlando International	MCO	L	$3.00	$305,570,400	6y6m	6/1/2019	12/1/2025
FL	Orlando	Orlando International	MCO	L	$4.50	$189,994,500	2y6m	12/1/2025	6/1/2028
FL	Orlando	Orlando International	MCO	L	$4.50	$232,500,000	3y1m	6/1/2031	7/1/2034
FL	Orlando	Orlando Sanford International	SFB	S	$1.00	$1,192,352	2y9m	3/1/2001	12/1/2003
FL	Orlando	Orlando Sanford International	SFB	S	$2.00	$13,312,090	7y9m	12/1/2003	9/1/2011
FL	Orlando	Orlando Sanford International	SFB	S	$4.00	**	1y3m	9/1/2011	12/1/2012
FL	Orlando	Orlando Sanford International	SFB	S	$4.00	$29,837,167	9y11m	12/1/2012	11/1/2022
FL	Panama City	Panama City - Bay County International	PFN	N	$3.00	$6,732,080	10y3m	2/1/1994	5/1/2004
FL	Panama City	Panama City - Bay County International	PFN	N	$4.50	**	4y8m	5/1/2004	1/1/2009
FL	Panama City	Panama City - Bay County International	PFN	N	$4.50	$39,251,783	1y4m	1/1/2009	5/1/2010
FL	Panama City	Northwest Florida Beaches International	ECP	N	$4.50	**	28y11m	5/1/2010	4/1/2039
FL	Pensacola	Penscola Gulf Coast Regional	PNS	S	$3.00	$24,954,478	9y10m	2/1/1993	12/1/2002
FL	Pensacola	Penscola Gulf Coast Regional	PNS	S	$4.50	**	4y9m	12/1/2002	9/1/2007
FL	Pensacola	Penscola Gulf Coast Regional	PNS	S	$4.50	$119,534,914	23y1m	9/1/2007	10/1/2031
FL	Sarasota	Sarasota/Bradenton International	SRQ	S	$3.00	$75,384,399	9y8m	9/1/1992	5/1/2002
FL	Sarasota	Sarasota/Bradenton International	SRQ	S	$4.50	**	19y9m	5/1/2002	2/1/2022
FL	St Petersburg	St Petersburg-Clearwater International	PIE	S	$3.00	$3,811,738	1y6m	5/1/2005	11/1/2006
FL	St Petersburg	St Petersburg-Clearwater International	PIE	S	$4.50	**	2y3m	11/1/2006	2/1/2009
FL	St Petersburg	St Petersburg-Clearwater International	PIE	S	$4.50	$17,685,075	8y4m	2/1/2009	6/1/2017
FL	Tallahassee	Tallahassee Regional	TLH	N	$3.00	$11,219,936	9y8m	2/1/1993	10/1/2002
FL	Tallahassee	Tallahassee Regional	TLH	N	$4.50	$36,852,800	13y3m	10/1/2002	1/1/2016
FL	Tampa	Tampa International	TPA	L	$3.00	$170,777,120	8y8m	10/1/1993	6/1/2002
FL	Tampa	Tampa International	TPA	L	$4.50	$658,095,350	17y5m	6/1/2002	11/1/2019
FL	Valparaiso	Eglin AFB	VPS	S	$3.00	$34,407,710	1y5m	1/1/2001	6/1/2002
FL	Valparaiso	Eglin AFB	VPS	S	$4.50	**	16y2m	6/1/2002	8/1/2018
FL	Valparaiso	Eglin AFB	VPS	S	$4.50	$13,330,797	6y9m	8/1/2018	5/1/2025

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FL	West Palm Beach	Palm Beach International	PBI	M	$3.00	$122,322,594	14y3m	4/1/1994	7/1/2008
FL	West Palm Beach	Palm Beach International	PBI	M	$4.50	$22,283,317	1y9m	7/1/2008	4/1/2010
FL	West Palm Beach	Palm Beach International	PBI	M	$4.50	$72,412,929	6y6m	4/1/2010	10/1/2016
GA	Albany	Southwest Georgia Regional	ABY	N	$3.00	$348,383	2y9m	9/1/1995	6/1/1998
GA	Albany	Southwest Georgia Regional	ABY	N	$3.00	$539,645	3y8m	6/1/1999	2/1/2003
GA	Albany	Southwest Georgia Regional	ABY	N	$4.50	**	6m	2/1/2003	8/1/2003
GA	Albany	Southwest Georgia Regional	ABY	N	$4.50	$457,111	4y6m	8/1/2003	2/1/2008
GA	Albany	Southwest Georgia Regional	ABY	N	$4.50	$995,083	6y7m	7/1/2008	2/1/2015
GA	Athens	Athens/Ben Epps	AHN	GA	$3.00	$165,615	4y5m	8/1/1997	1/1/2002
GA	Atlanta	Hartsfield-Jackson Atlanta Internatiional	ATL	L	$3.00	$1,463,359,982	3y11m	5/1/1997	4/1/2001
GA	Atlanta	Hartsfield-Jackson Atlanta Internatiional	ATL	L	$4.50	**	7y6m	4/1/2001	10/1/2008
GA	Atlanta	Hartsfield-Jackson Atlanta Internatiional	ATL	L	$4.50	$2,482,905,251	15y2m	10/1/2008	12/1/2023
GA	Augusta	Augusta Regional @ Bush Field	AGS	N	$3.00	$27,636,360	1y10m	9/1/1999	7/1/2001
GA	Augusta	Augusta Regional @ Bush Field	AGS	N	$4.50	**	23y1m	7/1/2001	8/1/2024
GA	Augusta	Augusta Regional @ Bush Field	AGS	N	$4.50	$4,098,034	3y3m	8/1/2024	11/1/2027
GA	Brunswick	Brunswick Golden Isles	BQK	N	$3.00	$813,170	2y6m	5/1/2001	11/1/2003
GA	Brunswick	Brunswick Golden Isles	BQK	N	$4.50	**	5y6m	11/1/2003	5/1/2009
GA	Brunswick	Brunswick Golden Isles	BQK	N	$4.50	$860,268	7y11m	5/1/2009	4/1/2017
GA	Columbus	Columbus	CSG	N	$3.00	$530,103	1y9m	12/1/1993	9/1/1995
GA	Columbus	Columbus	CSG	N	$3.00	$876,138	2y10m	8/1/2000	6/1/2003
GA	Columbus	Columbus	CSG	N	$4.50	**	3y5m	6/1/2003	11/1/2006
GA	Columbus	Columbus	CSG	N	$4.50	$1,032,681	2y2m	2/1/2010	4/1/2012
GA	Columbus	Columbus	CSG	N	$4.50	$601,216	2y6m	8/1/2012	2/1/2015
GA	Macon	Middle Georgia Regional	MCN	GA	$4.50	$1,052,392	9y2m	3/1/2002	5/1/2011
GA	Savannah	Savannah/ Hilton Head International	SAV	S	$3.00	$48,179,908	8y9m	7/1/1992	4/1/2001
GA	Savannah	Savannah/ Hilton Head International	SAV	S	$4.50	**	8y10m	4/1/2001	2/1/2010
GA	Savannah	Savannah/ Hilton Head International	SAV	S	$3.00	$977,956	3m	2/1/2010	5/1/2010
GA	Savannah	Savannah/ Hilton Head International	SAV	S	$4.50	$22,155,927	7y5m	5/1/2010	10/1/2017
GA	Valdosta	Valdosta Regional	VLD	N	$3.00	$369,077	6y7m	3/1/1993	10/1/1999
GA	Valdosta	Valdosta Regional	VLD	N	$3.00	$230,300	1y2m	4/1/2000	6/1/2001
GA	Valdosta	Valdosta Regional	VLD	N	$4.50	**	3m	6/1/2001	9/1/2001
GA	Valdosta	Valdosta Regional	VLD	N	$4.50	$438,675	3y	9/1/2001	9/1/2004
GA	Valdosta	Valdosta Regional	VLD	N	$3.00	$67,858	3m	2/1/2006	5/1/2006
GA	Valdosta	Valdosta Regional	VLD	N	$3.00	$12,140	2m	11/1/2006	1/1/2007
GA	Valdosta	Valdosta Regional	VLD	N	$3.00	$94,727	11m	8/1/2009	7/1/2010
GA	Valdosta	Valdosta Regional	VLD	N	$4.50	$517,379	2y7m	6/1/2011	1/1/2014
GU	Agana	Guam International	GUM	S	$3.00	$258,370,758	9y9m	2/1/1993	11/1/2002
GU	Agana	Guam International	GUM	S	$4.50	**	22y4m	11/1/2002	3/1/2025
HI	Hilo	Hilo International	ITO	S	$3.00	$548,196	1y7m	2/1/2007	11/1/2008
HI	Hilo	Hilo International	ITO	S	$4.50	**	1y2m	11/1/2008	1/1/2010
HI	Hilo	Hilo International	ITO	S	$4.50	$17,975,817	12y5m	2/1/2014	7/1/2026
HI	Honolulu	Honolulu International	HNL	L	$3.00	$104,346,794	4y1m	10/1/2004	11/1/2008
HI	Honolulu	Honolulu International	HNL	L	$4.50	**	1y2m	11/1/2008	1/1/2010

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HI	Honolulu	Honolulu International	HNL	L	$4.50	$428,207,098	16y6m	1/1/2010	7/1/2026
HI	Kahului	Kahului	OGG	M	$3.00	$23,590,693	4y1m	10/1/2004	11/1/2008
HI	Kahului	Kahului	OGG	M	$4.50	**	1y2m	11/1/2008	1/1/2010
HI	Kahului	Kahului	OGG	M	$4.50	$114,986,595	16y6m	1/1/2010	7/1/2026
HI	Kailua/Kona	Kona International @ Keohole	KOA	S	$3.00	$8,352,416	4y1m	10/1/2004	11/1/2008
HI	Kailua/Kona	Kona International @ Keohole	KOA	S	$4.50	**	1y2m	11/1/2008	1/1/2010
HI	Kailua/Kona	Kona International @ Keohole	KOA	S	$4.50	$35,670,339	16y6m	1/1/2010	7/1/2026
HI	Lihue	Lihue	LIH	S	$3.00	$4,740,899	4y1m	10/1/2004	11/1/2008
HI	Lihue	Lihue	LIH	S	$4.50	**	1y2m	11/1/2008	1/1/2010
HI	Lihue	Lihue	LIH	S	$4.50	$26,682,130	16y6m	1/1/2010	7/1/2026
ID	Boise	Boise Air Terminal/ Gowen Field	BOI	S	$3.00	$20,191,058	7y	8/1/1994	8/1/2001
ID	Boise	Boise Air Terminal/ Gowen Field	BOI	S	$4.50	$89,739,798	15y9m	8/1/2001	5/1/2017
ID	Hailey	Friedman Memorial	SUN	N	$3.00	$188,000	1y1m	9/1/1993	10/1/1994
ID	Hailey	Friedman Memorial	SUN	N	$3.00	$1,721,835	10y3m	3/1/1995	6/1/2005
ID	Hailey	Friedman Memorial	SUN	N	$4.50	$2,291,460	9y1m	6/1/2005	7/1/2014
ID	Idaho Falls	Idaho Falls Regional	IDA	N	$3.00	$1,473,899	5y	1/1/1993	1/1/1998
ID	Idaho Falls	Idaho Falls Regional	IDA	N	$3.00	$836,239	2y8m	2/1/1998	10/1/2000
ID	Idaho Falls	Idaho Falls Regional	IDA	N	$3.00	$8,950,000	6m	10/1/2000	4/1/2001
ID	Idaho Falls	Idaho Falls Regional	IDA	N	$4.50	**	19y3m	4/1/2001	7/1/2020
ID	Idaho Falls	Idaho Falls Regional	IDA	N	$4.50	$1,658,299	3y3m	7/1/2020	10/1/2023
ID	Lewiston	Lewiston-Nez Perce County	LWS	N	$3.00	$2,478,343	7y	5/1/1994	5/1/2001
ID	Lewiston	Lewiston-Nez Perce County	LWS	N	$4.50	**	5y5m	5/1/2001	10/1/2006
ID	Lewiston	Lewiston-Nez Perce County	LWS	N	$4.50	$2,751,122	12y5m	10/1/2006	3/1/2019
ID	Pocatello	Pocatello Regional	PIH	N	$3.00	$814,719	6y8m	9/1/1994	5/1/2001
ID	Pocatello	Pocatello Regional	PIH	N	$4.50	**	5m	5/1/2001	10/1/2001
ID	Pocatello	Pocatello Regional	PIH	N	$4.50	$1,769,170	15y3m	10/1/2001	1/1/2017
ID	Twin Falls	Joslin Field - Magic Valley Regional	TWF	N	$3.00	$1,628,107	8y7m	11/1/1992	6/1/2001
ID	Twin Falls	Joslin Field - Magic Valley Regional	TWF	N	$4.50	**	6y	6/1/2001	6/1/2007
ID	Twin Falls	Joslin Field - Magic Valley Regional	TWF	N	$4.50	$1,103,939	8y11m	7/1/2007	6/1/2016
IL	Belleville	Scott AFB/Midamerica	BLV	GA	$3.00	$7,000,000	41y4m	11/1/2005	3/1/2047
IL	Bloomington	Central Illinois Regional Airport at Bloomington-Normal	BMI	N	$3.00	$28,084,564	6y5m	11/1/1994	4/1/2001
IL	Bloomington	Central Illinois Regional Airport at Bloomington-Normal	BMI	N	$4.50	**	16y6m	4/1/2001	10/1/2017
IL	Bloomington	Central Illinois Regional Airport at Bloomington-Normal	BMI	N	$4.50	$1,161,019	7m	10/1/2017	6/1/2018
IL	Champaign/Urbana	University of Illinois-Willard	CMI	N	$3.00	$2,464,310	8y2m	12/1/1995	2/1/2004
IL	Champaign/Urbana	University of Illinois-Willard	CMI	N	$4.50	$3,580,415	8y11m	10/1/2005	9/1/2014
IL	Chicago	Chicago Midway International	MDW	L	$3.00	$690,891,936	13y4m	9/1/1993	1/1/2007
IL	Chicago	Chicago Midway International	MDW	L	$4.50	**	5y11m	1/1/2007	11/1/2012
IL	Chicago	Chicago Midway International	MDW	L	$4.50	$1,720,370,920	41y	11/1/2012	11/1/2053
IL	Chicago	Chicago O'Hare International	ORD	L	$3.00	$1,158,485,219	7y7m	9/1/1993	4/1/2001
IL	Chicago	Chicago O'Hare Intenational	ORD	L	$4.50	**	4y10m	4/1/2001	2/1/2006
IL	Chicago	Chicago O'Hare International	ORD	L	$4.50	$5,379,098,766	32y10m	2/1/2006	12/1/2038

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IL	Decatur	Decatur	DEC	CS	$4.50	$732,628	12y9m	6/1/2006	3/1/2019
IL	Marion	Williamson County Regional	MWA	N	$4.50	$509,499	10y6m	9/1/2005	3/1/2016
IL	Moline	Quad City International	MLI	S	$3.00	$29,523,476	7y11m	12/1/1994	1/1/2002
IL	Moline	Quad City International	MLI	S	$4.50	**	14y6m	1/1/2002	7/1/2016
IL	Moline	Quad City International	MLI	S	$4.50	$26,132,335	21y	7/1/2016	7/1/2037
IL	Peoria	General Downing - Peoria International	PIA	N	$3.00	$8,145,036	6y7m	12/1/1994	7/1/2001
IL	Peoria	General Downing - Peoria International	PIA	N	$4.50	**	5y7m	7/1/2001	2/1/2007
IL	Peoria	General Downing - Peoria International	PIA	N	$4.50	$1,476,770	1y6m	2/1/2007	8/1/2008
IL	Peoria	General Downing - Peoria International	PIA	N	$4.50	$7,550,000	6y3m	11/1/2008	2/1/2015
IL	Quincy	Quincy Regional-Baldwin Field	UIN	N	$3.00	$115,517	2y9m	10/1/1994	7/1/1997
IL	Quincy	Quincy Regional-Baldwin Field	UIN	N	$3.00	$298,153	7y7m	11/1/1997	6/1/2005
IL	Quincy	Quincy Regional-Baldwin Field	UIN	N	$3.00	*	2y2m	11/1/2005	1/1/2008
IL	Quincy	Quincy Regional-Baldwin Field	UIN	N	$4.50	$635,573	11y2m	1/1/2008	3/1/2019
IL	Rockford	Chicago/ Rockford International	RFD	N	$3.00	$385,681	4y	10/1/1992	10/1/1996
IL	Rockford	Chicago/ Rockford International	RFD	N	$3.00	$7,066,659	10y1m	5/1/1997	6/1/2007
IL	Rockford	Chicago/ Rockford International	RFD	N	$4.50	**	13y11m	6/1/2007	5/1/2021
IL	Springfield	Abraham Lincoln Capital	SPI	N	$3.00	$4,922,593	9y11m	6/1/1992	5/1/2002
IL	Springfield	Abraham Lincoln Capital	SPI	N	$4.50	**	5y5m	5/1/2002	10/1/2005
IL	Springfield	Abraham Lincoln Capital	SPI	N	$4.50	$3,608,170	15y9m	10/1/2005	7/1/2021
IN	Evansville	Evansville Regional	EVV	N	$4.50	$1,270,789	1y3m	8/1/2007	11/1/2008
IN	Evansville	Evansville Regional	EVV	N	$4.50	$3,983,706	6y9m	12/1/2008	5/1/2015
IN	Fort Wayne	Fort Wayne International	FWA	N	$3.00	$26,563,457	12y5m	7/1/1993	12/1/2005
IN	Fort Wayne	Fort Wayne International	FWA	N	$4.50	**	10y10m	12/1/2005	10/1/2016
IN	Fort Wayne	Fort Wayne International	FWA	N	$4.50	$2,045,000	1y5m	10/1/2016	3/1/2018
IN	Indianapolis	Indianapolis International	IND	M	$3.00	$80,825,898	7y7m	9/1/1993	4/1/2001
IN	Indianapolis	Indianapolis International	IND	M	$4.50	**	6m	4/1/2001	10/1/2001
IN	Indianapolis	Indianapolis International	IND	M	$4.50	$444,022,707	20y10m	10/1/2001	9/1/2022
IN	Indianapolis	Indianapolis International	IND	M	$3.00	$59,000	1m	9/1/2022	10/1/2022
IN	South Bend	South Bend	SBN	N	$3.00	$34,172,802	16y8m	11/1/1994	7/1/2011
IN	South Bend	South Bend	SBN	N	$4.50	**	9y6m	7/1/2011	1/1/2021
IN	South Bend	South Bend	SBN	N	$4.50	$6,000,000	8y6m	1/1/2021	7/1/2029
IA	Burlington	Southeast Iowa Regional	BRL	CS	$3.00	$521,304	4y2m	7/1/1997	9/1/2001
IA	Burlington	Southeast Iowa Regional	BRL	CS	$4.50	**	19y5m	9/1/2001	2/1/2021
IA	Cedar Rapids	The Eastern Iowa	CID	S	$3.00	$11,716,385	7y5m	1/1/1995	6/1/2002
IA	Cedar Rapids	The Eastern Iowa	CID	S	$4.50	**	1y9m	6/1/2002	3/1/2004
IA	Cedar Rapids	The Eastern Iowa	CID	S	$4.50	$23,341,050	12y7m	5/1/2004	12/1/2016
IA	Des Moines	Des Moines International	DSM	S	$3.00	$17,953,852	7y5m	3/1/1994	8/1/2001
IA	Des Moines	Des Moines International	DSM	S	$4.50	**	9m	8/1/2001	5/1/2002
IA	Des Moines	Des Moines International	DSM	S	$4.50	$59,313,453	18y7m	5/1/2002	12/1/2020
IA	Dubuque	Dubuque Regional	DBQ	N	$3.00	$1,106,761	8y4m	1/1/1993	5/1/2001
IA	Dubuque	Dubuque Regional	DBQ	N	$4.50	$6,461,405	31y9m	5/1/2001	2/1/2033
IA	Fort Dodge	Fort Dodge Regional	FOD	CS	$3.00	$169,331	6y6m	3/1/1995	9/1/2001
IA	Fort Dodge	Fort Dodge Regional	FOD	CS	$4.50	$315,570	9y3m	1/1/2002	4/1/2011

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IA	Mason City	Mason City Municipal	MCW	CS	$3.00	$302,090	5y9m	2/1/1996	10/1/2001
IA	Mason City	Mason City Municipal	MCW	CS	$4.50	**	1y6y	10/1/2001	4/1/2003
IA	Mason City	Mason City Municipal	MCW	CS	$4.50	$1,000,284	14y4m	8/1/2003	12/1/2017
IA	Sioux City	Sioux Gateway/Col. Bud Day Field	SUX	N	$3.00	$204,465	1y	6/1/1993	6/1/1994
IA	Sioux City	Sioux Gateway/Col. Bud Day Field	SUX	N	$3.00	$2,505,560	7y1m	2/1/1995	3/1/2002
IA	Sioux City	Sioux Gateway/Col. Bud Day Field	SUX	N	$4.50	**	1y10m	3/1/2002	1/1/2004
IA	Sioux City	Sioux Gateway/Col. Bud Day Field	SUX	N	$4.50	$969,350	9y8m	11/1/2004	7/1/2014
IA	Spencer	Spencer Municipal	SPW	GA	$3.00	$77,638	10y6m	9/1/1995	3/1/2006
IA	Waterloo	Waterloo Regional	ALO	N	$3.00	$628,088	4y	6/1/1994	6/1/1998
IA	Waterloo	Waterloo Regional	ALO	N	$3.00	$784,036	1y10m	9/1/1999	7/1/2001
IA	Waterloo	Waterloo Regional	ALO	N	$4.50	**	1y10m	7/1/2001	5/1/2003
IA	Waterloo	Waterloo Regional	ALO	N	$4.50	$1,631,044	16y3m	5/1/2003	8/1/2019
KS	Garden City	Garden City Regional	GCK	N	$4.50	$770,628	9y	10/1/2013	10/1/2022
KS	Manhattan	Manhattan Regional	MHK	N	$3.00	$401,978	3y5m	10/1/1998	3/1/2002
KS	Manhattan	Manhattan Regional	MHK	N	$4.50	**	6y4m	3/1/2002	7/1/2008
KS	Manhattan	Manhattan Regional	MHK	N	$4.50	$1,125,229	5y10m	7/1/2008	5/1/2014
KS	Topeka	Forbes Field	FOE	GA	$4.50	$823,720	15y7m	8/1/2007	3/1/2023
KS	Wichita	Wichita Mid-Continent	ICT	S	$3.00	$25,595,809	10y6m	12/1/1994	5/1/2005
KS	Wichita	Wichita Mid-Continent	ICT	S	$4.50	**	2y1m	5/1/2005	6/1/2007
KS	Wichita	Wichita Mid-Continent	ICT	S	$4.50	$7,548,050	2y2m	7/1/2007	9/1/2009
KS	Wichita	Wichita Mid-Continent	ICT	S	$4.50	$166,384,422	35y5m	11/1/2010	4/1/2046
KY	Covington	Cincinnati/Northern Kentucky International	CVG	M	$3.00	$155,087,555	6y2m	6/1/1994	8/1/2000
KY	Covington	Cincinnati/Northern Kentucky International	CVG	M	$3.00	$67,819,829	2y1m	7/1/2001	8/1/2003
KY	Covington	Cincinnati/Northern Kentucky International	CVG	M	$4.50	$210,651,000	5y9m	8/1/2003	5/1/2009
KY	Covington	Cincinnati/Northern Kentucky International	CVG	M	$3.00	$74,555,000	3y8m	5/1/2009	1/1/2013
KY	Covington	Cincinnati/Northern Kentucky International	CVG	M	$4.50	$20,539,000	1y9m	1/1/2013	10/1/2014
KY	Lexington	Blue Grass	LEX	S	$3.00	$11,900,969	7y7m	11/1/1993	6/1/2001
KY	Lexington	Blue Grass	LEX	S	$4.50	**	2y	6/1/2001	6/1/2003
KY	Lexington	Blue Grass	LEX	S	$3.00	$500,557	4m	8/1/2003	12/1/2003
KY	Lexington	Blue Grass	LEX	S	$4.50	$87,804,742	34y2m	12/1/2003	2/1/2038
KY	Louisville	Louisville International - Standiford Field	SDF	S	$3.00	$90,600,000	8y10m	5/1/1997	3/1/2006
KY	Louisville	Louisville International - Standiford Field	SDF	S	$4.50	**	7m	3/1/2006	10/1/2006
KY	Louisville	Louisville International - Standiford Field	SDF	S	$3.00	**	1y11m	10/1/2006	9/1/2008
KY	Louisville	Louisville International - Standiford Field	SDF	S	$4.50	**	1m	9/1/2008	10/1/2008
KY	Louisville	Louisville International - Standiford Field	SDF	S	$3.00	**	2y2m	10/1/2008	12/1/2010
KY	Louisville	Louisville International - Standiford Field	SDF	S	$4.50	**	3y	12/1/2010	12/1/2013
KY	Louisville	Louisville International - Standiford Field	SDF	S	$4.50	$22,575,269	3y4m	12/1/2013	4/1/2017
KY	Paducah	Barkley Regional	PAH	N	$3.00	$1,696,178	22y10m	3/1/1994	1/1/2017
LA	Alexandria	Alexandria International	AEX	N	$3.00	$10,284,927	2y8m	5/1/1999	1/1/2002
LA	Alexandria	Alexandria International	AEX	N	$4.50	**	20y11m	1/1/2002	12/1/2022
LA	Baton Rouge	Baton Rouge Metropolitan, Ryan Field	BTR	S	$3.00	$37,469,799	12y10m	12/1/1992	10/1/2005
LA	Baton Rouge	Baton Rouge Metropolitan, Ryan Field	BTR	S	$4.50	**	9y10m	10/1/2005	8/1/2015

