E&E Subcommittee Recommendations & FAA Responses

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Date: September 11, 2018

Federal Aviation Administration

Outline

- Meeting Dates
- Recommendations from August 2017 and March 2018
- Action Item Status

Meeting Dates

- March 19-20, 2019 - Washington DC

- Please fill out poll for August/September 2019 meeting dates

REDAC Recommendations - 2017-08 / 2018-03

- **Research priorities**
  - Aug-2017 Rec 01: Public Private Partnerships
  - Mar-2018 Rec 02: Public Private Partnerships
  - Mar-2018 Rec 01: Alternative Jet Fuels
  - Mar-2018 Rec 03: Noise Research
  - Aug-2017 Rec 03: Supersonic, Unmanned and Commercial Space Vehicle Impacts
  - Aug-2017 Rec 04: U.S. leadership in ICAO CAEP
  - Mar-2018 Rec 04: Global Leadership
- **Workforce development**
  - Aug-2017 Rec 02: Human Resource Allocation
  - Mar-2018 Rec 05: Staffing

REDAC Recommendations - 2017-08 / 2018-03

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2017-08 REDAC Recommendation - 1

Finding (1):

Public/Private Partnerships - Members of the E&E Subcommittee are very aware of the budgetary constraints that exist within the Department of Transportation and the FAA. The Continuous Lower Energy, Emissions, and Noise (CLEEN) program, the Commercial Aviation Alternative Fuels Initiative (CAAFI) and the Aviation Sustainability Control (ASCENT) program are successful industry/FAA cost-share programs that leverage scarce FAA R&D funds that have accomplished significant advances and improvements for the industry.

Recommendation (1):

The Subcommittee recommends that the FAA continues to prioritize robust funding for the Public Private Partnership programs like CLEEN, CAAFI and ASCENT.

Response (1):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation. We appreciate the Subcommittee's continued support for the FAA's efforts to accelerate the maturation of aircraft technologies to lower noise, emissions and fuel burn via the CLEEN Program, as well as, to advance the development of alternative jet fuels via CLEEN, CAAFI and the ASCENT Center of Excellence. All three of these programs are conducted in partnership with the private sector through cost-sharing agreements and with considerable industry engagement. This engagement is a key reason for their success. CLEEN and ASCENT account for roughly three quarters of the RE&D Environment and Energy funding. As such, three quarters of the RE&D budget is generating 100% cost share. CAAFI does not have a cost-share requirement so the non-government funds going toward it have not been tracked over time. However, the effort has considerable industry support – especially from the airlines – and has been successful in directing efforts across the federal government. These are also longstanding efforts of the FAA: ASCENT is the follow-on Center of Excellence to PARTNER which was established in 2004, CAAFI was started in 2006, and CLEEN was started in 2011.

2018-01 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 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.

2018-01 REDAC Recommendation - 1

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.

2018-01 REDAC Recommendation - 3

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.

2017-08 REDAC Recommendation - 3

Finding (3):

Supersonic, Unmanned and Commercial Space Vehicle Impacts - During the Subcommittee meeting, the FAA presented information that indicates that there has been a dramatic increase in the level of interest in supersonic aircraft under the current Administration. There is also potential growth in unmanned aerial systems and commercial space vehicles. There is a significant amount of research that needs to be done in order to understand the environmental impacts of these new entrants. Research is the key to establishing sound policy. The FAA/AEE should ensure that its research plans will address the noise, emissions and possible health impacts of these new entrants such that the FAA can make informed decisions in carrying out their responsibilities under various statutes.

Recommendation (3):

Based on increased interest in supersonic aircraft, the growth of unmanned aerial systems and the growth of commercial space vehicles, the Subcommittee encourages the FAA to advance our understanding on the environmental impacts of these entrants.

