BRAND NEW AIR TRAFFIC CONTROL SYSTEM

AMERICA IS BUILDING AGAIN

Introduction

The Federal Aviation Administration (FAA) faces a rapidly growing, complex and demanding aviation sector, with commercial air travel returning to pre-COVID levels and new entrants, including drones, advanced air mobility, and commercial space, increasing. As the National Airspace System (NAS) users increase, the FAA's air traffic system is based on outdated technologies that are unable to meet the demands. These outdated systems are showing their age – which leads to delays and inefficiencies. The lack of funding for major investments in key air traffic infrastructure, such as radars, telecommunications, and facilities, is now putting the aviation sector at risk. To be clear, the NAS is safe. However, maintaining that safety will come at the expense of efficiencies as the FAA will be forced to throttle down air traffic as outdated systems suffer from outages. This paper outlines a critical 3-year framework to reinvest in the National Airspace System to support an emergency supplemental funding increase to safeguard this important national asset.

The outage of a critical air traffic control system made international news in January 2023 when it caused the first nationwide ground stop since 9/11. The NOTAM system that failed, causing thousands of flight delays and cancellations, is just one of many crucial air traffic systems that, along with hundreds of facilities and thousands of pieces of infrastructure equipment, make up the NAS. Many of these systems, facilities, and equipment are decades old, antiquated, or obsolete and have outlived their useful service lives. While the FAA has highlighted the need to replace these critical legacy systems, facilities, and equipment before, the risk is greater now more than ever. Modernization of the NAS can no longer take 10+ years to complete; it must be done now.

Without modernization efforts – including upgraded technology, improved air traffic management, and enhanced safety measures – the risk of system failures, disruptions, and security vulnerabilities will only increase. The FAA's investments in infrastructure and technology are not just improvements; they are all critical to ensuring the reliability and safety of the aviation industry in the coming decades. The agency needs greater technology investment to better accommodate increasing commercial space launch and re-entry activity and unmanned aircraft systems activity, while ensuring the US aviation system remains the safest in the world for the flying public, and globally competitive against aggressive foreign competition. A slow-paced modernization poses a higher risk because it extends the lifespan of unreliable, inefficient systems, amplifying safety, economic, and security vulnerabilities in the era of growing air traffic and cyber threats. Rapid, safe, well-managed modernization, despite short-term challenges, is less risky as it aligns with growing aviation demands and global standards. This investment will enhance operational efficiency, reduce flight delays, improve safety outcomes, and support the growing demand in commercial aviation and emerging entrants.

While tackling these challenges will not be easy, either politically or financially, now is the time to make the FAA's funding needs a priority.

Over the past 15 years, the annual appropriation to the Facilities and Equipment (F&E) account used to sustain and improve most of FAA's air traffic control infrastructure has remained essentially flat at approximately $3 billion per year. This stagnant funding has caused the FAA to lose about $1 billion in purchasing power due to inflation, as the agency seeks to maintain aging systems and infrastructure and meet ambitious goals to modernize the system for increased safety and efficiency of the NAS. Given the current conditions of the FAA's infrastructure, we can no longer wait for funding levels to slowly catch up to the need. We need an immediate infusion of funding to address critical infrastructure needs.

State-of-the-Art ATC System

The FAA proposes supplemental funding in a comprehensive three-year framework. This framework seeks to transform the United States air traffic control system from its current antiquated state to a modern system capable of meeting the demands of today and the future. This proposal will build a new, state-of-the-art, air traffic control system in three years that will enhance the safety and efficiency of our nation's airspace. These investments are crucial for several reasons:

Invest in system replacement for a more resilient NAS: Without this funding, risk to the agency's critical safety and efficiency systems will continue to increase (reference GAO Report on Air Traffic Control: FAA Actions Are Urgently Needed to Modernize Aging Systems GAO-24-107001 September 23, 2024) as systems and infrastructure deterioration continues, which would have far-reaching consequences. This funding needed includes investments critical to replacing the FAA's communications and surveillance infrastructure. With the additional funding, the agency can plan for a systematic approach to move telecommunications from outdated copper lines to fiber and replace its outdated airborne and surface radar systems to ensure the airspace remains at the forefront of technological capabilities and safety standards.

So, accelerating the modernization of the agency's telecommunications system, including air-to-ground radio communication and data, to provide a faster and more reliable network, is paramount.

