

**Future of Aviation Advisory Committee  
Environment Subcommittee  
Record of Meeting**

*October 5, 2010*

Chicago InterContinental O'Hare  
Chicago, Illinois

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**Public Announcement**

The U.S. Department of Transportation (DOT), Office of the Secretary of Transportation, told the public of this Future of Aviation Advisory Committee (FAAC) Environment Subcommittee meeting in a Federal Register notice published September 21, 2010 (75 FR 57546).

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**Subcommittee Members in Attendance**

Name		Affiliation(s)
<i>Bryan K. Bedford (Subcommittee Chair)</i>	President and Chief Executive Officer	Republic Airways Holdings, Inc. (Republic Airways)
Juan J. Alonso	Associate Professor, Department of Aeronautics and Astronautics	Stanford University
Kinney Baxter	Attended for Raul Regalado	Metropolitan Nashville Airport Authority
Brian Brandewie	Attended for Cynthia Egnotovich	Goodrich Corporation (Goodrich)
Billy Glover	Attended for Nicole Piasecki	Boeing Commercial Airplanes (Boeing)

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**Committee Members Not in Attendance**

Name		Affiliation(s)
Cynthia M. Egnotovich	Segment President, Nacelles and Interior Systems	Goodrich
Nicole W. Piasecki	Vice President, Business Development	Boeing
Raul Regalado	President and Chief Executive Officer	Metropolitan Nashville Airport Authority

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**Other Officials Present**

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Name		Affiliation(s)
Lynne Pickard (Designated Federal Officer (DFO))	Deputy Director, Office of Environment and Energy	DOT/Federal Aviation Administration (FAA)
Camille Mittelholtz (Alternate DFO)	Environmental Policies Team Leader, Office of Assistant Secretary for Transportation Policy	DOT

**Other Persons Present**

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Name		Affiliation(s)
Steve Csonka	Technical Director, Advanced Programs and Environment Strategy	GE Aviation
Scott Harper	FAAC Support	PAI Consulting
Jonathan Hoffman	Senior Principal Scientist	The MITRE Corporation
Krister Holladay	Director, Government Affairs	Goodrich
Richard Marchi	Senior Advisor, Policy and Regulatory Affairs	Airports Council International–North America (ACI–NA)
Rick Pyatt	Vice President, Government Relations	Goodrich
Nancy N. Young	Vice President, Environmental Affairs	Air Transport Association of America, Inc. (ATA)

**BACKGROUND AND WELCOMING REMARKS**

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This is the record of the fourth meeting of the FAAC Environment Subcommittee, a Federal advisory committee formed pursuant to and subject to the requirements of the Federal Advisory Committee Act (FACA). The subcommittee and its meetings are likewise subject to the requirements of FACA.

Mr. Bryan K. Bedford, Subcommittee Chair, Republic Airways, called the meeting to order at 10:34 a.m.

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**ADMINISTRATIVE MATTERS**

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Mr. Bedford asked Ms. Lynne Pickard, DFO, DOT/FAA, to review the FACA requirements.

Ms. Pickard briefed the subcommittee on the history and purpose of FACA, and noted some of its key requirements, including balanced representation and publicly accessible meetings. She outlined her responsibilities as DFO, including maintaining information on costs and membership, ensuring efficient operations, and keeping publicly available records of FAAC activities.

Ms. Pickard noted meetings of the subcommittee are accessible to the public. She stated interested persons will have the opportunity to submit comments before each meeting, and the minutes of each meeting will be made available both in the regulatory docket at <http://www.regulations.gov> (Docket number DOT-OST-2010-0074) and on the FAAC Web site at <http://www.dot.gov/faac>.

Ms. Pickard read the formal statement required under FACA. She noted although the meeting was open to the public, participation in the meeting was limited to subcommittee members, their alternates, and Federal officials, subject to the discretion of the subcommittee chair. Ms. Pickard added that only subcommittee members and their alternates are entitled to vote on subcommittee business.

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**DISCUSSION**

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Mr. Bedford started the discussion by asking the committee to approve the minutes of the August 10, 2010, meeting held in Denver, Colorado. Ms. Pickard stated she wanted to complete some minor changes before the minutes are officially ratified. Mr. Bedford put the motion forward that upon completion of Ms. Pickard's changes, the minutes would be approved. He received a second and the motion was carried.

Mr. Bedford discussed the last report out and stated the subcommittee has come up with some good issues that will result in excellent proposals. He went on to thank the following individuals for their efforts in researching and writing the potential proposals: Mr. Billy Glover, Boeing; Mr. Dick Marchi, ACI-NCA; Mr. Brian Brandewie, Goodrich; Ms. Nancy Young, ATA; Mr. Kinney Baxter, Metropolitan Nashville Airport Authority; and Dr. Juan Alonso, Stanford University.

