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December 2, 2018

The Honorable Daniel Elwell
Acting Administrator
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Dear Administrator Elwell:

Attached below, please find the findings and recommendations from the Safety, Airports, Environment and Energy, Human Factors, NAS Operations subcommittees from their spring meetings.

The full committee also identified several cross cutting observations, which should be considered in Research Engineering and Development planning.

- The committee notes the significant activity and investment in more highly automated and autonomous vehicles such as planned Urban Air Mobility, Automated Air Cargo and Unmanned Air Vehicles, which will result in a major increase in certification and operational approval requests for these systems. These systems will open new issues requiring R&D effort to enable the agency to respond effectively.

- The committee reiterates its suggestions regarding the opportunity to use advanced data-mining techniques to identify emerging risks in the NAS and to monitor the performance and safety impact of systemic or experimental system changes, such as the increased use of uncertified information technology devices in the cockpit, the Part 107 changes or the UAS pathfinder programs.

- The committee noted the impact of recent changes to the grants approval process, which appears to challenge the agency's ability to execute R&D plans and is having an adverse impact on STEM students and relations with US academic institutions capable of supporting the agency. This is especially troubling as the agency and US Aerospace industry face an upcoming workforce shortfall.

We appreciate the opportunity to provide feedback and support the FAA in promoting the safety, efficiency and effectiveness of our national aviation infrastructure as well as the competitiveness of the US Aerospace Industry. I would be happy to meet to provide further insight on these observations or to explore ways in which the REDAC can more effectively support you and the FAA mission.

Thank you for the opportunity to contribute.

Sincerely,

R. John Hansman
Chair, FAA Research, Engineering and Development Advisory Committee

Enclosure

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Research, Engineering and Development Advisory Committee (REDAC)
Guidance on the FY 2021 Research and Development Portfolio

Subcommittee on Environment and Energy

General Observations: The Subcommittee focused on reviewing the R&D portfolio in Environment and Energy for 2019 and evaluated the impacts that the President's proposed $74M budget would have on these programs out to 2025. Future budget allocations will have a definite impact on when research projects could be completed. As of the writing of this document, we are pleased to see that both the House and the Senate have reached an agreement that would increase the FAA RED funding close to the approved 2018 level of $175M. The FAA should also be congratulated for their part in the recent adoption of the CORSIA standard by ICAO. The hard work and dedication that was put forth by its research staff was key to the passing of this recommendation at a global level.

Finding: 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: 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.

Finding: 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: 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.

Finding: 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: 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.

Finding: 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: 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.

Finding: 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: 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.

Subcommittee on NAS Operations

General Observations: During the fall 2018 NAS Operations REDAC meeting, the Subcommittee was briefed by the NextGen Enterprise Human Factors Office on the FY2021 proposed portfolio for Budget Line 1A11B0. The Enterprise Human Factor Development program provides integrated guidance on human performance considerations to concept development, validation, and implementation teams.

The Subcommittee was briefed by the Office of Commercial Space Transportation (AST) for Budget Line A.11N. AST regulates the civil, military, and commercial sectors of the space program to ensure the protection of the public, property and national security and to encourage, facilitate, and promote U.S. commercial space transportation.

This R&D portfolio addresses four reclassified research areas: (1) Aerospace Access and Operations, (2) Aerospace Vehicles, (3) Human Operations and Spaceflight, and (4) Industry Innovation.

Finding: Human Factors - The Subcommittee applauds the FAA in directing research toward systemic human factors considerations and defining best practices and related standards to ensure new concepts and technologies are accepted and effective. However, the process for determining which topics to pursue appears to be fragmented and lacks a cohesive top-down strategy. For example, effective air traffic management will become increasingly important as operations evolve from traditional tactical ATC to more strategic TBO flow management, yet ATM human factors research has not been identified as a priority. Additionally, it is not clear that the products produced through human factors research are communicated and disseminated in an effective manner to the broad set of FAA programs that may need that information.

Recommendation: The FAA should develop a clear top-down strategy for identifying and prioritizing human factors research that spans existing acquisition programs as well as future NextGen initiatives. This strategy should extend beyond tactical air traffic control to include complex collaborative air traffic management considerations in the future TBO environment. A more effective process for cataloguing and disseminating human factors research products should also be defined and implemented.

