Subcommittee on Environment and Energy | MINUTES

Meeting date & time *February 28-March 1, 2017*
Meeting location *GAMA, Washington D.C.*

Purpose FY19 E&E Portfolio Guidance
Facilitator Jim Hileman, DFO
Note taker Jim Hileman
Timekeeper Jim Hileman

Minutes from Meeting

Presentation Chair Opening Statements **| Presenter** *Mahendra Joshi*

Mahendra Joshi welcomed everyone and established the meeting logistics. Everyone introduced themselves. Mahendra discussed the last full REDAC meeting. The full REDAC discussed the need for a comprehensive R&D plan for the FAA (there is a briefing at this meeting on this subject). The letter to the Administrator had a note commending the FAA on the ICAO CAEP CO2 emissions standard.

Presentation What's New in FAA and AEE **| Presenter** *Curtis Holsclaw*

Curtis Holsclaw gave an update on what is happening in the FAA and AEE. Lourdes is retiring and Curtis will be the Acting Executive Director until the position is filled. We expect the announcement for Lourdes's position will be open to outside competition.

There are other AEE openings due to people leaving AEE or retiring. We currently have more openings than at any point since 2000 - 10 positions in total. There is confusion on how to fill these positions given the current hiring freeze.

The transition is going slowly. There are two people in FAA from the transition team. One of these is Dan Elwell who was formerly with APL.

We expect renewed activity on FAA Reauthorization. We expect to provide technical assistance as we have traditionally done. We are looking closely at how environmental issues would be handled with a potential FAA privatization.

Noise continues to be a priority for the agency. We have a new emphasis on community engagement on noise. This engagement is being built into the modernization work of NextGen. We have a noise steering group that spans the agency to work on noise issues. It is helping us to develop a consistent message across the FAA.

We have caps in place on travel due to the Continuing Resolution and this could affect AEE's ability to support the R&D program.

Presentation International Update | **Presenter** *Curtis Holsclaw*

Curtis Holsclaw gave an update on what is happening in AEE from an international perspective. ICAO started its CAEP/11 cycle in February 2016. The first steering group meeting was hosted by the US in Washington DC in December 2016. The working groups are meeting to advance their work.

In October, the Assembly agreed to pursue the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). The Assembly also agreed to Assembly Resolutions A39-1, A39-2 and A39-3, which cover areas of environment. CORSIA is described in A39-3.

FAA AEE continues to work with international partners. We expect two visitors from Indonesia later this year to do analyses with AEDT. We also have new agreements with Ukraine, Spain, and a trilateral agreement with Spain and Guatemala.

The ICAO Counsel has set up an advisory group for the technical aspects of the GMBM. This includes the standards and recommended practices that are currently being developed. These need to be completed very soon such that States can implement CORSIA by 2019.

ICAO has five capacity building seminars over the course of the next year. FAA intends to have representatives at each of these meetings. These meetings will also encourage States to file or update their State Action Plans and the FAA is willing to help on this front as needed.

The Transition Team has thus far not provided input to FAA on international efforts in ICAO.

Presentation Industry Perspective | **Presenter** *Steve Alterman*

Steve Alterman led a discussion that shared industry perspectives. At present there is considerable uncertainty with respect to what is happening in the federal government. Last year's reauthorization extended the FAA authority to late 2017 and therefore we are going to have many of the same discussions regarding FAA Privatization. No one is sure how environment is going to be handled with a potential spin-off of ATO. Industry has varied views on privatization. There is support from industry for the work that is contained in the E&E Portfolio and AEE. CLEEN should fit within the President's concept of a Public-Private Partnership.

There would be considerable challenges for industry if the rest of the world adopts the CO2 standard, but the US does not . This could be impacted by changes to the endangerment finding. There are also challenges with potential impacts to the EPA budget and staffing as they need to implement the CO2 standard domestically.

There is also an issue with the current noise regulation that has not been promulgated in the US but is being implemented elsewhere in the world.

Going forward there could also be issues with the particulate matter standard.

Presentation NARP Re-design | **Presenter** *Shelley Yak*

Shelley Yak gave a presentation on the ongoing effort to redesign the FAA National Aviation Research Plan (NARP). The objective of the effort is to improve FAA's Research Plan to better express Research & Development strategy and priorities. The GAO, in their ongoing review of the FAA R&D Program, has highlighted the NARP as something that could be improved.

