E&E Subcommittee Recommendations & FAA Responses

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Date: March 19, 2019

Outline

- Meeting Dates
- Recommendations from September 2018 and March 2019
- Action Item Status

Meeting Dates

- September 10-11, 2019 in Washington DC
- March 17-18, 2020 in Washington DC

Gonca will be sending out a Doodle poll for the Fall 2020 meeting dates.

REDAC Recommendations - 2018-09 / 2019-03

- **Research priorities**
  - Sept-2018/Mar-2019 Rec 01/Rec 03: Alternative Jet Fuels
  - Sept-2018/Mar-2019 Rec 02/Rec 04: Public Private Partnerships
  - Sept-2018/Mar-2019 Rec 03/Rec 01: Noise Research
  - Sept-2018/Mar-2019 Rec 04/Rec 02: Global Leadership
  - Mar-2019 Rec 05: Noise Research

- **Workforce development**
  - Mar-2018/Sept-2018 Rec 05: Staffing

2018-09 REDAC Recommendation - 1

Finding (1):

Alternative Jet Fuels - It is the position of this Subcommittee that the work on Alternative Jet Fuels (AJF) is critical to the U.S. industry and should be supported at the highest levels. Having the FAA maintain a leadership role in the development of AJF will also ensure that the rules that are developed internationally will benefit the U.S. industry. The elimination of funding for the Alternative Jet Fuel (AJF) Program (including efforts in the Commercial Aviation Alternative Fuels Initiative (CAAFI), CLEEN and ASCENT) will have a catastrophic effect on the maturation of this fledging industry. It is our view that the new companies and the industry that have been created will not be able to continue the work on AJF without government funding and the policies and procedures that are currently in place. Alternative fuels are a critical component of the industry's emissions reduction strategy and must be developed if industry is to get to their carbon neutral growth goals after 2020 and their emissions reduction goals in 2050.

Recommendation (1):

Since the maturation of the Alternative Jet Fuel program will be a major environmental benefit for the public, will create a new industry within the U.S. that benefits rural America, and will benefit the U.S. aviation industry, we strongly recommend that either RE&D A13.a or A13.b budget line items have an allocation for the continuation of research on AJF.

Response (1):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation.

The FAA continues to conduct research & development on the topic of alternative jet fuels. We recently convened the CAAFI Biennial General Meeting, which brought together nearly 200 people from industry, government and academia to discuss progress in the deployment of alternative jet fuels. We are also happy to note that the Secretary of Transportation has approved several research and development projects to conduct testing and analysis on alternative jet fuels within the ASCENT Center of Excellence. We also recently convened an industry day in preparation for a solicitation for the third phase of CLEEN and had much industry interest in research on alternative jet fuels. We will consider this recommendation as we develop the Fiscal Year 2021 budget.

2019-03 REDAC Recommendation - 3

Finding (3):

Alternative Jet Fuels - It is the position of this Subcommittee that the work on Alternative Jet Fuels (AJF) is critical to the U.S. industry and should be supported at the highest levels. Having the FAA maintain a leadership role in the development of AJF will also ensure that the rules that are developed internationally will benefit the U.S. industry. **A lot of progress has been made in the development of alternative fuels and any reduction of funding for the Alternative Jet Fuel (AJF) Program (including efforts in the Commercial Aviation Alternative Fuels Initiative (CAAFI), CLEEN and Aviation Sustainability Center (ASCENT)) will have a catastrophic effect on the maturation of this fledgling industry.** It is our view that the new companies and the industry that have been created will not be able to continue the work on AJF without government funding and the policies and procedures that are currently in place. Alternative fuels are a critical component of the industry's emissions reduction strategy and must be developed if industry is to get to their carbon neutral growth goals after 2020 and their emissions reduction goals in 2050.

Recommendation (3):

Since the maturation of the Alternative Jet Fuel program will be a major environmental benefit for the public, will create a new industry within the U.S. that benefits rural America, and will benefit the U.S. aviation industry, we strongly support funding for the continuation of research on AJF.

Response (3):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation(s).

The FAA continues to conduct research & development on the topic of alternative jet fuels. We recently convened the CAAFI Biennial General Meeting, which brought together nearly 200 people from industry, government, and academia to discuss progress in the deployment of alternative jet fuels. We are also happy to note several research and development projects to conduct testing and analysis on alternative jet fuels within the ASCENT Center of Excellence have been executed. These projects are key to ensuring that innovative new fuels are indeed safe for use by the commercial fleet as well as ensuring that domestically produced aviation fuels can be used by airlines towards meeting their offsetting requirements under CORSIA. We also recently convened an industry day in preparation for a solicitation for the third phase of CLEEN and had much industry interest in research on alternative jet fuels.