Finding: Commercial Space Transportation - Today, integration of Commercial Space Operations into the NAS is managed using existing traffic management tools. Given the rapid projected growth in Commercial Space Operations, this methodology is not sustainable moving forward. To date there has been little focus on analysis of flights, whether pre- or post - operations, to identify ways to decrease the size and timeframe of blocked airspace. Airspace operators are counting on near-term development activities for new procedures and tools to help

support more efficient integration of commercial space operations. The Subcommittee acknowledges there has been positive effort to enhance coordination through initial investments at ATCSCC with prototype space operation integration tools. Inclusion of data sharing services via SWIM will enable all NAS users to better plan operations. Identification of appropriate services and establishment of community best practices, like CDM, will foster industry collaboration engagement with FAA. This issue extends beyond technical considerations to also include policy decisions regarding the relative priority for access to airspace when contested between commercial space operators and commercial air carriers. Some of these policy decisions may be informed by recommendations made by Aviation Rulemaking Committee focused on Airspace Access Prioritization, which have not yet been released.

Recommendation: The FAA should accelerate its investment in near-term solutions (not requiring new tools) to minimize operational impact of commercial space launches on all NAS users. Investment in research for longer term solutions, such as TBO and integration R&D related to surveillance, aircraft separation, and airspace management during space operations needs to be accelerated. Technology, data, and processes should be developed for objectively mediating the relative costs and priorities between space and air operations requesting access to the same airspace.

Subcommittee on Human Factors

Finding: FAA Research and Development Landscape - The Subcommittee appreciated the framework presented by Shelley Yak on the FAAs' Research and Development Landscape. This new perspective promises to be a valuable tool for informing the FAA's R&D portfolio and planning. The Subcommittee has three recommendations categories regarding its further development and use. These recommendations are structured around content, process, and communicating the plan's status and impact.

Recommendation: Content - Continue to mature the Landscape framework.

Recommendation: Content - Identify partnerships for cross cutting HF areas and identify what research is being done, where, and any gaps.

Recommendation: Content - Identify lead, leverage, and watch areas for Human Factors research areas and provide links to partnerships.

Recommendation: Content - Illustrate the budget for the entire portfolio and identify high priority areas and how they link to funded programs.

Recommendation: Process - Create a means by which the Landscape can inform the R&D portfolio, including prioritization of projects.

Recommendation: Process - Describe how the Landscape will address cross cutting issues like Human Factors and Safety that impact multiple areas/domains identified in the Landscape.

Recommendation: Communication - Provide the HF Subcommittee evidence the Landscape is influencing the HF portfolio and prioritization of projects.

Recommendation: Communication – Provide examples of how the Landscape is being used to influence the overall R&D portfolio, especially as related to partnering and leveraging R&D from other stakeholders.

Consequences:

- Lack of strategic direction for the R&D portfolio, prioritization, and opportunity to leverage research from other parts of industry,
- Inability to identify significant partnerships,
- Inability to maximize collaboration,
- Duplication of effort and funding,
- Research gaps.

Finding: **Flight Crew Information Management -** Modern Flight Decks enable an extensive amount of information to be displayed to the flight crew. New information automation systems and applications distance the pilot from the processing of information such as: Advanced radar, Advanced Vision Systems, CPDLC, ACARS, Electronic Flight Bags, including operator and vender "Apps". These applications/systems provide useful information to the flight crew; however little is known about the issues these systems introduce and there is little guidance available to operators for managing information and for approvers to accurately assess its impact on workload. This issue was identified and recommended for funding several years ago, but remains unfunded and is an ongoing gap in the HF R&D portfolio.

Recommendation: The FAA should fund research on Flight Crew Information Management to address the identified gaps in the HF R&D portfolio. The research should document current practices, identify actual/potential threats, and identify mitigation strategies. The research should also include but should not be limited to the following:

- Managing information across systems such as: CPDLC, ACARS, Radar, EFB, aircraft systems, external (non-aircraft) applications, Etc.,
- Identify strategies for mitigating information overload and distraction,
- Methods for understanding the accuracy, integrity, (i.e., trustworthiness), and timeliness of information,
- Effective information management for operational, tactical, and strategic decision making.

Consequences:

- Perpetuate ongoing human factors/safety issues,
- Operators will continue to develop their own unique strategies for managing information and distractions on the flight deck,
- The FAA may perpetuate inadequate workload assessment methods,
- The FAA may permit the implementation of information integration where the integrity or completeness of presented information may be misunderstood or is used inappropriately by the flight crew.