Shelley provided the proposed structure for the new NARP and draft goals and objectives that are being developed. She concluded her briefing with the timeline for building and communicating the new version of the NARP.

During the discussion that ensued, several members provided feedback.

A Subcommittee member noted that there is considerable overlap of FAA work with that being done elsewhere. There was a suggestion to have the NARP capture partnerships with other Federal Agencies (such as NASA), industry, and elsewhere.

One of the Subcommittee members noted that we need to capture the fact that these are integrated problems and there needs to be a consideration of all of the areas including energy and environment. There should be language that includes synergy and what is catalyzing the work. There could also be a discussion on the use of sensors to get improved data and feedback.

Another member noted that we should include what is being done to improve the certification and compliance process.

There was a discussion on the challenges and importance of showing how the new NARP will be an integrated document.

There was a discussion on the document structure and who is using the NARP. The driver with the new structure is to improve the usability of the NARP and to provide a holistic view of R&D in the FAA.

A Subcommittee member noted the importance of considering each of the outcomes within the individual objectives.

Several Subcommittee members liked the fact that the structure is using right to left thinking.

Presentation Responses to REDAC Recommendations & Actions | **Presenter** *Jim Hileman*

Jim Hileman walked through the existing findings and recommendations from the past two meetings (April 2016 and August 2016). All of the recommendations were closed. He also walked through the action items from previous meetings. A Subcommittee member asked that the item action item to “leverage the road mapping efforts at NASA and FAA to update the White House National R&D Plan” be listed as being “on hold” until the NARP revision that is ongoing within the FAA is completed.

Open action items are listed below.

Action items (from previous meetings)	Person responsible	Deadline
Share the ASCENT NFO with the REDAC E&E Subcommittee (on an annual basis)	J. Hileman	May 2017
Create ASCENT fact sheet for sharing with community	J. Hileman	August 2017
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	J. Hileman	August 2017

Action items (from previous meetings)	Person responsible	Deadline
Monetize the air quality and climate benefits of having an alternative jet fuel with reduced sulfur and naphthalene content	J. Hileman	August 2017
Leverage the road mapping efforts at NASA and FAA to update the White House National R&D Plan	J. Hileman	On hold until NARP revisions completed

Presentation R&D Budget Status | Presenter *Mike Gallivan*

Mike Gallivan presented the FY17 budget details. The Government is currently operating under a Continuing Resolution.

At present there is not an overall FY 2018 funding agreement. Without a legislative agreement the Sequester Caps will kick in. The "Skinny Budget" Submission is currently scheduled for March 14, 2017.

We are currently awaiting an updated FY 2019 target. Full development of the out-year budget will be delayed until after the FY 2018 President's Submission.

The current authorization was approved by Congress on July 14, 2016 and signed by the President on July 15, 2016 which extends authorization through the end of FY 2017 (September 30, 2017). We are awaiting congressional action.

Presentation E&E Research Overview **| Presenter** *Jim Hileman*

Jim Hileman gave an overview of the Environment and Energy Research Portfolio to refresh the Subcommittee on the research program. This includes the goals for the program and the overall strategy. The presentation focused on the RE&D budget line items that comprise the Environment and Energy Portfolio, but it also included information on the ATR programs that are being used to examine airport environmental problems. He provided the FY19 program proposal and the out-year budget targets. His briefing provided a summary of how funding has been used and would be used for the time period between FY14 and FY19. Jim concluded the briefing with recent accomplishments that were funded by the Environment and Energy program.

There was considerable discussion on the research that would be done using FY19 funding and how the above target requests would be used.

A subcommittee member stated that the list of accomplishments is impressive.

Presentation NASA Update**| Presenter** *Jay Dryer*

Jay Dryer gave an update on NASA Aeronautics efforts. He focused on the NASA goals, structure of the aeronautics program, and key work areas.

Jay presented on the progress with the supersonic aircraft flight demonstration that is being done within the New Aviation Horizons (X-Plane) Initiative. The Preliminary Design for the supersonic flight demonstrator is underway and proceeding on track with completion expected in

the summer of 2017. There was considerable discussion afterward about the importance of this demonstration and how FAA and NASA are working together.