Tools to Support Air Traffic Controllers: The agency must make critical investments to provide the modern tools necessary for controllers to address increasing complexities and traffic in the NAS. The critical voice switch replacement program will be fully supported, providing controllers with a more flexible, VoIP-based communication system. In addition, surface surveillance tools, including those with more complex safety logic, would be deployed with additional funding, improving safety at over 200 airport surfaces at those airports that currently do not have surface surveillance systems. Improving surveillance of airport surfaces was a key outcome of the safety summit that occurred after the near runway misses, including in Austin, Texas. Finally, deploying additional technology to the Caribbean and Alaska to provide accurate real-time surveillance and weather information for air traffic control and pilots, will ensure safe and efficient flights for these critical locations.

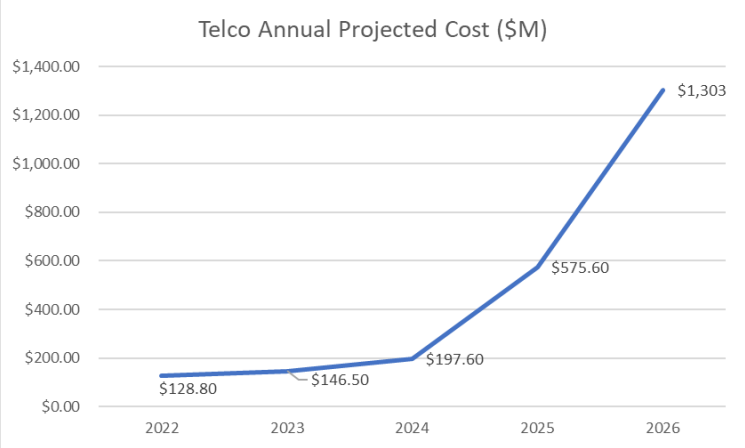
New Innovative Investments: Industry has long requested that the FAA accelerate investments to improve efficiencies in the NAS. Additional funding would allow for Terminal Flight Data Manager (TFDM) to be deployed at additional airport sites. The tool deploys electronic flight strips, which will sunset the antiquated paper strips. Moreover, the increased funding level for capital programs will enable the FAA to modernize current systems that utilize archaic technology – such as floppy disks and compact discs used in the OASIS systems in Alaska and in the numerous Information Display Systems (IDS) used across the NAS. Advancing the current Traffic Flow Management System to a more high-tech system (Flow Management and Data) will enable integrated capabilities that provide reliable consistent operational system-wide views,

greater operational decision-making, and more system usability that provides more efficient use of the NAS. Sunsetting these outdated technologies for more advanced technologies allows the FAA to enable superior enhancements for the future. Finally, to ensure the FAA maintains global leadership and ultramodern safety technology, the agency will focus on updating the current automation platforms from the 1990s with a common automation platform for the Enroute and Terminal operating environments within the NAS. This strategic program is aimed at optimizing operational efficiency, reducing operating costs, and enhancing system adaptability and interoperability.

In addition to higher funding levels, this framework proposes that the agency create a new budget account to address these capital needs. This would bring greater transparency and allow the agency to easily track and monitor the cost of these updates over the coming years.

Telecommunications

The FAA's urgent transition from Time-Division Multiplexing (TDM) to Internet Protocol (IP) on its FAA Telecommunications Infrastructure (FTI) network is essential to safeguard the National Airspace System, which underpins $1.6 trillion in annual economic activity and supports 10 million aviation-related jobs. The current FTI network dates to 2002 and is heavily dependent on obsolete 1960s TDM technology across over 30,000 services at 4,600 sites. This network faces an accelerated phase-out of this antiquated technology by telecommunications providers, with a major carrier's July 2024 notice indicating that 33% of NAS services are at risk of discontinuance up to two years earlier than anticipated, coupled with new monthly obsolescence fees and no guarantees of performance or support. This situation, echoed by other providers, jeopardizes critical communications for air traffic control, risking delays, safety issues, and significant economic impacts. To mitigate these threats, the FAA is accelerating the adoption of IP-based technologies, including fiber connections, wireless solutions, and satellite systems, while upgrading over 80 FAA systems, voice switches, and radios to native IP interfaces to ensure reliability, enhance cybersecurity, and to improve scalability. Without adequate funding, however, the FAA faces substantial challenges in completing this transition in time to avert potential service outages, which could severely disrupt the NAS's pivotal role in U.S. aviation, national security and economic prosperity.