*Efficient Ground Operations*

Mr. Bedford turned the meeting over to Mr. Glover and Mr. Marchi to discuss ground operations and runway metering. Mr. Glover began by discussing the challenge of making ground operations more efficient and reducing ground delays to lessen fuel burn and carbon dioxide emissions. The proposal relates to a recent runway closure at John F. Kennedy International Airport (JFK) and its ground metering program that reduced ground delays. Mr. Glover reported that the results of the program are encouraging, and referred to the House aviation reauthorization bill (H.R. 915) which calls for the program to be expanded to five additional public-use airports. He noted the program at JFK showed a reduction in fuel usage, carbon dioxide emissions, and delays.

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Ms. Camille Mittelholtz, DOT, explained the House reauthorization bill calls for a study of five additional airports to test air traffic flow methodologies and procedures. The bill would give a maximum of \$5 million to each airport for the program and calls for a report evaluating the benefits of the program 3 years after the start date.

Mr. Glover stated the proposal can work around this bill. He suggested the Secretary of Transportation initiate a pilot program to develop improved ground operational procedures at five public-use airports and report the findings after 3 years, consistent with the House bill. Ms. Pickard asked if the use of pilot program language was necessary since the program was already done at JFK. Mr. Marchi noted JFK's program was a very ad hoc process. He stated the language in the House bill not only calls for the Secretary to run a pilot program, but also to develop the supporting automation software necessary to run the program under different conditions at different airports.

Mr. Bedford noted in previous meetings regarding runway metering, it was mentioned that several different versions of software were being tested at different airports. He stressed the importance of developing a standard methodology for the program. Mr. Bedford added the methodology should be developed and adopted throughout the industry even though the procedures might be different at different airports.

Ms. Young thought developing a methodology was right because at this stage there is insufficient knowledge to point to one standard software program. She believed this pilot study would help in developing a methodology to point toward a standard software program. Ms. Young asked if the pilot study would include ways to evaluate the cost-effectiveness of this program, as well as how to look at the tradeoffs of a particular program (for example, improving outbound traffic, but worsening inbound traffic).

Mr. Bedford agreed, but stated the program also needs to put a value on carbon reduction. He commented the proposal would say the pilot program should be adopted, but there also needs to be a goal beyond the pilot program. Mr. Bedford added the goal should state, once the pilot program ends, there should be a consistent methodology identified and standard software developed. These should be usable at all airports and bring a return on capital.

Mr. Baxter asked if the subcommittee should suggest expanding the proposal beyond the five pilot airports. He thought, once the five pilot airport programs have been completed, the proposal could include a prioritized list of other airports that could benefit from implementing this program.

Mr. Bedford stated he was uncertain what criteria, besides density, would be used to identify these airports. Mr. Marchi suggested redrafting the proposal, based on language in the House bill, to include the costs and benefits of the program and a list of recommended airports that can be added after the pilot program ends. Mr. Marchi and Mr. Glover volunteered to take on the task of developing a specific proposal.

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Ms. Pickard asked if new legislative authority is required. Mr. Glover stated that he thought funding would require new legislative authority. However, Mr. Marchi noted the bill does not specify that funding come from the Airport Improvement Program (AIP); rather, it just directs the Secretary of Transportation to conduct the study. Mr. Marchi thought the Secretary could conduct the pilot program as an air traffic study.

Mr. Bedford closed this subject with a clarification of the possible proposal and inclusion of goals at the end of the study. He stated the proposal's goals should include: (1) consistent methodology; (2) common software tools made available to all users; (3) identification of key elements constituting success and these elements' return on invested capital; and (4) identification of criteria for airport selection, based on a preliminary cost-benefit analysis.

*NextGen and Related Funding*

Mr. Bedford moved the discussion to the Next Generation Air Transportation System (NextGen) and related funding. Mr. Brandewie stated the research on this issue was compiled by Mr. Rick Pyatt and Mr. Krister Holladay, both from Goodrich. Mr. Brandewie defined NextGen and presented its benefits. He discussed some of the key enabling technologies such as Automatic Dependent Surveillance–Broadcast (ADS–B), Area Navigation (RNAV), Required Navigation Performance (RNP), and Ground Based Augmentation System (GBAS). He also mentioned some of the benefits of these technologies, such as carbon reduction due to improved fuel utilization, job creation, enhanced safety capabilities, and more efficient use of available airspace. Mr. Brandewie pointed out the ADS–B mandate for installation at ground stations is 2013, which will happen on schedule and under budget. The ADS–B Out mandate for equipage is 2020 for primary airspace in the United States. He suggested one of the proposals move up the equipage to sometime earlier than 2020.