Jay also presented on other aspects of the New Aviation Horizons Initiative to advance subsonic aircraft concepts. Several subcommittee members noted the importance of these concepts to reducing noise. Jay noted that the work is geared specifically to commercialization of new concepts. Jay explained how NASA is also thinking about other aspects of the configurations including manufacturing, composites, and propulsion systems.

There was also discussion about the work that NASA is doing on Unmanned Aerial Systems (UAS) Traffic Management; how NASA is using its existing research infrastructure and how this infrastructure has been leveraged considerably to support the New Aviation Horizons Initiative; and how FAA and NASA are working together on a number of environment and energy areas including emissions, supersonics, helicopters, and UAS.

Presentation Noise Research – Roadmap and Update **| Presenter** *Rebecca Cointin*

Becky Cointin presented an overview of research that is ongoing within AEE on aviation noise. She started by outlining the challenge the FAA is facing in terms of commercial aircraft noise. She summarized the need to improve our understanding of noise impacts, increase public understanding of noise, and develop mitigation options to reduce noise. She provided research needs in terms of noise for commercial aircraft, supersonic aircraft, helicopters, UAS and commercial space.

A Subcommittee member noted that the FAA has been instrumental in changing the direction of NASA's helicopter program to focus more on how to reduce noise from helicopter operations.

Becky laid out the FY17 project priorities for noise. She also discussed the priorities for FY18, FY19 and beyond. She noted that National Institutes of Health is also going to be providing funding support to the efforts to examine aircraft noise health impacts. She answered a number of questions about the ongoing efforts to examine rotorcraft noise and what is being planned.

Becky provided information on existing projects with a focus on the noise survey, helicopter noise, and UAS noise.

There was considerable discussion around the community annoyance survey. There were several Subcommittee members who requested that the FAA exercise caution in the communication of community results to the public as there are a lot of expectations around these data and how they will be used.

There was also discussion around the certification of noise for UAS. A Subcommittee member noted that the risk-based certification is based on a safety consideration and wondered if one needs to have the same rigor with noise as it is done with safety. The FAA responded that we are working through the issues of noise certification for UAS and a risk-based approach could be helpful.

Presentation Emissions Research | **Presenter** *Ralph Iovinelli*

Ralph Iovinelli provided an overview of emissions research in AEE. He started his briefing by presenting historical progress in aircraft fuel efficiency and CO2 emissions. There was a brief discussion on how the efficiency and CO2 emissions trends are related.

Ralph presented the research areas covered by FY17 projects and then the research areas for FY18, FY19, and beyond.

A Subcommittee member asked what would happen if the US did not promulgate an internationally agreed upon standard. Ralph explained what happened with the CAEP/6 NO_X standard, which was not promulgated by the EPA as a domestic rule. Manufacturers ended up having many issues with the result being increased costs for certification. Another Subcommittee member noted that it is very awkward for a manufacturer not to be able to certify their aircraft to the latest international standard and that this is in fact happening today with the ICAO Chapter 14 noise standard.

A Subcommittee member noted that there has been a lot of progress in mapping air quality impacts near airports. He agreed to talk to Ralph further about this.

Ralph presented details on several existing projects.

Ralph stated that the work on measuring PM emissions from representative engines is nearly done. Some of the engines have been measured multiple times. Ralph noted that we are shifting our resources from measuring emissions from engines to developing correction factors for altitude effects, ambient conditions, and fuel composition. There was a good discussion around the PM measurement results for mass and number. The FAA noted that the reductions in PM mass are being achieved with reductions in NOx emissions.

Ralph presented on the future direction of ASCENT Project 10 to look at supersonic aircraft to complement the existing work on subsonic aircraft. Work was also presented on the efforts to improve our air quality and climate modeling methods within ASCENT.

There was discussion on the direction of the work on naphthalene reduction in conventional jet fuel. The FAA noted that the work is examining the costs at the refinery to reduce the naphthalene content of jet fuel as recent measurements show that these compounds have low hydrogen content and are already limited by the ASTM standard. After the initial work is done to examine costs, the research team will examine the potential benefits.