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LA	Baton Rouge	Baton Rouge Metropolitan, Ryan Field	BTR	S	$4.50	$43,889,437	15y11m	8/1/2015	7/1/2031
LA	Lafayette	Lafayette Regional	LFT	N	$3.00	$1,083,024	3y	9/1/1995	9/1/1998
LA	Lafayette	Lafayette Regional	LFT	N	$3.00	$2,273,692	1y	4/1/2001	4/1/2002
LA	Lafayette	Lafayette Regional	LFT	N	$4.50	**	2y8m	4/1/2002	1/1/2005
LA	Lafayette	Lafayette Regional	LFT	N	$4.50	$3,433,629	2y11m	5/1/2005	4/1/2008
LA	Lafayette	Lafayette Regional	LFT	N	$4.50	$5,736,733	6y9m	8/1/2008	5/1/2015
LA	Lake Charles	Lake Charles Regional	LCH	N	$3.00	$1,877,234	4y2m	3/1/2001	5/1/2005
LA	Lake Charles	Lake Charles Regional	LCH	N	$4.50	**	6y4m	5/1/2005	9/1/2011
LA	Lake Charles	Lake Charles Regional	LCH	N	$4.50	$1,085,490	4y4m	9/1/2011	1/1/2016
LA	Monroe	Monroe Regional	MLU	N	$4.50	$1,359,504	4y5m	4/1/2003	9/1/2007
LA	Monroe	Monroe Regional	MLU	N	$4.50	$16,400,000	25y7m	11/1/2008	6/1/2036
LA	New Orleans	Louis Armstrong New Orleans International	MSY	M	$3.00	$133,503,363	8y10m	6/1/1993	4/1/2002
LA	New Orleans	Louis Armstrong New Orleans International	MSY	M	$4.50	**	1y4m	4/1/2002	8/1/2003
LA	New Orleans	Louis Armstrong New Orleans International	MSY	M	$4.50	$431,317,387	23y4m	8/1/2003	12/1/2026
LA	Shreveport	Shreveport Regional	SHV	N	$3.00	$29,841,353	8y9m	2/1/1994	11/1/2002
LA	Shreveport	Shreveport Regional	SHV	N	$4.50	**	11y10m	11/1/2002	9/1/2014
ME	Bangor	Bangor International	BGR	N	$3.00	$8,961,006	15y3m	6/1/1995	9/1/2010
ME	Bangor	Bangor International	BGR	N	$4.50	$4,574,597	4y6m	12/1/2010	6/1/2015
ME	Portland	Portland International Jetport	PWM	S	$3.00	$33,601,082	15y	2/1/1994	2/1/2009
ME	Portland	Portland International Jetport	PWM	S	$4.50	**	1y9m	2/1/2009	11/1/2010
ME	Portland	Portland International Jetport	PWM	S	$4.50	$132,206,104	29y5m	11/1/2010	4/1/2040
ME	Presque Isle	Northern Maine Regional Airport at Presque Isle	PQI	N	$4.50	$245,853	4y9m	9/1/2004	6/1/2009
ME	Presque Isle	Northern Maine Regional Airport at Presque Isle	PQI	N	$4.50	$353,298	7y5m	8/1/2010	1/1/2018
ME	Rockland	Knox County Regional	RKD	N	$4.50	$167,250	4y6m	1/1/2012	7/1/2016
MD	Baltimore	Baltimore/Washington International Thurgood Marshall	BWI	L	$3.00	$189,381,695	9y8m	10/1/1992	6/1/2002
MD	Baltimore	Baltimore/Washington International Thurgood Marshall	BWI	L	$4.50	**	5m	6/1/2002	11/1/2002
MD	Baltimore	Baltimore/Washington International Thurgood Marshall	BWI	L	$4.50	$1,205,583,429	25y4m	11/1/2002	3/1/2028
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	HGR	N	$3.00	$308,817	2y7m	8/1/1999	3/1/2002
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	HGR	N	$4.50	**	1y10m	3/1/2002	1/1/2004
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	HGR	N	$4.50	$108,124	3y7m	1/1/2004	8/1/2007
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	HGR	N	$4.50	$12,303	0m	4/1/2013	4/1/2013
MD	Salisbury	Salisbury-Ocean City Wicomico Regional	SBY	N	$3.00	$1,446,184	6y1m	2/1/2002	3/1/2008
MD	Salisbury	Salisbury-Ocean City Wicomico Regional	SBY	N	$4.50	**	4y3m	3/1/2008	6/1/2012
MD	Salisbury	Salisbury-Ocean City Wicomico Regional	SBY	N	$4.50	$2,018,993	4y8m	6/1/2012	2/1/2017
MD	Wiley Ford	Greater Cumberland Reg	CBE	GA	$3.00	$144,345	5y	7/1/1994	7/1/1999
MD	Wiley Ford	Greater Cumberland Reg	CBE	GA	$3.00	*	6y8m	10/1/1999	6/1/2006
MA	Boston	General Edward Lawrence Logan International	BOS	L	$3.00	$702,015,217	11y11m	11/1/1993	10/1/2005
MA	Boston	General Edward Lawrence Logan International	BOS	L	$4.50	**	5y4m	10/1/2005	2/1/2011
MA	Boston	General Edward Lawrence Logan International	BOS	L	$4.50	$682,025,941	12y10m	2/1/2011	12/1/2023
MA	Hyannis	Barnstable Municipal-Boardman/Polando Field	HYA	N	$2.00	$2,573,600	13y7m	3/1/2011	10/1/2024

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MA	Worcester	Worcester Regional	ORH	GA	$3.00	$614,336	5y	10/1/1992	10/1/1997
MA	Worcester	Worcester Regional	ORH	GA	$3.00	$1,021,417	13y3m	9/1/1999	12/1/2011
MI	Alpena	Alpena County Regional	APN	N	$3.00	$268,480	4y4m	8/1/2001	12/1/2005
MI	Alpena	Alpena County Regional	APN	N	$4.50	**	2y8m	12/1/2005	8/1/2008
MI	Alpena	Alpena County Regional	APN	N	$4.50	$193,959	7y1m	8/1/2008	9/1/2015
MI	Detroit	Coleman A Young Municipal	DET	GA	$3.00	$240,053	4y2m	1/1/2000	3/1/2004
MI	Detroit	Detroit Metropolitan Wayne County	DTW	L	$3.00	$2,198,215,360	8y9m	1/1/1993	10/1/2001
MI	Detroit	Detroit Metropolitan Wayne County	DTW	L	$4.50	**	24y7m	10/1/2001	5/1/2026
MI	Detroit	Detroit Metropolitan Wayne County	DTW	L	$4.50	$936,750,724	7y9m	5/1/2026	2/1/2034
MI	Escanaba	Delta County	ESC	N	$3.00	$164,496	5y2m	2/1/1993	11/1/1997
MI	Escanaba	Delta County	ESC	N	$3.00	$182,700	1y11m	8/1/1998	7/1/2000
MI	Escanaba	Delta County	ESC	N	$3.00	$114,900	2y5m	10/1/2001	3/1/2004
MI	Escanaba	Delta County	ESC	N	$4.50	$40,000	1y10m	3/1/2004	1/1/2006
MI	Escanaba	Delta County	ESC	N	$4.50	$456,829	10y7m	4/1/2006	11/1/2016
MI	Flint	Bishop International	FNT	S	$3.00	$31,865,870	8y1m	9/1/1993	10/1/2001
MI	Flint	Bishop International	FNT	S	$4.50	**	16y3m	10/1/2001	1/1/2018
MI	Grand Rapids	Gerald R. Ford International	GRR	S	$3.00	$94,359,802	12y11m	12/1/1992	11/1/2005
MI	Grand Rapids	Gerald R. Ford International	GRR	S	$4.50	**	10y11m	11/1/2005	10/1/2016
MI	Grand Rapids	Gerald R. Ford International	GRR	S	$4.50	$7,654,985	3y4m	10/1/2016	2/1/2020
MI	Hancock	Houghton County Memorial	CMX	N	$3.00	$164,920	2y8m	7/1/1993	3/1/1996
MI	Hancock	Houghton County Memorial	CMX	N	$3.00	$149,326	3y	7/1/1996	7/1/1999
MI	Hancock	Houghton County Memorial	CMX	N	$3.00	$387,250	5y9m	10/1/1999	7/1/2005
MI	Hancock	Houghton County Memorial	CMX	N	$4.50	**	3m	7/1/2005	10/1/2005
MI	Hancock	Houghton County Memorial	CMX	N	$4.50	$1,067,093	11y3m	10/1/2005	1/1/2017
MI	Iron Mountain Kingsford	Ford	IMT	CS	$3.00	$176,029	8y9m	9/1/1995	6/1/2004
MI	Ironwood	Gogebic-Iron County	IWD	CS	$3.00	$90,531	13y2m	8/1/1993	10/1/2006
MI	Ironwood	Gogebic-Iron County	IWD	CS	$4.50	$128,549	18y8m	6/1/2007	2/1/2026
MI	Kalamazoo	Kalamazoo/Battle Creek Internaitonal	AZO	N	$3.00	$1,089,716	3y2m	4/1/1997	6/1/2000
MI	Kalamazoo	Kalamazoo/Battle Creek Internaitonal	AZO	N	$3.00	$5,312,429	4y	1/1/2001	1/1/2005
MI	Kalamazoo	Kalamazoo/Battle Creek Internaitonal	AZO	N	$4.50	**	1y7m	1/1/2005	8/1/2006
MI	Kalamazoo	Kalamazoo/Battle Creek Internaitonal	AZO	N	$4.50	$1,279,785	1y6m	10/1/2006	4/1/2008
MI	Kalamazoo	Kalamazoo/Battle Creek Internaitonal	AZO	N	$4.50	$14,821,076	16y	9/1/2008	9/1/2024
MI	Lansing	Capital Region International	LAN	N	$3.00	$9,380,340	8y9m	10/1/1993	7/1/2002
MI	Lansing	Capital Region International	LAN	N	$4.50	**	1y4m	7/1/2002	11/1/2003
MI	Lansing	Capital Region International	LAN	N	$4.50	$21,115,759	24y5m	11/1/2003	4/1/2028
MI	Manistee	Manistee County-Blacker	MBL	CS	$4.50	$388,986	32y5m	6/1/2008	11/1/2040
MI	Marquette	Marquette County	MQT	N	$3.00	$62,225	4y	12/1/1992	12/1/1996
MI	Marquette	Sawyer International	SAW/MQT	N	$3.00	$888,286	4y3m	4/1/1998	7/1/2002
MI	Marquette	Sawyer International	SAW/MQT	N	$4.50	**	6m	7/1/2002	1/1/2003
MI	Marquette	Sawyer International	SAW/MQT	N	$4.50	$779,776	3y8m	1/1/2003	9/1/2006

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MI	Marquette	Sawyer International	SAW/MQT	N	$4.50	$150,711	1y7m	10/1/2006	5/1/2008
MI	Marquette	Sawyer International	SAW/MQT	N	$4.50	$852,250	3y	8/1/2008	8/1/2011
MI	Marquette	Sawyer International	SAW/MQT	N	$4.50	$704,574	3y	3/1/2012	3/1/2015
MI	Muskegon	Muskegon County	MKG	N	$3.00	$5,013,088	10y1m	5/1/1994	5/1/2004
MI	Muskegon	Muskegon County	MKG	N	$4.50	**	16y6m	5/1/2004	11/1/2020
MI	Pellston	Pellston Regional Airport of Emmet County	PLN	N	$3.00	$159,752	4y6m	3/1/1993	9/1/1997
MI	Pellston	Pellston Regional Airport of Emmet County	PLN	N	$3.00	$916,433	13y7m	12/1/1997	7/1/2011
MI	Pellston	Pellston Regional Airport of Emmet County	PLN	N	$4.50	$897,255	6y10m	7/1/2011	5/1/2018
MI	Saginaw	MBS International	MBS	N	$3.00	$5,141,920	10y5m	2/1/1997	7/1/2007
MI	Saginaw	MBS International	MBS	N	$4.50	**	1m	7/1/2007	8/1/2007
MI	Saginaw	MBS International	MBS	N	$4.50	$13,233,477	21y5m	8/1/2007	1/1/2029
MI	Sault Ste. Marie	Chippewa County International	CIU	N	$4.50	$1,087,463	17y8m	11/1/2005	7/1/2023
MI	Traverse City	Cherry Capital	TVC	N	$3.00	$3,637,041	5y	1/1/1997	1/1/2002
MI	Traverse City	Cherry Capital	TVC	N	$4.50	**	1y9m	1/1/2002	10/1/2003
MI	Traverse City	Cherry Capital	TVC	N	$4.50	$6,441,642	7y2m	10/1/2003	12/1/2010
MI	Traverse City	Cherry Capital	TVC	N	$4.50	$2,452,975	5y	2/1/2011	2/1/2016
MN	Bemidji	Bemidji Regional	BJI	N	$3.00	$362,099	5y3m	11/1/1996	2/1/2002
MN	Bemidji	Bemidji Regional	BJI	N	$4.50	$401,336	3y6m	2/1/2002	8/1/2005
MN	Bemidji	Bemidji Regional	BJI	N	$4.50	$790,324	9y8m	6/1/2006	2/1/2016
MN	Brainerd	Brainerd Lakes Regional	BRD	N	$3.00	$313,455	7y11m	8/1/1993	7/1/2001
MN	Brainerd	Brainerd Lakes Regional	BRD	N	$4.50	$1,833,556	32y1m	7/1/2001	8/1/2033
MN	Duluth	Duluth International	DLH	N	$3.00	$2,341,795	7y6m	10/1/1994	4/1/2002
MN	Duluth	Duluth International	DLH	N	$4.50	$1,278,964	2y7m	4/1/2002	11/1/2004
MN	Duluth	Duluth International	DLH	N	$4.50	$8,846,024	15y6m	4/1/2005	10/1/2020
MN	Grand Rapids	Grand Rapids/Itasca County	GPZ	GA	$3.00	$151,263	3y10m	12/1/1997	10/1/2001
MN	Grand Rapids	Grand Rapids/Itasca County	GPZ	GA	$4.50	**	5y3m	10/1/2001	1/1/2007
MN	Hibbing	Range Regional	HIB	N	$3.00	$338,299	7y1m	6/1/1996	7/1/2003
MN	Hibbing	Range Regional	HIB	N	$4.50	**	3y10m	7/1/2003	5/1/2007
MN	Hibbing	Range Regional	HIB	N	$4.50	$461,737	10y6m	5/1/2007	11/1/2017
MN	International Falls	Falls International	INL	N	$3.00	$597,058	7y6m	12/1/1994	6/1/2002
MN	International Falls	Falls International	INL	N	$4.50	**	3y	6/1/2002	6/1/2005
MN	International Falls	Falls International	INL	N	$4.50	$477,226	9y7m	11/1/2005	6/1/2015
MN	Minneapolis	Minneapolis-St Paul International/Wold-Chamberlain	MSP	L	$3.00	$430,142,570	8y10m	6/1/1992	4/1/2001
MN	Minneapolis	Minneapolis-St Paul International/Wold-Chamberlain	MSP	L	$4.50	**	1y10m	4/1/2001	2/1/2003
MN	Minneapolis	Minneapolis-St Paul International/Wold-Chamberlain	MSP	L	$4.50	$1,059,306,867	15y1m	2/1/2003	3/1/2018
MN	Rochester	Rochester International	RST	N	$3.00	$5,507,696	5y10m	5/1/1996	3/1/2002
MN	Rochester	Rochester International	RST	N	$4.50	**	6y5m	3/1/2002	8/1/2008
MN	Rochester	Rochester International	RST	N	$4.50	$3,868,625	6y2m	8/1/2008	10/1/2014
MN	St. Cloud	St. Cloud Regional	STC	GA	$3.00	$1,147,578	2y5m	2/1/2000	7/1/2002
MN	St. Cloud	St. Cloud Regional	STC	GA	$4.50	**	18y3m	7/1/2002	10/1/2020

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MN	Thief River Falls	Thief River Falls Regional	TVF	CS	$4.50	$636,828	20y	6/1/2003	6/1/2023
MP	Rota Island	Benjamin Taisacan Mangiona International	GRO /ROP	N	$4.50	$1,777,742	11y8m	1/1/2005	8/1/2016
MP	Saipan	Francisco C. Ada/Saipan International	GSN/ SPN	S	$4.50	$29,573,280	11y8m	1/1/2005	8/1/2016
MP	Tinian Island	Tinian International	TNI/ TIQ	N	$4.50	$1,705,526	11y8m	1/1/2005	8/1/2016
MS	Columbus	Golden Triangle Regional	GTR	N	$3.00	$1,526,314	8y8m	8/1/1992	4/1/2001
MS	Columbus	Golden Triangle Regional	GTR	N	$4.50	**	2y9m	4/1/2001	1/1/2004
MS	Columbus	Golden Triangle Regional	GTR	N	$4.50	$2,320,794	15y9m	1/1/2004	10/1/2019
MS	Greenville	Mid Delta Regional	GLH	CS	$3.00	$148,873	4y4m	10/1/1998	2/1/2003
MS	Greenville	Mid Delta Regional	GLH	CS	$3.00	*	4m	4/1/2003	8/1/2003
MS	Greenville	Mid Delta Regional	GLH	CS	$3.00	$21,327	1y8m	8/1/2003	4/1/2005
MS	Greenville	Mid Delta Regional	GLH	CS	$4.50	**	8m	4/1/2005	12/1/2005
MS	Greenville	Mid Delta Regional	GLH	CS	$4.50	$162,432	5y4m	12/1/2005	8/1/2011
MS	Greenville	Mid Delta Regional	GLH	CS	$4.50	$114,263	3y1m	9/1/2012	10/1/2015
MS	Gulfport	Gulfport-Biloxi International	GPT	S	$3.00	$8,247,199	9y1m	7/1/1992	8/1/2001
MS	Gulfport	Gulfport-Biloxi International	GPT	S	$3.00	*	6m	12/1/2001	6/1/2002
MS	Gulfport	Gulfport-Biloxi International	GPT	S	$3.00	$1,031,474	9m	6/1/2002	5/1/2003
MS	Gulfport	Gulfport-Biloxi International	GPT	S	$4.50	$57,145,388	24y8m	5/1/2003	1/1/2028
MS	Hattiesburg	Hattiesburg-Laurel Regional	PIB	N	$3.00	$237,929	8y11m	7/1/1992	6/1/2001
MS	Hattiesburg	Hattiesburg-Laurel Regional	PIB	N	$4.50	$869,778	14y2m	6/1/2001	8/1/2015
MS	Jackson	Jackson-Medgar Wiley Evers International	JAN	S	$3.00	$22,059,819	10y5m	5/1/1993	10/1/2003
MS	Jackson	Jackson-Medgar Wiley Evers International	JAN	S	$4.50	**	2y3m	10/1/2003	1/1/2006
MS	Jackson	Jackson-Medgar Wiley Evers International	JAN	S	$4.50	$27,115,095	9y8m	1/1/2006	9/1/2015
MS	Meridian	Key Field	MEI	N	$3.00	$293,059	3y9m	11/1/1992	8/1/1996
MS	Meridian	Key Field	MEI	N	$3.00	$436,597	4y9m	3/1/1997	12/1/2001
MS	Meridian	Key Field	MEI	N	$4.50	**	2y5m	12/1/2001	5/1/2004
MS	Meridian	Key Field	MEI	N	$4.50	$1,025,361	15y	10/1/2005	10/1/2020
MS	Tupelo	Tupelo Regional	TUP	CS	$3.00	$457,216	8y5m	11/1/1994	4/1/2003
MS	Tupelo	Tupelo Regional	TUP	CS	$4.50	**	8m	4/1/2003	1/1/2004
MS	Tupelo	Tupelo Regional	TUP	CS	$4.50	$1,285,973	14y11m	1/1/2004	12/1/2018
MO	Columbia	Columbia Regional	COU	N	$4.50	$2,949,763	24y1m	11/1/2002	12/1/2026
MO	Joplin	Joplin Regional	JLN	N	$4.50	$889,664	12y2m	4/1/2003	6/1/2015
MO	Kansas City	Kansas City International	MCI	M	$3.00	$350,021,210	9y5m	3/1/1996	8/1/2005
MO	Kansas City	Kansas City International	MCI	M	$4.50	**	9y	8/1/2005	8/1/2014
MO	Kansas City	Kansas City International	MCI	M	$3.00	$78,338,552	4y10m	8/1/2014	6/1/2019
MO	Springfield	Springfield-Branson National	SGF	N	$3.00	$3,110,598	3y9m	11/1/1993	5/1/1997
MO	Springfield	Springfield-Branson National	SGF	N	$3.00	$6,370,614	2y10m	7/1/1998	5/1/2001
MO	Springfield	Springfield-Branson National	SGF	N	$4.50	**	2y7m	5/1/2001	1/1/2004
MO	Springfield	Springfield-Branson National	SGF	N	$4.50	$2,168,000	1y3m	5/1/2004	8/1/2005
MO	Springfield	Springfield-Branson National	SGF	N	$4.50	$900,000	6m	9/1/2005	3/1/2006
MO	Springfield	Springfield-Branson National	SGF	N	$4.50	$83,651,097	29y	1/1/2007	1/1/2036
MO	St Louis	Lambert-St Louis International	STL	M	$3.00	$330,818,323	9y	12/1/1992	12/1/2001
MO	St Louis	Lambert-St Louis International	STL	M	$4.50	**	12y1m	12/1/2001	5/1/2002

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MO	St Louis	Lambert-St Louis International	STL	M	$4.50	$760,523,801	24y5m	5/1/2002	10/1/2026
MT	Billings	Billings Logan International	BIL	S	$3.00	$19,956,013	20y5m	4/1/1994	9/1/2014
MT	Bozeman	Bozeman Yellowstone International	BZN	S	$3.00	$9,144,326	15y7m	8/1/1993	3/1/2009
MT	Bozeman	Bozeman Yellowstone International	BZN	S	$4.50	$31,200,000	19y4m	3/1/2009	7/1/2028
MT	Butte	Bert Mooney	BTM	N	$3.00	$1,289,307	11y11m	7/1/1994	6/1/2006
MT	Butte	Bert Mooney	BTM	N	$3.00	$112,047	1y1m	7/1/2006	8/1/2007
MT	Butte	Bert Mooney	BTM	N	$3.00	$58,163	2y4m	11/1/2007	3/1/2010
MT	Butte	Bert Mooney	BTM	N	$4.50	$669,161	7y	3/1/2010	3/1/2017
MT	Great Falls	Great Falls International	GTF	N	$3.00	$3,059,263	9y8m	11/1/1992	7/1/2002
MT	Great Falls	Great Falls International	GTF	N	$4.50	$12,867,065	18y11m	7/1/2002	6/1/2021
MT	Helena	Helena Regional	HLN	N	$3.00	$1,949,098	9y4m	4/1/1993	8/1/2002
MT	Helena	Helena Regional	HLN	N	$4.50	**	1y2m	8/1/2002	10/1/2003
MT	Helena	Helena Regional	HLN	N	$4.50	$4,276,888	13y9m	10/1/2003	7/1/2017
MT	Kalispell	Glacier Park International	GPI/ FCA	N	$3.00	$10,997,914	11y5m	12/1/1993	4/1/2005
MT	Kalispell	Glacier Park International	GPI/ FCA	N	$4.50	**	11y3m	4/1/2005	7/1/2016
MT	Kalispell	Glacier Park International	GPI/ FCA	N	$4.50	$833,138	1y4m	7/1/2016	11/1/2017
MT	Missoula	Missoula International	MSO	N	$3.00	$5,110,384	8y7m	9/1/1992	4/1/2001
MT	Missoula	Missoula International	MSO	N	$4.50	**	1y2m	4/1/2001	6/1/2002
MT	Missoula	Missoula International	MSO	N	$4.50	$14,917,768	15y4m	6/1/2002	10/1/2017
MT	West Yellowstone	Yellowstone	WYS	CS	$4.50	$277,202	14y	6/1/2011	6/1/2025
NE	Grand Island	Central Nebraska Regional	GRI	N	$3.00	$50,370	2y2m	2/1/1999	4/1/2001
NE	Grand Island	Central Nebraska Regional	GRI	N	$4.50	$1,460,580	15y	5/1/2001	5/1/2016
NE	Kearney	Kearney Regional	EAR	N	$4.00	$0	1y10m	11/1/2005	9/1/2007
NE	Kearney	Kearney Regional	EAR	N	$4.50	$231,600	3y10m	9/1/2007	7/1/2011
NE	Kearney	Kearney Regional	EAR	N	$4.50	$191,378	4y6m	10/1/2011	4/1/2016
NE	Scottsbluff	Western Nebraska Regional/ William B. Heilig Field	BFF	N	$3.00	$0	3y	3/1/2000	3/1/2003
NE	Scottsbluff	Western Nebraska Regional/ William B. Heilig Field	BFF	N	$4.50	$1,299,534	20y	7/1/2004	7/1/2024
NV	Elko	Elko Regional	EKO	N	$3.00	$6,790,017	5y2m	9/1/1998	11/1/2003
NV	Elko	Elko Regional	EKO	N	$4.50	**	17y3m	11/1/2003	2/1/2021
NV	Las Vegas	McCarran International	LAS	L	$3.00	$849,713,056	12y5m	6/1/1992	11/1/2004
NV	Las Vegas	McCarran International	LAS	L	$4.50	**	1y10m	11/1/2004	9/1/2006
NV	Las Vegas	McCarran International	LAS	L	$3.00	**	4m	9/1/2006	1/1/2007
NV	Las Vegas	McCarran International	LAS	L	$4.00	**	1y9m	1/1/2007	10/1/2008
NV	Las Vegas	McCarran International	LAS	L	$4.50	$3,713,433,0 02	45y1m	10/1/2008	11/1/2053
NV	Reno	Reno/Tahoe International	RNO	S	$3.00	$61,222,704	7y1m	1/1/1994	2/1/2001
NV	Reno	Reno/Tahoe International	RNO	S	$4.50	$7,258,689	10m	8/1/2001	6/1/2002
NV	Reno	Reno/Tahoe International	RNO	S	$3.00	$6,940,843	8m	6/1/2002	2/1/2003
NV	Reno	Reno/Tahoe International	RNO	S	$4.50	$11,922,040	1y8m	2/1/2003	10/1/2004
NV	Reno	Reno/Tahoe International	RNO	S	$3.00	**	2m	10/1/2004	12/1/2004
NV	Reno	Reno/Tahoe International	RNO	S	$3.00	$53,000,000	5m	12/1/2004	4/1/2005
NV	Reno	Reno/Tahoe International	RNO	S	$4.50	**	2y4m	4/1/2005	7/1/2007
NV	Reno	Reno/Tahoe International	RNO	S	$3.00	$3,066,408	5m	7/1/2007	12/1/2007