2018-09 REDAC Recommendation - 2

Finding (2):

Public Private Partnerships - The Office of Environment and Energy (AEE) have proven over decades to be very good stewards of taxpayer money. They have used their budgeted amounts to conduct and coordinate the research necessary to produce informed policies, facilitate technological advances in the aviation industry, and produced models and data that have positioned the U.S. as both a State leader at ICAO CAEP and on the global aviation stage. This has been accomplished by working collaboratively with private industry, major universities through the Partner and ASCENT Centers of Excellence, other Federal Departments and Foreign Governments. Three quarters of Environment and Energy research funds generate 100% plus cost matching from non-federal partners (CLEEN, CAAFI, and ASCENT). These programs help prepare the next generation of professionals for the aviation environment and energy domain. In order for the work that is being conducted with private industry and by these Centers of Excellence to not be adversely impacted, the government must approve the associated grants that are currently in the pipeline.

Recommendation (2):

The Subcommittee continues to endorse the robust funding like Public Private Partnerships like the CLEEN, CAAFI and ASCENT that leverage scarce resources. We also endorse the close collaboration between NASA and the FAA. In order to not interrupt the much needed work that is being accomplished, we request that the FAA expedite the approval of the pending grants associated with these partnerships.

Response (2):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation.

The FAA supports the Administration's vision to maximize the impact of taxpayer dollars by improving the efficiency of Federal programs through partnerships with industry and creating benefit for the American public. The vast majority of the Environment and Energy R&D program has been leveraging resources from the private sector via public-private partnerships. CLEEN, CAAFI and ASCENT have all been successful because of their strong engagement with industry. We also appreciate the recognition of our close partnership with NASA and its value. The Fiscal Year 2021 budget for the Environment and Energy R&D Program will continue to leverage private sector innovation through partnerships with industry, academia, private sector, and other government agencies and coordinate initiatives across federal agencies to maximize collaboration and avoid duplication of efforts.

The FAA understand the new grant approval process has been challenging and we are working to improve the process.

2019-03 REDAC Recommendation - 4

Finding (4):

Public Private Partnerships - The Office of Environment and Energy (AEE) have proven over decades to be very good stewards of taxpayer money. They have used their budgeted amounts to conduct and coordinate the research necessary to produce informed policies, facilitate technological advances in the aviation industry, and produced models and data that have positioned the U.S. as both a State leader at ICAO CAEP and on the global aviation stage. This has been accomplished by working collaboratively with private industry, major universities through the Partner and ASCENT Centers of Excellence, other Federal Departments and Foreign Governments. Three quarters of Environment and Energy research funds generate 100% plus cost matching from non-federal partners (CLEEN, CAAFI, and ASCENT). **Recent challenges in the grant approval process have led AEE to solicit new project ideas from a wide range of researchers in the ASCENT and CLEEN program. These ideas will lead to new research efforts for ASCENT that should result in real-world innovation.** In order for the work that is being conducted with private industry and by the universities in the Center of Excellence to not be adversely impacted, the government must approve these new grants and expedite the approval of grants that are currently in the pipeline. Delays in the approval of these grants has a negative effect on our working relationship with our partners.

Recommendation (4):

The Subcommittee continues to endorse the robust funding of Public Private Partnerships like the CLEEN, CAAFI and ASCENT that leverage scarce resources. The Subcommittee is also pleased with the close collaboration between NASA and the FAA. AEE presented an overall plan on how to get much needed new research ideas and to expedite the grant approval process. The Subcommittee endorses this plan. In order to not interrupt the much needed work that is being accomplished, we request that the FAA adopt this plan and expedite the approval of university grants.

Response (4):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation.

The FAA supports the Administration's vision to maximize the impact of taxpayer dollars by improving the efficiency of Federal programs through partnerships with industry and creating benefit for the American public. The vast majority of the Environment and Energy R&D program has been leveraging resources from the private sector via public-private partnerships. CLEEN, CAAFI and ASCENT have all been successful because of their strong engagement with industry. ASCENT builds on the PARTNER Center of Excellence, which also had strong engagement with industry. Each of these programs, CLEEN, CAAFI, and ASCENT/PARTNER, have had strong partnerships with, and support from, industry for over a decade. We also appreciate the recognition of our close partnership with NASA and its value. We are also working in close collaboration with a number of Federal Agencies in the area of alternative jet fuels. We have worked hard to develop these partnerships over many years. Appropriations for the Environment and Energy R&D Program have enabled private sector innovation through partnerships with industry, academia, private sector, and other government agencies and coordinate initiatives across federal agencies to maximize collaboration and avoid duplication of efforts.