Ralph finished his presentation with a discussion on the aggressive timeline associated with the PM standard that is being pursued during the CAEP/11 cycle.

A Subcommittee member noted that there is a large cohort study ongoing in California that could be of use to the ongoing emissions impact work.

There was a discussion around the importance of modeling and measurements to obtain the actual PM exposure of those who live and work near airports.

Presentation AEDT Development | **Presenter** *Mohammed Majeed and Joe DiPardo*

Mohammed Majeed and Joe DiPardo gave a briefing outlining AEDT development over the next few years.

Mohammed started the presentation with the development drivers for AEDT which led to a discussion on whether or not AEDT is being used across the FAA. One Subcommittee noted that it is a really useful tool and he didn't know why some lines of business in the FAA are having issues with it. The FAA asked whether or not these lines of business in the FAA have ever used the legacy tools that were combined to create AEDT. A Subcommittee member noted that the analyses using the legacy tools have always been performed by contractors working for the FAA and that it would be good to get training for the folks who oversee the work at the FAA such that they are comfortable examining them. The FAA noted that it has provided specific training for Air Traffic staff using valuable AEE staff and are willing to provide this to others within the FAA as needed such that they can use/interpret AEDT results.

Mohammed walked through the plans for AEDT2c and AEDT2d development in FY16 and FY17. A Subcommittee member noted that there are many improvements to the tool and commends the FAA for fixing AEDT to allow multiple versions of the tool to work on the same computer.

Joe presented on the AEDT3a development plans for FY18.

A Subcommittee member noted that the FAA should provide guidance on how the results will change with the use of the new version of the tool. The FAA noted that this is something that we normally do with new tool releases and something that will need to be done in the future.

There was a discussion about the importance of doing the work scheduled for AEDT3a and the FAA noted that these changes are needed to enable the evaluation of the environmental benefits of NextGen and therefore they are a priority.

A Subcommittee member recommended that the FAA develop a decision date by which they decide on whether or not to move forward with BADA4 for AEDT3a or develop an alternative performance method.

Joe also presented the AEDT3b development plans for FY19 which focuses on improved taxiway modeling.

Joe and Mohammed presented ideas for AEDT4 development in FY20+ which would focus on higher fidelity noise characterization and improved air quality modeling.

The Subcommittee Chair complemented the FAA on the detailed AEDT development plan and for being very responsive to the Subcommittee's requests on AEDT. **End of Day 1**

Presentation Airport Technology Research - Environment Projects | **Presenter** *Tom Cuddy*

Tom Cuddy presented on the Airport Technology Research (ATR) Program and its efforts related to noise and environment. Tom started with an overview of the ATR Program and the three Research Program Areas within it that cover safety, pavement, and environment. The majority of the briefing was focused on the Airport Environmental Research Program Area.

Tom provided updates on each of the projects that are being funded within the FY16 Airport Environmental Research Program Area. He also provided brief summaries of what is planned using the funds from FY17-FY19.

The Subcommittee had a conversation on the relative benefits of directly measuring emissions around airports as opposed to relying on modeling. This led to an action for the FAA that is captured below.

A Subcommittee member asked whether or not water would be a part of the Airport Environmental Research Topic Area. Tom responded that this could be a part of the 10 year plan.

A Subcommittee member stated that the climate resiliency and Equivalent Lateral Spacing Operations (ELSO) work will be of particular interest to airports.

The FAA clarified that the results from the ongoing ATR funded work would be made public, but the forum for sharing them is still undetermined.

A Subcommittee member asked if the ATR funds could be used to increase the usability of AEDT. Tom commented that the staff in the field do not necessarily need to use AEDT but should know how to use it. He further stated that the Environmental Protection Specialists are being encouraged to seek training, and that AEE have offered much support for this. The Subcommittee member noted that there are Environmental Protection Specialists who would benefit from AEDT training such that they make informed decisions about AEDT analyses. Tom said he would be behind pushing for this.