Mr. Brandewie noted the cost of implementing these technologies varies. He stated the Aerospace Industries Association (AIA) estimates the cost of the infrastructure to be about \$15 billion, with a range of \$6 billion to \$20 billion for equipage of all the aircraft. He mentioned the primary systems or procedures (for example, RNAV for point-to-point capabilities, RNP for closer spacing and airspace efficiency, and GBASS for more efficient tracking and scheduling of aircraft) would provide the most benefit in terms of carbon dioxide reduction and lower fuel costs.

Mr. Brandewie stressed the following three areas of importance:

1. Economic and employment impact. The plan will drive the nation's economic recovery and stimulate job growth across all sectors.
2. Global competitiveness. In addition to domestic benefits, NextGen will increase demand for U.S.-developed air traffic management (ATM) solutions in international markets. This will further strengthen the contribution of aerospace to the U.S. balance of trade and create jobs.
3. Environmental impact. Full implementation of NextGen could reduce greenhouse gas emissions from aircraft up to 12 percent by 2025.

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Mr. Brandewie stated, to accelerate the benefits of a modern air traffic control (ATC) system, it is critically important to begin equipping aircraft today. He stated the subcommittee could propose an initial investment of \$6.4 billion over the next 5 years. This investment would include the following:

1. ADS-B Out (approximately \$4.1 billion) upgrades for all Title 14, Code of Federal Regulations (CFR) part 121 air carriers, including regional jets, general aviation (GA) jets and turboprops, helicopters, and the majority of GA pistons.
2. ADS-B In (approximately \$0.8 billion) for a small number (less than 20 percent) of aircraft currently operating in or expected to operate in ADS-B In pilot locations.
3. RNAV/RNP (approximately \$1.2 billion) upgrades to 10 to 15 percent of the civil fleet currently not RNAV-capable, to ensure that portion of the civil fleet using the most congested airspace is appropriately equipped.
4. GBAS (approximately \$0.2 billion) installed at selected airports.

Mr. Brandewie mentioned the common theme was carbon-neutral growth from 2020 and beyond, with the main issue being the cost of equipage. He reiterated that at the least, ground stations will be ready by 2013 and aircraft will be equipped by 2020, in accordance with the current FAA mandate.

Mr. Brandewie stated distribution of the \$6.4 billion could be used as a baseline for a possible proposal for accelerating NextGen equipage goals.

Mr. Bedford asked if the subcommittee proceeded with a proposal around these figures, would it address the requirement that aircraft flying into high density airports must have the necessary equipage. Ms. Young thought the concern around this issue would be the funding; she also mentioned GA would be a major issue.

Mr. Bedford stated the presentation mentioned a \$41 billion impact on the U.S. economy due to delays. He added, if this was such a waste, perhaps the Federal Government would be willing to provide the funding at a low payback rate to accelerate these savings; then the industry could borrow, equip, cut its losses, and pay back the Government. Ms. Young responded the \$41 billion impacted the entire economy (not just the air carriers), and indirect losses were accounted for in that figure.

Ms. Pickard asked the subcommittee if they knew of other subcommittees working on a similar NextGen equipage proposal. If so, she suggested that proposals from multiple subcommittees might be combined into an overall NextGen proposal. The group thought that the Subcommittee on Financing and the Subcommittee on Competition were working on a NextGen proposal.

Mr. Bedford asked if any data or studies show the value of a fully implemented NextGen program on carbon reduction, fuel consumption, or more efficient handling. The members of the subcommittee agreed there are studies showing up to a 12 percent savings, although a lower 6 percent savings is thought by some to be more realistic. Ms. Pickard pointed out this is just operational savings and does not include the Continuous Lower Energy, Emissions, and Noise (CLEEN) technology.

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Mr. Bedford pointed out there are benefits of NextGen that would lead to payback and cash flow incentives and attract air carriers to invest in the equipment. He noted there were enough indirect benefits to attract the Federal Government to fund the acceleration of NextGen. Mr. Bedford believed if all the different subcommittees pooled together their ideas into one single proposal, the result would be a powerful proposal.

Dr. Alonso agreed with Mr. Bedford and favored conversations with the other subcommittees to form a single proposal on NextGen. Dr. Alonso felt this would strengthen the NextGen proposal because the Subcommittee on Financing would be able to include other benefits in addition to environmental benefits in its proposal.

With the subcommittees' support, Mr. Bedford agreed that proposing the acceleration of NextGen would be a focus of this subcommittee. He added, until he had a conversation with the Subcommittee on Financing, this subcommittee would include proposing the acceleration of NextGen in the report out.

Mr. Brandewie agreed to draft the NextGen proposal, with assistance from Mr. Glover. He stated he would tie it into the carbon reduction goal of the subcommittee. Brandewie emphasized, with ground stations being completed by 2013, accelerating equipment installations would help produce benefits more rapidly.