Subcommittee on Aircraft Safety

General Observations: To assess the 2018 research plan performance, SAS continued to utilize our new portfolio review approach. The FAA staff prepared a Research Program Area Report for the 15 major program areas summarizing the desired outcome, research outputs delivered in FY18 and the overall status. Each SAS member had the opportunity to question the researchers in each major program area. Additionally, we were provided visibility of the overall R&D Program Strategy and how the FAA is developing new "research focus areas" such as Airport Technology, Aircraft Safety Assurance, Digital Systems and Technologies, Environmental and Weather Impact Mitigation, Human Factors and Aeromedical Factors and Aviation Performance and Planning. The SAS members appreciated the approach and suggested the FAA present a first pass of the research landscape and ongoing research at our next meeting. SAS continued its practice of engaging both Subcommittee members and agency expertise to inform our discussions. At this meeting presentations from MITRE and AVSI (Aerospace Vehicle Systems Institute) informed our views on the future directions of industry. Additionally, we were provided with a briefing on Commercial Space Transportation Research and the AIR Innovation Center Initiative.

Finding: Research and Development Program Strategy and Research Portfolio Assessment - The Subcommittee notes the initiative underway to establish research focus areas to coordinate and communicate the strategic thrust of ongoing and future research. The research focus areas will include Airport Technology, Aircraft Safety Assurance, Digital Systems & Technology, Environment and Weather Impact Mitigation and Human Factors and Aeromedical Factors. A research landscape will be created for each focus area to capture all ongoing research and establish the strategic vision. The Subcommittee agrees with the approach and believes this is an opportunity to assure that the strategic research needs and emerging issues that the subcommittee has defined are captured and continuously reassessed. It has been noted that the funding sources and research topics are sufficiently different between Human Factors and Aeromedical Factors that it may make sense that these not be combined into a single research area.

Recommendation: - The FAA should continue down the path of developing and maturing the research focus areas and landscapes and provide a draft to the subcommittee for review and feedback prior to the next subcommittee meeting in March 2019. The draft should include a compilation of the ongoing research that supports the research focus area, regardless of BLI.

Recommendation: The FAA should consider not separating Human Factors and Aeromedical Factors in the new research focus areas.

Finding: FAA Research and Development Landscape - The Subcommittee appreciates the FAA sharing the agency's Research Landscape and Strategic Direction for R&D (Shelley Yak briefing to SAS, 31 July 2018), the draft FY21 Strategic Guidance (Mark Orr briefing to SAS, 31 July 2018, under FAA management review as of 31 July 2018), and the FY19 Aviation Safety Portfolio (document provided to SAS by Mark Orr, 1 August 2018). These materials, plus the FAA's responses to the SAS Spring 2018 Finding "Research Prioritizations", adequately addresses the SAS concern regarding the FAA's process for prioritizing research activities. Further to the subject of the FAA's research prioritization process, the SAS finds that the value

of each FAA research activity will be more easily understood by identifying the hazard and/or significant safety risk being addressed by the proposed research. In accomplishing this, SAS encourages the FAA to draw on all available data as the basis for determining benefits. As one example of this, in the SAS review of the FY18 accomplishments, it was noted that reduced research budgets will delay release of an Advisory Circular. No indication was given of the linkage of this Advisory Circular release to the FAA's overall research priorities. Hence the SAS was unable to understand and provide input to the FAA on the implications of the resulting delayed Advisory Circular release.

Recommendation: In order for the SAS to provide the FAA more meaningful feedback on the proposed research portfolio, we recommend that the FAA convey, for each research activity:

a. The alignment or linkage to the current or emerging hazards with a high likelihood or potential to result in significant safety risks as identified by the FAA's research priorities, and
b. The benefits (e.g., safety improvement) of each research activity, drawing on all available data and reasonable hazard assessment (i.e., going beyond limited-source data such as the Commercial Aviation Safety Team (CAST), General Aviation Joint Steering Committee (GAJSC), or Helicopter Safety Team data).