To help expedite the grant process, we have developed an approach that directly incorporates senior FAA leadership decision-making into the process, and does so at an early stage of the grant development. We are currently using this new approach for the first time and look forward to reporting on it at a future Subcommittee meeting.

2018-09 REDAC Recommendation - 3

Finding (3):

Noise Research - The Subcommittee realizes that aviation noise is an ongoing issue. Despite all the work that is currently being conducted, much research is still necessary to address the ongoing topic of aviation noise. If not properly addressed, it will be a constraint on the growth of the U.S industry. AEE has a number of research projects that are looking at the impacts of noise on children's learning, sleep impacts, community annoyance and cardiovascular health. AEE is looking at the certification requirements for supersonic aircraft as well as UAS that are larger than 55 pounds. There is currently no noise regulations for supersonic aircraft other than the Concorde. AEE is also examining how to reduce the noise from commercial aircraft and helicopters through changes in operational procedures. Finally, AEE is working with industry to accelerate the development of technologies that reduce noise through the CLEEN Program. This work could soon be held up because of the current delay in processing grants.

Recommendation (3):

The Subcommittee strongly supports the prioritization of the noise research that will support informed decision-making and enable NextGen Deployment. We believe that the focus should be on impacts of Subsonic, UAM/UAS, Supersonics and then Commercial Space vehicles, in that order. The FAA should therefore aggressively move forward with its research efforts.

Response (3):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation.

Noise is indeed a challenge for the aviation industry. UAS, UAM, supersonic aircraft, and commercial space vehicles all present economic opportunities for the U.S. as well as potential concerns in terms of the environment, in particular noise. We have been working for many years to better understand the issues associated with noise from subsonic airplanes and helicopters and identify solutions that could help address noise concerns. More recently, the FAA has been doing work related to noise from supersonic aircraft and UAS. The FAA intends to continue these research efforts in the forthcoming budget submissions. Some of these efforts will address noise provisions in the 2018 FAA reauthorization. We are also working in close collaboration with NASA to address noise from subsonic aircraft, helicopters, UAS, UAM and supersonic aircraft. This includes domestic efforts as well as efforts in ICAO CAEP. In coordination with the Institute for Noise Control Engineering (INCE), the FAA and NASA recently convened a workshop on noise emissions and noise control engineering technology for noise from UAS. This meeting brought together industry, academia and government to discuss the potential issues with UAS noise and identify opportunities for collaboration. Noise reduction from gas turbine powered fixed wing aircraft will also be an area of emphasis for the third phase of the CLEEN Program, which will start in 2020.

2019-03 REDAC Recommendation - 1

Finding (1):

Noise Research - The Subcommittee realizes that aviation noise is an ongoing issue and quite possibly the biggest threat to NextGen, the modernization of the NAS and constraint to the growth of the U.S. Aviation industry. Much research is still necessary to address the ongoing topic of aviation noise and the possible impact of new entrants into the market. **The Subcommittee believes that there will be growth from Subsonic, UAM/UAS, Supersonics and Commercial Space vehicles and the FAA will need to be able to address the noise, emissions and health impacts of these new entrants.** AEE is working with universities through the Aviation Sustainability Center (ASCENT) to better understand the underlying issues and develop innovative solutions. AEE is also working with industry to accelerate the development of technologies that reduce noise through the Continuous Lower Energy, Emissions and Noise (CLEEN) Program. Some of the work in ASCENT is being held up because of the current delay in processing grants.

Recommendation (1):

The Subcommittee strongly supports the prioritization of the noise research that will support informed decision-making and enable NextGen Deployment. We believe that the focus should be on impacts of Subsonic, UAM/UAS, Supersonics and then Commercial Space vehicles, in that order. The FAA should aggressively move forward with its research efforts as research is the key to establishing sound policy.

Response (1):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation.