Under the FAA's current projected program plan, based on historical F&E appropriations, the full TDM transition to IP would not be completed until 2038, incurring hundreds of millions of dollars in expenses.

Radio Communications

Voice communication is critical to air traffic control (ATC) in the United States because it serves as the primary, real-time method for controllers to issue instructions, coordinate aircraft movements, and ensure safety across the NAS. It enables precise, immediate exchanges between controllers and pilots, conveying clearances, weather updates, and emergency directives that automation alone cannot fully replicate,

especially in dynamic or non-routine situations. Radios and voice switches, along with telecommunications, enable this critical service.

The FAA must transition its radios to newer equipment to address the obsolescence, reliability issues, and cybersecurity vulnerabilities of aging radio equipment, and to ensure safe and efficient air traffic communication in the NAS. Legacy radios, some over 30 years old, rely on outdated analog technology, leading to frequent outages, high maintenance costs due to scarce parts, and incompatibility with modern digital standards like VoIP. Newer equipment, being deployed as part of the FAA's NEXCOM program, offers improved clarity, reliability, and spectrum efficiency, critical for managing increasing air traffic. These digital systems enhance cybersecurity, reduce risks that were highlighted in GAO reports on FAA's vulnerable IT, and enable integration with advanced automation for real-time data sharing. This transition, targeting the replacement of over 25,000 radios, is vital for maintaining controller-pilot communication, reducing delays, and aligning with global aviation standards.

The FAA also urgently needs to replace its legacy voice switches, some nearly 30 years old, due to their obsolescence, high maintenance costs, and critical vulnerabilities that threaten the safety and efficiency of the NAS. These aging systems, with nearly 800 switches across en route, terminal, and air traffic control tower facilities, rely on outdated analog technology, making them prone to failure. They lack the flexibility to support modern air traffic demands, such as dynamic re-sectorization or integration with technologies like VoIP and are increasingly difficult to maintain due to scarce spare parts and retiring skilled personnel. The FAA's VoICE program, transitioning to digital VoIP-enabled switches, aims to rapidly enhance reliability, resilience, and controller efficiency, aligning with modernization goals to ensure safe air travel.

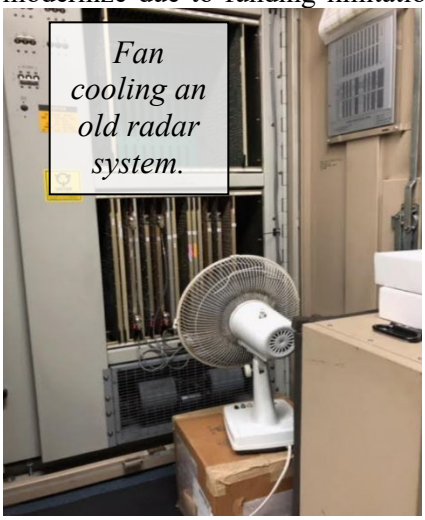
However, under the FAA's current projected program plan based on historical F&E appropriations, radio communications programs (including voice switch) would not be completed until 2037 at the earliest.

Surveillance

The FAA maintains hundreds of surveillance systems across the nation, including airborne and surface systems. These systems, deployed over many decades beginning in the 1970s, are critical tools used by air traffic controllers to manage air traffic safely and efficiently. FAA surveillance systems provide safety-critical information to air traffic controllers, including an aircraft's position and identity as well as weather information. FAA airborne radar systems provide a backup to Automatic Dependent Surveillance–Broadcast information, providing essential information in the event of GPS degradation.

As the 618 FAA airborne radar systems exceed their intended lifespan, outages increase in frequency and duration, and service restoration becomes more difficult as antiquated components become increasingly difficult to obtain. The absence of critical aircraft position and identity information increases the risk of airborne collision and results in increased separation requirements, reducing operational efficiency. As

radar systems components reach their end of life, the FAA modernizes, but has been unable to fully modernize due to funding limitations. This has led to over twelve different configurations of airborne surveillance in the NAS. This variety of configurations creates complexity in training technicians, logistics, sparing, and support. This modernization effort will move from twelve different configurations to, at most, 2 of the cutting-edge radars.



Fan cooling an old radar system.