Mr. Bedford stated over the years, air carriers have invested in systems that were never finished. He suggested including language in the proposal regarding some type of government loan or incentives to help industry equip aircraft. This language could include wording that says, once the system is up and running and the air carriers are seeing the benefits, the air carriers could repay the government. Mr. Bedford stated it will take time to manufacture and equip aircraft, but when the system is turned on in 2013, the air carriers would be ready to operate with that system.

Mr. Glover commented this idea was similar to the cash-for-carbon concept, which would propose funds to industry to equip aircraft in exchange for a carbon-neutral growth commitment. Ms. Young suggested if the proposal includes some sort of funding, the subcommittee should think about being more creative, for example, using tax incentives or loan guarantees.

Ms. Pickard pointed out the subcommittee needs to connect this issue to the public good. She stated the subcommittee should emphasize that not only is this investment good for air carriers, it also benefits the public as a whole in terms of cost savings and carbon reductions. Mr. Glover stated this also ties into indirect benefits such as job creation and gross domestic product improvements.

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Mr. Brandewie ask whether it was realistic for subcommittee members to believe the government would give loans to air carriers without some type of commitment, such as carbon-neutral growth. Mr. Glover thought this could be tied together with the concept of government funding for air carriers with repayment expected back when the FAA has the system in place and air carriers are showing a return on investment. He stated it would take a coordinated effort among the government and air carriers, but the outcome of carbon reduction and other benefits would accrue to all parties.

Mr. Glover thought the subcommittee's proposal could emphasize the advantage of a coordinated and accelerated effort between government and industry. He added such an effort will benefit the public, air carriers, and other stakeholders from an operational standpoint, as well as provide carbon benefits.

Ms. Pickard suggested Mr. Bedford bring this up with the full committee. When discussing carbon reductions, the full committee will need to consider a comprehensive array of measures (for example, the operational aspects of NextGen, new technologies, alternative fuels, and market-based measures). Mr. Bedford agreed and stated the subcommittee needs to focus on the fact that it takes all of these measures to come together to fulfill the objective of this subcommittee. Mr. Brandewie and Mr. Glover agreed to work on the proposal, which would include the funding issues raised by this subcommittee.

*Voluntary Airport Low Emissions*

Mr. Bedford turned the meeting over to Mr. Baxter who discussed the Voluntary Airport Low Emissions (VALE) program. Mr. Baxter stated, at a recent small airport conference, one of the issues raised was rising airport operating costs. He added one of the ways smaller airports are reducing their costs is through energy savings. Mr. Baxter noted VALE opportunities help in these efforts. He asked how this program could reach out to all airports, not just the non-attainment airports (that is, airports located in areas that do not meet national ambient air quality standards). Mr. Baxter mentioned, according to Dr. Jake Plante, FAA, the VALE program will be available to more communities within the year because more areas will be in non-attainment. This is because the U.S. Environmental Protection Agency (EPA) is reevaluating areas based on some stricter air quality standards. Ms. Pickard added that VALE will automatically expand as the EPA declares more areas in non-attainment. Ms. Young mentioned the number of affected airports will increase three-fold as the EPA redefines the criteria for non-attainment.

Mr. Baxter believed many airports are not taking sufficient advantage of the VALE program. However, he thought smaller airports would be interested because VALE is an Airport Improvement Program (AIP) and Passenger Facility Charge (PFC)-eligible program. Mr. Baxter stated small airports are looking at uses of AIP funding and would like to use this money on systems such as solar panels, wind generators, and charging stations to reduce emissions.

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Mr. Baxter suggested airports can encourage air carriers to use electric vehicles by providing these vehicles for rent or having the facilities to promote their use (for example, charging stations). Mr. Baxter stated airports will need ways to save on energy, which would directly impact air carriers; currently energy costs are being distributed back by means of agreements with air carriers. Mr. Baxter pointed out he is expecting the cost of electricity for his airport to double over the next couple of years. He believed the savings would be an easy fix with the use of available technologies.

Ms. Young was not sure the proposals under discussion could be covered by the VALE program. She thought there were many things within the scope of VALE that could have broader advantages to communities without trying to extend the program to airports that do not have an air quality problem.

Ms. Pickard pointed out that procedurally and legally, the proposal would not be within the scope of the current VALE program and would require legislation, which the subcommittee could still consider. She also believed carbon dioxide savings would not be recognized under the current VALE program, but instead would require a restructuring of the VALE program. This is because VALE is set up so airports can receive credits for reducing emissions under the Clean Air Act from states administering the Act via a State Implementation Plan. FAA's approval of AIP or PFC funding for VALE is linked to state credits. Carbon dioxide, however, is not currently regulated under the Clean Air Act; therefore, there are no state credits.