Action items	Person responsible	Deadline
FAA will explore and clarify the air quality analytical requirements for airport projects that are on the Presumed to Conform list for General Conformity purposes versus NEPA disclosure purposes. This could be used with the AQ Screening Method being developed with FY16 ATR funds. The expected outcome is an update to the guidance in FAA's Air Quality Handbook.	R. Iovinelli	August 2017

Presentation Operations Research - Roadmap and Update | **Presenter** *Chris Dorbian*

Chris Dorbian presented on the ongoing work on operations research. He divided the work into three areas that focus on noise, fuel/emissions reduction, and modeling/tools.

Chris showed how the various ongoing efforts are linked to work to develop a “Toolbox” of procedures and procedural changes that could mitigate noise. These efforts include the work of ASCENT Project 23, which is developing an enhanced NAS-wide air traffic evaluation framework. The focus is on assessing implications of proposed operational procedures on fuel burn, noise, and environmental justice without detriment to safety. The work ties to the FAA-Massport MOU, which is providing a case study to evaluate the feasibility of such a framework. He also talked about the various ideas that are being considered to potentially mitigate noise.

A Subcommittee member noted that the work on noise abatement procedure usage and effectiveness would benefit from a consideration of General Aviation aircraft as they have specific procedures to reduce noise that differ from larger aircraft.

The FAA noted that there are ongoing discussions with UPS to examine procedure changes to reduce noise that would leverage existing data from actual aircraft operations. They also noted that the work needs to consider pilot and controller workload and the FAA-Massport MOU would also examine these.

There was a lengthy discussion on the overall work and its direction. One subcommittee member stated that these efforts will be critical to the FAA and their credibility when saying that they are looking at everything possible to reduce noise.

Chris quickly covered the fuel/emissions and modeling/tools aspects of the operations research.

The Subcommittee asked several clarifying questions about the surface work that is ongoing as well as the Cruise Altitude and Speed Optimization (CASO) and Delayed Deceleration Approach (DDA) efforts.

Presentation Analysis & Tools – Roadmap and Update **| Presenter** *Fabio Grandi*

Fabio Grandi gave an overview of the analysis and tools efforts that are ongoing within AEE. He started his presentation with a timeline for the tools and analysis roadmap as well as efforts to develop analytical capabilities within AEE.

Fabio also walked through updates on the FLEET-Builder development, tools-related ASCENT projects, and AEE in-house AEDT development and testing efforts. A Subcommittee member commented that FLEET Builder should have a fully AEDT compliant schedule for analysis.

Fabio also presented on ongoing in-house efforts related to AEDT. This included efforts that are leading to improvements in AEDT. He also provided updates on collaborative efforts that are occurring within the FAA that relate to tools and analysis. He finished his briefing with a discussion of an in-house analysis performed in response to an action from the last REDAC meeting to examine how population encroachment near airports might have led to changes to the number of people exposed to significant noise.

Presentation Alternative Jet Fuels – Analysis, Testing and Coordination Efforts **| Presenter** *Nate Brown*

Nate Brown presented on the ongoing efforts in AEE on alternative jet fuels. He started his briefing with a list of the challenges that need to be overcome to enable the expanded use of alternative jet fuels. He followed this up by outlining how the FAA is doing work on analysis, testing and coordination.

Nate provided details on the work that is being done by the FAA on alternative jet fuel testing with details on the ASTM approval process. A Subcommittee member asked if the ASTM approval process that is outlined in Nate's briefing applies to aviation gasoline and Nate said that it does not apply as it only applies to alternative jet fuels. Nate continued to provide information on the alternative jet fuel testing efforts at U. Dayton Research Institute and through CLEEN II. He gave a high level overview of the National Jet Fuel Combustion Program that is developing

methods to streamline the ASTM approval process. A Subcommittee member stated that the senior leadership at his engine company was very impressed with the quality of the work coming out of the NJFCP.

A Subcommittee member asked about the implications of decreased funding on alternative jet fuel testing. The FAA noted that decreased funding results in work either being shifted to the future or being removed. Some efforts require the availability of engine rigs and these may only be available during limited time windows. If those opportunities are missed, then the experiment may not be possible or the costs could be higher.