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NV	Reno	Reno/Tahoe International	RNO	S	$4.50	$66,811,876	10y7m	12/1/2007	7/1/2018
NH	Lebanon	Lebanon Municipal	LEB	N	$3.00	$530,630	7y	8/1/1995	8/1/2002
NH	Lebanon	Lebanon Municipal	LEB	N	$4.50	$63,774	2y6m	11/1/2003	5/1/2006
NH	Lebanon	Lebanon Municipal	LEB	N	$4.50	$203,144	6y7m	10/1/2007	5/1/2014
NH	Manchester	Manchester	MHT	S	$3.00	$123,305,983	15y	1/1/1993	1/1/2008
NH	Manchester	Manchester	MHT	S	$4.50	**	7y7m	1/1/2008	8/1/2015
NH	Manchester	Manchester	MHT	S	$4.50	$75,185,261	7y4m	8/1/2015	12/1/2022
NJ	Atlantic City	Atlantic City International	ACY	S	$3.00	$15,739,338	6y2m	10/1/1999	12/1/2005
NJ	Atlantic City	Atlantic City International	ACY	S	$4.50	**	3y5m	12/1/2005	4/1/2009
NJ	Atlantic City	Atlantic City International	ACY	S	$4.50	$14,569,296	5y1m	4/1/2009	5/1/2014
NJ	Newark	Newark Liberty International	EWR	L	$3.00	$945,361,335	13y6m	10/1/1992	4/1/2006
NJ	Newark	Newark Liberty International	EWR	L	$4.50	**	5y3m	4/1/2006	7/1/2011
NJ	Newark	Newark Liberty International	EWR	L	$4.50	$358,690,269	7y	7/1/2011	7/1/2018
NJ	Trenton	Trenton Mercer	TTN	CS	$3.00	$0	3y4m	1/1/2001	5/1/2004
NJ	Trenton	Trenton Mercer	TTN	CS	$4.50	$3,975,081	11y8m	5/1/2004	1/1/2016
NM	Albuquerque	Albuquerque International Sunport	ABQ	M	$3.00	$169,822,308	15y	7/1/1996	7/1/2011
NM	Albuquerque	Albuquerque International Sunport	ABQ	M	$4.50	**	6y3m	7/1/2011	10/1/2017
NM	Farmington	Four Corners Regional	FMN	N	$3.00	$661,102	13y11m	6/1/2003	5/1/2017
NM	Roswell	Roswell International Air Center	ROW	N	$3.00	$334,477	4y10m	4/1/1999	2/1/2004
NM	Roswell	Roswell International Air Center	ROW	N	$4.50	**	4m	2/1/2004	6/1/2004
NM	Roswell	Roswell International Air Center	ROW	N	$3.00	**	1y	6/1/2004	6/1/2005
NM	Roswell	Roswell International Air Center	ROW	N	$4.50	**	2y8m	6/1/2005	2/1/2008
NM	Roswell	Roswell International Air Center	ROW	N	$4.50	$2,085,789	14y1m	3/1/2008	4/1/2022
NY	Albany	Albany International	ALB	S	$3.00	$116,740,338	15y6m	3/1/1994	9/1/2009
NY	Albany	Albany International	ALB	S	$4.50	**	10y5m	9/1/2009	2/1/2020
NY	Binghamton	Greater Binghamton/Edwin A. Link Field	BGM	N	$3.00	$4,684,325	8y10m	11/1/1993	9/1/2002
NY	Binghamton	Greater Binghamton/Edwin A. Link Field	BGM	N	$4.50	**	3y10m	9/1/2002	7/1/2006
NY	Binghamton	Greater Binghamton/Edwin A. Link Field	BGM	N	$4.50	$559,849	3y2m	7/1/2006	2/1/2008
NY	Binghamton	Greater Binghamton/Edwin A. Link Field	BGM	N	$4.50	$5,247,822	10y	5/1/2008	5/1/2018
NY	Buffalo	Buffalo Niagara International	BUF	M	$3.00	$149,995,516	14y11m	8/1/1992	8/1/2007
NY	Buffalo	Buffalo Niagara International	BUF	M	$4.50	**	5y3m	8/1/2007	11/1/2012
NY	Buffalo	Buffalo Niagara International	BUF	M	$4.50	$18,916,902	1y9m	11/1/2012	8/1/2014
NY	Elmira	Elmira/Corning Regional	ELM	N	$3.00	$733,042	3y1m	12/1/2004	1/1/2008
NY	Elmira	Elmira/Corning Regional	ELM	N	$4.50	$5,931,284	11y3m	5/1/2008	8/1/2019
NY	Islip	Long Island MacArthur	ISP	S	$3.00	$27,645,312	10y9m	12/1/1994	9/1/2005
NY	Islip	Long Island MacArthur	ISP	S	$4.50	$37,133,218	9y7m	9/1/2005	4/1/2015
NY	Ithaca	Ithica Tompkins Regional	ITH	N	$3.00	$6,872,612	16y2m	1/1/1993	3/1/2009
NY	Ithaca	Ithica Tompkins Regional	ITH	N	$4.50	**	7y2m	3/1/2009	5/1/2016
NY	Jamestown	Chautauqua County/Jamestown	JHW	CS	$3.00	$593,058	9y2m	6/1/1993	8/1/2002
NY	Jamestown	Chautauqua County/Jamestown	JHW	CS	$4.50	$200,112	11y2m	9/1/2004	11/1/2015
NY	Massena	Massena International - Richards Field	MSS	CS	$3.00	$163,429	19y7m	4/1/1996	11/1/2015
NY	New York	John F. Kennedy International	JFK	L	$3.00	$992,679,240	13y6m	10/1/1992	4/1/2006
NY	New York	John F. Kennedy International	JFK	L	$4.50	**	5y3m	4/1/2006	7/1/2011

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NY	New York	John F. Kennedy International	JFK	L	$4.50	$663,296,350	7y4m	7/1/2011	11/1/2018
NY	New York	LaGuardia	LGA	L	$3.00	$702,439,084	13y6m	10/1/1992	4/1/2006
NY	New York	LaGuardia	LGA	L	$4.50	**	5y3m	4/1/2006	7/1/2011
NY	New York	LaGuardia	LGA	L	$4.50	$328,890,787	7y4m	7/1/2011	11/1/2018
NY	Newburgh	Stewart International	SWF	N	$3.00	$8,827,899	6y4m	11/1/1995	3/1/2002
NY	Newburgh	Stewart International	SWF	N	$4.50	**	3y8m	3/1/2002	11/1/2005
NY	Newburgh	Stewart International	SWF	N	$4.50	$254,187	4m	5/1/2007	9/1/2007
NY	Newburgh	Stewart International	SWF	N	$4.50	$9,055,729	9y3m	7/1/2010	10/1/2019
NY	Ogdensburg	Ogdensburg International	OGS	CS	$3.00	$125,050	23y8m	4/1/1996	12/1/2019
NY	Plattsburgh	Clinton County	PLB	N	$3.00	$184,658	7y8m	7/1/1993	3/1/2001
NY	Plattsburgh	Clinton County	PLB	N	$3.00	$46,317	3y10m	6/1/2001	4/1/2003
NY	Plattsburgh	Plattsburgh International	PBG	N	$4.50	$56,896,377	34y1m	1/1/2009	2/1/2043
NY	Rochester	Greater Rochester International	ROC	S	$3.00	$20,664,219	6y8m	12/1/1997	9/1/2004
NY	Rochester	Greater Rochester International	ROC	S	$4.50	$77,242,638	16y9m	9/1/2004	6/1/2021
NY	Saranac Lake	Adirondack Regional	SLK	CS	$3.00	$120,749	13y1m	8/1/1994	9/1/2007
NY	Saranac Lake	Adirondack Regional	SLK	CS	$4.50	$470,825	22y4m	2/1/2011	6/1/2033
NY	Syracuse	Syracuse Hancock International	SYR	S	$3.00	$15,445,446	6y3m	10/1/1995	1/1/2002
NY	Syracuse	Syracuse Hancock International	SYR	S	$4.50	$10,495,193	2y10m	10/1/2002	8/1/2005
NY	Syracuse	Syracuse Hancock International	SYR	S	$4.50	$4,248,943	1y3m	11/1/2005	2/1/2007
NY	Syracuse	Syracuse Hancock International	SYR	S	$4.50	$96,732,010	19y4m	4/1/2007	8/1/2026
NY	Utica	Oneida County	UCA		$3.00	$1,298,631	12y10m	8/1/1997	6/1/2010
NY	White Plains	Westchester County	HPN	S	$3.00	$15,546,537	8y10m	2/1/1993	12/1/2001
NY	White Plains	Westchester County	HPN	S	$4.50	**	2y5m	12/1/2001	5/1/2004
NY	White Plains	Westchester County	HPN	S	$4.50	$37,300,000	10y3m	5/1/2004	8/1/2014
NC	Asheville	Asheville Regional	AVL	N	$3.00	$5,622,844	7y10m	12/1/1994	10/1/2002
NC	Asheville	Asheville Regional	AVL	N	$4.50	$4,916,517	4y1m	10/1/2002	11/1/2006
NC	Asheville	Asheville Regional	AVL	N	$4.50	$478,051	5m	4/1/2007	9/1/2007
NC	Asheville	Asheville Regional	AVL	N	$4.50	$18,534,839	16y6m	10/1/2007	4/1/2024
NC	Charlotte	Charlotte/Douglas International	CLT	L	$3.00	$1,036,775,656	18y9m	11/1/2004	8/1/2023
NC	Fayetteville	Fayetteville Regional/Grannis Field	FAY	N	$3.00	$1,676,077	5y3m	11/1/2000	2/1/2006
NC	Fayetteville	Fayetteville Regional/Grannis Field	FAY	N	$4.00	$1,992,908	3y3m	7/1/2009	10/1/2012
NC	Fayetteville	Fayetteville Regional/Grannis Field	FAY	N	$4.00	$1,575,744	3m	3/1/2013	6/1/2013
NC	Greensboro	Piedmont Triad International	GSO	S	$4.50	$43,872,158	10y8m	9/1/2011	5/1/2022
NC	Greenville	Pitt-Greenville	PGV	N	$3.00	$494,486	3y6m	10/1/1997	4/1/2001
NC	Greenville	Pitt-Greenville	PGV	N	$4.50	**	3m	4/1/2001	7/1/2001
NC	Greenville	Pitt-Greenville	PGV	N	$4.50	$11,287,343	37y3m	7/1/2001	10/1/2038
NC	Jacksonville	Albert J. Ellis	OAJ	N	$3.00	$208,878	2y9m	1/1/1996	10/1/1998
NC	Jacksonville	Albert J. Ellis	OAJ	N	$3.00	*	11m	9/1/1999	8/1/2000
NC	Jacksonville	Albert J. Ellis	OAJ	N	$3.00	$980,261	3y10m	3/1/2005	1/1/2009
NC	Jacksonville	Albert J. Ellis	OAJ	N	$3.00	$115,842	2y9m	2/1/2009	11/1/2011
NC	Jacksonville	Albert J. Ellis	OAJ	N	$3.00	$11,919,255	3m	11/1/2011	2/1/2012
NC	Jacksonville	Albert J. Ellis	OAJ	N	$4.50	**	17y2m	2/1/2012	4/1/2029
NC	New Bern	Coastal Carolina Regional	EWN	N	$3.00	$10,681,398	6y9m	2/1/1997	11/1/2003

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NC	New Bern	Coastal Carolina Regional	EWN	N	$4.50	**	21y	11/1/2003	11/1/2024
NC	New Bern	Coastal Carolina Regional	EWN	N	$4.50	$518,877	11m	11/1/2024	10/1/2025
NC	Raleigh	Raleigh-Durham International	RDU	M	$3.00	$7,439,029	1y6m	4/1/2003	10/1/2004
NC	Raleigh	Raleigh-Durham International	RDU	M	$4.50	$765,251,376	28y11m	10/1/2004	9/1/2032
NC	Wilmington	Wilmington International	ILM	S	$3.00	$1,526,487	2y7m	2/1/1994	9/1/1996
NC	Wilmington	Wilmington International	ILM	S	$3.00	$7,984,994	4y11m	6/1/1998	5/1/2003
NC	Wilmington	Wilmington International	ILM	S	$4.50	**	3y11m	5/1/2003	4/1/2007
NC	Wilmington	Wilmington International	ILM	S	$4.50	$15,574,579	12y6m	4/1/2007	10/1/2019
ND	Bismarck	Bismarck Municipal	BIS	N	$3.00	$349,092	1y	7/1/1996	7/1/1997
ND	Bismarck	Bismarck Municipal	BIS	N	$3.00	$1,342,095	3y10m	6/1/1998	4/1/2002
ND	Bismarck	Bismarck Municipal	BIS	N	$4.50	$12,915,129	19y10m	4/1/2002	2/1/2022
ND	Fargo	Hector International	FAR	S	$3.00	$4,633,814	5y7m	1/1/1997	8/1/2002
ND	Fargo	Hector International	FAR	S	$4.50	**	1y11m	8/1/2002	7/1/2004
ND	Fargo	Hector International	FAR	S	$4.50	$18,778,543	14y	7/1/2004	7/1/2018
ND	Grand Forks	Grand Forks International	GFK	N	$3.00	$680,106	3y6m	2/1/1993	8/1/1996
ND	Grand Forks	Grand Forks International	GFK	N	$3.00	$1,649,102	3y11m	5/1/1997	4/1/2001
ND	Grand Forks	Grand Forks International	GFK	N	$4.50	**	2y2m	4/1/2001	6/1/2003
ND	Grand Forks	Grand Forks International	GFK	N	$4.50	$1,506,569	4y5m	5/1/2004	10/1/2008
ND	Grand Forks	Grand Forks International	GFK	N	$4.50	$3,761,072	10y	1/1/2009	1/1/2019
ND	Minot	Minot International	MOT	N	$3.00	$825,445	4y4m	3/1/1994	7/1/1998
ND	Minot	Minot International	MOT	N	$3.00	$990,656	2y11m	3/1/1999	2/1/2002
ND	Minot	Minot International	MOT	N	$4.50	**	1y2m	2/1/2002	4/1/2003
ND	Minot	Minot International	MOT	N	$4.50	$15,821,748	20y4m	4/1/2003	8/1/2023
ND	Williston	Sloulin Field International	ISN	N	$4.50	$2,825,713	12y10m	4/1/2013	2/1/2026
OH	Akron	Akron-Canton Regional	CAK	S	$3.00	$9,066,039	10y	9/1/1992	9/1/2002
OH	Akron	Akron-Canton Regional	CAK	S	$4.50	$44,624,553	16y4m	9/1/2002	1/1/2019
OH	Cleveland	Cleveland-Hopkins International	CLE	M	$3.00	$194,277,586	9y4m	11/1/1992	3/1/2002
OH	Cleveland	Cleveland-Hopkins International	CLE	M	$4.50	**	2y5m	3/1/2002	8/1/2004
OH	Cleveland	Cleveland-Hopkins International	CLE	M	$4.50	$360,575,600	16y6m	8/1/2004	2/1/2021
OH	Columbus	Port Columbus International	CMH	M	$3.00	$128,445,302	9y6m	10/1/1992	4/1/2002
OH	Columbus	Port Columbus International	CMH	M	$4.50	**	2y6m	4/1/2002	10/1/2004
OH	Columbus	Port Columbus International	CMH	M	$4.50	$334,181,216	19y4m	10/1/2004	2/1/2024
OH	Dayton	James M Cox Dayton International	DAY	S	$3.00	$28,098,728	6y11m	10/1/1994	9/1/2001
OH	Dayton	James M Cox Dayton International	DAY	S	$4.50	**	1y10m	9/1/2001	7/1/2003
OH	Dayton	James M Cox Dayton International	DAY	S	$4.50	$102,734,120	15y9m	7/1/2003	4/1/2019
OH	Toledo	Toledo Express	TOL	N	$3.00	$2,246,374	3y	9/1/1993	9/1/1996
OH	Toledo	Toledo Express	TOL	N	$3.00	$6,442,493	4y	7/1/1997	7/1/2001
OH	Toledo	Toledo Express	TOL	N	$4.50	**	2y6m	7/1/2001	1/1/2004
OH	Toledo	Toledo Express	TOL	N	$4.50	$7,789,544	14y5m	1/1/2004	6/1/2018
OH	Youngstown	Youngstown-Warren Regional	YNG	N	$3.00	$214,384	2y2m	5/1/1994	7/1/1996
OH	Youngstown	Youngstown-Warren Regional	YNG	N	$3.00	$477,044	4y6m	8/1/1997	2/1/2002
OH	Youngstown	Youngstown-Warren Regional	YNG	N	$4.50	$2,493,885	22y10m	4/1/2007	2/1/2030
OK	Lawton	Lawton-Fort Sill Regional	LAW	N	$2.00	$452,189	1y5m	8/1/1992	1/1/1994

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OK	Lawton	Lawton-Fort Sill Regional	LAW	N	$3.00	**	2y3m	1/1/1994	4/1/1996
OK	Lawton	Lawton-Fort Sill Regional	LAW	N	$3.00	$380,745	2y7m	1/1/1998	8/1/2000
OK	Lawton	Lawton-Fort Sill Regional	LAW	N	$4.50	$303,687	1y9m	6/1/2002	3/1/2004
OK	Lawton	Lawton-Fort Sill Regional	LAW	N	$4.50	$249,492	1y1m	9/1/2004	10/1/2005
OK	Lawton	Lawton-Fort Sill Regional	LAW	N	$4.50	$2,424,273	8y	11/1/2007	11/1/2015
OK	Oklahoma City	Will Rogers World	OKC	S	$3.00	$131,057,571	12y9m	7/1/1997	4/1/2010
OK	Oklahoma City	Will Rogers World	OKC	S	$4.50	**	10y1m	4/1/2010	5/1/2020
OK	Oklahoma City	Will Rogers World	OKC	S	$4.50	$5,226,000	7m	5/1/2020	12/1/2020
OK	Tulsa	Tulsa International	TUL	S	$3.00	$15,986,724	3y7m	8/1/1992	3/1/1996
OK	Tulsa	Tulsa International	TUL	S	$3.00	$107,383,756	12y11m	1/1/1997	8/1/2010
OK	Tulsa	Tulsa International	TUL	S	$4.50	**	11y8m	8/1/2010	4/1/2022
OK	Tulsa	Tulsa International	TUL	S	$4.50	$65,980,712	11y	4/1/2022	4/1/2033
OR	Eugene	Mahlon Sweet Field	EUG	S	$3.00	$6,537,176	7y7m	11/1/1993	6/1/2001
OR	Eugene	Mahlon Sweet Field	EUG	S	$4.50	$21,736,419	15y1m	6/1/2001	7/1/2016
OR	Klamath Falls	Klamath Falls	LMT	N	$3.00	$426,251	1y1m	3/1/2000	4/1/2001
OR	Klamath Falls	Klamath Falls	LMT	N	$4.50	**	3y1m	4/1/2001	5/1/2004
OR	Klamath Falls	Klamath Falls	LMT	N	$4.50	$877,799	7y7m	5/1/2004	12/1/2011
OR	Klamath Falls	Klamath Falls	LMT	N	$4.50	$987,785	11y6m	4/1/2012	10/1/2023
OR	Medford	Rogue Valley International - Medford	MFR	N	$3.00	$4,881,207	7y9m	7/1/1993	4/1/2001
OR	Medford	Rogue Valley International - Medford	MFR	N	$4.50	**	2y	4/1/2001	4/1/2003
OR	Medford	Rogue Valley International - Medford	MFR	N	$4.50	$29,951,653	23y4m	4/1/2003	8/1/2026
OR	North Bend	Southwest Oregon Regional	OTH	N	$3.00	$520,605	7y6m	2/1/1994	8/1/2001
OR	North Bend	Southwest Oregon Regional	OTH	N	$4.50	**	1y9m	8/1/2001	5/1/2003
OR	North Bend	Southwest Oregon Regional	OTH	N	$4.50	$2,557,363	17y9m	5/1/2003	2/1/2021
OR	Pendleton	Eastern Oregon Regional at Pendleton	PDT	CS	$3.00	$486,540	13y10m	12/1/1995	10/1/2009
OR	Pendleton	Eastern Oregon Regional at Pendleton	PDT	CS	$4.50	**	5y5m	10/1/2009	3/1/2015
OR	Portland	Portland International	PDX	M	$3.00	$613,687,685	9y3m	7/1/1992	10/1/2001
OR	Portland	Portland International	PDX	M	$4.50	**	14y7m	10/1/2001	5/1/2016
OR	Portland	Portland International	PDX	M	$4.50	$501,226,941	18y6m	5/1/2016	11/1/2034
OR	Redmond	Roberts Field	RDM	N	$3.00	$3,517,536	8y1m	10/1/1993	11/1/2001
OR	Redmond	Roberts Field	RDM	N	$4.50	**	2y1m	11/1/2001	12/1/2003
OR	Redmond	Roberts Field	RDM	N	$4.50	$2,083,546	3y	12/1/2003	12/1/2006
OR	Redmond	Roberts Field	RDM	N	$4.50	$27,930,168	33y4m	3/1/2007	7/1/2040
PA	Allentown	Lehigh Valley International	ABE	N	$3.00	$11,092,349	8y3m	11/1/1992	2/1/2001
PA	Allentown	Lehigh Valley International	ABE	N	$3.00	$2,807,572	5m	6/1/2001	11/1/2001
PA	Allentown	Lehigh Valley International	ABE	N	$4.50	**	1y2m	11/1/2001	1/1/2003
PA	Allentown	Lehigh Valley International	ABE	N	$4.50	$31,075,601	14y11m	9/1/2003	8/1/2018
PA	Altoona	Altoona-Blair County	AOO	CS	$3.00	$110,500	2y9m	5/1/1993	2/1/1996
PA	Altoona	Altoona-Blair County	AOO	CS	$3.00	$116,620	2y9m	1/1/1997	10/1/1999
PA	Altoona	Altoona-Blair County	AOO	CS	$3.00	$298,660	8y5m	7/1/2000	12/1/2008
PA	Altoona	Altoona-Blair County	AOO	CS	$4.50	**	3y	12/1/2008	12/1/2011
PA	Altoona	Altoona-Blair County	AOO	CS	$4.50	$139,918	3y	12/1/2011	12/1/2014
PA	Bradford	Bradford Regional	BFD	GA	$3.00	$206,793	7y9m	8/1/1995	5/1/2003

