Research, Engineering Development Advisory Committee
Subcommittee for Aircraft Safety (SAS)

2016 Fall Meeting Summary Report

The Sub-committee for Aircraft Safety of the REDAC met on September 14 and 15, 2016 in Alexandria, VA at the headquarters of the Flight Safety Foundation for its routine fall 2016 meeting. The main objectives of the meeting were as follows:

1. Provide continual input and guidance to the 2019 FAA research portfolio
2. Begin to explore questions around Big Data as requested at the Spring full REDAC meeting
3. Chart a path forward to maximize SAS value to the FAA Aviation Safety Management Team.

In order to accomplish these objectives the SAS received presentations, and held detailed discussions, on topics covering; risk based decision making, big data and data analytics, UAS CONOPS, Additive Manufacturing and real time system-wide safety assurance. SAS also reviewed over 75 quad charts detailing existing research programs and priorities and had the opportunity to ask questions to FAA expert sponsors and performers. There were several findings and recommendations to come forth from these deliberations. These findings and recommendations are detailed in this report.

Additionally, we had the opportunity to have dedicated sessions with both the FAA's Research and Development and Aviation Safety management teams to discuss expectations, both of the FAA leadership and the SAS, regarding the direction and output of the SAS. These were extremely helpful, enabling great dialogue among the participants, which clarified some direction for the SAS to take as we structure future meetings, activities and reports to the FAA. We discussed the SAS' continuing efforts to better understand the overall big picture of the research portfolio and how the various efforts fit together in a complex array of budgets, fiscal management policies and research demands. We also discussed the need to achieve the balance of relatively immediate, mandated, safety research vs longer term research needed to help the agency avoid future currency shortfalls in critical safety and certification areas. The SAS has taken an action item to reconsider how it structures its meetings in support of these objectives. We jointly agreed that future meetings of this sort would be beneficial to all parties involved.

In addition to the findings and recommendations noted below SAS would like to draw attention to the findings and recommendations from our Spring 2016 meeting. These were also intended to be of value and offer early thoughts on the 2019 Research Portfolio. Specific topics mentioned in those recommendations related to Additive Manufacturing, Advanced Materials Research for engine materials and nondestructive evaluations (NDE), and Ice Crystal Icing are still valid in our opinion. We were able to observe the draft responses to our recommendations and encourage this information sharing in the future. Additionally we would like to thank the Aviation Safety Management Team for including our previously identified emerging and future issues in their 2019 Research Strategic Guidance published in May, 2016, shortly after our joint briefing on SAS activities.

The next SAS meeting is scheduled for March 8 and 9, 2017 to be held at FAA's Civil Aerospace Medical Institute.

Respectfully Submitted,

Kenneth Hylander
Chairman, Safety Sub-committee, REDAC
September 22, 2016

Research, Engineering Development Advisory Committee
Subcommittee for Aircraft Safety (SAS)

2016 Fall Meeting Findings and Recommendations

Finding: Real Time System-Wide Safety Assurance. In the Fall of 2014 The REDAC Safety Sub Committee identified, and defined, Real Time System-Wide Safety Assurance as a significant emerging issue worthy of future FAA research resource expenditure. NASA has also identified this subject, although possibly defined slightly differently, as one of its top strategic thrusts. The topic has risen to the level of a NASA/FAA Joint Research Transition Team item. The SAS received a briefing on this subject and was pleased to enhance its knowledge of government efforts and strategic direction on this important topic. In particular the definition of "real-time" as meaning in time to mitigate the hazard is very appropriate. The committee also supports the vision for a capability that is distributed among users who can employ system-wide knowledge and information to mitigate local and regional safety issues. SAS will use this new knowledge to refine its emerging issue going forward in hopes of adding value to the Research Transition Team efforts.

Recommendation: The System-wide Safety Research Transition Team should provide the SAS and other appropriate industry sectors with updates on progress toward real-time system-wide safety and solicit regular input from those stakeholders. We also recommend that focus be put on short term research deliverables (less than 5 years) as the need for the ability to make an impact for in-time mitigations is immediate and necessary.

Finding: Additive Manufacturing. The sub-committee finds that progress has been made in accelerating research activities around the topic of additive manufacturing. The Additive Manufacturing National Team (AMNT) is in place with an approved charter and initial documents have been released to the ACO and MIDO offices to aid in the certification of parts produced by additive manufacturing methods. Collaborations are also ongoing with industry organizations including AIA and SAE to establish working groups and committees. A FAA Additive Manufacturing roadmap is under development which includes training and education, development of regulatory documents, R&D plan and interagency communication. The roadmap and R&D plan were not shared with the sub-committee.

Recommendation: The FAA should share the draft roadmap and accompanying R&D plan with the sub-committee for review and comment.

Finding: Fatigue Knowledge Affecting Aviation Safety. FAA implemented science based flight and duty time regulations for commercial passenger carriers in February 2014. These rules were the first significant revisions made in over 60 years and greatly changed how the agency regulates airline operations. Evaluations are ongoing with the regulatory situation for large cargo carriers and smaller commercial operations. This is an acknowledgment from FAA that pilot fatigue remains a significant safety concern and must be addressed. The subcommittee is

concerned because there is no evidence that significant FAA research into human fatigue incidence, effects, mechanisms, or countermeasures in US civil aviation is taking place. Without objective data or evidence gather by research, it is very difficult to validate existing regulations or develop new ones.

Experience and recent data suggest that even though the new regulations seem to be an effective mitigation to pilot fatigue in many cases, the fatigue problem has not been solved, and continues to create risk in various aspects of flight operations ranging from commercial to general aviation in both fixed-wing and rotary-wing aircrew. Experience from the Department of Defense (DoD) suggests that operator fatigue will be a problem in UAS operators as well.

The subcommittee acknowledges comments from the FAA that fatigue research occurs in various programs across the research portfolio, but is unable to evaluate the efficiency, applicability and adequacy of the current and future programs since they have not been presented to the subcommittee in any organized form.

Recommendation: The SAS requests that, in the upcoming SAS 2017 Spring meeting, the FAA presents a coherent and holistic view of the fatigue problem in U.S. aviation. The presentation should include the knowledge gaps in fatigue potentially affecting aviation safety and the relevant research programs at FAA and other government agencies concerned with aviation and non-aviation fatigue, which can be both funded and unfunded and/or current and planned research activities. If the conclusion is that further research is not needed, the rationale for that conclusion should be provided.