Response (3):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation. 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. As such, the FAA is devoting resources to advance our understanding of the environmental impacts of these new entrants such that effective solutions can be found to overcome potential barriers to their entry into the NAS. There is indeed an increased interest in supersonic aircraft. Industry has put forward many design concepts for supersonic aircraft. Some are low-boom designs and some would result in a full boom like the Concorde. 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. Supersonic aircraft will only be economically viable if they can take off and land in other countries. That will require international agreements at ICAO CAEP. 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. Commercial space vehicles could also present noise and emissions challenges depending on their design and where they are operating. We are leveraging efforts being funded by the Airports Cooperative Research Program to ensure our modeling capabilities can capture the noise and emissions from these vehicles.

2017-08 REDAC Recommendation - 4

Finding (4):

Non-Volatile Particulate Matter - The Subcommittee is very pleased with the work done by AEE on developing a non-volatile particulate matter (PM) emissions standard and in the development of the Carbon Offsetting and Reduction System for International Aviation (CORSIA). In regards to the CORSIA, it is important that proper credit be given for the use of alternative fuels. The Subcommittee is also pleased with the efforts of the FAA along with NASA to conduct and align research activities to inform the development of noise and emission standards for supersonic aircraft. The Subcommittee believes that United States leadership in the ICAO CAEP process continues to be an important priority.

Recommendation (4):

The Subcommittee highly recommends that the FAA continue their commitment for all of the necessary programs to support continued U.S. leadership in ICAO CAEP. This includes the non-volatile PM emissions standard, CORSIA, alternative fuels and supersonic aircraft.

Response (4):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation. We appreciate the support of the Subcommittee for our ICAO CAEP activities and the importance of continued U.S. leadership therein. Robust funding is critical to not only ensuring that we have robust participation in the ICAO CAEP process but also to the development of our modeling capabilities and the generation of data to support the decision-making process within ICAO CAEP. Because of FAA leadership, the CAEP Steering Group reached an agreement in September on the CORSIA Package. The inclusion of alternative jet fuels within CORSIA is a direct result of many years of effort by the FAA and the ASCENT Center of Excellence. 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. Efforts are also continuing in ICAO CAEP on supersonic aircraft. This is important as these aircraft will only be economically viable if they can take off and land in other countries and this will require international agreements at ICAO CAEP..

2018-01 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. 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.

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2017-08 REDAC Recommendation - 2

Finding (2):

Human Resource Allocations - As has been highlighted in the past, there is serious concern over the number of vacancies that exist in the Office of Environment and Energy (AEE) and the increasing requests for answers. There are currently twelve (12) vacancies in AEE. In order for the dedicated employees within AEE to be able to properly manage the current portfolio, which we believe is well balanced, maintain the FAA's global leadership position in the International Civil Aviation Organization (ICAO), address the growth of other areas of commercial transportation and the development of smart policy, there is a need for answers. The answers to the many questions require the ongoing need for research.

Recommendation (2):

In order to provide the research that is needed to properly address the increased tasking of the Office of Environment and Energy (AEE), the Subcommittee recommends that the FAA commit the resources needed to hire additionally qualified individuals to be able to properly address portfolio needs. We would ask the FAA to not take away limited resources from current work in an effort to handle new work.

Response (2):

The FAA concurs with the Committee's finding and recommendation and is undertaking the following actions to address its recommendation. The FAA appreciates the assessment that the Environment and Energy portfolio is well-balanced and we understand the Subcommittee's concern about staff availability as the Office of Environment and Energy (AEE) has been operating with vacancies for 1/5 of their positions. Qualified staff are needed to maintain FAA's leadership position within ICAO CAEP, to continue to manage the current research portfolio, and to overcome environmental challenges that could prevent the entry of UAS, supersonic aircraft and commercial space vehicles into the NAS. AEE have had 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. 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.

2018-01 REDAC Recommendation - 5

Finding (4):

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 (4):

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 (4):

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.

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

Complete

- Examine the Pathways Program that is used by NASA and the FAA Tech Center as a potential means of attracting interns to AEE