Aircraft noise-related concerns continue to pose a challenge to enhancing safety, capacity, and efficiency, and accommodating growth. Unmanned Aircraft Systems (UAS), Urban Air Mobility (UAM), supersonic aircraft, and commercial space vehicles all present economic opportunities for the U.S. We have been working for many years to better understand the issues associated with noise from subsonic airplanes and helicopters and identify solutions that could help address noise concerns. For example, we are continuing to explore operational procedure concepts that could help mitigate noise issues while also improving the Aviation Environmental Design Tool (AEDT) to ensure it can quantify aircraft noise at further distances from airports, where some communities are expressing concerns. We are also working in close collaboration with NASA to address noise from subsonic and supersonic aircraft, helicopters, UAS, and UAM. This includes domestic efforts as well as efforts in the International Civil Aviation Organization (ICAO) Committee on Aviation Environmental Protection (CAEP). Noise reduction from gas turbine powered fixed wing aircraft will also be an area of emphasis for the third phase of the CLEEN Program, which will start in 2020 and is included in the FY 2020 President budget request.

2019-03 REDAC Recommendation - 5

Finding (5):

Emissions - AEE has identified challenges associated with the use of the Aviation Environmental Design Tool (AEDT) to evaluate compliance with air quality standards. AEE has also identified challenges in getting air quality and noise data to support modeling efforts. **AEDT is an important tool in the arsenal of tools that the FAA relies on to enhance usability and improve airspace and airport design.** The Subcommittee is supportive of the work that has been done to develop this tool, but believes that a plan needs to be developed to address air quality modeling challenges and to compare AEDT results with field measurements.

Recommendation (5):

The Subcommittee recommends the FAA continue the simultaneous balanced development of usability improvements, enhanced features, and increased accuracy of AEDT in the near term. The FAA should make a point of emphasis to improve the dispersion modeling that is used by AEDT to evaluate air quality impacts. We also recommend that the FAA reach out to airports that use air quality and noise monitors and partner with them in order to get their emissions and noise data that would support their modeling efforts.

Response (5):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation.

The FAA appreciates the support of the Subcommittee to improve the air quality modeling capabilities within AEDT. As required by the EPA, AEDT uses AERMOD to model the dispersion of criteria pollutants. However, AERMOD was not designed for aircraft emissions. For example, it cannot accurately capture the three-dimensional effects of a rising aircraft plume. The FAA has awarded a grant to the University of North Carolina under the ASCENT Center of Excellence to help us determine an appropriate and efficient approach to address the dispersion modeling deficiencies that are currently in the AERMOD tool. In the interim, we are working to develop solutions to improve the accuracy within the limits of the current EPA model and identify means for airports to show their projects are in compliance with air quality standards through the use of their monitoring data.

2018-09 REDAC Recommendation - 4

Finding (4):

Global Leadership - Through the FAA's ability to influence the establishment of international standards at ICAO, the U.S. aviation industry has been able to maintain its competitiveness throughout the world. The Subcommittee believes that maintaining the U.S. global leadership position at ICAO CAEP is essential to protecting U.S. aviation interests. The Subcommittee is still very concerned about the FAA's long term ability to meet its goals and from being able to maintain current research or evaluate the impact of future entrants on the environment given the current President's proposed budget cuts. Decreased funding will undoubtedly reduce the FAA's ability to respond to domestic needs, such as those regarding noise, and seriously jeopardize the U.S. global leadership position at ICAO CAEP.

Recommendation (4):

The Subcommittee recommends the prioritization of all research efforts/programs that will allow the FAA and the U.S. to maintain its current global leadership position at ICAO CAEP. It is the belief of the Subcommittee that if the FAA/U.S. does not maintain its leadership position at ICAO CAEP, it will not be able to influence policy/rulemaking and this could have a significant negative impact on the U.S. aviation industry.

Response (4):

The FAA concurs with the Committee's recommendation and is undertaking the following actions to address it.

The FAA appreciates the support of the Subcommittee for our ICAO CAEP activities and the importance of continued U.S. leadership therein. We concur that it is critical for FAA to have robust participation in the ICAO CAEP process. FAA prioritized research efforts includes developing the modeling capabilities, and generating the data to support the decision-making process within ICAO CAEP. Efforts are also continuing in ICAO CAEP on supersonic aircraft. To be economically viable, these aircraft will need to be able to take off and land in other countries and this will require international agreements at ICAO CAEP. We have made considerable investments with industry to develop an engine Particulate Matter test database and modeling capabilities. As a result of these investments, we have a solid foundation for making decisions in ICAO CAEP on an engine PM emissions standard at the CAEP/11 meeting.