Ms. Pickard mentioned the FAA Airports Office is working on developing a new concept on airport sustainability. This concept would be broader than the VALE program in terms of its availability to all airports and energy sustainability emphasis.

Mr. Baxter mentioned his airport was one of 10 airports in a pilot program on sustainability, and he has contracted a consultant to perform a sustainability study at his airport. This effort will fit into his new master plan that will have a chapter on sustainability. He also stated any projects that come out of this study will be eligible for AIP funding. Mr. Baxter noted the definition of sustainability is not very clear, and each airport may have a different definition. He suggested the definition should require that nothing leave an airport that has not been treated in some way, but that would be very hard to achieve.

Ms. Young mentioned that the Airports Cooperative Research Program (ACRP), under the Transportation Research Board (TRB), approved two projects; these projects would further define sustainability and best practices, and would build up some additional data.

Mr. Brandewie wondered if the cost-benefit of this proposal is any better than the other proposals the committee has discussed. Mr. Baxter suggested this proposal could take VALE funding that is not used, and pass it out to other smaller airports to help reduce energy costs.

Mr. Brandewie asked how this would change the VALE program. Mr. Glover pointed out this would require a statutory change before the Administrator could implement Mr. Baxter's proposal. Ms. Pickard confirmed the Administrator would have to seek and receive a statutory change.

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Ms. Young reminded the subcommittee the VALE program was used to fund local air quality projects and can include some fuel-related projects, but it's a narrow definition. She said if carbon dioxide or energy savings-related projects were to be included in the VALE program, it would require a restructuring of the program to allow a broader scope of projects.

Mr. Bedford summarized the previous discussions on this proposal and stated the proposal should be kept on the agenda. However, the proposal should be reconsidered as a broader new program, and VALE should be taken out of the proposal. The subcommittee agreed but wondered if this could be tied into the proposal on sustainability.

Mr. Bedford suggested that Mr. Baxter consolidate his proposal with the sustainability proposal. Mr. Baxter stated sustainability covers a wide variety of issues and perhaps the subcommittee could focus more on the emissions part. Ms. Young thought focusing on the concept of energy efficiency and savings would bring in the environmental benefits and were relevant to the subcommittee's work on carbon dioxide emissions.

Mr. Baxter pointed out airports are a non-taxed entities. He stated the benefits of programs to save energy are based on tax credits, which prevent airports from getting needed grants. Mr. Baxter continued to talk about available energy saving systems (for example, solar panels and light-emitting diode (LED) lighting), which could be used at his airport to save energy if grant money were available.

Ms. Young asked if there were energy efficiency programs for airports the subcommittee could focus on. She also asked if these programs could be productively expanded. Mr. Baxter responded there were no such programs. Mr. Glover thought perhaps that should be the focus of the proposal. Ms. Young mentioned air carriers were working with airports to determine capital projects and funding bonds programs for energy overhauls. Mr. Baxter stated he had gotten a positive reaction from the air carriers when they were asked to help with these projects. Mr. Bedford asked Mr. Baxter to work with Dr. Plante on an airport sustainability proposal.

*Sustainable Alternative Aviation Fuels*

Mr. Bedford moved the discussion on to alternative fuels. Mr. Glover addressed the background on the proposal to reduce carbon emissions and stated this is a significant opportunity for the aviation industry. He explained the Secretary of Transportation plays a unique role in developing alternative fuels for ground transportation. He further explained aviation is different because it does not have many alternative fuels available and relies heavily on liquid fuels.

Mr. Glover stated the DOT could play a significant role in accelerating approvals of alternative fuels and facilitating the infrastructure needed for providing alternative fuels. Ms. Young described how the DOT might use the framework of the government to support deployment of alternative fuel in the aviation community and give environmental credit to air carriers. She stated the credit would have to be given to air carriers at the time of purchase rather than the time of use due to the co-mingling of air carrier fuel use. Ms. Young used the example of Mr. Bedford buying the fuel, but Mr. Tilton

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actually flying the fuel. She noted the unique role of the Secretary of DOT to address the complications of co-mingling fuel.

Ms. Young added the DOT could establish environmental guidance for acceptable use of fuels both domestically and internationally. She explained the aviation and shipping industries are the two modes of transportation operating internationally. Ms. Young would like support for alternative aviation fuels similar to what is used in other industries. Mr. Glover explained there is a biofuels interagency working group and recommended the Secretary of Transportation be more engaged.

