FAA REDAC Subcommittee for Aviation Safety

August 2019 Meeting

Findings and Recommendations

The Subcommittee on Aviation Safety (SAS) of the FAA's Research, Engineering, and Development Advisory Committee (REDAC) met on August 19-20, 2019 at the FAA's William J. Hughes Technical Center in Atlantic City, New Jersey. The committee had the opportunity to review the FAA FY19 and FY20 budgets along with the associated appropriations for research engineering & development. The committee also reviewed the FY21 proposed budget that was deliver to OST in June 2019.

In addition to the budget reviews, the committee also received presentations on the following topics:

- R&D Landscapes
- FY19 Aircraft Safety Assurance Portfolio Accomplishments
- FY22 New Process for Strategic Guidance
- Software Assurance Challenges
- Update on UAS Research
- Response to the SAS F&R on Runway Friction
- National Artificial Intelligence R&D Strategic Plan
- Cybersecurity-safety Commercial Aviation Team
- RTCA and FAA Working Relationship

Findings and Recommendations

The following findings and recommendations were developed during the subcommittee's meeting and submits these to the FAA for consideration.

<u># 1 Finding and Recommendation – Funding of New and Emerging Safety Risks R&D</u> Finding:

The FAA REDAC Sub Committee for Aircraft Safety (SAS) has a charge to "provide advice to the Administrator through the REDAC regarding needs, objectives, plans, approaches, content and accomplishments for the FAA research program." The SAS has historically been able to meet this objective through a thorough review of ongoing and planned research activities. A reality that the SAS must recognize is that the lengthy budget cycles significantly restrict the ability of the FAA to plan and conduct research in near real time to address emerging issues. Based on the pace of development in industry, some of these issues have the potential to influence the current strategies around the NAS and could create a challenge to safety if the right levels of oversight are not provided. In all cases, the experts at the FAA are best equipped to make decisions with respect to the prioritization of research in the interest of safety.

Recommendation:

A process should be established (ideally as part of the appropriation process) to set aside a portion of the RE&D budget for discretionary efforts to address out of cycle emerging issues that are agreed to have a potential impact on aircraft safety.

#2 Finding and Recommendation - AVS Research Planning Process Finding:

The subcommittee received a briefing on the rebuilding of the AVS research proposal and prioritization process. The subcommittee was encouraged to see the effort to refine the process from the Agency's experience. Part of the discussion highlighted the FAA's aspiration of creating a balance between emerging issues and current issues. However, the subcommittee was concerned that strategic material developed with Industry and SME input contained in the Research Landscapes for the National Airspace System is not explicitly included as reference, or required guidance, in the development of research proposals. Nor is it explicitly built into the rubric for selecting research proposals in order to achieve the balance.

Recommendation:

The Subcommittee for Aviation Safety recommends that, as the research proposal and selection process is refined, guidance for the use of Research Landscapes and their associated Research Challenges, as reference for individuals proposing new research, and also that those Landscapes and Challenges are considered as part of the selection rubric. The Subcommittee for Aviation Safety recommends that the guidance shall establish a definition of emerging issues, in contrast to current issues, and the percentage of the RE&D budget that shall be allocated to emerging issues for the FY planning year.

#3 Find and Recommendation – Additional Funding for Complex System R&D

Finding: The subcommittee has identified the certification of complex, non-deterministic systems as a significant emerging issue for several years now. Addressing this multifaceted, complicated challenge involves many different related aspects. The subcommittee applauds FAA research into assurance cases and model-based systems engineering. However, the subcommittee is concerned that there are some aspects which are being under-addressed involving such areas as the validation and verification of complex digital systems employing non-deterministic software elements to include autonomous systems, artificial intelligence, and machine learning. Also, under-addressed are design standards and best practices for safety critical non-deterministic systems. While autonomous flight is likely to have implications for all aspects of aviation, it is most likely to have near-term implications for systems which enable unmanned aircraft, urban air mobility type operations, and the use of single pilot operations in cargo aircraft.

Recommendation: The FY20 request for Digital System Safety includes a total of approximately \$3M which is not currently supported by the House version. Given that \$3M is likely to be insufficient to address the complicated challenge in a timely fashion and the direct relationship

to the scope of the Unmanned Aircraft System BLI, the FAA should dedicate a significant portion the anticipated congressional plus-ups in the area of unmanned systems to this essential topic. The FAA should continue to leverage, where appropriate, research investments at NASA and the Department of Defense. The subcommittee would like a detailed update on FAA progress, plans, and relationships in this area at a future meeting.

Future Meetings

The Subcommittee's next meeting will take place at RTCA Headquarters in Washington, DC on February 25-26, 2020.