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PA	Bradford	Bradford Regional	BFD	GA	$4.50	$437,822	14y6m	5/1/2003	11/1/2017
PA	Du Bois	Dubois Regional	DUJ	CS	$3.00	$386,636	5y10m	6/1/1995	4/1/2001
PA	Du Bois	Dubois Regional	DUJ	CS	$4.50	**	2y7m	4/1/2001	11/1/2003
PA	Du Bois	Dubois Regional	DUJ	CS	$4.50	$325,413	14y6m	4/1/2004	10/1/2018
PA	Erie	Erie International/Tom Ridge Field	ERI	N	$3.00	$2,022,109	4y8m	10/1/1992	6/1/1997
PA	Erie	Erie International/Tom Ridge Field	ERI	N	$3.00	$1,216,914	3y5m	12/1/1997	5/1/2001
PA	Erie	Erie International/Tom Ridge Field	ERI	N	$4.50	$618,885	1y5m	8/1/2003	1/1/2005
PA	Erie	Erie International/Tom Ridge Field	ERI	N	$4.50	$12,070,540	19y7m	7/1/2005	2/1/2025
PA	Harrisburg	Harrisburg International	MDT	S	$3.00	$17,744,614	5y11m	2/1/1997	1/1/2003
PA	Harrisburg	Harrisburg International	MDT	S	$4.50	$118,372,500	31y6m	1/1/2003	7/1/2034
PA	Johnstown	John Murtha Johnstown-Cambria County	JST	CS	$3.00	$148,269	3y1m	11/1/1993	12/1/1996
PA	Johnstown	John Murtha Johnstown-Cambria County	JST	CS	$3.00	$510,227	5y4m	12/1/1997	5/1/2001
PA	Johnstown	John Murtha Johnstown-Cambria County	JST	CS	$4.50	**	5y8m	5/1/2001	1/1/2007
PA	Johnstown	John Murtha Johnstown-Cambria County	JST	CS	$4.50	$285,335	7y11m	7/1/2007	6/1/2015
PA	Lancaster	Lancaster	LNS	CS	$3.00	$495,032	14y	2/1/1995	2/1/2009
PA	Lancaster	Lancaster	LNS	CS	$4.50	$35,917	1y10m	7/1/2013	5/1/2015
PA	Latrobe	Arnold Palmer Regional	LBE	N	$3.00	$1,397,687	17y4m	3/1/1996	7/1/2013
PA	Latrobe	Arnold Palmer Regional	LBE	N	$4.50	$829,690	2y8m	7/1/2013	3/1/2016
PA	Philadelphia	Philadelphia International	PHL	L	$3.00	$1,141,562,798	8y7m	9/1/1992	4/1/2001
PA	Philadelphia	Philadelphia International	PHL	L	$4.50	**	11y10m	4/1/2001	2/1/2013
PA	Philadelphia	Philadelphia International	PHL	L	$3.00	**	1m	2/1/2013	3/1/2013
PA	Philadelphia	Philadelphia International	PHL	L	$4.50	**	3y3m	3/1/2013	6/1/2016
PA	Philadelphia	Philadelphia International	PHL	L	$3.00	$24,400,000	5m	6/1/2016	11/1/2016
PA	Philadelphia	Philadelphia International	PHL	L	$4.50	$249,450,000	2y3m	11/1/2016	2/1/2019
PA	Pittsburgh	Pittsburgh International	PIT	M	$3.00	$100,098,648	3y2m	10/1/2001	12/1/2004
PA	Pittsburgh	Pittsburgh International	PIT	M	$4.50	**	1y9m	12/1/2004	9/1/2006
PA	Pittsburgh	Pittsburgh International	PIT	M	$4.50	$426,674,028	18y3m	9/1/2006	12/1/2024
PA	Reading	Reading Regional/Carl A Spaatz Field	RDG	GA	$3.00	$1,006,653	13y7m	12/1/1994	7/1/2008
PA	State College	University Park	UNV/ SCE	N	$3.00	$3,742,876	11y	11/1/1992	11/1/2003
PA	State College	University Park	UNV/ SCE	N	$4.50	**	2y8m	11/1/2003	7/1/2006
PA	State College	University Park	UNV/ SCE	N	$4.50	$5,620,995	8y5m	7/1/2006	12/1/2014
PA	Wilkes-Barre	Wilkes-Barre/Scranton International	AVP	N	$3.00	$4,453,122	3y6m	12/1/1993	6/1/1997
PA	Wilkes-Barre	Wilkes-Barre/Scranton International	AVP	N	$3.00	*	3y5m	12/1/1997	5/1/2001
PA	Wilkes-Barre	Wilkes-Barre/Scranton International	AVP	N	$4.50	$19,080,729	30y2m	5/1/2001	7/1/2031
PA	Williamsport	Williamsport Regional	IPT	N	$3.00	$132,488	1y6m	5/1/1997	11/1/1998
PA	Williamsport	Williamsport Regional	IPT	N	$4.50	$225,000	1y	11/1/2013	11/1/2014
PR	Aguadilla	Rafael Hernandez	BQN	N	$3.00	$0	3y2m	3/1/1993	5/1/1996
PR	Aguadilla	Rafael Hernandez	BQN	N	$4.50	$9,828,476	16y	12/1/2005	12/1/2021
PR	Ponce	Mercedita	PSE	N	$3.00	$866,000	5y5m	3/1/1993	9/1/1998
PR	San Juan	Luis Munoz Marin International	SJU	M	$3.00	$180,182,826	12y9m	3/1/1993	12/1/2005
PR	San Juan	Luis Munoz Marin International	SJU	M	$4.50	**	2y6m	12/1/2005	6/1/2008
PR	San Juan	Luis Munoz Marin International	SJU	M	$4.50	$479,036,578	22y	6/1/2008	6/1/2030

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RI	Providence	Theodore Francis Green State	PVD	S	$3.00	$100,136,720	12y7m	2/1/1994	9/1/2006
RI	Providence	Theodore Francis Green State	PVD	S	$4.50	**	1y6m	9/1/2006	3/1/2008
RI	Providence	Theodore Francis Green State	PVD	S	$4.50	$83,421,991	8y8m	3/1/2008	11/1/2016
SC	Charleston	Charleston AFB/International	CHS	S	$4.50	$197,985,832	30y7m	3/1/2010	10/1/2040
SC	Columbia	Columbia Metropolitan	CAE	S	$3.00	$70,528,884	8y1m	11/1/1993	12/1/2001
SC	Columbia	Columbia Metropolitan	CAE	S	$4.50	**	26y10m	12/1/2001	10/1/2028
SC	Florence	Florence Regional	FLO	N	$3.00	$669,334	3y11m	12/1/1995	11/1/1999
SC	Florence	Florence Regional	FLO	N	$3.00	*	2m	12/1/1999	2/1/2000
SC	Hilton Head Island	Hilton Head	HXD/ HHH	N	$3.00	$1,542,300	6y4m	2/1/1994	6/1/2000
SC	Hilton Head Island	Hilton Head	HXD/ HHH	N	$3.00	$1,375,156	6y10m	12/1/2000	10/1/2007
SC	Hilton Head Island	Hilton Head	HXD/ HHH	N	$4.50	$2,619,447	10y2m	5/1/2012	7/1/2022
SC	Myrtle Beach	Myrtle Beach International	MYR	S	$3.00	$27,941,134	5y10m	10/1/1996	8/1/2001
SC	Myrtle Beach	Myrtle Beach International	MYR	S	$4.50	**	6y	8/1/2001	8/1/2007
SC	Myrtle Beach	Myrtle Beach International	MYR	S	$4.50	$104,020,700	21y7m	6/1/2010	1/1/2032
SD	Aberdeen	Aberdeen Regional	ABR	N	$3.00	$677,809	2y	1/1/2000	1/1/2002
SD	Aberdeen	Aberdeen Regional	ABR	N	$4.50	**	5y5m	1/1/2002	6/1/2007
SD	Aberdeen	Aberdeen Regional	ABR	N	$4.50	$1,076,140	11y10m	6/1/2007	4/1/2019
SD	Pierre	Pierre Regional	PIR	N	$4.50	$366,239	6y5m	2/1/2003	7/1/2009
SD	Pierre	Pierre Regional	PIR	N	$4.50	$422,107	7y	9/1/2009	9/1/2016
SD	Rapid City	Rapid City Regional	RAP	N	$3.00	$700,358	2y5m	8/1/1997	1/1/2000
SD	Rapid City	Rapid City Regional	RAP	N	$3.00	$4,109,960	6y	6/1/2000	6/1/2006
SD	Rapid City	Rapid City Regional	RAP	N	$4.50	**	9m	6/1/2006	5/1/2007
SD	Rapid City	Rapid City Regional	RAP	N	$4.50	$30,128,260	26y10m	5/1/2007	3/1/2034
TN	Bristol	Tri-Cities Regional TN/VA	TRI	N	$3.00	$10,521,507	10y5m	2/1/1997	7/1/2007
TN	Bristol	Tri-Cities Regional TN/VA	TRI	N	$4.50	**	5y7m	7/1/2007	2/1/2013
TN	Bristol	Tri-Cities Regional TN/VA	TRI	N	$4.50	$2,050,585	3y	2/1/2013	2/1/2016
TN	Chattanooga	Lovell Field	CHA	N	$3.00	$12,249,301	6y9m	7/1/1994	4/1/2001
TN	Chattanooga	Lovell Field	CHA	N	$4.50	**	3y7m	4/1/2001	11/1/2004
TN	Chattanooga	Lovell Field	CHA	N	$3.00	**	3m	11/1/2004	2/1/2005
TN	Chattanooga	Lovell Field	CHA	N	$4.50	**	5y6m	2/1/2005	8/1/2010
TN	Chattanooga	Lovell Field	CHA	N	$4.50	$9,416,408	6y10m	8/1/2010	6/1/2017
TN	Jackson	McKellar-Sipes Regional	MKL	GA	$4.50	$332,248	22y8m	10/1/2002	6/1/2025
TN	Knoxville	McGhee Tyson	TYS	S	$3.00	$99,080,294	9y9m	1/1/1994	10/1/2003
TN	Knoxville	McGhee Tyson	TYS	S	$4.50	**	18y9m	10/1/2003	7/1/2022
TN	Knoxville	McGhee Tyson	TYS	S	$4.50	$4,691,627	1y2m	7/1/2022	9/1/2023
TN	Memphis	Memphis International	MEM	M	$3.00	$53,700,000	4y5m	8/1/1992	1/1/1997
TN	Nashville	Nashville International	BNA	M	$3.00	$220,000,330	22y8m	1/1/1993	12/1/2009
TN	Nashville	Nashville International	BNA	M	$4.50	**	9m	12/1/2009	9/1/2010
TN	Nashville	Nashville International	BNA	M	$3.00	$81,618,442	5y9m	9/1/2010	6/1/2016
TN	Nashville	Nashville International	BNA	M	$4.50	$11,698,934	7m	6/1/2016	1/1/2017
TN	Nashville	Nashville International	BNA	M	$3.00	$2,797,105	5m	1/1/2017	6/1/2017
TN	Nashville	Nashville International	BNA	M	$4.50	$6,405,000	5m	6/1/2017	11/1/2017

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TX	Abilene	Abilene Regional	ABI	N	$3.00	$2,008,611	4y8m	1/1/1998	9/1/2002
TX	Abilene	Abilene Regional	ABI	N	$4.50	**	5y10m	9/1/2002	7/1/2008
TX	Abilene	Abilene Regional	ABI	N	$4.50	$2,519,008	7y1m	7/1/2008	8/1/2015
TX	Amarillo	Rick Husband Amarillo International	AMA	S	$4.50	$19,200,000	9y7m	12/1/2008	7/1/2018
TX	Austin	Robert Mueller Municipal	AUS	M	$2.00	$6,189,459	3m	11/1/1993	2/1/1994
TX	Austin	Robert Mueller Municipal	AUS	M	$3.00	**	1y	2/1/1994	2/1/1995
TX	Austin	Austin-Bergstrom International	AUS	M	$3.00	$343,074,546	8y9m	7/1/1995	4/1/2004
TX	Austin	Austin-Bergstrom International	AUS	M	$4.50	**	15y9m	4/1/2004	1/1/2020
TX	Austin	Austin-Bergstrom International	AUS	M	$4.50	$4,125,000	4m	1/1/2020	5/1/2020
TX	Beaumont/Port Arthur	Jack Brooks Regional	BPT	CS	$3.00	$2,784,768	7y6m	9/1/1994	3/1/2002
TX	Beaumont/Port Arthur	Jack Brooks Regional	BPT	CS	$4.50	**	3y1m	3/1/2002	4/1/2005
TX	Beaumont/Port Arthur	Jack Brooks Regional	BPT	CS	$4.50	$1,758,573	16y6m	4/1/2005	10/1/2021
TX	Brownsville	Brownsville/South Padre Island International	BRO	N	$3.00	$1,099,404	5y7m	10/1/1997	5/1/2003
TX	Brownsville	Brownsville/South Padre Island International	BRO	N	$4.50	$5,925,705	17y11m	5/1/2003	4/1/2021
TX	College Station	Easterwood Field	CLL	N	$3.00	$2,063,797	4y9m	7/1/1996	4/1/2001
TX	College Station	Easterwood Field	CLL	N	$4.50	**	2y9m	4/1/2001	1/1/2004
TX	College Station	Easterwood Field	CLL	N	$4.50	$4,712,844	14y4m	1/1/2004	5/1/2018
TX	Corpus Christi	Corpus Christi International	CRP	N	$3.00	$49,700,114	9y1m	3/1/1994	3/1/2003
TX	Corpus Christi	Corpus Christi International	CRP	N	$4.50	**	23y10m	3/1/2003	1/1/2027
TX	Dallas	Dallas Love Field	DAL	M	$3.00	$383,636,108	2y	2/1/2008	2/1/2010
TX	Dallas	Dallas Love Field	DAL	M	$4.50	**	16y2m	2/1/2010	4/1/2026
TX	Dallas	Dallas Love Field	DAL	M	$3.00	$13,637,816	1y6m	7/1/2026	10/1/2027
TX	Dallas-Ft Worth	Dallas/Ft Worth International	DFW	L	$3.00	$182,438,761	2y1m	5/1/1994	6/1/1996
TX	Dallas-Ft Worth	Dallas/Ft Worth International	DFW	L	$3.00	$2,306,174,080	5y5m	2/1/1997	7/1/2002
TX	Dallas-Ft Worth	Dallas/Ft Worth International	DFW	L	$4.50	**	14y8m	7/1/2002	3/1/2017
TX	Dallas-Ft Worth	Dallas/Ft Worth International	DFW	L	$3.00	$51,900,495	2m	3/1/2017	5/1/2017
TX	Dallas-Ft Worth	Dallas/Ft Worth International	DFW	L	$4.50	$2,988,412,952	17y4m	5/1/2017	9/1/2034
TX	Del Rio	Del Rio International	DRT	N	$4.50	$403,739	5y10m	2/1/2010	12/1/2015
TX	El Paso	El Paso International	ELP	S	$3.00	$76,826,242	13y7m	1/1/1997	8/1/2010
TX	El Paso	El Paso International	ELP	S	$4.50	**	2y9m	8/1/2010	5/1/2013
TX	El Paso	El Paso International	ELP	S	$4.50	$19,085,123	3y6m	6/1/2013	12/1/2016
TX	Harlingen	Valley International	HRL	S	$3.00	$9,716,744	9y1m	11/1/1998	12/1/2007
TX	Harlingen	Valley International	HRL	S	$4.50	$3,876,104	1y7m	12/1/2007	7/1/2009
TX	Harlingen	Valley International	HRL	S	$4.50	$13,044,000	6y9m	8/1/2009	5/1/2016
TX	Houston	William P. Hobby	HOU	M	$3.00	$163,517,150	12y	11/1/2006	11/1/2017
TX	Houston	George Bush Intercontinental/ Houston	IAH	L	$3.00	$1,372,445,143	18y11m	12/1/2008	11/1/2027
TX	Killeen	Killeen Municipal	ILE	N	$3.00	$242,051	1y10m	1/1/1993	11/1/1994
TX	Killeen	Killeen Municipal	ILE	N	$3.00	$3,579,834	6y1m	4/1/1995	5/1/2001
TX	Killeen	Killeen Municipal	ILE	N	$4.50	**	2y3m	5/1/2001	8/1/2003
TX	Killeen	Robert Gray AAF	ILE/ GRK	N	$4.50	*	2y1m	12/1/2003	1/1/2006
TX	Killeen	Robert Gray AAF	GRK	N	$4.50	$6,951,575	11y1m	6/1/2006	7/1/2017

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TX	Laredo	Laredo International	LRD	N	$3.00	$6,303,839	15y8m	10/1/1993	6/1/2009
TX	Laredo	Laredo International	LRD	N	$4.50	**	9y2m	6/1/2009	8/1/2016
TX	Laredo	Laredo International	LRD	N	$4.50	$7,852,765	9y5m	8/1/2016	1/1/2026
TX	Longview	East Texas Regional	GGG	N	$3.00	$472,571	5y7m	9/1/1996	4/1/2002
TX	Longview	East Texas Regional	GGG	N	$3.00	$699,232	10y	9/1/2002	9/1/2012
TX	Longview	East Texas Regional	GGG	N	$4.50	**	4m	9/1/2012	1/1/2013
TX	Longview	East Texas Regional	GGG	N	$4.50	$1,178,540	10y8m	1/1/2013	9/1/2023
TX	Lubbock	Lubbock Preston Smith International	LBB	S	$3.00	$16,178,722	11y4m	10/1/1993	2/1/2005
TX	Lubbock	Lubbock Preston Smith International	LBB	S	$2.00	$4,168,971	2y	2/1/2005	2/1/2007
TX	Lubbock	Lubbock Preston Smith International	LBB	S	$3.00	$12,794,346	1y4m	2/1/2007	6/1/2008
TX	Lubbock	Lubbock Preston Smith International	LBB	S	$4.50	**	4y5m	6/1/2008	11/1/2012
TX	Lubbock	Lubbock Preston Smith International	LBB	S	$4.50	$14,023,957	7y4m	11/1/2012	3/1/2020
TX	McAllen	McAllen Miller International	MFE	N	$3.00	$15,479,029	13y2m	4/1/1998	6/1/2011
TX	McAllen	McAllen Miller International	MFE	N	$4.50	**	2y	6/1/2011	6/1/2013
TX	McAllen	McAllen Miller International	MFE	N	$4.50	$19,145,000	13y6m	6/1/2013	12/1/2026
TX	Midland	Midland International	MAF	S	$3.00	$35,873,495	11y9m	1/1/1993	9/1/2004
TX	Midland	Midland International	MAF	S	$4.50	**	9y4m	9/1/2004	1/1/2014
TX	Midland	Midland International	MAF	S	$3.00	$1,395,921	10m	1/1/2014	11/1/2014
TX	Midland	Midland International	MAF	S	$4.50	$5,284,172	2y5m	11/1/2014	4/1/2017
TX	San Angelo	San Angelo Regional/Mathis Field	SJT	N	$3.00	$1,266,877	8y11m	5/1/1993	4/1/2002
TX	San Angelo	San Angelo Regional/Mathis Field	SJT	N	$4.50	**	2y4m	4/1/2002	8/1/2004
TX	San Angelo	San Angelo Regional/Mathis Field	SJT	N	$4.50	$2,942,045	10y	8/1/2004	8/1/2014
TX	San Antonio	San Antonio International	SAT	M	$3.00	$364,227,049	5y11m	11/1/2001	10/1/2007
TX	San Antonio	San Antonio International	SAT	M	$4.50	**	11y7m	10/1/2007	5/1/2019
TX	San Antonio	San Antonio International	SAT	M	$4.50	$142,929,158	6y2m	5/1/2019	7/1/2025
TX	Tyler	Tyler Pounds Regional	TYR	N	$3.00	$2,901,212	9y6m	3/1/1994	9/1/2003
TX	Tyler	Tyler Pounds Regional	TYR	N	$4.50	**	4y11m	9/1/2003	8/1/2008
TX	Tyler	Tyler Pounds Regional	TYR	N	$4.50	$3,220,587	9y1m	8/1/2008	9/1/2017
TX	Victoria	Victoria Regional	VCT	CS	$3.00	$195,960	3y	12/1/1994	8/1/1998
TX	Victoria	Victoria Regional	VCT	CS	$3.00	$188,872	3y	1/1/1999	1/1/2002
TX	Victoria	Victoria Regional	VCT	CS	$4.50	$444,905	14y2m	1/1/2002	3/1/2016
TX	Waco	Waco Regional	ACT	N	$3.00	$2,438,451	5y11m	11/1/1995	10/1/2001
TX	Waco	Waco Regional	ACT	N	$4.50	**	6y3m	10/1/2001	1/1/2008
TX	Waco	Waco Regional	ACT	N	$4.50	$2,210,688	8y	1/1/2008	1/1/2016
TX	Wichita Falls	Sheppard AFB/Wichita Falls Municipal	SPS	N	$4.50	$1,646,268	9y2m	10/1/2008	12/1/2017
UT	Cedar City	Cedar City Regional	CDC	N	$4.50	$229,900	4y8m	2/1/2007	10/1/2011
UT	Cedar City	Cedar City Regional	CDC	N	$4.50	$500,000	12y1m	2/1/2012	3/1/2024
UT	Salt Lake City	Salt Lake City International	SLC	L	$3.00	$166,173,468	6y4m	12/1/1994	4/1/2001
UT	Salt Lake City	Salt Lake City International	SLC	L	$4.50	**	3m	4/1/2001	7/1/2001
UT	Salt Lake City	Salt Lake City International	SLC	L	$4.50	$839,365,261	20y6m	7/1/2001	1/1/2022
UT	St George	St George Municipal	DXZ/ SGU	N	$3.00	$23,568	4y4m	5/1/1998	9/1/2002
UT	St George	St George Municipal	DXZ/ SGU	N	$4.50	$3,515,402	12y7m	6/1/2003	1/1/2016

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UT	Wendover	Wendover	ENV	N	$3.00	$142,300	3y2m	8/1/1996	10/1/1999
VT	Burlington	Burlington International	BTV	S	$3.00	$25,408,285	6y5m	4/1/1997	9/1/2003
VT	Burlington	Burlington International	BTV	S	$4.50	**	6y1m	9/1/2003	10/1/2009
VT	Burlington	Burlington International	BTV	S	$4.50	$22,708,469	6y2m	12/1/2009	2/1/2016
VI	Charlotte Amalie	Cyril E. King	STT	S	$3.00	$3,808,574	2y5m	3/1/1993	8/1/1995
VI	Charlotte Amalie	Cyril E. King	STT	S	$3.00	$7,792,000	7y	12/1/1995	12/1/2002
VI	Charlotte Amalie	Cyril E. King	STT	S	$3.00	$13,500,000	7y9m	8/1/2004	4/1/2012
VI	Charlotte Amalie	Cyril E. King	STT	S	$4.50	$13,353,396	9y6m	4/1/2012	10/1/2021
VI	Christiansted	Henry E. Rohlsen	STX	N	$3.00	$2,158,095	3y1m	3/1/1993	4/1/1996
VI	Christiansted	Henry E. Rohlsen	STX	N	$3.00	$4,914,898	6y7m	12/1/1996	7/1/2003
VI	Christiansted	Henry E. Rohlsen	STX	N	$3.00	$1,869,822	9y4m	10/1/2011	2/1/2021
VA	Arlington	Ronald Reagan Washington National	DCA	L	$3.00	$249,603,543	7y6m	11/1/1993	5/1/2001
VA	Arlington	Ronald Reagan Washington National	DCA	L	$4.50	**	4y1m	5/1/2001	6/1/2005
VA	Arlington	Ronald Reagan Washington National	DCA	L	$4.50	$350,449,489	9y9m	6/1/2005	3/1/2015
VA	Chantilly	Washington Dulles International	IAD	L	$3.00	$269,427,498	7y6m	1/1/1994	5/1/2001
VA	Chantilly	Washington Dulles International	IAD	L	$4.50	**	4y	5/1/2001	5/1/2005
VA	Chantilly	Washington Dulles International	IAD	L	$4.50	$2,173,226,6 52	33y7m	5/1/2005	12/1/2038
VA	Charlottesville	Charlottesville-Albemarle	CHO	N	$2.00	$305,992	1y1m	9/1/1992	10/1/1993
VA	Charlottesville	Charlottesville-Albemarle	CHO	N	$3.00	$3,499,774	9y9m	4/1/1995	1/1/2005
VA	Charlottesville	Charlottesville-Albemarle	CHO	N	$4.50	**	1m	1/1/2005	2/1/2005
VA	Charlottesville	Charlottesville-Albemarle	CHO	N	$4.50	$2,658,998	4y11m	2/1/2005	1/1/2010
VA	Charlottesville	Charlottesville-Albemarle	CHO	N	$4.50	$6,739,394	5y11m	8/1/2010	7/1/2016
VA	Lynchburg	Lynchburg Regional/Preston Glenn Field	LYH	N	$3.00	$184,209	1y	7/1/1995	7/1/1996
VA	Lynchburg	Lynchburg Regional/Preston Glenn Field	LYH	N	$3.00	$827,616	1y9m	9/1/2000	6/1/2002
VA	Lynchburg	Lynchburg Regional/Preston Glenn Field	LYH	N	$4.50	$5,724,121	19y7m	6/1/2002	1/1/2022
VA	Newport News	Newport News/Williamsburg International	PHF	N	$3.00	$552,500	9m	10/1/2006	7/1/2007
VA	Newport News	Newport News/Williamsburg International	PHF	N	$4.50	$15,866,709	9y8m	7/1/2010	3/1/2020
VA	Norfolk	Norfolk International	ORF	S	$3.00	$64,951,249	12y7m	5/1/1997	1/1/2010
VA	Norfolk	Norfolk International	ORF	S	$4.50	$47,090,687	6y1m	9/1/2010	10/1/2016
VA	Richmond	Richmond International	RIC	S	$3.00	$136,345,671	10y7m	5/1/1994	1/1/2005
VA	Richmond	Richmond International	RIC	S	$4.50	**	14y10m	1/1/2005	10/1/2019
VA	Roanoke	Roanoke Regional/Woodrum Field	ROA	N	$3.00	$6,463,183	3y3m	9/1/1998	12/1/2001
VA	Roanoke	Roanoke Regional/Woodrum Field	ROA	N	$4.50	**	3y2m	12/1/2001	2/1/2005
VA	Roanoke	Roanoke Regional/Woodrum Field	ROA	N	$3.00	$8,158,043	9m	2/1/2005	11/1/2005
VA	Roanoke	Roanoke Regional/Woodrum Field	ROA	N	$4.50	**	6y	11/1/2005	11/1/2011
VA	Roanoke	Roanoke Regional/Woodrum Field	ROA	N	$4.50	$6,471,251	4y4m	11/1/2011	3/1/2016
VA	Staunton	Shenandoah Valley Regional	SHD	N	$3.00	$87,482	5y	12/1/2001	12/1/2006
VA	Staunton	Shenandoah Valley Regional	SHD	N	$4.50	$555,364	10y3m	6/1/2007	9/1/2017
WA	Bellingham	Bellingham International	BLI	S	$3.00	$1,594,527	5y1m	7/1/1993	8/1/1998
WA	Bellingham	Bellingham International	BLI	S	$3.00	*	10m	3/1/1999	1/1/2000
WA	Bellingham	Bellingham International	BLI	S	$3.00	$1,400,000	2y6m	1/1/2000	7/1/2002
WA	Bellingham	Bellingham International	BLI	S	$4.50	**	2y11m	7/1/2002	6/1/2005
WA	Bellingham	Bellingham International	BLI	S	$4.50	$5,241,939	5y1m	6/1/2005	7/1/2010