2019-03 REDAC Recommendation - 2

Finding (2):

Global Leadership - The adoption of CORSIA at the ICAO CAEP meetings is a clear indication of the FAA's ability to influence the establishment of international standards, which allows the U.S. aviation industry to maintain its competitiveness throughout the world. **The Subcommittee believes that maintaining the U.S. global leadership position at ICAO CAEP is essential to protecting U.S. aviation interests.** This position is only possible because of the FAA's ability to maintain its current research goals and its ability to evaluate the impacts of future entrants on the environment.

Recommendation (2):

The Subcommittee recommends the prioritization of all research efforts/programs that will allow the FAA and the U.S. to maintain its current global leadership position at ICAO CAEP and to expedite university research grants that support the U.S. work in ICAO CAEP. It is the belief of the Subcommittee that if the FAA/U.S. does not maintain its leadership position at ICAO CAEP, it will not be able to influence policy/rulemaking and this could have a significant negative impact on the U.S. aviation industry.

Response (2):

The FAA concurs with the Committee's recommendation and is undertaking the following actions to address it.

The FAA appreciates the support of the Subcommittee for our ICAO CAEP activities and the importance of continued U.S. leadership therein. We concur that it is critical for FAA to have robust participation in the ICAO CAEP process and we have devoted resources such that we can provide leadership in many of the working groups of CAEP. FAA prioritized research efforts include developing the modeling capabilities and generating the data to support the decision-making process within ICAO CAEP. We are currently working with U.S. stakeholders and the international community to develop noise standards for supersonic aircraft. These aircraft will need the operational flexibility to be able to take off and land in other countries, which will require international agreement at ICAO on takeoff and landing noise levels. As AEDT is the primary tool for supporting decision making at ICAO CAEP, we are working with the Volpe Center to enhance its capabilities to include supersonic aircraft. We are also working with industry, NASA, and ASCENT Center of Excellence universities to develop the data that will inform the decision-making process of ICAO CAEP. This includes efforts to ensure that a wide range of aviation fuels can receive credit under the ICAO Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). In the past, we made considerable investments with industry and academia to develop an engine Particulate Matter test database and modeling capabilities. Because of these investments, we were able to reach an international agreement on a cost-effective engine particulate matter emissions standard at the CAEP/11 meeting.

2018-09 REDAC Recommendation - 5

Finding (5):

Staffing - The Subcommittee is very supportive of the work that AEE does and believes that E&E is well managed and has a well balanced portfolio. We still believe that the inability to fill vacant positions will hamper the efforts of E&E to properly coordinate the amount of research necessary to both maintain the current programs and address future research that is necessary for informed decision making.

Recommendation (5):

The Subcommittee recommends the FAA place a high priority on filling staff vacancies to manage the E&E R&D portfolio and support the expanding workload within AEE.

Response (5):

The FAA concurs with the Committee's recommendation and is undertaking the following actions to address it.

The FAA understands the Subcommittee's concern about staff availability within the Office of Environment and Energy (AEE). We are in the process of executing a hiring plan that was developed in accordance with administration guidance. To accommodate the evolving nature of the industry and the FAA's needs, we are seeking individuals who could cover a variety of needs to fill these openings. AEE have had good success over the years in filling positions with highly qualified environmental professionals. This is due in part to the students and staff that have been trained as a part of PARTNER and ASCENT, the FAA Centers of Excellence for environment and alternative jet fuels.

Actions Completed/Underway – from Previous Meetings

Ongoing

- Share ASCENT NFO with REDAC E&E Subcommittee (on an annual basis)
- Leverage “right-to-left” thinking in developing roadmaps wherein we start by thinking about the endpoint (goal) that is desired and decide how to get there
- Monetize the air quality and climate benefits of having an alternative jet fuel with reduced sulfur and naphthalene content
- Leverage the road mapping efforts at NASA and FAA to update the White House National R&D Plan
- Develop a means to communicate information on AEDT to the layperson. This could include its noise and emissions modeling capabilities and how it reduces the need for noise and emissions monitoring
- Develop a means to communicate successes from E&E Portfolio summary slide
- Examine indirect environmental impacts from aviation that result from modifications to supply chains

Actions Completed/Underway – from Previous Meetings

Complete

- Presentation materials should talk about fuel instead of energy as the term energy means both fuel and electricity to airports. Make other changes suggested by the Subcommittee for the overview briefing
- Provide FY2020 budget breakout in chart 33 of the E&E R&D Overview briefing