Surface Movement Radar, critical to ASDE-X and ASSC surface safety systems, directly impacts airport efficiency and safety. Any degradation reduces throughput, causing significant operational delays. Upgrading this radar technology at the 44 airports must be prioritized to sustain high-volume airport operations and ensure safety for airports. ASDE-X and ASSC provide real-time accurate safety information for air traffic controllers.

While the ASDE-X and ASSC are deployed to 44 of the most complex airports, there are over 400 airports that do not have any surface tools for air traffic controllers. Implementing real-time surface movement awareness technology is vital in the prevention of runway incursions, significantly enhancing safety at many airports. The FAA rapidly deployed the Surface Awareness Initiative (SAI) system following a close call between a FedEx aircraft on final approach and a Southwest Airlines jet preparing for takeoff at Austin-Bergstrom International Airport (AUS), Austin, Texas on October 11, 2023. The deployment of SAI is in accordance with National Transportation Safety Board Safety Recommendation A-24-010 as an outcome of the Austin, TX event. Immediate deployment of this system can reduce the risk of incidents/accidents and potentially save lives. Through this initiative the FAA would deploy the lifesaving SAI technology to 200 more airports.

Investing in ADS-B in the Caribbean is vital for the FAA to enhance aviation safety and efficiency in a region with limited radar coverage, busy international flight corridors, and challenging geography. ADS-B's satellite-based tracking provides precise, real-time aircraft surveillance over remote oceanic areas, enabling safer routing, reduced aircraft separation, and improved search and rescue capabilities. It's cost-effective, requiring smaller, cheaper ground stations than radar, and supports general aviation, tourism-driven economies, and emerging technologies like drones. By aligning with global ICAO standards, ADS-B ensures interoperability, boosts air traffic capacity, and prepares the Caribbean for future aviation demands, all while supporting the FAA's modernization goals. Airborne surveillance in the Caribbean is currently unreliable due to challenging terrain and frequent adverse weather. This region is a high-volume, complex airspace where increased ADS-B coverage would significantly improve both safety and operational efficiency for pilots and controllers navigating these corridors.

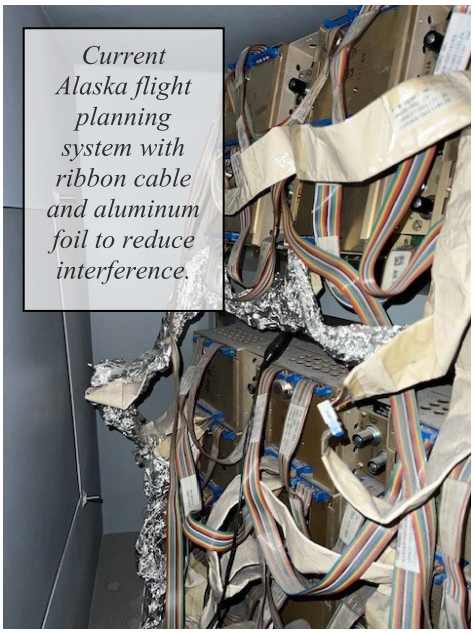
However, under the FAA's current projected program plan based on historical F&E appropriations, surface surveillance and SAI programs would not be completed until 2033.

Automation Programs

Traffic Flow Management (TFM) is critical for ensuring safe, efficient air traffic movement by minimizing delays and congestion through strategic coordination and use of Traffic Management Initiatives. The current Traffic Flow Management System (TFMS), which supports balancing National Airspace System capacity with growing flight demand, is based on 1960s technology and is struggling with performance, reliability, scalability, and maintainability issues. Despite recent technical refreshes, TFMS cannot meet increasing user expectations or operational needs as it suffers from fragmented data integration and lacks a comprehensive failover strategy. To address these critical shortcomings, the FAA is developing the Flow

Management Data and Services (FMDS) program, which will deliver a modern, scalable, and integrated platform with improved reliability, usability, and operational continuity—ensuring TFM can effectively support the evolving demands of the NAS well into the future.