Finding: Future Research Needs - In the AVS Research FY 21 Strategic Guidance, AVS has committed to applying SMS principles and is using an evidence based approach to identify hazards, risks, and safety issues to drive future research needs. These research needs are based on data gathered throughout the National Airspace System (NAS). Some of the data used to support the FY 21 Strategic Guidance is 7 years old. Much has changed in the last 7 years. Additionally, technology is rapidly evolving, which creates new challenges and a very dynamic environment for risk identification and assessment. The subcommittee agrees with and supports the data driven, evidence based approach that AVS is using. However, using old data could lead to research that isn't timely or based on assumptions that are no longer correct. It could also lead to omission of emerging issues when priorities are set. The NAS continuously generates new data. Most of this data is readily available and can be accessed in a timely manner.

Recommendation: Data that is more up to date should be used when identifying hazards, risks and safety issues analyzing risk in the NAS and identifying strategic research needs

Recommendation: Advances in data mining and machine learning should be applied to the large set of operational data to identify causal influences and trends in emerging risk areas

Finding: Automation and Artificial Intelligence - The Subcommittee notes the high level of industry investment and interest in higher level automation and machine learning for manned and unmanned vehicles (small and large UAV, UAM, Simplified Vehicle Operations, Automated Air Cargo, etc.). This is an emerging issue which the SAS has noted in the past but is becoming more urgent.

Recommendation: FAA should develop a research plan to develop certification approaches and to support certification criteria and human factors evaluation of advanced automation systems.

Finding: Runway Friction Research - The Subcommittee appreciates the briefing on Runway Friction Research and notes that the activity is no longer airport-centric in its nature. The SAS believes that the effort would benefit from REDAC input on the next steps. There is an opportunity to take the data that is available to develop a predictive tool that can be tracked and validated via on board data.

Recommendation: The FAA should develop a plan to explore data reduction methods and provide the REDAC with an updated research approach including the overall roadmap and strategic plan.

Subcommittee on Airports

General Observations: The Subcommittee had the opportunity to review the progress of the FAA's Airport Technologies Research Program and provide comments regarding the Program's priorities. The Subcommittee felt that good progress had been made across the Program's portfolio of 19 research project areas (RPAs) as shown below. The Subcommittee remains supportive of the Program's ongoing work and future research directions, which continue to emphasize foundational research to support (1) advisory circulars and design guidance promulgated by the FAA Office of Airports, (2) airport infrastructure enhancements currently eligible or prospectively eligible for federal grant funding under the Airport Improvement Program, and (3) U.S leadership in areas of airport safety, planning, and airport infrastructure. The Subcommittee remains very concerned about ongoing pressure to reduce in FAA research and development funding.

Finding: Commercial Airspace Aviation Rulemaking - The Subcommittee remains pleased that the FAA's Airport Technology Research Branch has begun researching safety and design standards for commercial spaceports, but continues to feel that more substantial outreach is needed with the concurrent efforts of commercial airspace aviation rulemaking committees (ARCs), principally the Spaceport Categorization ARC.

Recommendation: The Subcommittee recommends that the FAA's Office of Airports together with the Airport Technology Research Branch directly coordinates with the Spaceport Categorization ARC and, to the extent it is pertinent, the Airspace Access Priorities ARC to ensure that their research informs (and is informed by) the ARCs.

Finding: Cybersecurity R&D Plan - The Subcommittee was pleased to receive an update regarding the FAA's Cybersecurity R&D Plan and learn more about how various FAA R&D programs are expected to support it. We agree with the FAA that there needs to be more awareness and involvement from airports in the development and refinement of this Plan.

Recommendation: The Subcommittee recommends that the FAA work with the Subcommittee members and other subject matter experts at airports to ensure that the FAA Cybersecurity R&D Plan appropriately reflects airport operators' roles, responsibilities, and involvement in aviation cybersecurity in the United States.

Finding: PFAS - Over the past year, several U.S. States and municipalities have been focusing their attention on environmental contamination by per- and polyfluoroalkyl substances (PFAS), classes of fluorinated hydrocarbon molecules that can lead to adverse health outcomes in

humans. In addition to their potential toxicity, most forms of PFAS do not readily breakdown in the environment and bio accumulates in those that are exposed to the substances.

One of the areas that PFAS is used is in aqueous film-forming foam (AFFF) which is used to suppress and extinguish aircraft fuel fires. Under current FAA regulations, certificated airports are required to use fluorinated AFFF because of the high level of performance AFFF provides (e.g., ease of dispensing via current ARFF equipment, fire knockdown times, fire burn-through times). This said, over the last decade there have been numerous fluorine-free foams (3F) that have come onto the market and are being used at airports around the world.