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WA	Bellingham	Bellingham International	BLI	S	$4.50	$30,250,000	17y3m	10/1/2010	10/1/2027
WA	Friday Harbor	Friday Harbor	FRD/ FHR	N	$3.00	$517,077	15y5m	2/1/2001	7/1/2016
WA	Moses Lake	Grant County International	MW H		$3.00	$470,000	6y8m	3/1/1999	11/1/2005
WA	Moses Lake	Grant County International	MW H		$4.50	**	10y2m	11/1/2005	1/1/2016
WA	Pasco	Tri-Cities	PSC	N	$3.00	$3,657,898	7y11m	11/1/1993	10/1/2001
WA	Pasco	Tri-Cities	PSC	N	$4.50	**	1y6m	10/1/2001	4/1/2003
WA	Pasco	Tri-Cities	PSC	N	$4.50	$21,173,709	20y4m	4/1/2003	8/1/2023
WA	Port Angeles	William R. Fairchild International	CLM	CS	$3.00	$117,556	1y9m	8/1/1993	5/1/1995
WA	Port Angeles	William R. Fairchild International	CLM	CS	$3.00	$721,391	15y1m	9/1/1996	10/1/2011
WA	Port Angeles	William R. Fairchild International	CLM	CS	$3.00	$161,209	9y9m	7/1/2012	4/1/2022
WA	Pullman	Pullman/Moscow Regional	PUW	N	$3.00	$169,288	2y8m	6/1/1994	2/1/1996
WA	Pullman	Pullman/Moscow Regional	PUW	N	$3.00	$706,727	1y11m	2/1/2000	1/1/2002
WA	Pullman	Pullman/Moscow Regional	PUW	N	$4.50	**	3y9m	1/1/2002	10/1/2005
WA	Pullman	Pullman/Moscow Regional	PUW	N	$4.50	$1,566,644	7y11m	10/1/2005	9/1/2013
WA	Pullman	Pullman/Moscow Regional	PUW	N	$4.50	$0	1y	11/1/2013	11/1/2014
WA	Seattle	Seattle-Tacoma International	SEA	L	$3.00	$369,583,600	8y11m	11/1/1992	10/1/2001
WA	Seattle	Seattle-Tacoma International	SEA	L	$4.50	**	1y7m	10/1/2001	3/1/2003
WA	Seattle	Seattle-Tacoma International	SEA	L	$4.50	$1,797,794,8 60	25y8m	3/1/2003	11/1/2028
WA	Spokane	Spokane International	GEG	S	$3.00	$52,372,419	9y10m	6/1/1993	4/1/2003
WA	Spokane	Spokane International	GEG	S	$4.50	**	2y1m	4/1/2003	5/1/2005
WA	Spokane	Spokane International	GEG	S	$4.50	$68,683,633	10y6m	5/1/2005	11/1/2015
WA	Walla Walla	Walla Walla Regional	ALW	N	$3.00	$3,745,775	7y11m	11/1/1993	10/1/2001
WA	Walla Walla	Walla Walla Regional	ALW	N	$4.50	**	18y	10/1/2001	10/1/2019
WA	Wenatchee	Pangborn Memorial	EAT	N	$3.00	$622,488	2y2m	8/1/1993	10/1/1995
WA	Wenatchee	Pangborn Memorial	EAT	N	$3.00	$660,570	4y1m	6/1/1998	7/1/2002
WA	Wenatchee	Pangborn Memorial	EAT	N	$4.50	**	7m	7/1/2002	2/1/2003
WA	Wenatchee	Pangborn Memorial	EAT	N	$4.50	$1,194,578	6y11m	5/1/2003	4/1/2010
WA	Wenatchee	Pangborn Memorial	EAT	N	$4.50	$938,454	6y3m	5/1/2010	8/1/2016
WA	Yakima	Yakima Air Terminal/McAllister Field	YKM	N	$3.00	$1,565,797	6y	2/1/1993	2/1/1999
WA	Yakima	Yakima Air Terminal/McAllister Field	YKM	N	$3.00	*	1y1m	5/1/1999	6/1/2000
WA	Yakima	Yakima Air Terminal/McAllister Field	YKM	N	$3.00	$1,650,240	10y10m	6/1/2000	4/1/2011
WA	Yakima	Yakima Air Terminal/McAllister Field	YKM	N	$4.50	$1,220,979	4y9m	4/1/2011	1/1/2016
WV	Charleston	Yeager	CRW	N	$3.00	$6,921,430	8y3m	8/1/1993	11/1/2001
WV	Charleston	Yeager	CRW	N	$4.50	**	1y5m	11/1/2001	4/1/2003
WV	Charleston	Yeager	CRW	N	$4.50	$18,720,086	15y2m	4/1/2003	6/1/2018
WV	Clarksburg	North Central West Virginia	CKB	N	$3.00	$79,103	2y1m	3/1/1994	10/1/1995
WV	Clarksburg	North Central West Virginia	CKB	N	$4.50	$101,489	1y10m	4/1/2001	8/1/2002
WV	Clarksburg	North Central West Virginia	CKB	N	$4.50	$2,920,641	50y	5/1/2004	5/1/2054
WV	Huntington	Tri-State/Milton J. Ferguson Field	HTS	N	$3.00	$1,853,497	13y	12/1/1995	12/1/2008
WV	Huntington	Tri-State/Milton J. Ferguson Field	HTS	N	$3.00	$1,195,890	3y1m	5/1/2009	6/1/2012
WV	Huntington	Tri-State/Milton J. Ferguson Field	HTS	N	$4.50	$2,369,532	5y4m	7/1/2012	11/1/2017
WV	Lewisburg	Greenbrier Valley	LWB	N	$4.50	$1,105,408	13y9m	4/1/2011	1/1/2025

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WV	Morgantown	Morgantown Municipal-Walter L. Bill Hart Field	MGW	N	$2.00	$54,012	1y1m	12/1/1992	1/1/1994
WV	Morgantown	Morgantown Municipal-Walter L. Bill Hart Field	MGW	N	$2.00	$211,390	7y1m	12/1/1994	1/1/2002
WV	Morgantown	Morgantown Municipal-Walter L. Bill Hart Field	MGW	N	$4.50	**	2y5m	1/1/2002	6/1/2004
WV	Morgantown	Morgantown Municipal-Walter L. Bill Hart Field	MGW	N	$4.50	$227,618	3y9m	6/1/2004	3/1/2008
WV	Morgantown	Morgantown Municipal-Walter L. Bill Hart Field	MGW	N	$4.50	$663,774	16y7m	6/1/2009	1/1/2026
WV	Parkersburg	Mid-Ohio Valley Regional	PKB	CS	$3.00	$305,491	3y3m	5/1/1999	8/1/2002
WV	Parkersburg	Mid-Ohio Valley Regional	PKB	CS	$4.50	$286,543	13y5m	8/1/2003	1/1/2016
WI	Appleton	Outagamie County Regional	ATW	N	$3.00	$10,466,940	11y11m	7/1/1994	6/1/2006
WI	Appleton	Outagamie County Regional	ATW	N	$4.50	**	1y10m	6/1/2006	4/1/2008
WI	Appleton	Outagamie County Regional	ATW	N	$3.00	$318,410	5m	4/1/2008	9/1/2008
WI	Appleton	Outagamie County Regional	ATW	N	$4.50	$9,632,210	8y8m	9/1/2008	5/1/2017
WI	Eau Claire	Chippewa Valley Regional	EAU	N	$3.00	$708,253	5y10m	2/1/1996	12/1/2001
WI	Eau Claire	Chippewa Valley Regional	EAU	N	$4.50	**	4y1m	12/1/2001	1/1/2006
WI	Eau Claire	Chippewa Valley Regional	EAU	N	$4.50	$662,411	7y9m	8/1/2006	5/1/2014
WI	Green Bay	Austin Straubel International	GRB	N	$3.00	$7,530,958	9y	3/1/1993	3/1/2002
WI	Green Bay	Austin Straubel International	GRB	N	$4.50	$38,768,829	18y7m	3/1/2002	10/1/2020
WI	La Crosse	La Crosse Municipal	LSE	N	$3.00	$1,964,469	6y9m	7/1/1994	4/1/2001
WI	La Crosse	La Crosse Municipal	LSE	N	$4.50	**	6m	4/1/2001	10/1/2001
WI	La Crosse	La Crosse Municipal	LSE	N	$4.50	$9,560,233	21y3m	10/1/2001	1/1/2023
WI	Madison	Dane County Regional - Truax Field	MSN	S	$3.00	$12,308,713	8y2m	9/1/1993	11/1/2001
WI	Madison	Dane County Regional - Truax Field	MSN	S	$4.50	$79,902,856	21y11m	11/1/2001	10/1/2023
WI	Milwaukee	General Mitchell International	MKE	M	$3.00	$185,730,598	17y6m	5/1/1995	11/1/2012
WI	Milwaukee	General Mitchell International	MKE	M	$4.50	**	5m	11/1/2012	4/1/2013
WI	Milwaukee	General Mitchell International	MKE	M	$4.50	$34,755,919	2y	4/1/2013	4/1/2015
WI	Milwaukee	General Mitchell International	MKE	M	$3.00	$174,001,850	11y7m	4/1/2015	11/1/2026
WI	Mosinee	Central Wisconsin	CWA	N	$3.00	$7,725,600	13y10m	11/1/1993	9/1/2007
WI	Mosinee	Central Wisconsin	CWA	N	$4.50	**	3y2m	9/1/2007	12/1/2010
WI	Mosinee	Central Wisconsin	CWA	N	$4.50	$3,529,500	5y9m	12/1/2010	9/1/2016
WI	Rhinelander	Rhinelander-Oneida County	RHI	N	$3.00	$204,771	2y2m	1/1/1994	4/1/1996
WI	Rhinelander	Rhinelander-Oneida County	RHI	N	$3.00	$457,484	5y3m	6/1/1996	9/1/2001
WI	Rhinelander	Rhinelander-Oneida County	RHI	N	$4.50	**	2y4m	9/1/2001	1/1/2004
WI	Rhinelander	Rhinelander-Oneida County	RHI	N	$4.50	$1,480,260	10y11m	1/1/2004	12/1/2014
WY	Casper	Casper/ Natrona County International	CPR	N	$3.00	$1,629,582	7y7m	9/1/1993	4/1/2001
WY	Casper	Casper/ Natrona County International	CPR	N	$4.50	**	2y2m	4/1/2001	6/1/2003
WY	Casper	Casper/ Natrona County International	CPR	N	$4.50	$2,890,545	8y9m	6/1/2003	3/1/2012
WY	Casper	Casper/ Natrona County International	CPR	N	$3.00	$1,751,415	7y2m	3/1/2012	5/1/2019
WY	Cheyenne	Cheyenne Regional/Jerry Olson Field	CYS	N	$3.00	$957,013	7y5m	11/1/1993	4/1/2001
WY	Cheyenne	Cheyenne Regional/Jerry Olson Field	CYS	N	$4.50	**	5y8m	4/1/2001	1/1/2007
WY	Cheyenne	Cheyenne Regional/Jerry Olson Field	CYS	N	$4.50	$407,728	5y8m	1/1/2007	9/1/2012
WY	Cody	Yellowstone Regional	COD	N	$3.00	$413,037	3y11m	8/1/1997	7/1/2001
WY	Cody	Yellowstone Regional	COD	N	$4.50	**	2y	7/1/2001	7/1/2003
WY	Cody	Yellowstone Regional	COD	N	$4.50	$76,373	1y9m	7/1/2003	4/1/2005

State	Associated City	Airport Name	LOC ID	Hub size	Level	Total Approved	Duration	Start Date	Est. Expir. Date
WY	Cody	Yellowstone Regional	COD	N	$4.50	$858,632	10y3m	9/1/2005	12/1/2015
WY	Gillette	Gillette-Campbell County	GCC	N	$3.00	$369,132	8y3m	9/1/1993	12/1/2001
WY	Gillette	Gillette-Campbell County	GCC	N	$4.50	$162,537	2y6m	12/1/2001	6/1/2004
WY	Gillette	Gillette-Campbell County	GCC	N	$4.50	*	6m	1/1/2005	7/1/2005
WY	Gillette	Gillette-Campbell County	GCC	N	$4.50	$1,283,823	11y8m	7/1/2005	3/1/2017
WY	Jackson	Jackson Hole	JAC	N	$3.00	$3,799,325	7y8m	8/1/1993	4/1/2001
WY	Jackson	Jackson Hole	JAC	N	$4.50	**	1y4m	4/1/2001	8/1/2002
WY	Jackson	Jackson Hole	JAC	N	$4.50	$35,838,684	39y1m	8/1/2002	9/1/2041
WY	Laramie	Laramie Regional	LAR	CS	$3.00	$126,457	4y2m	8/1/1996	10/1/2000
WY	Laramie	Laramie Regional	LAR	CS	$3.00	*	9m	12/1/2000	8/1/2001
WY	Laramie	Laramie Regional	LAR	CS	$4.50	$252,009	6y4m	12/1/2006	4/1/2013
WY	Laramie	Laramie Regional	LAR	CS	$4.50	$185,425	4y	6/1/2013	6/1/2017
WY	Riverton	Riverton Regional	RIW	N	$3.00	$1,055,040	5y11m	5/1/1995	4/1/2001
WY	Riverton	Riverton Regional	RIW	N	$4.50	**	22y6m	4/1/2001	10/1/2023
WY	Rock Springs	Rock Springs-Sweetwater County	RKS	N	$3.00	$382,300	11y	4/1/1995	4/1/2006
WY	Rock Springs	Rock Springs-Sweetwater County	RKS	N	$4.50	$938,840	11y8m	4/1/2006	12/1/2017
WY	Sheridan	Sheridan County	SHR	N	$3.00	$218,988	5y10m	3/1/1996	12/1/2001
WY	Sheridan	Sheridan County	SHR	N	$4.50	$433,610	6y9m	12/1/2001	9/1/2008
WY	Sheridan	Sheridan County	SHR	N	$4.50	$736,114	6y8m	10/1/2008	6/1/2015
WY	Worland	Worland Municipal	WRL	CS	$4.50	$72,022	5y2m	1/1/2003	3/1/2008
WY	Worland	Worland Municipal	WRL	CS	$4.50	$193,038	13y11m	8/1/2008	7/1/2022
	NOTES:								
	Collections at locations noted by * in the amount column were prematurely stopped due to FAA processing errors.								
	** Amount shown on line imediately above the double asterisk is the total approved collections at this location at both the $3 and $4.50 levels.								

Letter of Intent (LOI) Commitments by Fiscal Year

State	City	Airport Name			Discretionary 2014	Entitlement 2014
AK	Anchorage	Ted Stevens Anchorage International			4,000,000.00	1,911,930.00
CA	Los Angeles	Los Angeles International			10,000,000.00	3,195,863.00
CA	Sacramento	Sacramento International			6,000,000.00	2,086,975.00
CO	Denver	Denver International			0	0
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International			20,000,000.00	4,000,000.00
IL	Chicago	Chicago O'Hare International			65,000,000.00	0
IN	Gary	Gary/Chicago International			5,000,000.00	1,000,000.00
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field			0	0
NC	Charlotte	Charlotte/Douglas International			6,000,000.00	0
NC	Greensboro	Piedmont Triad International			0	0
NY	New York	John F Kennedy International			1,000,000.00	0
OH	Cleveland	Cleveland-Hopkins International			0	3,378,000.00
OH	Columbus	Port Columbus International			10,000,000.00	2,064,000.00
PA	Philadelphia	Philadelphia International			23,000,000.00	6,800,000.00
TX	Dallas	Dallas Love Field			8,000,000.00	900,000.00
UT	St. George	St George Municipal			10,000,000.00	1,000,000.00
VA	Washington	Washington Dulles International			13,000,000.00	0
WA	Seattle	Seattle-Tacoma International			0	5,700,000.00
			Total		181,000,000.00	32,036,768.00

Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)

State	City	Airport Name	Discretionary 2015	Entitlement 2015	Discretionary 2016	Entitlement 2016
AK	Anchorage	Ted Stevens Anchorage International	4,000,000.00	0	1,000,000.00	0
CA	Los Angeles	Los Angeles International	10,000,000.00	0	11,000,000.00	0
CA	Sacramento	Sacramento International	6,000,000.00	1,772,314.00	0	0
CO	Denver	Denver International	0	0	0	0
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	20,000,000.00	4,000,000.00	20,000,000.00	0
IL	Chicago	Chicago O'Hare International	50,000,000.00	0	45,000,000.00	0
IN	Gary	Gary/Chicago International	2,844,597.00	1,000,000.00	0	0
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	0	0	0	0
NC	Charlotte	Charlotte/Douglas International	0	0	0	0
NC	Greensboro	Piedmont Triad International	0	0	0	0
NY	New York	John F Kennedy International	7,000,000.00	0	7,000,000.00	0
OH	Cleveland	Cleveland-Hopkins International	0	3,455,000.00	0	3,535,000.00
OH	Columbus	Port Columbus International	10,000,000.00	2,104,000.00	10,000,000.00	2,144,000.00
PA	Philadelphia	Philadelphia International	16,000,000.00	6,900,000.00	27,000,000.00	7,000,000.00
TX	Dallas	Dallas Love Field	7,000,000.00	900,000.00	7,000,000.00	900,000.00
UT	St. George	St George Municipal	9,000,000.00	1,000,000.00	0	0
VA	Washington	Washington Dulles International	14,000,000.00	0	9,000,000.00	0
WA	Seattle	Seattle-Tacoma International	0	6,231,753.00	0	0
		Total	155,844,597.00	27,363,067.00	137,000,000.00	13,579,000.00

Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)

State	City	Airport Name	Discretionary 2017	Entitlement 2017	Discretionary 2018	Entitlement 2018
AK	Anchorage	Ted Stevens Anchorage International	0	0	0	0
CA	Los Angeles	Los Angeles International	11,000,000.00	0	11,000,000.00	0
CA	Sacramento	Sacramento International	0	0	0	0
CO	Denver	Denver International	0	0	0	0
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	20,000,000.00	0	20,000,000.00	0
IL	Chicago	Chicago O'Hare International	45,000,000.00	0	55,000,000.00	0
IN	Gary	Gary/Chicago International	0	0	0	0
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	0	0	0	0
NC	Charlotte	Charlotte/Douglas International	0	0	0	0
NC	Greensboro	Piedmont Triad International	0	0	0	0
NY	New York	John F Kennedy International	0	0	0	0
OH	Cleveland	Cleveland-Hopkins International	0	658,991.00	0	0
OH	Columbus	Port Columbus International	1,928,463.00	1,703,869.00	0	0
PA	Philadelphia	Philadelphia International	22,000,000.00	0	26,000,000.00	0
TX	Dallas	Dallas Love Field	7,000,000.00	900,000.00	0	0
UT	St. George	St George Municipal	0	0	0	0
VA	Washington	Washington Dulles International	0	0	0	0
WA	Seattle	Seattle-Tacoma International	0	0	0	0
		Total	106,928,463.00	3,262,860.00	112,000,000.00	0.00

Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)

State	City	Airport Name	Discretionary 2019	Entitlement 2019	Discretionary 2020	Entitlement 2020
AK	Anchorage	Ted Stevens Anchorage International	0	0	0	0
CA	Los Angeles	Los Angeles International	11,000,000.00	0	0	0
CA	Sacramento	Sacramento International	0	0	0	0
CO	Denver	Denver International	0	0	0	0
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	20,000,000.00	0	20,000,000.00	0
IL	Chicago	Chicago O'Hare International	65,000,000.00	0	65,000,000.00	0
IN	Gary	Gary/Chicago International	0	0	0	0
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	0	0	0	0
NC	Charlotte	Charlotte/Douglas International	0	0	0	0
NC	Greensboro	Piedmont Triad International	0	0	0	0
NY	New York	John F Kennedy International	0	0	0	0
OH	Cleveland	Cleveland-Hopkins International	0	0	0	0
OH	Columbus	Port Columbus International	0	0	0	0
PA	Philadelphia	Philadelphia International	30,000,000.00	0	32,000,000.00	0
TX	Dallas	Dallas Love Field	0	0	0	0
UT	St. George	St George Municipal	0	0	0	0
VA	Washington	Washington Dulles International	0	0	0	0
WA	Seattle	Seattle-Tacoma International	0	0	0	0

Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)

State	City	Airport Name	Discretionary 2021	Entitlement 2021	Discretionary Beyond	Entitlement Beyond
AK	Anchorage	Ted Stevens Anchorage International	0	0	0	0
CA	Los Angeles	Los Angeles International	0	0	0	0
CA	Sacramento	Sacramento International	0	0	0	0
CO	Denver	Denver International	0	0	0	0
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	20,000,000.00	0	10,000,000.00	0
IL	Chicago	Chicago O'Hare International	25,000,000.00	0	105,000,000.00	0
IN	Gary	Gary/Chicago International	0	0	0	0
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	0	0	0	0
NC	Charlotte	Charlotte/Douglas International	0	0	0	0
NC	Greensboro	Piedmont Triad International	0	0	0	0
NY	New York	John F Kennedy International	0	0	0	0
OH	Cleveland	Cleveland-Hopkins International	0	0	0	0
OH	Columbus	Port Columbus International	0	0	0	0
PA	Philadelphia	Philadelphia International	40,000,000.00	0	208,000,000.00	0
TX	Dallas	Dallas Love Field	0	0	0	0
UT	St. George	St George Municipal	0	0	0	0
VA	Washington	Washington Dulles International	0	0	0	0
WA	Seattle	Seattle-Tacoma International	0	0	0	0
		Total	85,000,000.00	0.00	323,000,000.00	0.00

Letter of Intent (LOI) Commitments by Fiscal Year (Cont'd)

State	City	Airport Name	Discretionary Total	Entitlement Total
AK	Anchorage	Ted Stevens Anchorage International	13,000,000.00	6,162,767.00
CA	Los Angeles	Los Angeles International	64,000,000.00	3,195,863.00
CA	Sacramento	Sacramento International	18,000,000.00	5,941,061.00
CO	Denver	Denver International	2,000,000.00	0
FL	Fort Lauderdale	Fort Lauderdale/Hollywood International	190,000,000.00	12,000,000.00
IL	Chicago	Chicago O'Hare International	605,000,000.00	0
IN	Gary	Gary/Chicago International	12,844,597.00	3,000,000.00
MD	Hagerstown	Hagerstown Regional-Richard A Henson Field	850,000.00	150,000.00
NC	Charlotte	Charlotte/Douglas International	18,000,000.00	0
NC	Greensboro	Piedmont Triad International	0	6,115,513.00
NY	New York	John F Kennedy International	15,000,000.00	0
OH	Cleveland	Cleveland-Hopkins International	0	14,330,991.00
OH	Columbus	Port Columbus International	41,928,463.00	10,041,869.00
PA	Philadelphia	Philadelphia International	439,000,000.00	27,500,000.00
TX	Dallas	Dallas Love Field	36,000,000.00	4,500,000.00
UT	St. George	St George Municipal	29,000,000.00	3,000,000.00
VA	Washington	Washington Dulles International	49,000,000.00	0
WA	Seattle	Seattle-Tacoma International	0	17,531,753.00
		Total	1,533,623,060.00	113,469,817.00

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3E. OTHER INFORMATION

FACILITIES AND EQUIPMENT, RECOVERY ACT

Program and Financing
(in millions of dollars)

Identification code: 69-1304-0		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Change in obligated balances:			
3000	Unpaid Obligations, brought forward, Oct 1:	3	1	1
3020	Total outlays (gross)	-1	.....	.....
3041	Recoveries of prior year unpaid obligations, expired	-1	.....	.....
3050	Unpaid Obligations, end of year	1	1	1
3100	Obligated balance, start of year	3	1	1
3200	Obligated balance, end of year	1	1	1
	Outlays (gross), detail:			
4011	Outlays from discretionary balances	1	.....	.....
	Net budget authority and outlays			
4190	Outlays (total)	1	.....	.....

The American Recovery and Reinvestment Act of 2009 provided $200 million to Federal Aviation Administration's (FAA) Facilities & Equipment account, which finances major capital investments related to modernizing and improving air traffic control and airway facilities, equipment, and systems. Funds were appropriated from the General Fund of the U.S. Treasury and available for obligation through 2010. The funding is being used to upgrade, modernize, and improve FAA power systems, air route traffic control centers, air traffic control towers, terminal radar approach control facilities, and navigation and landing equipment.