The NAS would greatly benefit from the implementation of Alaska Automation Capability (AAC) for Flight Service in Alaska to modernize and enhance the efficiency, safety, and reliability of flight services in a state with unique challenges like vast wilderness, limited infrastructure, and harsh weather. AAC, will replace and modernize the aging, unsecure automation systems like OASIS, integrate advanced automation for weather graphics, flight plan processing, and emergency services, addressing the limitations of outdated manual processes and systems with security vulnerabilities. Additionally, the aging voice switches, which provide the only radio coverage in many regions of Alaska, are failing with no replacement available prior to 2035. All existing Alaska Flight Service systems are currently maintained in sustainment-only mode. Without immediate modernization, essential aviation-dependent services in Alaska face increasing risks of failure, threatening public safety and economic stability. In Alaska, 82% of communities lack road access and rely heavily on aviation in ways foreign to most in CONUS. AAC supports critical services like pilot briefings, NOTAMs, and search-and-rescue coordination in areas with minimal cellphone or internet coverage. By providing real-time data and streamlined interfaces, AAC reduces controller workload, improves response times, and enhances safety for general aviation and commercial operations in Alaska's non-radar environments, aligning with the FAA's Alaska Flight Service Initiative goals.



Current Alaska flight planning system with ribbon cable and aluminum foil to reduce interference.

Immediate funding would allow for the FAA to address the Don Young Alaska Aviation Safety Initiative (DYAASI) specified in FAA's 2024 Reauthorization Act (P.L. 188-63), while modernizing Flight Service systems, which is a Congressional identified critical need. AAC would leverage an already deployed modern Flight Service capability in CONUS and include appropriate modifications to meet Alaska requirements through a common platform.

Automated Weather Observing Systems (AWOS) and Visual Weather Observing Systems (VWOS) are critical for Alaska aviation, providing real-time, accurate weather data in remote areas with harsh, rapidly changing conditions, enabling safer flight planning and operations. Weather cameras complement these systems by offering visual confirmation of conditions at airports and key routes, helping pilots assess visibility and hazards like fog or snow. Together, they enhance situational awareness, reduce weather-related accidents, and support Alaska's vast general aviation and commercial operations in areas with limited radar and infrastructure. Accurate, real-time weather information is indispensable for safe aviation operations in Alaska, where many communities depend solely on-air transportation. Failure to maintain and modernize AWOS, VWOS, and weather cameras can lead to severe disruptions, risking the timely delivery of critical supplies, healthcare, and emergency services. Immediate investment in these systems is necessary to ensure continuous and safe connectivity for remote Alaskan communities.

As traffic demands on the NAS continue to increase, the need to efficiently manage volume becomes more important. Terminal Flight Data Manager (TFDM) will help air traffic controllers manage the increasing load at busy airports through a number of assistive technologies. Electronic Flight Data (EFD) exchange and Electronic Flight Strips (EFS) will be installed in air traffic control towers across the US to replace paper flight strips. TFDM terminal data will be available to flight operators and other stakeholders to provide real-time schedules of all airplanes arriving and departing, which will improve traffic flow. TFDM will also integrate with other FAA traffic flow management systems to ensure alignment of all traffic flow management initiatives enabling efficient operations. TFDM will replace multiple systems in the NAS through the integration of their functionality into the system. This will achieve technology modernization, sharing of data, and lower maintenance costs. Through this initiative, TFDM will deploy electronic flight strips to 89 airports.


Paper flight strips

The FAA must replace its legacy Information Display Systems (IDS) due to their outdated technology, which struggles to meet modern air traffic demands, poses cybersecurity concerns, and incurs high maintenance costs. These systems, some dating back to the 1980s, rely on obsolete hardware such as floppy disks and software, leading to inefficiencies, limited scalability, and vulnerabilities to cyberattacks, as highlighted by experts noting pathways for hackers in outdated IT infrastructure. E-IDS will provide multiple safety benefits to the American public, including increased productivity for air traffic controllers, user efficiency, and NAS safety by displaying, entering, and distributing Notice to Airmen and access to Special Activity Airspace schedule and status. This system will enhance safety in the NAS with Pilot Reports collection and distribution across the system and to other NAS users. Improving NAS resiliency by supporting faster recovery during adverse events and providing required operational position information to any other properly configured position in the NAS will support Air Traffic Management service providers in maintaining continuity of operations. By replacing multiple legacy IDS with E-IDS, as a single system, reduces the need for costly compensating controls and supports compliance with evolving aviation standards, aligning with the FAA's modernization needs.