Nate provided details of the work that is being done by the FAA on analysis with the Volpe Center and the ASCENT Center of Excellence. He gave additional details on the ongoing work at U. Tennessee that shows the use of multi-cropping, wherein crops are grown on land that is fallow in the winter, could provide billions of gallons of jet fuel while also providing billions of dollars of economic development in rural areas. Nate concluded the analysis portion of the work with a discussion on the efforts to support ICAO CAEP in the inclusion of alternative jet fuels within CORSIA.

A Subcommittee member asked what the implications would be for a trillion-dollar infrastructure investment. He suggested that we use the knowledge that has been gained from these analysis efforts to create ideas.

A Subcommittee member asked about the work of U. Tennessee. The FAA noted that the use of multi-cropping would not provide enough fuel to replace all petroleum fuel but it could provide billions of gallons in a manner that provides economic benefit to rural America while also providing environmental benefits. The Subcommittee member was in agreement.

Nate provided information on the coordination work being done by the FAA. This includes efforts within the Commercial Aviation Alternative Fuels Initiative (CAAFI) and Farm to Fly 2.0 (F2F2). He concluded his briefing with an update on progress in commercializing alternative jet fuels.

There was a discussion on the inclusion of alternative jet fuels within the California Low Carbon Fuel Standard. The FAA noted that the alternative jet fuel emissions measurements that have been performed in the E&E Research Portfolio have been instrumental to this effort as they show there is no increase in criteria pollutants, and in the case of particulate matter a substantial decrease, with the use of alternative jet fuels.

A Subcommittee member noted that having effective air quality measurements and models would help in the assessment of the air quality benefits of the use of alternative jet fuels.

Presentation Aircraft Technology – CLEEN and CLEEN II Update | **Presenter**
Levent Ileri and Jim Skalecky

Levent Ileri gave an overview of the CLEEN Program. He provided a list of completed technology demonstrations that have taken place in the first phase of CLEEN as well as the benefits that would be provided by the matured technologies.

Jim Skalecky walked through each of the CLEEN II technologies that are being matured, which provided the benefits of the technology, where they could be applied, and key milestones that have occurred thus far. Jim concluded the briefing by noting that the initial CLEEN Program is

wrapping up and the next CLEEN Consortium meeting will take place on May 2-4 in Cincinnati Ohio.

A Subcommittee member asked if we have any additional information on when the technologies will be entering service. He asked as folks want to see the technologies entering the fleet to provide tangible benefits today. Another Subcommittee member noted that this is also useful information for other programs too that are coming from the Federal Government.

Action items	Person responsible	Deadline
Provide updated information on when CLEEN technologies will be entering the fleet.	Levent Ileri	August 2017

Discussion | Lead *Mahendra Joshi*

The Subcommittee Chair led a discussion to summarize the meeting. This included a discussion on the NARP revision and how R&D outcomes from the E&E Program are providing U.S. leadership on aviation and economic growth opportunities.

The Subcommittee noted that the FAA provided clarity on AEDT development and further development needs and these will enable improved usability and capabilities to meet domestic and international analysis needs. The Subcommittee also feels that AEE identified key risks to AEDT development and has developed appropriate contingency plans. The Subcommittee considers the action to request information on AEDT to be closed. The discussion also led to the development of a finding and recommendation.

The Subcommittee discussed the need for continued prioritization of CLEEN and CAAFI as they are successful public private partnerships. There was a discussion around ASCENT COE also being a public-private partnership. The FAA noted that because of CLEEN and the ASCENT COE, roughly three-fourths of the E&E R&D funding has cost share match. CAAFI is also generating substantial industry participation, but does not have a cost share requirement. This discussion led to the development of a finding and recommendation.

The Subcommittee discussed the need for an effective communication strategy for aviation noise issues. This discussion led to the development of a finding and recommendation.

The subcommittee noted its appreciation for the participation in the meeting by Airport Technology team and supports continuation of Airport Technical Research (ATR) related to the environment. The presentation on the ATR funds led to a discussion on water issues, which led to the development of a finding and recommendation.

The Subcommittee expressed concerns about the number of vacancies in AEE and how this will affect the execution of the R&D Portfolio. This discussion led to the development of a finding and recommendation.

The Subcommittee also discussed the ongoing efforts on operations as well as the planned efforts going forward. These discussions led to the development of a finding and recommendation.