GRANTS-IN-AID FOR AIRPORTS, RECOVERY ACT

Program and Financing
(in millions of dollars)

Identification code: 69-1306-0		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Change in obligated balances:			
3000	Unpaid obligations, brought forward, Oct 1 (gross)	3	1	1
3020	Outlays (gross)	-1	.....	......
3041	Recoveries of prior year unpaid obligations, expired......	-1	.....	......
3050	Unpaid Obligations, end of year...	1	1	1
3100	Obligated balance, start of year...	3	1	1
3200	Obligated balance, end of year	1	1	1
	Outlays (gross):			
4011	Outlays from discretionary balances......................................	1	.....	.....
4030	Federal Sources	-1	.....	.....
4052	Offsetting collections credited to expired accounts.........	1	.....	......

The American Recovery and Reinvestment Act of 2009 provided $1.1 billion for Grants-in-Aid for Airports. Funds were appropriated from the General Fund of the U.S. Treasury and were available for obligation through 2010. Discretionary grants were allocated to qualified airports based on a project priority system that addresses airport safety and security, runway safety, increased capacity, and mitigation of environmental impacts.

AVIATION INSURANCE REVOLVING FUND

Program and Financing
(in millions of dollars)

Identification code: 69-4120-0-3-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Obligations by program activity:			
0801	Program administration	4	7	......
0802	Insurance Claims	9	......	......
0803	Insurance Claims from Probabilistic Loss Estimates	......	23	46
0900	Total new obligations	13	30	46
	Budget resources:			
	Unobligated balance:			
1000	Unobligated balance brought forward, Oct. 1	1,834	2,012	2,160
	Budget authority:			
	Spending authority form offsetting collections, mandatory:			
1800	Collected	191	178	30
1850	Spending auth from offsetting collections, mand (total)	191	178	30
1930	Total budgetary resources available	2,025	2,190	2,190
	Memorandum (non-add) entries:			
1941	Unexpired unobligated balance, end of year	2,012	2,160	2,144
	Change in obligated balance:			
	Unpaid obligations:			
3000	Unpaid obligations, brought forward, Oct. 1 (gross)	2	1	8
3010	Obligations incurred, unexpired accounts	13	30	46
3020	Outlays (gross)	-14	-23	-46
3050	Unpaid obligations, end of year	1	8	8
	Memorandum (non-add) entries:			
3100	Obligated balance, start of year	2	1	8
3200	Obligated balance, end of year	1	8	8
	Budget authority and outlays net:			
	Mandatory:			
4090	Budget authority, gross	191	178	30
	Outlay, gross:			
4100	Outlays from new mandatory authority	13	23	......
4101	Outlays from mandatory balances	1	......	46
4110	Outlays, gross (total)	14	23	46
	Offsets against gross budget authority and outlays:			
	Offsetting collections (collected) from:			
4121	Interest on Federal securities	-26	-12	-30
4123	Non-Federal sources	-165	-166	......
4130	Offsets against gross budget authority and outlays (total)	-191	-178	-30
4170	Outlays, net (mandatory)	-177	-155	16
4190	Outlays, net (total)	-177	-155	16
	Memorandum (non-add) entries:			
5000	Total investments, SOY: Federal securities: Par value	1,818	1,937	1,994
5001	Total investments, EOY: Federal securities: Par value	1,937	1,994	2,147

Summary of Budget Authority and Outlays
(in millions of dollars)

Identification code: 69-4120-0-3-402	FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
Enacted/requested:			
Outlays	-177	-155	16
Legislative proposal, subject to PAYGO:			
Outlays	......	......	-19
Total:			
Outlays	-177	-155	-3

The fund provides direct support for the aviation insurance program (chapter 443 of title 49, U.S. Code). Income to the fund is derived from premium collections for premium insurance coverage issued, income from authorized investments, and filing fees for non-premium coverage issued. The non-premium program provides aviation insurance coverage for aircraft used in connection with certain Government contract operations by a Department or Agency that agrees to indemnify the Secretary of Transportation for any losses covered by the insurance. The premium program provides war risk insurance coverage at a premium based on activity. The Homeland Security Act of 2002 (P.L. 107–296) added a provision to require the Secretary to provide additional premium war risk insurance coverage (hull loss or damage and passenger and crew liability) to air carriers insured for third party war risk liability on November 25, 2002. The premium war risk insurance policy covers: (i) hull losses at agreed value; (ii) death, injury or property loss to passengers or crew, the limit being the same as the air carrier's commercial coverage as of November 25, 2002; and (iii) third party liability. Current premiums are capped, and FAA does not collect enough premiums to cover its potential risk. The Budget includes outlays reflecting probabilistic estimates of losses for the aviation war risk insurance program. The authority to provide aviation war risk insurance expires on September 30, 2014. The Administration plans to submit a legislative proposal to reform the Aviation War Risk Insurance Program. The Administration's reform proposal will request permanent authority that will not require a future reauthorization. The legislative proposal returns U.S. air carriers to the commercial aviation insurance market for most of their terrorism and war risk insurance coverage. However, the U.S. Government will continue to provide coverage for losses associated with terrorist attacks involving the use of nuclear, bio- and/or radioactive (NBCR) weapons, as this coverage is not commercially available. Under the proposal, the Administration will charge a premium commensurate with the financial risk being assumed for the NBCR coverage. For this reason, this proposal is largely budget neutral. The proposal will also allow the Administration to react immediately to future market failures, if any, by providing the Secretary of Transportation with authority to provide full aviation war risk insurance for ninety (90) days in the event of a widespread cancellation of coverage by the private insurance market, similar to the one experienced immediately following the attacks of September 11, 2001. In addition, the proposal will extend the "Non-Premium War Risk Insurance Program" that ensures air carriers can obtain the necessary insurance to operate under Department of Defense contracts in support of national defense.

Object Classification
(in millions of dollars)

Identification code: 69-4120-0-3-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Reimbursable obligations:			
2111	Personnel Compensation: Full time permanent	1	1	......
2251	Advisory and Assistance Services	......	1	......
2420	Projected Insurance Claims and indemnities	10	23	46
2440	Refunds	2	5	......
9999	Total new obligations	13	30	46

Employment Summary

Identification code: 69-4120-0-3-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
2001	Reimbursable Civilian full-time equivalent employment....	5	5	......

AVIATION INSURANCE REVOLVING FUND
(Legislative proposal, subject to PAYGO)

Program and Financing
(in millions of dollars)

Identification code: 69-4120-0-3-402		FY 2013 Actual	FY 2014 Enacted	FY 2015 Estimate
	Obligations by program activity:			
0801	Program administration..	......	......	7
0803	Insurance Claims from Probabilistic Loss................................	......	......	19
0900	Total new obligations..	......	......	26
	Budget Resources:			
	Budget authority:			
	Spending authority form offsetting collections, mandatory:			
1800	Collected	......	......	45
1850	Spending auth from offsetting collections, mand (total)	......	......	45
1930	Total budgetary resources available	......	......	45
	Memorandum (non-add) entries:			
1941	Unexpired unobligated balance, end of year...........................	......	......	19
	Change in obligated balance:			
	Unpaid obligations:			
3010	Obligations incurred, unexpired accounts...............................	......	......	26
3020	Outlays (gross)	......	......	-26
	Budget authority and outlays net:			
	Mandatory:			
4090	Budget authority, gross..	......	......	45
	Outlay, gross:			
4100	Outlays from new mandatory authority	......	......	26
	Offsets against gross budget authority and outlays:			
	Offsetting collections (collected) from:			
4123	Non-Federal sources..	......	......	-45
4190	Outlays, net (total)	......	......	-19

Employment Summary

Identification code: 69-4120-0-3-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
2001	Reimbursable Civilian full-time equivalent employment....	......	......	5

ADMINISTRATIVE SERVICES FRANCHISE FUND

Program and Financing
(in millions of dollars)

Identification code: 69-4562-0-4-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Obligations by program activity:			
0801	Accounting Services	61	59	60
0804	Information Services	97	111	113
0805	Duplicating Services	3	3	3
0806	Multi Media	2	2	2
0807	CMEL/Training	5	8	8
0808	International Training	4	7	7
0810	Logistics	206	211	214
0811	Aircraft Maintenance	61	64	65
0812	Acquisition	9	9	9
0900	Total new obligations	448	474	481
	Budgetary Resources:			
1000	Unobligated balance brought forward, Oct 1	109	121	147
1021	Recoveries of prior year unpaid obligations	35	....	....
1050	Unobligated balance (total)	144	121	147
	Budget authority:			
	Spending authority from offsetting collections, discretionary:			
1700	Collected	420	500	430
1701	Change in uncollected payments, federal sources	5	....	....
1750	Spending auth from offsetting collections, disc (total)	425	500	430
1930	Total budgetary resources available	569	621	577
	Memorandum (non-add) entries:			
1941	Unexpired unobligated balance, end of year	121	147	96
	Change in obligated balances:			
	Unpaid obligations:			
3000	Unpaid obligations, brought forward, Oct 1	169	158	102
3010	Obligations incurred, unexpired accounts	448	474	481
3020	Outlays (gross)	-424	-530	-448
3040	Recoveries of prior year unpaid obligations unexpired	-35	....	....
3050	Unpaid obligations, end of year	158	102	135
	Uncollected payments:			
3060	Uncollected pymts, Fed sources, brought forward, Oct 1	-7	-12	-12
3070	Change in Uncollected pymts, fed sources, unexpired	-5	....	....
3090	Uncollected pymts, fed sources, end of year	-12	-12	-12
	Memorandum (non-add) entries:			
3100	Obligated balance, start of year	162	146	90
3200	Obligated balance, end of year	146	90	123
	Budget authority and Outlays, net:			
	Discretionary:			
4000	Budget authority, gross	425	500	430
	Outlays gross:			
4010	Outlays from new discretionary authority	314	340	292
4011	Outlays from discretionary balances	110	190	156
4020	Outlays, gross (total)	424	530	448
	Offsets against gross budget authority and outlays:			
	Offsetting collections (collected) from:			
4030	Federal sources	-420	-500	-430
	Additional offsets against gross budget authority only:			
4050	Change in uncollected pmts, Fed sources unexpired	-5	....	....
4080	Outlays, net (discretionary)	4	30	18
4190	Outlays, net (total)	4	30	18

In 1997, the Federal Aviation Administration (FAA) established a franchise fund to finance operations where the costs for goods and services provided are charged to the users on a fee-for-service basis. The fund improves organizational efficiency and provides better support to FAA's internal and external customers. The activities included in this franchise fund are: training, accounting, travel, duplicating services, multi-media services, information technology, materiel management (logistics), and aircraft maintenance

Object Classification

(in millions of dollars)

Identification code: 69-4562-0-4-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Reimbursable obligations:			
2111	Personnel compensation: Full-time permanent	129	138	140
2121	Civilian personnel benefits	42	41	41
2210	Travel and transportation of persons	5	7	7
2220	Transportation of things	8	9	9
2233	Communications, utilities, and miscellaneous charges	13	13	14
2240	Printing and reproduction	1	1	1
2252	Other services	179	187	190
2260	Supplies and materials	64	65	66
2310	Equipment	7	12	12
2420	Insurance claims and indemnities	....	1	1
9999	Total new obligations	448	474	481

Employment Summary

Identification code: 69-4562-0-4-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
2001	Reimbursable civilian full-time equivalent employment	1,752	1,779	2,072

AVIATION USER FEES

Special and Trust Fund Receipts
(in millions of dollars)

Identification code: 69-5422-0-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
0100	Balance, start of year...	65	35	16
	Receipts:			
0200	Aviation User Fee, Overflight Fees..	68	82	92
0220	Property Disposal or Lease Proceeds, Aviation User Fee.......	1	....	......
0299	Total receipts and collections...	69	82	92
0400	Total: Balances and collections	134	117	108
	Appropriations:			
0500	Essential Air Service and Rural Airport Improvement Fund..	5	9	......
0501	Aviation User Fees...	-104	-130	-106
0599	Total appropriations..	-99	-121	-106
0610	Aviation User Fees..	......	20	......
0799	Balance, end of year..	35	16	2

Program and Financing
(in millions of dollars)

Identification code: 69-5422-0-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Budgetary Resources:			
0001	Other Collections	......	1	......
0100	Direct program activities, subtotal	.....	1	......
0900	Total new obligations (object class 25.2)	.....	1	......
	Unobligated balance:			
1000	Unobligated balance brought forward, Oct 1............................	16	21	....
1011	Unobligated balance transferred from other accounts [69-5423]..	4	....	....
1029	Other balances withdrawn	....	-20	....
1050	Unobligated balance (total)	20	1	....
	Budget authority:			
1201	Appropriations (special or trust fund)......................................	104	130	106
1220	Appropriations Transferred to other accounts [69-5423]	-103	-130	-106
1260	Appropriations, mandatory (total)...	1	......	......
1900	Budget authority (total)..	1	.....	......
1930	Total budgetary resources available	21	1	......
	Memorandum (non-add) entries:			
1941	Unexpired unobligated balance, end of year..........................	21	......	......
1950	Other balances withdrawn and returned to unappropriated receipts..	......	20	......
	Budget authority and outlays net:			
3010	Obligations incurred unexpired accounts.	......	1	......
3020	Outlays (gross)	......	-1	......
4090	Budget authority, gross..	1	......	......
	Outlays, gross:			
4101	Outlays from mandatory balances..	.....	1	......
4180	Budget authority, net (total)...	1	....	......
4190	Outlays, net (total)..	......	1	......

The Federal Aviation Reauthorization Act of 1996 (P.L. 104–264) authorized the collection of user fees for air traffic control and related services provided by the Federal Aviation Administration to aircraft that neither take off nor land in the United States, commonly known as overflight fees. The Budget estimates that $92 million in overflight fees will be collected in 2015.

AIRPORT AND AIRWAY TRUST FUND

Program and Financing
(in millions of dollars)

Identification code: 69-8103-0-7-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Memorandum (non-add) entries:			
50.00	Total investments, start of year: Federal securities: Par value	10,425	11,808	12,069
50.01	Total investments, end of year: Federal securities: Par value	11,808	12,069	10,810

Section 9502 of Title 26, U.S. Code, provides for amounts equivalent to the funds received in the U.S. Treasury for the passenger ticket tax and certain other taxes paid by airport and airway users to be transferred to the Airport and Airway Trust Fund. In turn, appropriations are authorized from this fund to meet obligations for airport improvement grants, Federal Aviation Administration facilities and equipment, research, operations, payment to air carriers, and for the Bureau of Transportation Statistics Office of Airline Information.

To more equitably distribute the cost of air traffic services across the aviation user community, the Administration proposes to establish a new surcharge for air traffic services of $100 per flight. Military aircraft, public aircraft, piston aircraft, air ambulances, aircraft operating outside of controlled airspace, and Canada-to-Canada flights would be exempt. The revenues generated by the surcharge would be deposited into the Airport and Airway Trust Fund. The surcharge would be effective for flights beginning after September 30, 2014.

The status of the fund is as follows:

Status of Funds (in millions of dollars)

Identification code: 69-8103-0-7-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Unexpended balance, start of year:			
01.00	Balance, start of year...	11,623	13,203	13,521
	Adjustments:			
01.91	Rounding adjustment	-1		
01.99	Total balance, start of year	11,622	13,203	13,521
	Cash Income during the year:			
	Current law:			
	Receipts			
12.00	Excise Taxes, Airport and Airway Trust Fund [021-00-810310-0]	12,854	13,347	13,814
	Offsetting receipts (intragovernmental):			
12.40	Interest, Airport and Airway Trust Fund [021-00-810320-0] .	235	248	254
	Offsetting collections:			
12.80	Payments to Air Carriers...	7	......	....
12.81	Grants-in-aid for Airports (Airport and Airway Trust Fund) [021-12-8106-0]	1	......	....
12.82	Grants-in-aid for Airports (Airport and Airway Trust Fund) [021-12-8106-0]	......	1	1
12.84	Facilities and Equipment (Airport and Airway and Airport Trust Fund [021-12-8107-0]	[illegible]	[illegible]	[illegible]
12.84	Facilities and Equipment (Airport and Airway and Airport Trust Fund [021-12-8107-0]	[illegible]	[illegible]	[illegible]
12.85	Research, engineering and development (Airport and Airway Trust Fund) [021-12-8108]..	6	3	3
12.99	Income under present law	13,199	13,641	14,114
	Proposed legislation:			
	Receipts:			
22.01	Excise Taxes, Airport and Airway Trust Fund........................	......	....	967
22.99	Income under proposed legislation	......	....	967
32.99	Total cash income	13,199	13,641	15,081
	Cash outgo during year:			
	Current law:			
45.00	Payments to Air Carriers [021-12-8304-0]..........................	-161	-127	-153
45.00	Trust Fund Share of FAA Activities (Airport and Airway Trust Fund) [021-12-8104-0]...	-4,796	-6,495	-9,041
45.00	Grants-in-aid for Airports (Airport and Airway Trust Fund) [021-12-8106-0]	-3,654	-3,768	-3,610
45.00	Facilities and Equipment (Airport and Airway Trust Fund) [021-12-8107-0]	-2,849	-2,758	-2,734
45.00	Research, Engineering and Development (Airport and Airway Trust Fund) [021-12-8108-0]..	-158	-175	-174
45.99	Outgo under current law (-)	-11,618	-13,323	-15,712
65.99	Total Cash outgo (-)	-11,618	-13,323	-15,712
	Unexpended balance, end of year:			
87.00	Uninvested balance (net), end of year................................	1,395	1,452	2,080
87.01	Airport and Airway Trust Fund...	11,808	12,069	10,810
87.99	Total balance, end of year..	13,203	13,521	12,890

TRUST FUND SHARE OF FAA Activities
(AIRPORT AND AIRWAY TRUST FUND)

Program and Financing
(in millions of dollars)

Identification code: 69-8104-0-7-402		FY 2013 Actual	FY 2014 Estimate	FY 2015 Estimate
	Obligations by program activity:			
0001	Payment to operations	4,796	6,495	9,041
0900	Total new obligations (object class 94.0)	4,796	6,495	9,041
	Budgetary resources:			
	Appropriations, discretionary:			
1101	Appropriations (special or trust fund).	5,061	6,495	9,041
1132	Appropriations temporarily reduced	-265		
1160	Appropriations, discretionary (total)	4,796	6,495	9,041
1930	Total budgetary resources available	4,796	6,495	9,041
	Change in obligated balance:			
	Unpaid obligations:			
3010	Obligations incurred, unexpired accounts	4,796	6,495	9,041
3020	Outlays (gross):	-4796	-6,495	-9,041
	Budget authority and outlays, net:			
	Discretionary:			
4000	Budget authority, gross	4,796	6,495	9,041
	Outlays, gross:			
4010	Outlays from new discretionary authority	4,796	6,495	9,041
4180	Budget authority, net (total)	4,796	6,495	9,041
4190	Outlays, net (total)	4,796	6,495	9,041

For 2015, the Budget proposes $9,750 million for Federal Aviation Administration Operations, of which $9,041 million would be provided from the Airport and Airway Trust Fund.

FAA Administrative Provisions in FY 2015 President's Budget

Sec. 110. The Administrator of the Federal Aviation Administration may reimburse amounts made available to satisfy 49 U.S.C. 41742(a)(1) from fees credited under 49 U.S.C. 45303 and any amount remaining in such account at the close of that fiscal year may be made available to satisfy section 41742(a)(1) for the subsequent fiscal year.

- ❖ In order to satisfy 49 U.S.C. 41742(a)(1), at the beginning of each fiscal year FAA makes available to the Essential Air Services (EAS) program $50 million from the Facilities & Equipment (F&E) account. This provision allows FAA to reimburse F&E from the over-flight fees collected and is needed in order to continue the practice in FY 2015.

Sec. 111. Amounts collected under section 40113(e) of title 49, United States Code, shall be credited to the appropriation current at the time of collection, to be merged with and available for the same purposes of such appropriation.

- ❖ As authorized under 49 USC 40113(e), the FAA may provide safety-related training and operational services to foreign aviation authorities with or without reimbursement. While FAA generally enforces a prepayment policy for reimbursable goods and services provided to foreign countries or international organizations, many have laws or regulations similar to the U.S. that prohibit advance payments. In those instances, FAA often receives payments for services provided during a fiscal year after that year has ended. This provision allows FAA to use the funds for additional technical assistance work that cannot be prepaid, instead of returning the funds to a lapsed appropriation.

Sec. 112. None of the funds in this Act shall be available for paying premium pay under subsection 5546(a) of title 5, United States Code, to any Federal Aviation Administration employee unless such employee actually performed work during the time corresponding to such premium pay.

- ❖ The provision stems from past legal action taken by air traffic controllers to receive premium pay for a full shift, even if only part of the shift was eligible for premium pay. The FAA recommends retaining this provision as a GP that would apply to all FAA accounts. FAA also recommends keeping this provision for FY 2015 in order to minimize potential payroll liability.

Sec. 113. None of the funds in this Act may be obligated or expended for an employee of the Federal Aviation Administration to purchase a store gift card or gift certificate through use of a Government-issued credit card.

- ❖ This provision prohibits FAA employees from using a government-issued credit card to purchase a store gift card or gift certificate. FAA recommends retaining this provision as a GP that would apply to all FAA accounts.

Sec. 114. None of the funds in this Act may be obligated or expended for retention bonuses for an employee of the Federal Aviation Administration without the prior written approval of the Assistant Secretary for Administration of the Department of Transportation.

- ❖ The FY 2015 budget proposes to retain the provision that all FAA retention bonuses continue to be approved by the Assistant Secretary for Administration.

FEDERAL AVIATION ADMINISTRATION

OPERATIONS

ESTIMATES		APPROPRIATIONS	
2004	[1]7,590,648,000	2004	[2, 3]7,479,206,153
2005	[4]7,849,000,000	2005	[5, 6]7,706,537,000
2006	[7, 8]8,201,000,000	2006	[9, 10]8,104,140,000
2007	[11]8,366,000,000	2007	[12]8,374,374,217
2008	[13]8,725,783,000	2008	[14]8,740,000,000
2009	[15]8,998,461,700	2009	[16]9,046,167,000
2010	[17]9,335,798,000	2010	[18, 19]9,351,400,000
2011	[20]9,793,000,000	2011	[21]9,516,172,000
2012	[22]9,823,000,000	2012	[23]9,653,395,000
2013	[24]9,517,948,000	2013	[25]9,653,395,000
		2013 Sequester (P.L.112-240)	[26]-485,623,489
		2013 Rescission (P.L. 113-6)	[27]-19,307,790
2014	[28]9,707,000,000	2014	[30]$9,651,422,000
2015	[29]9,750,000,000		

[1] Administration proposes $6,000,000,000 from Airport and Airway Trust Fund.
[2] Reflects 0.59 percent across-the-board rescission per P.L. 108-199; Working Capital Fund cut by $7.3M.
[3] Includes $4,469,000,000 from Airport Airway Trust Fund.
[4] Includes $6,002,000,000 from Airport and Airway Trust Fund with $2M for Bureau of Transportation Statistics.
[5] Reflects 0.80 percent across-the-board rescission per P.L. 108-447 and Working Capital Fund cut of $6.3M.
[6] Includes $$4,878,728,416 from Airport and Airway Trust Fund.
[7] Includes $6,500,000,000 from the Airport and Airway Trust Fund.
[8] Includes $150,000,000 for Flight Service Station A-76 Competition.
[9] Reflects 1.0 percent across-the-board rescission per P.L. 109-148.
[10] Includes $5,541,000,000 from Airport and Airway Trust Fund.
[11] Includes $5,445,000,000 from Airport and Airway Trust Fund.
[12] Includes $5,627,900,000 from Airport and Airway Trust Fund
[13] Includes $6,243,027,000 from Airport and Airway Trust Fund. FAA did not request funding for this account in FY 2008. Funding was requested in the proposed Safety and Operations and Air Traffic Organization accounts. The Operations amount is shown here for comparative purposes.
[14] Includes $6,397,061,000 from Airport and Airway Trust Fund.
[15] Includes $6,280,973,000 from Airport and Airway Trust Fund. FAA did not request funding for this account in FY 2009. Funding was requested in the proposed Safety and Operations and Air Traffic Organization accounts. The Operations amount is shown here for comparative purposes.
[16] Includes $5,238,005,000 from Airport and Airway Trust Fund. Also includes $3.7 million transfer from the U.S. Department of State.
[17] Includes $6,207,798,000 from Airport and Airway Trust Fund.
[18] Includes $4,000,000,000 from Airport and Airway Trust Fund.
[19] Includes $1,300,000 transfer from the U.S. Department of State
[20] Includes $6,064,000,000 from Airport and Airway Trust Fund
[21] Reflects as rescission of $19,066,000 per P.L. 112-55. Includes $4,549,882,000 from Airport and Airway Trust Fund. Also includes $2.3 million transfer from the U.S. Department of State
[22] Includes $4,958,000,000 from Airport and Airway Trust Fund
[23] Includes $5,060,694,000 from Airport and Airway Trust Fund
[24] Includes $6,721,000,000 from Airport and Airway Trust Fund
[25] Reflects funding at the FY 2012 funding level pursuant to P.L. 113-6, Consolidated and Further Continuing Appropriations Act, 2013.
[26] FY 2013 funds sequestered pursuant to the Budget Control Act of 2011 as Amended by The American Taxpayer Relief Act of 2012 (P.L. 112-240).
[27] Reflects a 0.20 percent across-the-board rescission per P.L. 113-6.
[28] Includes $6,484,000,000 from the Airport and Airway Trust Fund
[29] Includes $9,040,850,000 from the Airport and Airway Trust Fund.
[30] Includes $6,495,208,000 from the Airport and Airway Trust Fund.