Ms. Pickard supported the proposal but suggested there are too many details in the report. She felt there needs to be more high level action items for the DOT Secretary to consider. Ms. Pickard suggested one of the high level themes should be that the U.S. is the leader in alternative aviation fuels. Alternative fuels would have broader benefits than just for aviation users. The accrual of benefits should be noted, such as energy security, green jobs, "farm-to-fly" initiative benefits to rural areas. Ms. Pickard suggested the proposal should highlight the aviation sector's taking a leadership role on alternative fuels, producing broader societal benefits.

The committee members agreed with Ms. Pickard's comments and suggestions and agreed the aviation industry should be promoted as a leader in alternative fuels. Mr. Bedford mentioned this is an opportunity for the United States to become a clean fuel and alternative energy leader. He explained the funding should be tied to a specific test clean fuel project. Mr. Bedford also asked if facilities could be constructed in 2 to 3 years to produce bulk quantities of fuel. Mr. Glover explained a proposal like this would be possible within 3 years. The committee members liked the proposal and reinforced the need for promoting the work the aviation industry can do in clean/alternative fuels.

The committee suggested any proposals be "punchy and short" to grab the attention of the DOT to promote aviation as an industry leader in clean/alternative fuels. It was noted the FAAC and other facets of the transportation industry have several subcommittee groups and reports coming in, and it would be important to have a recommendation that stands out.

Ms. Young suggested after the committee comes up with a title that gets the attention of the DOT, the proposal needs to have good supporting content. Ms. Pickard explained the deliverables for the committee, and noted each subcommittee is make 3 to 5 proposals. The full committee will discuss and condense the proposals at the October 20, 2010, FAAC meeting. Ms. Pickard stated the subcommittees should be focusing on finalizing the proposals, to be presented by Mr. Bedford, at the October 20, 2010, meeting. The committee agreed the current proposal is good but needs more work.

Mr. Glover then discussed the issue of fuel facilities and noted they could be built within 2 years. However, he stated there needs to be further investigation of the harvest infrastructure currently in place and how long it would take to provide the materials plants needs to produce the fuel. The subcommittee discussed the startup of factories and some variables that might hinder the ability of factories to produce fuel. The subcommittee discussed the need to promote the farming aspect. The

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subcommittee also discussed partnering various government agencies with industry and making the building of plants a national priority.

Mr. Bedford proposed involving universities in the process, particularly universities that teach farmers and crop growers. Mr. Glover mentioned the "farm to fly" program was in place, but needs the DOT's involvement. The committee discussed the need for scientific research on how much real estate would be needed to fuel aircraft. Mr. Glover and Ms. Young agreed to work on this proposal.

*Environmental Goals and Regulatory Framework*

Mr. Bedford then addressed the proposal to harmonize domestic and global efforts to reduce aviation greenhouse gas emissions. Ms. Young stated the subcommittee could set specific environmental goals to submit to the DOT. She explained industry, government, and the DOT each have their own set of goals to improve aviation greenhouse gas emissions. Ms. Young explained, to meet the goals of the different parties involved, the parties need to work collaboratively to be effective.

Mr. Bedford discussed having a good flow of communication among all parties. He added the cost and benefits of projects should be outlined to verify whether they can be completed. Mr. Bedford stated air carriers need a figure to promote investment in an alternative fuel program. Mr. Bedford further described the importance of having charts and a presentation on the programs air carriers could invest in for alternative energy. The charts and presentation should include the types of penalties that could result if the goals are not met. He stressed the importance of presenting the global ideas currently in progress. Mr. Bedford commented all of the goals have equal importance, and the committee should consider what penalties should be imposed if the goals are not met. He explained the goals may be very expensive, and the costs should be considered when imposing them on the U.S. air carrier industry.

Mr. Glover stated the committee should disclose the goals currently in place and evaluate what credits should be given for users of alternative fuel. Mr. Bedford brought up the idea of penalizing air carriers that do not meet the goals. The committee suggested this should be a voluntary process and that there should be no penalties.

Ms. Young stated the carbon dioxide standard for future aircraft is being developed right now. She said this standard should be developed first before deciding what penalties are imposed. Ms. Young noted she charted the difference in government and industry targets in carbon-neutral growth in 2020 relative to 2005. She stated one could see the delta in the cost of carbon. Mr. Bedford requested a copy of that chart and thought the chart should be included in the proposal. Ms. Young further explained carbon is predicted to cost \$20 a ton in 2012 and an assumed \$45 or \$50 in 2020.

Ms. Pickard asked Ms. Young how she saw this chart fitting into the framework of the proposal. She also asked if the chart was based on the assumed costs for industry and government and how this all fit into the proposal. Ms. Pickard commented the cost chart grabs the attention of the reader and wanted an explanation of how it was going to be used in the report. Mr. Glover thought this was a chance for the United States to take on a leadership role.