Research into the performance of these new foams has been spotty and often seems to be vendor-sponsored, leaving considerable uncertainty about the efficacy of these foams. There are also are a number of questions about the foam performance standards that the FAA uses—which are taken from Military Specifications—that make it challenging to evaluate whether the safety benefits associated with AFFF outweigh the potential environmental hazards associated with PFAS. The Airport Cooperative Research Program's (ACRP) Report 173 does state that fluorine-free foams meet the requirements of the International Civil Aviation Organization for fire extinguishing performance. The ACRP Report 173 also finds, "Fluorine-free foams have been shown to not have the same performance as their fluorinated counterparts. They are currently not able to provide the same level of fire suppression capability, flexibility, applicability, and scope of usage as AFFF firefighting foams. An analysis of the performance of two available fluorine-free foams found that they would need to be replenished three times more often than AFFF to provide the same level of fire protection." The report also states, "Further research is warranted on whether AFFF alternatives available outside North America can or should be acceptable (e.g., through specification requirement changes, product approvals, or advances in foam development)."

In addition, the Subcommittee notes that there are other areas in which the FAA can assist airports in limiting release of PFAS into the environment—specifically through reducing the need for or eliminating entirely ARFF equipment testing procedures that require discharge of PFAS-containing AFFF into the environment. Research into technologies and procedures would reduce the need for and quantity of AFFF released during ARFF equipment testing, inspections, and training has been underway under RPA S3 for several years and includes the evaluation of alternative foam proportioning system testing systems and revisions to ARFF equipment certification tests.

Recommendation: The Subcommittee strongly recommends that the FAA expedite completion of ongoing research efforts relating to foam proportioning systems. The Subcommittee also strongly encourages the FAA to revisit firefighting foam research and ensure that there are scientifically-based mechanisms/testing protocols for evaluating fluorine-free foams in the civil aviation sector, ideally using the newly-commissioned and state-of-the-art fire testing facility at the FAA Technical Center.

Recommendation: We also recommend that the Airport Technology Research Programs perform a gap analysis of research regarding the health and environmental hazards associated with fluorinated AFFF use at airports and work with the Subcommittee to determine how these gaps can be addressed either within or externally to the these FAA Research Programs.

Finding: DOT/FAA Strategic Research - The Subcommittee appreciates the direction the FAA is receiving from the U.S. Department of Transportation regarding the alignment of FAA research with DOT's broader strategic research priorities. We additionally note that ongoing research associated with Unmanned Aircraft Systems and Commercial Space appear to be areas where there is significant existing alignment between FAA and DOT/Trump Administration priorities and directly involve airport research interests.

Research into the facilitation of transcontinental supersonic aircraft operations, pavement research focusing on extending longevity of runways, taxiways, and aprons, and many of the airport safety research projects currently underway within the Airport Technologies Research program are similarly situated.

Recommendation: The Subcommittee recommends including discussions of the alignment of the Airport Technologies Research program with broader DOT and FAA strategic research goals in each of our face-to-face meetings.

Finding: **Strategic Program Focus -** The Subcommittee found that the shortened agenda for this Subcommittee meeting—although driven by events beyond the Subcommittee's control—did expedite discussion of key program topics and kept research program discussions at a more appropriate strategic level than prior meetings. In addition, the incorporation of web/teleconference access to the meeting ensured broader participation of Subcommittee members than would have been otherwise possible.

Recommendation: Although we do currently plan to meet for two days at our March 2019 meeting, the Subcommittee recommends continuing the precedent set at the summer 2018. This includes organizing the agenda for this meeting to focus on strategic reviews of Airport Technologies Research Program, its connections with other FAA research programs—notably the Environment & Energy Research Program, and alignment with DOT research priorities.

We understand that this would come at the expense of more comprehensive and detailed reviews of individual research projects. To ensure that reviews of projects of particular interest are not missed, the Subcommittee proposes to identify 4-5 projects for deeper technical discussion in collaboration with the FAA Research Program leadership a month or so prior to each face-to-face meeting.

Recommendation: The Subcommittee also recommends that the FAA continues to provide web/teleconference access for Subcommittee members that are unable to attend the meeting in person either due to financial or time constraints.