FEDERAL AVIATION ADMINISTRATION

FACILITIES AND EQUIPMENT (AIRPORT AND AIRWAY TRUST FUND)

ESTIMATES	
2004	2,916,000,000
2005	2,500,000,000
2006	2,448,000,000
2007	2,503,000,000
2008	[37]2,461,566,000
2009	[38]2,723,510,000
2010	2,925,202,000
2011	2,970,000,000
2012	[42]3,120,000,000
2013	2,850,000,000
2014	2,777,798,000
2015	2,603,700,000

APPROPRIATIONS	
2004	[31]2,892,831,000
2004 Rescission	[32]-30,000,000
2005	[33]2,519,680,000
2005 Supplemental (P.L.108-324)	[34]5,100,000
2006	[35]2,514,600,000
2006	[36]40,600,000
2007	2,517,520,000
2008	2,513,611,000
2009	2,742,095,000
2009 Supplemental (P.L.111-5)	[39]200,000,000
2010	[40]2,928,315,000
2011	[41]2,730,731,000
2012	2,730,731,074
2013	[43]2,730,731,074
2013 Supplemental (P.L. 113-2)	[44]30,000,000
2013 Sequester (P.L.11-240)	[45]-141,642,505
2013 Rescission (P.L. 113-6)	[46]5,461,462
2014	2,600,000,000

[31] Reflects 0.59 percent across-the–board rescission per P.L. 108-199.
[32] Rescission of unobligated balances.
[33] Reflects 0.80 percent across-the-board rescission per P.L. 108-447.
[34] American Recovery and Reinvestment Act Supplemental per P.L. 111-5, from the General Fund.
[35] Reflects 1.0 percent across-the-board rescission, per P. L. 109-148.
[36] Hurricane Supplemental fund per P.L. 109-148
[37] FAA did not request funding for this account in FY 2008. Funding was requested in the proposed Safety and Operations and Air Traffic Organization accounts. The Facilities and Equipment amount is shown here for comparative purposes.
[38] FAA did not request funding for this account in FY 2009. Funding was requested in the proposed Safety and Operations and Air Traffic Organization accounts. The Facilities amount is shown here for comparative purposes.
[39] American Recovery and Reinvestment Act Supplemental per P.L. 111-5, from the General Fund.
[40] Reflects $7,888,000 rescission of prior year authority per P.L. 111-117.
[41] Reflects a rescission of $5,472,000 per P.L. 112-55.
[42] Includes $250,000,000 of mandatory General Fund from the Administration's Infrastructure proposal.
[43] Reflects funding at the FY 2012 funding level pursuant to P.L. 113-6, Consolidated and Further Continuing Appropriations Act, 2013.
[44] Hurricane Sandy Emergency Supplemental, P.L. 113-2
[45] FY 2013 funds sequestered pursuant to the Budget Control Act of 2011 as Amended by The American Taxpayer Relief Act of 2012 (P.L. 112-240). Includes $2,770,000 in offsetting collections.
[46] Reflects a 0.20 percent across-the-board rescission per P.L. 113-6.

FEDERAL AVIATION ADMINISTRATION

RESEARCH, ENGINEERING, AND DEVELOPMENT

ESTIMATES		APPROPRIATIONS	
2004	100,000,000	2004	[47]118,734,310
2005	117,000,000	2005	[48]129,879,584
2006	130,000,000	2006	[49]136,620,000
2007	130,000,000	2007	130,234,000
2008	[50]140,000,000	2008	146,828,000
2009	[51]171,028,000	2009	171,000,000
2010	180,000,000	2010	190,500,000
2011	190,000,000	2011	[52]169,660,000
2012	190,000,000	2012	167,556,000
2013	180,000,000	2013	[53]167,556,000
		2013 Sequester (P.L.112-240)	[54]-8,429,072
		2013 Rescission (P.L. 113-6)	[55] $335,112
2014	166,000,000	2014	158,792,000
		2014 Rescission	[56]-26,183,998
2015	156,750,000		

[47] Reflects a 0.59 percent across-the-board rescission per P.L. 108-199.
[48] Reflects a 0.80 percent across-the-board rescission per P.L. 108-447.
[49] Reflects a 1.0 percent across-the-board rescission of 1.0 percent per P.L. 109-148.
[50] Includes $122,867,000 from the Airport and Airway Trust Fund.
[51] Includes $156,003,000 from the Airport and Airway Trust Fund.
[52] Reflects a $340,000 rescission per P.L. 112-55.
[7] Reflects funding at the FY 2012 funding level pursuant to P.L. 113-6, Consolidated and Further Continuing Appropriations Act, 2013.
[54] FY 2013 funds sequestered pursuant to the Budget Control Act of 2011 as Amended by The American Taxpayer Relief Act of 2012 (P.L. 112-240).
[9] Reflects a 0.20 percent across-the-board rescission per P.L. 113-6.
[56] Reflects a $26,183,998 rescission, per P.L. 113-76.

FEDERAL AVIATION ADMINISTRATION

GRANTS-IN-AID FOR AIRPORTS
(LIQUIDATION OF CONTRACT AUTHORIZATION)
(AIRPORT AND AIRWAY TRUST FUND)

ESTIMATES		APPROPRIATIONS	
2004	3,400,000,000	2004	3,400,000,000
2005	2,800,000,000	2005	2,800,000,000
2006	3,300,000,000	2006	3,399,000,000
2007	4,000,000,000	2007	4,399,000,000
2008	4,300,000,000	2008	4,399,000,000
2009	3,600,000,000	2009	3,600,000,000
		2009 Supplemental (P.L. 111-5)	[57] 1,100,000,000
2010	3,000,000,000	2010	3,000,000,000
2011	3,550,000,000	2011	3,550,000,000
2012	3,600,000,000	2012	3,435,000,000
2013	3,400,000,000	2013	3,435,000,000
2014	3,200,000,000	2014	3,200,000,000
2015	3,200,000,000		

[57] American Recovery and Reinvestment Act Supplemental, per P.L. 111-5, from the General Fund.

FEDERAL AVIATION ADMINISTRATION

GRANTS-IN-AID FOR AIRPORTS
LIMITATION ON OBLIGATIONS
(AIRPORT AND AIRWAY TRUST FUND)

ESTIMATES		APPROPRIATIONS	
2004	(3,400,000,000)	2004	[58] (3,379,940,000)
		2004	[59](1,988,200)
2005	(3,500,000,000)	2005	[60](3,497,000,000)
2006	(3,000,000,000)	2006	(3,514,500,000)
2007	(2,750,000,000)	2007	(3,514,500,000)
2008	(2,750,000,000)	2008	(3,514,500,000)
2009	(2,750,000,000)	2009	(3,514,500,000)
2010	(3,515,000,000)	2010	(3,515,000,000)
2011	(3,515,000,000)	2011	(3,515,000,000)
2012	(2,424,000,000)	2012	(3,350,000,000)
2013	(2,424,000,000)	2013	[61](3,343,300,000)
2014	(2,900,000,000)	2014	(3,350,000,000)
2015	(2,900,000,000)		

[58] Reflects 0.59 percent across-the-board rescission per P.L. 108-199.
[59] Direct appropriation from General Fund for Ft. Worth Alliance Airport, pursuant to Division H, Section 167, P.L. 108-199.
[60] Includes 0.80 percent across-the-board rescission per P.L. 108-447 and includes a $25,000,000 Hurricane supplemental per P.L. 108-324.
[61] Reflects funding at the FY 2012 funding level pursuant to P.L. 113-6, Consolidated and Further Continuing Appropriations Act, 2013, minus the 0.20% across-the-board rescission.

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SECTION 4. RESEARCH, DEVELOPMENT, & TECHNOLOGY

RESEARCH, DEVELOPMENT & TECHNOLOGY
DEPARTEMENT OF TRANSPORTATION
BUDGET AUTHORITY
($ in Thousands)
EXHIBIT V-1

		FY 2013 With Sequestration	FY 2014 Enacted	FY 2015 Pres. Bud. Request	Applied	Development
	FEDERAL AVIATION ADMINISTRATION					
A. Research, Engineering and Development		**158,792**	**158,792**	**156,750**	**156,750**	
A11	**Improve Aviation Safety**	**84,642**	**87,244**	**94,484**	**94,484**	
a.	Fire Research and Safety	6,881	8,000	6,929	6,929	
b.	Propulsion and Fuel Systems	2,693	1,800	2,413	2,413	
c.	Advanced Materials/Structural Safety	2,065	2,600	2,909	2,909	
d.	Aircraft Icing/Digital System Safety	5,486	7,500	5,889	5,889	
e.	Continued Airworthiness	10,511	8,000	9,619	9,619	
f.	Aircraft Catastrophic Failure Prevention Research	1,539	1,500	1,567	1,567	
g.	Flightdeck/Maintenance/System Integration Human Factors	4,416	5,000	9,897	9,897	
h.	System Safety Management	10,985	11,000	7,970	7,970	
I.	Air Traffic Control/Technical Operations Human Factors	9,822	5,000	5,898	5,898	
j.	Aeromedical Research	8,849	7,000	8,919	8,919	
k.	Weather Program	15,204	14,200	17,800	17,800	
l.	Unmanned Aircraft Systems Research	4,228	8,644	8,974	8,974	
m.	NextGen - Alternative Fuels for General Aviation	1,963	6,000	5,700	5,700	
n	NextGen - Advanced Systems and Software Validation		1,000	-	-	
A12	**Improve Efficiency**	**32,387**	**24,329**	**22,286**	**22,286**	
a.	Joint Planning and Development Office	8,000	-	-	-	
b.	NextGen - Wake Turbulence	9,861	9,000	8,541	8,541	
c.	NextGen - Air Ground Integration Human Factors	6,467	11,329	9,697	9,697	
d.	NextGen - Self-Separation Human Factors	3,233			-	
e.	NextGen - Weather Technology in the Cockpit	4,826	4,000	4,048	4,048	
A13	**Reduce Environmental Impact**	**36,556**	**41,579**	**34,435**	**34,435**	
a.	Environment and Energy	14,285	14,600	14,921	14,921	
b.	NextGen - Environmental Research - Aircraft Technologies,	22,271	26,979	19,514	19,514	
A14	**Mission Support**	**5,207**	**5,640**	**5,545**	**5,545**	
a.	System Planning and Resource Management	1,627	2,200	2,135	2,135	
b.	William J. Hughes Technical Center Laboratory Facility	3,580	3,440	3,410	3,410	
B.	**Facilities & Equipment**	**101,817**	**106,638**	**69,769**		**44,520**
a.	Advanced Technology Development and Prototype	17,372	18,722	18,500		18,500
b.	Plant	19,428	17,000	25,249		
c.	CAASD	16,685	12,840	12,840		12,840
d.	NextGen Demonstrations and Infrastructure Development					
f.	NextGen ATM Research	48,332	58,076	13,180		13,180
C. Airport Improvement Program, Airport Technology (T)		**44,161**	**44,500**	**44,750**	**44,750**	
a.	Airport Technology Research	29,191	29,500	29,750	29,750	
b.	Airport Cooperative Research	14,970	15,000	15,000	15,000	
D. Operations		**9,324**	**10,464**	**10,844**		10,844
E. Commercial Space Transportation		**998**	**-**	**-**		-
	Subtotal, Research and Development	**295,664**	**303,394**	**256,864**	**201,500**	**55,364**
	Subtotal, Technology Investment (T)	**-**	**-**	**-**		
	Subtotal , Facilities (F)	**19,428**	**17,000**	**25,249**		
	TOTAL FAA	**315,092**	**320,394**	**282,113**	**201,500**	**55,364**

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SECTION 5: NEXTGEN

Next Generation Air Transportation System (NextGen)

For FY 2015, the Next Generation Air Transportation System is requesting a total of $835.6 million.

Executive Summary

The FAA continues to make critical progress implementing Next Generation Air Transportation System (NextGen) capabilities, which encompass the deployment of new systems, technologies, and procedures that will help reduce delays, expand air traffic system capacity, and mitigate aviation's impact on the environment, while ensuring the highest levels of safety.

Since NextGen's inception in 2007, FAA has focused primarily on conducting applied and basic research about adapting current information technology (IT) to a wide spectrum of aviation programs to enhance the efficiency and effectiveness of the NAS. NextGen is now moving programs out of development and into baselined and operational programs, and FAA and other stakeholders are beginning to experience the benefits of NextGen investments. This budget request includes six baselined programs, which have entered the implementation stages for Initial Operating Capability (IOC) and ORD. NextGen achievements have already provided the following capabilities to the aviation community:

- Satellite-based surveillance and navigation. Automatic Dependent Surveillance-Broadcast (ADS-B) is in the final stages of implementation with delivery of the total complement of about 700 radio stations. Air traffic controllers are using ADS-B to separate traffic in South Florida, Louisville, Philadelphia, Juneau, and the Gulf of Mexico. Implementation of ADS-B to control air traffic in the Gulf of Mexico is a significant safety and efficiency improvement by providing radar-like services to a region which was without surveillance. Airlines, which are required to equip with ADS-B out capabilities by 2020, are already investing in the ADS-B to realize these benefits.
- Performance Based Navigation (PBN). The introduction of area navigation operations and the more advanced GPS-based performance-based navigation procedures are reducing flight distances, flight times, noise pollution, fuel consumption, and harmful engine emissions.
- Surface Movement Data Sharing. FAA is beginning to share surface movement data between FAA, airport authorities and airlines to reducing aircraft wait times on the tarmac and facilitating greater throughput at airports that have closely spaced and converging or intersecting runways.

Introduction

For FY 2015, $835.6 million is requested for the NextGen programs, projects, and activities. With the requested funding FAA will continue the on-going development and implementation of operational improvements in how safely and efficiently we operate the NAS, and in how well we fulfill our responsibilities as stewards of the environment.

As the number of international passengers and aviation activities across the globe increase every year, it becomes even more important the United States remain the gold standard for aviation safety. To make this happen, FAA actively builds partnerships and shares knowledge to create a safe, seamless and efficient global aviation system. Our premise is simple: national boundary lines should not be impediments to safety. The global aviation system moves more than 6.2 million people and tons of cargo to their destinations every day. Through the Office of Policy, International Affairs and Environment (APL), FAA collaborates with domestic and international partners to improve aviation safety, efficiency and the environment. People across the globe benefit from the work we do.

The public at large benefits from reduced aviation noise and emission impacts. The aviation industry also benefits because lower environmental impacts reduce restrictions on aviation growth. Improvements in fuel burn and energy efficiency improve emission, reduce the economic burden imposed by high fuel costs and contribute to U.S. energy conservation.

By 2022, the air transportation system will be fundamentally different from the one we knew just 10 years ago. The way we track aircraft is transforming from ground-based radar to satellite-based position-fixing. For commercial aviation, satellite-based surveillance is a technological leap that is greatly increasing accuracy and improving situational awareness at air traffic control facilities and on properly equipped aircraft.

Aircraft navigation capabilities are transitioning from cumbersome, step-by-step clearances to PBN-based procedures, allowing for more precise, direct trajectories in all phases of flight – takeoff, ascent, cruise, descent, and landing. Additionally, PBN procedures are reducing flight distances, flight times, fuel consumption, and harmful engine emissions – all of which further the FAA's commitment to reducing the environmental footprint of greenhouse-gas emissions and noise created by the aviation industry, while ensuring the continuation of a safe and secure NAS.

FAA is also increasing its focus on the way information is transferred between the cockpit and the air traffic control facilities. Currently, all communications are voice, but switching to a more data-focused transfer of information will both modernize the information transfers and increase efficiency by minimizing garbled or misunderstood messages. As with other improvements, this will be phased in to minimize disruption and ensure that messages are delivered without the errors in hearing and transcribing the information causing repeats or worse – operational errors. Applied initially to messages between airport towers and aircraft on the surface, data communications will improve safety and reduce the time it takes from gate to air, and will eventually become the principal method of routine communications through all phases of flight.

Organizing information for pilots, controllers, airports, airlines and other NAS stakeholders will undergo perhaps the greatest change of all, moving from disjointed data presentations in ad-hoc formats, to improved, fully-merged data presented in the same format to all players.

FY 2015 Funding Profile and Budget Restructuring

This budget supports continued progress on our NextGen efforts. The entire FY 2015 NextGen funding profile totals $835.6 million distributed among F&E ($774 million), Research, Engineering & Development ($47.5 million), and Operations ($14.1 million). The funding will be used to achieve the NextGen goals that have the largest benefits and the biggest need by focusing the deployment on enhancements at "optimal" sites and delivering ready capabilities now. This request is a decrease of $65.7 million, or approximately 7.3 percent, below the FY 2014 enacted level.

As NextGen has progressed over the last several years, more programs have transitioned into the implementation phase. NextGen's concept development and pre-implementation work is now building off of the programs in the implementation phase, so it is important that the pre-implementation activities align very closely with the intended end products. This alignment will help to more easily integrate capabilities and functionalities for the user community. As a response to this natural evolution towards implementation and to address RTCA Task Force 5 recommendations, NextGen planning documents shifted to implementation portfolios in the NextGen Segment Implementation Plan (NSIP) and the NextGen Implementation Plan (NGIP) in 2010. However, the budget line items remained in the old structure.

The FY 2015 budget submission has been realigned to make the line-of-sight clearer across all NextGen communications and plans. This means that the budget is being requested in the same structure as the public NextGen Implementation Plan, so stakeholders can transparently track the funding while also seeing when certain capabilities will be deployed and operational. It also eliminates duplicative structures within FAA that were created to continually crosswalk budget solution sets to implementation portfolios.

This realignment has predominantly affected the NextGen projects under F&E Activity 1 by refocusing what were previously referred to as the "solution sets" into "portfolios" that are structured around implementation activities. Table 1 below shows the conversion of the Budget structure from the FY 2014 Enacted Budget Line Items that are in the old Solution Set structure (left column) to the new FY 2015 Implementation Portfolio Structure (top line of the matrix). The funding for the BLIs is plotted across the table and aligns with both structures. Table 2 is a comparability adjustment of what the FY 2013 and FY 2014 enacted levels would have been if organized by implementation portfolios. Please note that the decrease in the funding request in the new BLIs is not because of the realignment to portfolios. FAA's Capital Investment Plan shows that this is a one-year low for the pre-implementation portfolios to focus limited resources on implementation programs that will yield benefits more immediately.

FAA is focusing these resources on implementation activities in FY 2015 to respond to a NextGen Advisory Committee (NAC) recommendation to deliver as many readily available benefits as possible in the near-term. FAA's investment in pre-implementation activities in 2015 is also consistent with NAC's recommendations for prioritizing NextGen.

Table 1: FY 2014-FY 2015 Portfolio Crosswalk
($000)

FY 2014 Solution Set Line Item Title	FY 2014 Enacted	FY 2015 Request										
		Sep Mgmt	TFDM	On Demand	Envir	IMRO	NAS Infr	NextGen Support	PBN	CATMT	TBFM	Safety
System Demand Infrastructure Development	20,000			3,000								
System Development	58,076				2,500		4,980	4,000				5,700
Trajectory Based Operations	15,988	5,000					2,500					
Reduce Weather Impact	2,729											
High Density/Arrivals/ Departures	5,484											
Collaborative ATM	20,251			3,000					1,000	10,200		
Flexible Terminals and Airports	12,923	3,000				3,500	6,000					
System Network Facilities	5,094							9,000				
Performance Based Nav/RNAV/RNP	32,200								24,500			
Collaborative ATM Technologies	28,200									3,291		
Time Based Flow Mgmt	10,500										21,000	
Tower Flt Data Manager	19,250		38,808									
Aviation Safety Information Analysis and Sharing	15,000											13,000
ADS-B In Applications – Flt Interval Mgmt		5,000										
Table 2 FY15 totals		13,000	38,808	6,000	2,500	3,500	13,480	13,000	25,500	13,491	21,000	18,700

Table 2: NextGen Budget Restructuring Comparability Adjustments
($000)

NextGen Program Comparability Adjustment	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request
NextGen - Separation Management Portfolio	$16,774	$20,328	$13,000
NextGen - Improved Surface/TFDM Portfolio	$41,661	$23,139	$38,808
NextGen - On Demand NAS Portfolio	$11,573	$8,500	$6,000
NextGen - Environment Portfolio	$7,360	$9,443	$2,500
NextGen - Improved Multiple Runway Operations Portfolio	$9,023	$9,000	$3,500
NextGen - NAS Infrastructure Portfolio	$42,705	$25,504	$13,480
NextGen – Support Portfolio	$30,137	$25,094	$13,000
NextGen - System Safety Management Portfolio	$20,811	$22,555	$18,700
Performance Based Navigation and Metroplex Portfolio	$42,640	$34,451	$25,500
Collaborative Air Traffic Management (CATMT) Portfolio	$32,620	$28,200	$13,491
Tactical Flow Time Based Flow Management (TBFM)	$12,225	$10,500	$21,000
Cross Agency NextGen Management			$2,000
Total NextGen Portfolios/Solution Set Comparability	$267,529	$216,714	$170,979

Table 3, found below, shows the old budget BLIs as well as the new BLIs. Detailed funding and program requirements can be found in the budget narrative, Section 3. Table 4, located on the last page of this section, gives the section and page number of the specific locations. Line item detail for each account is shown in the table below.

Table 3: NextGen Programs Summary

	FY 2013 Actual	FY 2014 Enacted	FY 2015 Request
Facilities and Equipment	**$814,307,000**	**$828,166,093**	**$774,000,000**
NextGen - Separation Management Portfolio			13,000,000
NextGen - Improved Surface/TFDM Portfolio			38,808,000
NextGen - On Demand NAS Portfolio			6,000,000
NextGen - Environment Portfolio			2,500,000
NextGen - Improved Multiple Runway Operations Portfolio			3,500,000
NextGen - NAS Infrastructure Portfolio			13,480,000
NextGen – Support Portfolio			13,000,000
NextGen - System Safety Management Portfolio			18,700,000
Performance Based Navigation and Metroplex Portfolio			25,500,000
NextGen - Communications in Support of NextGen	135,169,000	115,450,000	147,340,000
NextGen - Demonstration and Infrastructure Development	21,134,000	20,000,000	
NextGen - System Development	48,332,000	58,075,883	
NextGen - Trajectory Based Operations	12,604,000	15,988,063	
NextGen - Reduce Weather Impact	15,447,000	2,729,354	
NextGen - High Density Arrivals/Departures	9,003,000	5,484,247	
NextGen - Collaborative ATM	19,523,000	20,250,589	
NextGen - Flexible Terminals and Airports	22,934,000	12,923,385	
NextGen - System Network Facilities	9,003,000	5,094,032	
NextGen - Future Facilities	30,772,000	10,000,000	
Performance Based Navigation - Optimization of Airspace and Procedures for Metroplex (OAPM)	39,045,000	32,200,000	
En Route Automation Modernization (ERAM) - System Enhancements	9,477,000	35,000,000	45,200,000
System - Wide Information Management (SWIM)	46,627,000	66,550,000	60,261,000
ADS - B NAS Wide Implementation	257,394,000	282,100,400	247,200,000
Collaborative Air Traffic Management (CATMT) Portfolio	32,620,000	28,200,000	13,491,000
Colorado ADS - B WAM Cost Share	1,327,000	3,400,000	
Tactical Time Based Flow Management (TBFM)	12,225,000	10,500,000	21,000,000
Next Generation Weather Processor (NWP) [1]		11,475,000	23,320,000
NAS Voice System (NVS)	9,714,000	16,000,000	20,550,000
Terminal Flight Data Manger (TFDM)	31,843,000	19,250,000	
Aviation Safety Information Analysis and Sharing (ASIAS)	15,000,000	15,000,000	
Aeronautical Information Management Program (AIM Segment 2)	2,000,000	9,050,000	12,650,000
Cross Agency NextGen Management			2,000,000
Activity 5 F&E PCBT - NextGen Staffing [4]	33,114,000	33,445,145	46,500,000
Research Engineering and Development (RE&D)	**$56,621,000**	**$58,308,000**	**$47,500,000**
NextGen - Alternative Fuels for General Aviation	1,963,000	6,000,000	5,700,000
NextGen - Advanced Systems and Software Validation		1,000,000	
Joint Planning and Development Office	8,000,000		
NextGen - Wake Turbulence	9,861,000	9,000,000	8,541,000
NextGen - Air Ground Integration*	6,467,000	11,329,000	9,697,000
NextGen - Self Separation [2]	3,233,000		
NextGen - Weather in the Cockpit	4,826,000	4,000,000	4,048,000
NextGen - Environmental Research, Aircraft Technologies, Fuels and Metrics	22,271,000	26,979,000	19,514,000
Operations	**$12,400,000**	**$14,863,130**	**$14,100,000**
Integrate Environmental Performance into NextGen [4]	725,000	732,250	744,000
NextGen Environmental/Noise Studies [4]	1,675,000	1,691,750	1,709,000
NextGen Staffing [3,4]	10,000,000	12,439,130	11,647,000
Total NextGen Programs	**$883,328,000**	**$901,337,223**	**$835,600,000**

Note:

[1] New BLI in FY 2014 migration of pre-implementation to implementation

[2] BLI merged into NextGen Air/Ground Integration in FY 2014

[3] 11 FTE from JPDO were moved from R,E&D to Ops under ANG

[4] A staffing rightsizing is in progress for NextGen resources across supporting organizations

Achieving the Benefits of NextGen

FAA estimates that NextGen will reduce total flight delays about 41 percent by 2020, compared with the level that delays would reach absent NextGen, while providing $38 billion in cumulative benefits to the traveling public, aircraft operators, and the FAA. Aircraft owners will save about 1.6 billion gallons of fuel during this period, reducing carbon dioxide emissions by 16 million tons. FAA is achieving these benefits by the improvements delivered through foundational program deployments and implementation portfolios.