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Mr. Bedford stated there is not much information available to the public, and the committee could provide that information. He added that laying out several proposals would indicate the cost of carbon is significant and create a sense of urgency. He explained the subcommittee should use this data in the framework of its proposals and present the economic benefits of reducing carbon emissions.

Mr. Bedford explained this proposal could serve to warn industry of significant potential costs.

Ms. Young took an action item to coordinate with Mr. Glover and submit the proposal to Mr. Bedford.

*Accelerating R&D for Instruction of Aircraft/Engine Technologies into the Fleet*

Dr. Alonso introduced the proposal on engine and aircraft technology. He mentioned the subcommittee was focusing on reducing carbon dioxide emissions from aircraft in the commercial fleet. Dr. Alonso added, while great things are expected from operational improvements, historically, 90 to 95 percent of environmental impact reductions have come from improvements in the technology on aircraft (engines, airframe structure, and aerodynamics). Dr. Alonso mentioned that, unfortunately, making these improvements takes time and money. He added research and development (R&D) usually takes 10 to 15 years for these new technologies to materialize and even longer to reach the fleet and have an impact. Dr. Alonso suggested a concerted effort is needed to accelerate the development of improved technologies and their introduction to the fleet. He asked to open the discussion around crafting a proposal ensuring investments in R&D of new technologies are sustained to a level to meet the aggressive targets set by various governments.

Dr. Alonso mentioned this proposal can be related to the CLEEN program, which is overseen by the FAA. The proposal can also be related to other R&D programs. The concept is that DOT could encourage R&D to be done in conjunction with industry to realize these technological improvements.

Mr. Glover stated much of the R&D in aviation is accomplished by several agencies including the National Aeronautics and Space Administration (NASA), the U.S. Department of Energy, and DOD. He asked if the subcommittee should look at R&D in a broader scope, where the DOT takes the lead to coordinate R&D efforts among these other agencies. Dr. Alonso thought there were already mechanisms in place toward coordinated R&D efforts among agencies, and referred to the National R&D Plan.

Ms. Pickard stated she had assumed the CLEEN program was singled out was because it is specifically oriented to accelerate more immediate delivery. She noted CLEEN looks at areas being researched and pushes them through the program more quickly. Ms. Pickard pointed out the advantage of CLEEN in the terms of what this subcommittee is trying to push forward. She also stated an element could be added to bring in additional current research on carbon reduction.

Dr. Alonso stated the key element was not only to accelerate the R&D pipeline, but also to accelerate the introduction of new technologies into the fleet. He wanted to ensure the subcommittee looks at things that can be done earlier than the normal 10 to 15 years. Dr. Alonso mentioned CLEEN is a great program for accelerating these technologies, but the chances of success would increase significantly if its scope and resources were expanded. It is generally acknowledged that the CLEEN program is underfunded for what it is trying to accomplish.

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Mr. Bedford thought that it would be helpful to include some facts to address the funding issue. He noted billions of dollars are being spent on NextGen. Mr. Bedford believed R&D in airframe and engine technologies (which could provide the bulk of the opportunity to reduce carbon over the next 50 years) is underfunded. Mr. Bedford pointed out if R&D funding is spread around to different agencies, there could be an opportunity for consolidation of these resources working toward a common goal.

Mr. Glover stated CLEEN is a unique program in that it is targeted for a shorter time implementation; other efforts, particularly NASA programs, are looking more at the longer term. Ms. Pickard noted CLEEN received government funding of \$125 million for 5 years, with a minimum 50 percent match from industry. Ms. Young stated CLEEN primarily covers technology, but some of its money goes to alternative fuels.

Mr. Bedford noted the graphic provided by Ms. Young and stated the challenge will be meeting the carbon emission goal by 2050. He pointed out the contribution of ATC/NowGen (the near-term NextGen program) and low carbon fuels are fairly well known. However, Mr. Bedford questioned whether reductions in carbon emissions (brought about by technological improvements) will be possible with funding of \$25 million per year.

Mr. Glover stressed the subcommittee does not dismiss industry's investments in R&D. Mr. Brandewie added the R&D tax credits approved by Congress will provide a greater overall benefit to reducing carbon emissions. He noted almost every other mode of transportation is funded through tax credits, and the Environment Subcommittee should endorse the renewal of these R&D tax credits.

Mr. Glover asked if this proposal could be wrapped around the additional funding for the CLEEN program and the R&D tax credit. Mr. Bedford thought this could be a proposal not just about the CLEEN program, but also for the R&D tax credit. He mentioned the R&D tax credits were originally on the agenda and were removed with the assumption that the Administration was on board with the tax credits. Now R&D tax credits need to be placed back on the agenda. Mr. Bedford also noted the industry is relying on the fact that new technology will deliver a significant benefit in the future. However, the question is whether the R&D programs are funded properly so results can be delivered in 10 to 15 years. He suggested the overall thought was programs are not getting the proper funding, and the subcommittee should suggest fixes.