The FAA must develop a common automation platform to replace the Standard Terminal Automation Replacement System (STARS) and En Route Automation Modernization (ERAM) to address the inefficiencies, high costs, and integration challenges posed by these disparate, aging systems, which struggle to support the growing complexity of the NAS. A unified platform would streamline air traffic control by standardizing interfaces, consolidating data processing for terminal and en route operations, and enhancing interoperability with newer technologies. The current NAS automation systems are infrastructure is siloed, inflexible, and increasingly costly to maintain as it ages. Each program independently procures and manages its own hardware and IT tools, resulting in redundant efforts, inconsistent platforms, and higher operational costs. Legacy systems also create data integration challenges, require inefficient one-off fixes, and make it difficult to adapt to evolving aviation needs. Modernizing to a standardized, scalable platform would

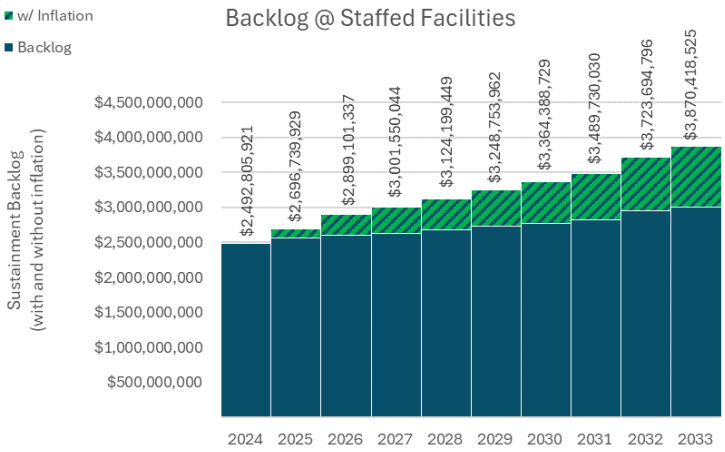

Current FAA Terminal Facility

reduce the total cost of ownership, simplify integration of new technologies, accelerate deployment of new capabilities, improve cybersecurity, and eliminate vendor lock-in—ultimately enabling the FAA to respond more efficiently to operational changes and support future aviation growth.

However, under the FAA's current projected program plan based on historical F&E appropriations, these critical automation systems would not be implemented until 2040.

Facilities

Increased funding for Air Traffic Control facilities is also imperative to prevent the growth of our air traffic control facilities' sustainment backlog. Many ATC facilities, including Towers, TRACONs, and en route centers, are deteriorating at alarming rates. Failing infrastructure such as HVAC systems, pest issues, leaking roofs, and asbestos hazards, are compromising safety. Swift action to replace these facilities will prevent potentially catastrophic service interruptions, safeguard personnel health, and uphold the operational integrity of the entire NAS. With this support, the agency can effectively manage the backlog and ensure the operational integrity of these vital assets. Additionally, addressing the replacement of air traffic control facilities is paramount. Currently, the FAA replaces, on average, one control tower per year among the 377 FAA-owned towers in the agency's inventory, resulting in a staggering 300-year timeline for full replacement. The agency's aim is to significantly expedite this process, reducing the replacement timeline to a far more practical 80 years, which translates to replacing 4 to 5 towers annually. The FAA would also initiate planning and land acquisition for the replacement of the FAA's 21 Enroute air traffic control facilities (ARTCCs), which are approximately 61 years old on average. The FAA's 21 ARTCCs were placed throughout the NAS because of the legacy technology limitations. These limitations are no longer an obstacle and therefore the FAA can consolidate and reduce the number of ARTCCs, which would save FAA operations funding.



Conclusion

It is imperative that the United States invest in the safety, efficiency, and growth of our nation's antiquated aviation infrastructure immediately. Industry has voiced concern and recommended providing "immediate robust, emergency funding for ATC critical infrastructure investment in facilities and technology" (Reference "Modern Skies Coalition - Text to Enhance NAS Safety and Efficiency - 25.04.14" addressed to Senators Ted Cruz (R-TX) and Jerry Moran (R-KS), Committee on Commerce, Science and Transportation, US Senate). The United States must invest in its infrastructure to become the gold standard again and lead with the best ATC system in global aviation. This funding, in addition to creating tens of thousands of jobs across the United States, will provide a safe, stable, efficient, and modern infrastructure to support air travel for years to come. Any dollar invested in U.S. airspace is a prudent investment: Aerospace generates 5 percent of US GDP, the equivalent of $1.25 trillion, and accounts for over 2 million jobs. Aviation represents a larger sector of the US economy than the automotive industry. It is one of the nation's most important national security, economic, and geostrategic assets. It is critical the United States acts now to invest and modernize a National Airspace System that supports the future and moves beyond the 1960s.