NextGen programs made great strides in 2013, which continues in 2014, in achieving these benefits. This is particularly true in the areas of ADS-B ground-based infrastructure deployment, PBN procedure-related activities, renewable fuels, and responding to the Radio Technical Commission for Aeronautics (RTCA) recommendations.

By the end of 2014 more than 630 ADS-B ground stations will be deployed, providing satellite-based surveillance coverage of the East, West and Gulf coasts and most of the area near the U.S. - Canadian border. Total complements of about 700 radio stations are expected in place and operational in 2014.

In FY 2013, the FAA published 96 PBN RNAV arrival procedures and 157 PBN RNAV departure procedures. Additionally three high altitude and five low altitude procedures were published. The agency attributes the increased publication levels to a new process developed to reduce the time it takes to introduce new PBN procedures. These new PBN procedures are designed to provide greater flexibility in the NAS and to facilitate more dynamic management of air traffic. However, FAA is striving to limit the numbers of new procedures to those that are required and will actually be flown.

The FAA continues to provide significantly improved access to general aviation airports through the publication of PBN approach procedures known as Area Navigation (RNAV) Wide Area Augmentation System (WAAS) Localizer Performance (LP) with Vertical Guidance (LPV). WAAS, a satellite based navigation technology, allows qualifying airports in the NAS to have vertical and horizontal guidance during all phases of a flight, regardless of weather conditions, without installing expensive legacy navigation hardware at each runway. As of February 2014, more than 3,900 WAAS LP/LPV procedures were in place at more than 1,500 airports throughout the United States.

Additionally, the Design Phase of FAA's Metroplex initiative has been completed at six locations with implementation of a limited number of new independent utility PBN arrival procedures by the Washington, DC Metroplex Team. Under the Metroplex initiative, Study Teams identify near-term PBN improvements and minor airspace adjustments that can be completed in the major metropolitan areas within about three years.

FAA is working to provide flight planners, in the mid-term, increased access to information on the status of the NAS through a shared, network-enabled information source. By moving from what today is mostly verbal exchange to information standards and sources, operators will be able to see current and planned strategies to deal with congestion and other airspace constraints. New information will indicate whether airspace is blocked for military, security or space operations. It will describe other airspace limitations, such as those due to current or forecasted weather events and congestion.

The initial phase of DataComm is in implementation which means that as the time for the flight approaches, the flight crew will receive the final flight path agreement as a data message. Data communications will provide pre-departure clearances that allow for amendments to flight plans. When the aircraft taxis out, the flight crew's situational awareness will be improved by flight deck displays of a moving map indicating the aircraft's position on the airport surface and, at busy airports, the position of other aircraft and surface vehicles. In the tower, improved ground systems, such as surface-movement displays, are already enabling controllers to manage taxiways and runways more efficiently. Surface-movement displays and the support tools in development will help controllers manage the size of the departure queue and choose the best runway and taxi paths for a departing aircraft's intended flight path, and provide the status and positions of all other aircraft on the airport surface and in the terminal area.

These flight deck and tower displays are important safety tools that will improve the prevention of runway incursions and other surface conflicts, especially when visibility is low. More efficient management will mean fewer radio transmissions, shorter wait times, fewer departure delays and reduced fuel consumption and emissions. Weather information will be integrated into decision-making for surface management.

Departure performance is being improved by using multiple more precise departure courses from each runway end through Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures. As we add multiple departure paths, this will enable controllers to place each aircraft on its own separate track, avoiding known constraints, thunderstorms and other severe weather near the airport. The ability to operate simultaneously on closely spaced parallel runways – through increased accuracy in surveillance and navigation, and through improved understanding of wake vortices – is already helping airports to gain capacity for their existing runways. Together, these capabilities will enhance safety, improve environmental performance, and reduce operators' delay and fuel costs.

As an aircraft climbs into the en route airspace, enhanced processing of surveillance data will improve position information and enable the flight crew and controllers to take advantage of reduced separation standards. Because the flight crew will be able to monitor the position of other aircraft from their own aircraft's flight deck, air traffic personnel will be able to assign spacing responsibility to the flight crew as the aircraft climbs to its cruising altitude. The aircraft will be able to merge into the overhead stream with minimal additional maneuvers.

Data communications will provide routine and strategic information to the flight crew and automate some routine tasks for both pilots and controllers. The use of data communications for severe weather reroutes will enhance the ability of the FAA and aircraft operators to more efficiently manage the deviations weather cause. Also fewer voice communications will reduce radio-frequency congestion and oral miscommunication.

In oceanic operations, air traffic management (ATM) personnel will provide aircraft entering oceanic airspace with an optimized trajectory. Airspace entry will be specified by track entry time and the intended trajectory. As weather and wind conditions change, both individual reroutes and changes to the entire route structure will be managed via data communications.

NextGen capabilities will provide a number of improvements to terminal area operations that save fuel, increase predictability and minimize holding patterns, delaying vectors and other such maneuvers. The time-based flow management tool analyzes flights approaching an airport from hundreds of miles away, across air traffic control facility boundaries, and calculates scheduled arrival times to reduce low altitude delays and holding. To increase the benefit and usage of performance based procedures in the busiest terminals the tool will provide arrival sequence and spacing guidance to allow the aircraft to fly the fuel efficient procedure while maintaining runway throughput. These advances will improve the flow of arrival traffic by efficiently maximize use of existing capacity saving fuel and reducing emissions.

Not all the benefits come through improved air traffic management. Our ongoing advocacy of sustainable jet fuels through the Commercial Aviation Alternative Fuels Initiative reached a significant milestone on July 1, 2011. Standards-setting organization ASTM International approved the use of a renewable, bio-derived jet fuel. In 2012, endurance tests of a turbofan engine using this Hydroprocessed Renewable Jet fuel showed that this blend does not affect long-term engine wear or operational performance.

FAA Stakeholder Collaboration on Achieving Benefits of NextGen

When facing tight budget constraints in FY 2013, FAA turned to its stakeholders to seek input on how they would prioritize NextGen Investment. In July 2013, the FAA requested that the NextGen Advisory Committee (NAC) develop recommendations related to the Agency's NextGen investments. The purpose of the NAC was to evaluate those items of direct operational benefit to external stakeholders. In light of budget pressures, the NAC reviewed current FAA plans and activities that have an effect on the implementation of NextGen and developed a prioritized list of Tier 1 (consensus on activities that should continue no matter what) and Tier 2 (consensus on activities that should continue, resources permitting) recommendations. The NAC published their report, "NextGen Priorities in a Budget Constrained Environment" in September 2013 and the overall results of their effort yielded an outcome very consistent with previous recommendations from the NAC, as well as those made by Task Force 5 (TF5). Those results have supported the FY 2015 Budget formulation process for NextGen and guided the preservation of dollars for those capabilities with preferred outcomes.

FAA is also continuing to make progress on responding to the RTCA NextGen Mid-Term Implementation Task Force recommendations from 2009. FAA has completed more than one-third of the Task Force recommendations, which were provided by a consortium of 300-plus representatives from the aviation community. The following tables depict a partial illustration of the progress made in response to the Task Force recommendations. FAA provides a full summary the NAC recommendations and the FAA responses in the NextGen Implementation Plan, June 2013 (www.faa.gov/nextgen/Implementation). The FAA is adjusting its planning as necessary to address these recommendations.

Program	RTCA Task Force	FY 2012 FY 2013	FY 2014	FY 2015 - Mid-Term
Automatic Dependent Surveillance - Broadcast (ADS-B)	NAS Access #28	▪ Continued to deploy ADS-B ground infrastructure ▪ As of August 2013, program has achieved Initial Operating Capability (IOC) for Air Traffic Control separation services at a total of 51 sites and 24 surface advisory sites.	▪ Complete NAS-wide deployment of ADS-B baseline ADS-B radio station infrastructure ▪ Achieve Initial Operating Capability (IOC) for Air Traffic Control (ATC) Surface Advisory Services at remaining sites ▪ Achieve IOC for En Route ATC Separation Services at remaining sites. ▪ Achieve IOC for ASSC at 1 Site ▪ Achieve IOC for Ground-Based Interval Management – Spacing (GIM-S) ▪ Achieve IOC of Automation Upgrades for ATOP automation platform ▪ Initial Investment Decision (IID) for ADS-B In Applications	▪ Continue to provide ADS-B baseline services and applications ▪ Begin NAS-wide deployment of GIM-S ▪ Complete ATOP modifications to support the use of the In Trail Procedures application
		▪ Established FAA infrastructure that supports ground vehicle surveillance at Denver Airport	▪ Establish FAA infrastructure that supports ground vehicle surveillance at O'Hare Airport ▪ Complete deployment and integration of the ADS-B system in the surface domain at all ASDE-X sites	
Data Communications (DataComm)	DataComm #16, 17, 39, 44, 42	▪ Achieved Final Investment Decision (FID) for Segment 1 Phase 1 Tower Services ▪ Awarded Data Comm Integration Services (DCIS) contract ▪ Completed Tower Data Link Services (TDLS) Preliminary Design Review (PDR) and Critical Design Review (CDR) ▪ Initiated Departure Clearance (DCL) trials at Memphis (MEM) and	▪ En Route Automation ERAM Release 4 Initial Test Release (ITR) ▪ TDLS V12 Initial Test Release (ITR) ▪ Deliver Data Comm Network Service (DCNS) Build 1 to William J. Hughes Technical Center (WJHTC) to support Segment 1 Phase 1 testing ▪ Complete Data Comm Informal Integration and Interface Service Test for Segment 1 Phase 1	▪ Achieve FID for Segment 1 Phase 2 En Route Services ▪ Achieve Initial Operating Capability (IOC) for Segment 1 Phase 1 Tower Services ▪ Achieve IOC for Segment 1 Phase 2 En Route Services ▪ Begin planning for ATN and Segment 2 services

Program	RTCA Task Force	FY 2012 FY 2013	FY 2014	FY 2015 - Mid-Term
		Newark (EWR) airports	▪ Finalize Segment 1 Phase 2 En Route Use Cases ▪ Finalize System Specification Documents for Segment 1 Phase 2	

System Wide Information Management (SWIM)	Surface #40, 35	▪ Provided Corridor Integrated Weather System (CIWS) publication
		▪ Provided NEXRAD weather data to CIWS
		▪ Achieved final investment decision for SWIM Segment 2
		▪ Provided reroute data exchange capability
		▪ Provided terminal data distribution capability for
		  ▪ Runway Visual Range
		  ▪ Surface Movement Events
		  ▪ ASDE-X
		  ▪ Tower Departure Events
		▪ Provided altimeter settings and pilot weather report
		▪ Provided weather data to Alaska flight services system
			▪ Provide Integrated Terminal Weather system (ITWS) publication
			▪ Provide air traffic management data distribution (Aero nautical Situation Display to Industry (ASDI))
			▪ Publish data for:
			  ▪ Traffic Flow Management System (TFMS)
			  ▪ Time Based Flow Management (TBFM)
			  ▪ Notice to Airmen (NOTAM)
			▪ Provide National Weather Service information to NAS weather systems Support Services – Weather (CSS-WX) Segment
				▪ Provided flight data publication for initial flight data services
				▪ Provide data to NAS Information Display System (NIDS)
				▪ Provide data distribution services to Terminal Automation Management Replacement (TAMR)
				▪ Provide data distribution services to Terminal Flight Data Management (TFDM)
				▪ Provide data distribution services to Common Support Services – Weather (CSS-WX)

		▪ Complete documentation in support of Initial Investment Decision (IID) for Common Support Services – Weather (CSS-WX) Segment		
Collaborative Air Traffic Management Technologies (CATMT	Integrated ATM #47	▪ Continued CATMT Work Package 3 concept engineering and planning to support: (1) modernization of the decision support tool suite, and (2) collaborative information exchange ▪ Upgraded the Traffic Flow Management System to include an initial electronic negotiation capability for more efficient flight planning ▪ Designed and developed Route Availability Planning Tool (RAPT) ▪ Designed and developed the next increment of the Collaborative Airspace Constraint Resolution (CACR)	CATMT WP2: ▪ Deploy RAPT ▪ Deploy CACR Phase 2 CATMT WP3: ▪ Complete development of Collaborative Information Exchange (CIX)	CATMT WP3: ▪ Complete deployment of Collaborative Information Exchange (CIX)

Program	RTCA Task Force	FY 2012 FY 2013	FY 2014	FY 2015 - Mid-Term
		capability.		
		▪ Continued the analysis to develop the requirements to implement proven decision-support tools and data sharing capabilities	▪ Complete Investment Analysis Readiness Decision for CATMT Work Package 4 to support improvements to arrival and departure route planning, air traffic flow demand predictions, and traffic management initiative decision support tools.	▪ Receive a Final Investment Decision from the FAA JRC for CATMT WP4.

Best Equipped – Best Served Concept

NextGen is being implemented airport-by-airport, region-by-region, aircraft-by-aircraft, over a period of years. The FAA proposes moving from the concept of first come, first served to best equipped, best served. While early adopters will reap the greatest benefits, lesser equipped aircraft will receive safe and efficient service at the same high standards as today. During FAA's transition to NextGen capabilities, unequipped aircraft currently operating in the NAS will not be excluded from the airspace, but they will not reap the benefits of NextGen.

Among factors that determine how much and how quickly NextGen will increase efficiency, safety, and environmental performance in the NAS, equipage decisions by aircraft operators will have a significant effect. For this reason, FAA is developing options for different ways to encourage rapid deployment of NextGen avionics throughout the industry.

NextGen Performance Measures

In 2012, by direction of the FAA's NextGen Management Board, FAA developed a comprehensive set of performance metrics to gauge its overall operational performance. The metrics are aligned with the International Civil Aviation Organization (ICAO) Key Performance Areas (KPA), and while not exhaustive, cover a wide range of important aspects of the Agency's operations. Although most of these metrics have been publically available for some time, a new public Web site (www.faa.gov/nextgen) has been created in order to provide increased transparency.

NextGen targets have thus far been defined for six of the Key Performance Areas, which align with other FAA performance metrics and FAA's strategic plan (*Destination 2025)*:

1. Cost Effectiveness. The FAA's harmonized cost-effectiveness metric is the Unit Cost per Operation, defined as the total air traffic organization costs divided by the number of IFR and VFR operations handled. Tower, en route Center, and TRACON operations are separately counted and then summed. Both Federal and contract towers are included. Since NextGen is not expected to decrease the cost of providing air traffic control services, the goal is to maintain the unit cost at the FY 2011 level in real terms (i.e., after accounting for inflation). The target is thus to maintain the unit cost per operation at $87.85 through FY 2018.

2. Access. NextGen will help General Aviation (GA) maintain access to small airports during bad weather through the use of Precision-Based Navigation, and in particular through the use of the GPS Wide-Are Augmentation System (WAAS). NextGen will be measuring the number of runways with Published LP/LPV Procedures. Localizer Performance (LP) and Localizer Performance with Vertical Guidance (LPV) procedures allow WAAS-equipped aircraft to perform precision and improved non-precision approaches when ceilings and visibilities are low, improving access during inclement weather as well as safety. The target is 5,218 runways in FY 2018. FAA is currently evaluating a more applicable metric that could measure scheduled carriers' access.

3. Capacity. Airport capacity is essential to reduce delays, decrease fuel burn, and reduce the environmental impact of aviation. The NextGen metric is Average Daily Capacity for Reportable Hours, which is also one of the FAA's harmonized metrics. This metric is the sum of published arrival and departure rates for the Core 30 airports during specified busy hours. The NextGen target is to increase this metric by eight to 10 percent by FY 2018.

4. Efficiency. Efficiency refers to the operational and economic cost-effectiveness of gate-to-gate operations, from a single flight perspective. Measures of efficiency typically compare some aspect of the flight trajectory or flight time to some optimal value. NextGen is expected to improve the descent profile of flights by removing level-offs, thereby saving fuel and reducing the environmental impact. The NextGen efficiency metric is therefore Distance in Level Flight from Top of Descent to Runway Threshold. This metric is defined as the total distance in level flight, once descent has begun, divided by the total number of arrivals, for all arrivals at Core 30 airports. To maximize efficiency this metric should approach zero. The target is to reduce this metric by 10 percent by FY 2018.

5. Environment. Two environment metrics (and associated targets) have so far been selected. Several NextGen research efforts, including the Continuous Lower Energy, Emissions, and Noise (CLEEN) initiative, will yield a cleaner and quieter aircraft fleet.

    a. The Number of People Exposed to Significant Noise Around U.S. Airports quantifies the population residing within the 65 decibels (dB) Day/Night Sound Level (DNL) contour for noise inventory airports (defined as those airports having at least 365 annual jet departures). DNL is the 24 hour average sound level obtained from the accumulation of all events, with the addition of 10 dB to sound levels from 10 PM to 7 AM local time. Noise exposure is computed using the MAGENTA model. FAA's target is 300,000 people in FY 2018.
    b. NAS-Wide Energy Efficiency is defined as fuel burn for all U.S. commercial operations normalized by distance flown. FAA's target is 3.56 kg/km in FY 2018, which represents a two percent annual decrease from 2010.

6. Global Interoperability. According to ICAO, the ATM system should be based on global standards and uniform principles to ensure the technical and operational interoperability of ATM systems and facilitate homogeneous and non-discriminatory global and regional traffic flows. The NextGen metric is Percentage of Commercial Aircraft from the Top 25 Aviation States Using Fully Interoperable NextGen Technologies and Procedures. The technologies and procedures referred to here is either PBN, DataComm, or ADS-B Out. The target for this metric is 40 percent in FY 2018.

NextGen Staffing

FAA is required to identify, track, and report NextGen "dedicated" staffing levels and costs to various external stakeholders. Several re-organizations have occurred since the NextGen staffing baseline was initially established in FY 2011 and it has been necessary to re-establish a baseline and validate current and planned NextGen staffing levels on an annual basis. The FAA manages NextGen across organizational structures and lines of business. A Standard Operating Procedure (SOP) that establishes guidance and processes to consistently identify and track federal employees "dedicated" to working on NextGen programs has been created. The FAA is working to identify, quantify, and track in the agency's administrative systems existing staff which have been reassigned to the NextGen effort in order to determine total NextGen staffing strength. These efforts are currently underway and while the right sizing of the NextGen staffing will be an ongoing and evolving task, FAA hopes to have a staffing plan update in FY 2015.

NextGen Challenges

NextGen's multiple capabilities are interdependent, and we will incorporate them into our airspace over varying time frames. This calls for a deliberate and incremental approach, not only in technology and infrastructure development but also the policies, standards, and operational practices that ensure our careful approach. The logical progression of our deployments – near-term, mid-term, long-term –each laying a solid foundation for the next, belies its overall complexity.

Enhancing safety, security, and environmental performance must remain the center of our planning as we improve the current NAS and accommodate new elements with the proliferation of very light jets, unmanned aircraft systems, and commercial space flight. Furthermore, the needs and capabilities of the diverse segments of the aviation community vary across and within sectors and by locality. The FAA is aware that these are complex and sometimes competing factors.

Variable maturity times for interdependent projects create a communications challenge, arising from perceptions about complexity and uncertainty. The FAA must continually ensure that our intent, commitment and timing remain clear to all stakeholders as we move forward together with NextGen.

Proper recognition and management of uncertainty must be a central feature of our overall approach to NextGen development and deployment. Failure to do so would place NextGen capabilities, benefits and costs in jeopardy. For example, premature specification of detailed requirements for distinct NextGen systems could artificially constrain both industry and FAA by locking in specific technical solutions when more cost-effective alternatives could emerge through development activities. Rarely is there only one option, because capabilities often can be realized through combinations of operational practices, policies, systems, and technologies. The FAA must fully explore these possibilities with our stakeholders, global partners, and in our internal business practices to ensure the most effective solutions.

As we make our respective investment decisions, FAA and the private sector must consider the full context of capabilities and benefits, rather than focusing only on specific systems or deployments in isolation. Private-sector stakeholders must use their own internal processes to commit to investing in NextGen capabilities. A thorough understanding of expected benefits and costs will help solidify the business cases both FAA and individual stakeholders need to justify investment decisions. The FAA and stakeholders must work closely together and remain flexible to adjust to factors, whether environmental, economic or global conditions, that drive those decisions.

As stakeholders equip their aircraft in varying ways to achieve specific NextGen benefits, air traffic controllers will face the challenge of managing a diverse fleet with very different capabilities. While operators who upgrade avionics for NextGen will receive the earliest benefits, FAA will continue to also accommodate lesser-equipped operators. We are examining best-equipped/best-served concepts, whereby aircraft equipped for NextGen capabilities would be served in ways that deliver the NextGen benefits. Controller training is developed to match the introduction of new capabilities and is also included as part of the safety management system process. Ensuring international harmonization of aircraft equipage standards, so that aircraft equipped for NextGen will be able to operate using equivalent capabilities in other regions of the world, is another complex endeavor. Both of these requirements make partnership an integral component of FAA's strategy for NextGen.

Stakeholder engagement is a way to manage priorities and risks collaboratively by reaching a common understanding of what to implement, and where, when and how benefits will result. By leveraging opportunities for demonstrations and other critical work with willing partners, we gain extremely valuable insight into NextGen benefits, which can reduce uncertainty. Benefits can be clearly measured in a real-world, operational environment. Solutions to integration issues can be accelerated, and specific programmatic requirements and operational and certification standards can crystallize outcomes that can help solidify the case for follow-on investments.

Operational demonstrations and prototypes also present solutions to uncertainties that arise due to local factors, such as unique airport or airspace considerations. These and other local, technical or political factors may require implementation teams tasked with working out a specific local implementation plan guided by an overarching national framework. A properly managed and effective mix of FAA and stakeholder participants is needed to ensure bilateral implementation of respective NextGen capabilities. These types of teams may also be instrumental in developing local applications of emerging best-equipped/best-served principles to stimulate higher levels of aircraft equipage.

NextGen is a wide ranging transformation of the entire national air transportation system. It has aligned research and prototyping activities, developed the components of a mid-term architecture, integrated implementation plans, moved forward with execution, and enhanced industry engagement, NextGen will meet future demands while improving safety and protecting the environment.

Next Generation Air Transportation System (NextGen)
Budget Narrative Reference Guide

Specific funding and program requirements can be found as indicated below in Table 4.

Table 4: NextGen Index of Programs

		Amount	Page
	Facilities and Equipment (F&E)		**Section 3B**
1A05	Next Gen – Separation Management Portfolio	$13,000,000	35
1A06	Next Gen – Improved Surface/TFDM Portfolio	$38,808,000	39
1A07	Next Gen – On Demand NAS Portfolio	$6,000,000	42
1A08	Next Gen – Environment Portfolio	$2,500,000	46
1A09	Next Gen – Improved Multiple Runway Operations Portfolio	$3,500,000	49
1A10	Next Gen –NAS Infrastructure Portfolio	$13,480,000	53
1A11	Next Gen –Support Portfolio	$13,000,000	58
1A12	Performance Based Navigation and Metroplex Portfolio	$25,500,000	62
2A02	En Route Automation Modernization System Enhancements and Tech Refresh	$45,200,000	74
2A12	System-Wide Information Management (SWIM)	$60,261,000	99
2A13	ADS-B NAS Wide Implementation (ADS-B)	$247,200,000	103
2A15	Collaborative Air Traffic Management (CATMT) Portfolio	$13,491,000	109
2A16	Tactical Flow Time Based Flow Management (TBFM) Portfolio	$21,000,000	113
2A17	Next Generation Weather Processor (NWP) [1]	$23,320,000	116
2A19	Data Communications in Support of NextGen	$147,340,000	122
2B13	National Airspace System Voice System (NVS)	$20,550,000	156
3A09	Next Gen – System Safety Management Portfolio	$18,700,000	258
4A09	Aeronautical Information Management Program (AIM) Segment 2	$12,650,000	297
4A10	Cross Agency NextGen Management	$2,000,000	299
5A01	Personnel and Related Expenses - NextGen Staffing [3]	$46,500,000	301
	Total, Facilities and Equipment	**$774,000,000**	
	Research, Engineering, and Development		**Section 3C**
A11M	NextGen – Alternative Fuels for General Aviation	$5,700,000	62
A12B	NextGen – Wake Turbulence	$8,541,000	67
A12C	NextGen – Air/Ground Integration Human Factors*	$9,697,000	72
A12D	NextGen – Weather Technology in the Cockpit	$4,048,000	76
A13B	NextGen – Environmental Research, Aircraft Technologies, Fuels and Metrics	$19,514,000	84
	Total, Research, Engineering, and Development	**$47,500,000**	
	Operations		**Section 3A**
	Integrate Environmental Performance into NextGen [3]	$744,000	APL
	NextGen Environmental/Noise Studies [3]	$1,709,000	APL
	NextGen Staffing [2,3]	$11,647,000	ANG/ATO
	Total, Operations	**$14,100,000**	
	Total, NextGen Programs	**$835,600,000**	

Note:

[1] New BLI in FY 2014 migration of pre-implementation to implementation

[2] 11 FTE from JPDO were moved from R<E&D to Ops under ANG

[3] A staffing rightsizing is in progress for NextGen resources across supporting organizations