Dr. Alonso agreed the proposal should focus on the broader R&D process and funding, rather than only on the CLEEN program, and give some ideas on what is needed. Mr. Pyatt thought the R&D tax credit is at risk this year and noted there are already companies that have closed out their fiscal year reporting. He stated these companies are involved in NextGen and other key R&D that should also be accelerated. However, because of the lack of credits, these companies will be taking financial hits. Mr. Pyatt believed it was very important for this subcommittee to take this on as a proposal.

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Dr. Alonso agreed the proposal should include the R&D tax credit. He noted this could go beyond just the interests of the Environment Subcommittee and impact many other areas of this industry. Dr. Alonso believed these R&D tax credits are extremely broad. Mr. Glover pointed out over 75 percent of his company's R&D investments in commercial airplanes are focused on environmental impact. He thought the subcommittee's role is to point out that these tax credits benefit carbon reduction efforts, along with other benefits. Dr. Alonso agreed to develop the technologies R&D proposal.

***Conclusion***

Mr. Bedford thought he could approach these proposals to the FAAC by looking at the goals for carbon reduction. He stated, although there are no global agreements, the cost for achieving even the lowest goal is quite significant. Mr. Bedford noted, to achieve even the minimum goal, one must look at the ways necessary to accomplish it, including: (1) NextGen, (2) alternative fuels, (3) technology improvements, and (4) some smaller initiatives such as runway metering programs. He suggested the proposal include all of these elements to show the approaches needed. Ms. Pickard thought he could end this with harmonization, and for all of these efforts to be brought together and succeed, there is a need for a national and international complementary environment.

Mr. Bedford believed there is a need for the DOT to take a lead in this national policy discussion. He felt if the DOT takes the lead, the results could include: (1) a more viable and competitive air carrier industry and manufacturing base, (2) a better environmental outcome; and (3) the development of clean energy industries. Mr. Bedford added the DOT could become a global leader in this effort, which would help the United States renew its economy.

Mr. Glover thought this is a great opportunity for the United States. Rather than wait for a global treaty, the United States could set up a system through bilateral agreements to further harmonization throughout the world.

Ms. Pickard asked Mr. Bedford how many proposals from the Environment Subcommittee he would like to bring forth to the full FAAC. She also gave him the time lines for the proposals. Mr. Bedford recapped the assignments as discussed below.

Mr. Glover suggested Mr. Bedford categorize the proposals into three areas: (1) Operational and Infrastructure Improvements, (2) Alternative Fuels, and (3) Technology and Fleet Renewal. Mr. Bedford agreed to the three areas suggested by Mr. Glover. He added harmonization could be brought in as the introduction and the ending of the proposal, which may entail a fourth recommendation. It was agreed the fourth recommendation of harmonization would be included in the proposals brought forward.

**PUBLIC COMMENTS**

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One public comment from AIA was discussed. The comment provided in a paper entitled, "Civil Aviation Growth in the 21<sup>st</sup> Century: Meeting Capacity and Environmental Challenges." (Docket item

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DOT-OST-2010-0074-0150.) Ms. Pickard mentioned the comment discussed many issues the subcommittee has talked about, and she recommended the subcommittee members look at the paper.

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**CLOSING REMARKS/NEXT MEETING**

Mr. Bedford closed the meeting by reviewing the action items to be given to him within short timelines in preparation for the full FAAC meeting on October 20, 2010. The subcommittee members recapped their individual assignments as discussed below.

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**ACTION ITEMS**

Assigned to	Action Item
Billy Glover	Draft the final four proposals based on inputs described below and send out to subcommittee members for refinement of the drafts.
Billy Glover and Brian Brandewie	Refine the NextGen component of the operational proposal.
Billy Glover and Richard Marchi	Refine the proposal on the airport metering pilot program.
Kinney Baxter	Develop a proposal on airport energy efficiency and emissions reduction.
Billy Glover and Nancy Young	Revise the alternative fuels proposal.
Juan Alonso and Brian Brandewie	Work on the technologies proposal, including R&D tax credits for industry and CLEEN.
Billy Glover and Nancy Young	Refine the harmonization proposal, including a graphic chart depicting carbon reductions anticipated from various measures compared to targets.

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**ADJOURNMENT**

Mr. Bedford solicited a motion for adjournment. On motion, duly seconded and approved by the majority of the FAAC members present, the meeting was adjourned.

The meeting adjourned at 3:05 p.m.

I hereby certify that, to the best of my knowledge, the foregoing minutes are accurate and complete.

Approved by: *Lynne Pickard*  
Lynne Pickard, Designated Federal Official

Dated: *February 8, 2011*