The Subcommittee noted that the AEDT model is evolving into a powerful analytical tool. However, robust utilization could be enhanced by the knowledge/training of front-line FAA employees within other lines of business. This discussion led to the following action item.

Action items	Person responsible	Deadline
FAA should develop appropriate training programs on AEDT to ensure FAA front line staff fully understands the model.	Fabio Grandi	August 2017

The Subcommittee feels that continued focus on supersonic aircraft noise and emissions is needed to keep pace with planned Type Certificate (TC) application dates of some aircraft manufacturers. The FAA has been proactive in conducting research that is enabling better understanding of sonic boom propagation thru the atmosphere. This discussion led to the following action item.

Action items	Person responsible	Deadline
FAA should take full advantage of the work that NASA is doing to help inform rule-making regarding supersonic aircraft.	Becky Cointin	August 2017

At a previous meeting the Subcommittee expressed concern about FAA's ability to make nvPM measurements on a large number of engines to develop the database needed for standard setting. The update presented at this meeting indicated that FAA, through collaboration with industry and universities, has made significant progress in developing the needed database. However, there are serious concerns that the nvPM number measurements need to be better analyzed and understood prior to using them in standard development. This discussion led to the following action item.

Action items	Person responsible	Deadline
AEE to provide information (if available), or develop a research plan focused on the scientific understanding of nvPM number size distribution and formation for gas turbine engines. Statistical analysis of engine-to-engine, fuels, ambient conditions plus all of the engine/combustor effects is suggested to help in the understanding of the source of variation.	Ralph Iovinelli	August 2017

The Subcommittee feels that US implementation of environmental regulations on noise that are supported by the industry is lagging other national airworthiness authorities. This could put the US aerospace industry at a competitive disadvantage. The Subcommittee thinks the FAA should ensure that certification requirements are promulgated in a timely manner to avoid disadvantaging the US manufacturing community. This discussion led to the following action item.

Action items	Person responsible	Deadline
The FAA should communicate a strategy for addressing the noise certification promulgation gap at a future REDAC sub-committee meeting.	Rebecca Cointin	August 2017

The US implementation of ICAO standards on particulate matter and CO2 is lagging other national airworthiness authorities. This could also put the US aerospace industry at a competitive disadvantage. EPA needs to implement ICAO international standards for CO2 and particulate matter prior to FAA being able to complete their certification rulemaking. FAA should ensure that certification requirements are promulgated in a timely manner. This discussion led to the following action item.

Action items	Person responsible	Deadline
The FAA should work with EPA to develop a strategy for addressing emissions certification promulgation gaps and share it with the Subcommittee at a future meeting.	Ralph Iovinelli	August 2017

Mahendra thanked all of the presenters for their good work and closed out the meeting.

Meeting Close-Out | Lead *Mahendra Joshi*

Mahendra agreed to develop findings and recommendations based on the discussions for further development by the group.

Subcommittee Discussion of Open Recommendations (Discuss status of FAA response and decide to close or remain open)

All of the recommendations from the April 2016 and August 2016 meeting were closed.

Next Meetings – Date/Location/Agenda Items to be Included

August 1-2, 2017 in Washington DC

March 7-8, 2018 in Washington DC

Adjourned at 3:30 pm on Wednesday, March 1, 2017

DRAFT FAA REDAC Subcommittee on Environment & Energy
Spring 2017 Meeting Agenda
GAMA

1400 K St NW #801
Washington, DC 20005

Purpose:

- Review the R&D portfolio developed based on strategic guidance from Fall 2016 E&E REDAC mtg
- FAA to brief the FY + 2 portfolio
- E&E REDAC to provide recommendations on the proposed portfolio

Remote Participation: *Telephone:*

US toll-free call in and passcode: (877)336-1839, 2230569; HOST PASSCODE: 6935
WEBEX PARTICIPATING (views documents, chats, etc.):

- Go to website https://www.connectmeeting.att.com
- Enter meeting number 877-336-1839
- Enter access code 2230569
- Enter user email (ex. clay.reherman@dot.gov)
- Enter user first/last name (ex. Clay, Reherman)
- (next screen)
- Select "Participant" and click submit
- Website will automatically run Webex files and open meeting; host can view documents and chat/raise hand

