

Subcommittee on Aircraft Safety 2015 Fall Meeting Summary

FAA Research, Engineering &
Development Advisory Committee
October 7, 2015

REDAC SAS Meeting Objectives

- **Overview of the FY15 RE&D aviation safety portfolio**
- **What are the research findings and how are we progressing?**
- **Do we have the right strategies?**
- **Early input for consideration towards FY18 research plan**

Approach

- **FAA prepared over 70 research “quad” charts detailing**
 - **Research Requirements**
 - **Desired Sponsor Outcomes**
 - **FY15 Research Accomplishments**
 - **Upcoming critical Milestones**
- **SAS committee reviewed, as homework, quad charts and prepared questions to inform discussions at meeting**

Approach (Con't)

- **Desire to continue to build upon work of prior SAS meetings**
 - Keep previously identified Emerging and Future concerns in the forefront to assist in identifying research gaps
- **CSTA and outside industry/FAA expert participation whenever possible**
- **Deep Dives into significant items – as defined by:**
 - Significant research dollars committed
 - REDAC priority items
 - Committee concern items

Deep Dive Topics

- This meeting's agenda built with a strong connection to previously identified Emerging and Future, and REDAC, issues
- ***Certification of Advanced Materials and Structural Technologies***
 - Additive Manufacturing topics
- ***Dependability of Increasingly Complex Systems***
 - SDS Research Plan
 - Cyber Security
- ***Mixed UAS and Manned Aircraft Operations***
 - UAS R&D Plan
- ***Real Time System-wide Safety Assurance***
 - Big Data/ASIAS Lab Tour
- GA Alternate Fuels
- Icing

For Consideration During the Meeting

- **Are SAS Emerging and Future issues still the right ones?**
 - Should they be changed or adjusted?
- **What else do we need to evaluate/deep dive into to better inform us?**
 - Short term?
 - Long term?

Findings and Recommendations

- **Improved Program Management Tools for Safety Research Needed**
- **Finding**
 - Over 70 safety portfolio research requirements with budget expenditure on the order of \$90 million
 - Warrants a clear picture into overall research objectives, sponsor outcomes, financial commitments over multiple years, research exit criteria, etc.
 - Lack clear line of sight to the higher program level making input into overall research programs fragmented and incomplete at best
- **Recommendation**

Create a comprehensive program management tool set for safety research that:

 - Clearly identifies the higher level research objectives, by topic, (icing, fire safety, structural technologies, etc.)
 - Provides connectivity to the comprehensive set of specific targeted research objectives in each area
 - Clearly demonstrates how individual research supports the overall objectives.
 - Designed to primarily add FAA management value as well as support the SAS Committee objectives

Findings and Recommendations

- **Enhanced International Collaboration on Safety Research**
- **Finding**
 - Association of European Research Establishments in Aeronautics (EREA) Future Sky Safety program
 - FAA Aviation Safety organization will be engaged in the Advisory Board
 - The program's four themes are addressing issues which align with many of the FAA's aviation safety priorities
- **Recommendation**
 - Consider taking a leadership role in deepening US-European collaboration on Aviation Safety research
 - Initially focus on one or two specific areas of common interest
 - One potential is big data analytics associated with aviation safety data exploration.

Findings and Recommendations

- **Immediate needs for Additive Manufacturing Certification Support**
- **Findings**
 - Continued progress accelerating the development of a FAA Additive Manufacturing Roadmap and identification of focused research
 - Industry continuing to accelerate efforts to incorporate additive manufacturing technologies as full-scale production processes
 - Near term strategy is required to help the certification directorates assess type designs or type design changes which incorporate parts produced utilizing additive / advanced manufacturing methods
- **Recommendations**
 - Develop guidelines describing the considerations, which should be assessed relative to the incorporation of parts produced by Additive Manufacturing. Target for implementation of these guidelines should be immediate (on the order of 3 months).
 - FAA assess the need for additional research to supplement the initial guidelines for the potential longer-term codification of Additive Manufacturing guidance

Findings and Recommendations

- **Research to Mitigate the Impact of Cockpit Laser Strikes**
- **Findings**
 - The frequency of reported laser strikes has increased more than 10 fold since 2006;
 - Considerable research has been conducted within the military, much of this work is classified, focused on specific threats, and therefore will not provide a complete solution for the civilian sector.
 - Current approach to mitigate the impact of a laser illumination event is to document and characterize these events, and educate flight crews on how to recognize an event and then respond in a manner to help identify and prosecute offenders
 - No research funding to investigate and/or develop potential technical solutions to mitigate the impact of a laser strike
- **Recommendations**
 - R&D should be coordinated with the DoD existing research and be leveraged to the maximum extent possible
 - The solution should:
 - Require no action by the flight crew that would disrupt or unduly complicate normal operations
 - Be effective against a high percentage of laser strikes, regardless of frequency (i.e., color) and power of the source
 - Be capable of being used on any aircraft used in FAR Part 121 or Part 135 service
 - Not impair pilots' visual acuity or ability to correctly interpret colors of messages, warnings, etc., on cockpit displays at any time, or otherwise degrade performance, while operating the aircraft

Appendix

Fall 2014 - SAS Emerging Issues Reminder

- Real time system-wide safety assurance
- Dependability of increasingly complex systems
- Certification of advanced materials and structural technologies
- High density energy storage, management, and use

Fall 2014 - SAS Future Opportunities- Reminder

- Commercial space integration with the National space system
- General aviation's role in safety systems development
- Effects of breakthrough medical technologies on FAA medical certification standards
- Identification and funding of strategic research and development