# E&E Subcommittee Recommendations & FAA Responses

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- Date: March 19, 2019



Federal Aviation Administration

## Outline

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



## **Meeting Dates**

- Sept 10-11, 2019 Washington DC
- Please fill out poll for February/March 2020 meeting dates



### REDAC Recommendations - 2018-03 / 2018-09

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



#### Finding (1):

Alternative Jet Fuels - 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. This research has helped with the creation of a number of companies that will benefit the rural economies of some states and the U.S. Aviation industry. It is the position of this Subcommittee that the work on Alternative Jet Fuels is critical to the U.S. industry and should not be eliminated. 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. It is our view that these new companies and the industry that is being 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 appreciates the Committee's finding and recommendation; however, we are not able to pursue this recommendation at this time for the following reasons. The FAA's research & development prioritization process includes a review of its complete R&D portfolio, including the area recommended by the Subcommittee. As part of this process, the FAA will continue to provide the subcommittee with status and rationale on funded/unfunded research to obtain feedback/concerns on areas the Subcommittee believes require reconsideration. We appreciate your feedback; however, this area was not funded in the President's Budget for FY19 as it was viewed as an area that could be supported by industry.



#### 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.



#### 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 leverage scarce FAA R&D funds to accomplish significant advances and improvements. In addition to the Alternative Jet fuels described in Finding 1, above, the CLEEN program has resulted in a number of technological advances that will reduce noise and emissions. For example, the GE Twin Annular Premixing Swirler (TAPS) II combuster, matured under the CLEEN program has entered into service in a CFM International engine. This engine is being used on the B-737 MAX and Airbus 320 aircraft. It reduces landing and takeoff emissions by 55% relative to current standards and reduces particulate matter by 90% relative to the current international visibility limit. In addition, government funding has been used effectively to lower the risk of new and emerging technologies such that they can be adopted by industry. The maturation of environmental technologies that deliver improved environmental performance allows aviation system growth and associated positive economic impacts.

#### Recommendation (2):

The Subcommittee continues to endorse Public Private Partnerships like the CLEEN, CAAFI and ASCENT programs to leverage resources and recommends that FAA should continue to prioritize robust funding for these programs. At the very least, the FAA should ensure that none of these programs are completely eliminated to enable the Agency to continue work on them, even if such work is at a reduced level.

#### 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. In Fiscal Year 2019, the FAA proposed a Research, Engineering & Development program focused on leveraging private sector innovation through partnerships with industry, academia, private sector, and other government agencies; coordinating Research & Development initiatives across federal agencies to maximize collaboration and avoid duplicate efforts; and continuing research in high priority technology and policy areas that promote innovation.



#### 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.



#### Finding (3):

**Noise Research** - The Subcommittee realizes that there is much research that is still necessary to address the ongoing topic of aviation noise. There are increased noise complaints from individuals outside of the day-night noise level (DNL) of 65 dB. The increase in complaints is paired with an increase in public opposition which is resulting in growing political pressure on the FAA as well as litigation in many areas, which is delaying NextGen Deployment. 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. 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.

#### Recommendation (3):

The Subcommittee strongly supports the prioritization of the noise research that will support informed decision-making and enable NextGen Deployment. The FAA should therefore aggressively move forward with its research efforts to review and understand current community noise concerns and to take appropriate action when conclusions are reached.

#### 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. We have been working for many years to better understand the issues and identify solutions that could help address it. UAS, 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 are working in close collaboration with NASA to evaluate low boom technologies and conduct the necessary analyses to understand the noise and emissions impacts of these new designs. Depending on the vehicle design, UAS could lead to noise concerns. We continue to seek partners to measure the noise from these vehicles to understand the potential issues and ensure we are well placed to deal with them through continued innovation.



#### 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.

#### 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. Examples of recent successes include the setting of a particulate matter standard and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Absent this leadership, there is a significant possibility that actions will be taken that are adverse to U.S. aviation interests and will place U.S. industries at a competitive disadvantage vis-à-vis their foreign counterparts. The Subcommittee therefore believes that maintaining the U.S. global leadership position at ICAO CAEP is essential. The draconian reduction in funding of approximately \$95 million (more than 50%) in 2019 and subsequent years drastically inhibits the FAA from being able to meet its goals and from being able to maintain current research or evaluate the impact of future entrants on the environment. 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 finding and recommendation and is undertaking the following actions to address its recommendation. 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, but also to develop the modeling capabilities, and generation of 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 PM 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.



#### 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.



#### 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. The proposed budget cuts would require a reduction in staffing of approximately 50%. Staff will be required to maintain the same level of research to inform decision making and advance solutions such that the FAA can attain its goals. The loss of skilled staff could further delay the completion of critical projects. Sufficient financial and personnel resources are required.

#### 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 appreciates the Committee's finding and recommendation; however, we are not able to pursue this recommendation at this time for the following reasons. 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. AEE has been working with vacancies for 1/5 of their positions. 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.



#### 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

- Update the E&E trifold to include information on how the E&E Portfolio is leveraging private sector funding
- Examine how aviation economic benefits are conveyed in E&E outreach materials (to ensure that importance of aviation exports are captured)



### **Action Item**

# Update the E&E trifold to include information on how the E&E Portfolio is leveraging private sector funding

- The trifold 'Environmental and Energy Strategy" page was updated to include a graphic covering the E&E Public-Private partnership programs.
- Have been ensuring that the message is being conveyed in all applicable materials



Examine how aviation economic benefits are conveyed in E&E outreach materials (to ensure that importance of aviation exports are captured)

- Coordinated with A4A to ensure the trifold satisfactorily conveyed aviation's economic benefits
- Have been ensuring that the message is being conveyed in all applicable materials