Read Ahead Materials: http://redacdb.faa.gov/browse.cfm

Tuesday, February 28, 2017

Time	Duration	Title	Presenter
8:00	0:30	Check-In	
8:30	0:05	Welcome	
8:35	0:10	Chair opening statement & Introductions	M. Joshi
8:45	0:15	What's new in FAA & AEE	C. Holsclaw
9:00	0:15	ICAO Update	C. Holsclaw
9:15	0:30	Industry Perspective	S. Alterman
9:45	0:15	Break	
10:00	0:30	NARP Re-design	S. Yak
10:30	0:15	Responses to REDAC Recommendations & Actions	J. Hileman
10:45	0:15	FY17/FY18 Budget Update	M. Gallivan
11:00	0:15	Discussion	
11:15	0:30	FY19 Program Proposal	J. Hileman
11:45	0:15	Discussion	
12:00	1:00	Lunch	
13:00	0:30	NASA Update	J. Dryer
13:30	0:15	Discussion	
13:45	0:45	Noise Research – Roadmap and Update	R. Cointin
14:30	0:15	Discussion	
14:45	0:15	Break	
15:00	0:45	Emissions Research – Roadmap and Update	R. Lovinelli
15:45	0:15	Discussion	
16:00	0:45	AEDT Update	M. Majeed J. DiPardo
16:45	0:15	Discussion	
17:00		End of Day-1	

Wednesday, March 01, 2017

Time	Duration	Topic	Presenter
8:00	0:30	Check-in	
8:30	0:30	Airport Technology Research – Environment Projects	T. Cuddy
9:00	0:15	Discussion	
9:15	0:30	Operations Research – Roadmap and Update	C. Dorbian
9:45	0:15	Discussion	
10:00	0:15	Break	
10:15	0:30	Analysis & Tools – Roadmap and Update	F. Grandi
10:45	0:15	Discussion	
11:00	0:45	Alternative Jet Fuels – Analysis, Testing and Coordination Efforts	N. Brown
11:45	0:15	Discussion	
12:00	0:45	Lunch	
12:45	0:30	Aircraft Technology – CLEEN & CLEEN II Update	L. Ileri & J. Skalecky
13:15	0:15	Discussion	
13:30	1:30	Summary of Action Items and Findings & Recommendations	M. Joshi
15:00		End of Day-2	

Attendance List:

First name	Last name	Affiliation	28-Feb	1-Mar
Steve	Alterman	CAA	X	
Royce	Bassarab	FAA		X
Gonca	Birkan	FAA	X	
Nate	Brown	FAA		X
Jimmy	Bruno	FAA	X	
Becky	Cointin	FAA	X	X
Tom	Cuddy	FAA		X
Joe	DiPardo	FAA	X	X
Chris	Dorbian	FAA	X	
Jay	Dryer	NASA	X	
Rudy	Dudebout	Honeywell	X	X
Jennifer	Duke	P&W	X	X
Charles	Etter	Gulfstream	X	X
Gregg	Fleming	Volpe	X	X
Andrea	Freeburg	FAA		X
Mike	Gallivan	FAA	X	
Fabio	Grandi	FAA	X	X
Steve	Hamburg	EDF	X	X
Jim	Hileman	FAA	X	X
Curtis	Holsclaw	FAA	X	
Levent	Ileri	FAA	X	X
Ralph	Iovinelli	FAA	X	X
Mahendra	Joshi	Boeing	X	X
Mohammed	Majeed	FAA	X	X
Dimitri	Mavris	Georgia Tech	X	X
Maureen	Molz	FAA	X	X
Monique	Moore	FAA	X	X
Tim	Pohle	FAA		X
Katherine	Preston	ACI-NA	X	X
Ian	Redhead	Kansas City Intl Airport	X	X
Leslie	Riegle	AIA	X	X
Chinita	Roundtree Coleman	FAA	X	X
Don	Scata	FAA	X	
Jim	Skalecky	FAA	X	X
Ed	Smith	GAMA	X	X
Dan	Williams	FAA	X	
Shelley	Yak	FAA	X	X
Darcy	Zarubiak	Haley & Aldrich, Inc.	X	X
Joe	Zelina	GE	X	X