#### FAA REDAC AIRCRAFT SAFETY SUBCOMMITTEE

#### **MEETING REPORT**

#### AUGUST 2013

The Aircraft Safety Subcommittee, SAS, of the FAA Research, Engineering and Development Committee, REDAC, met at GAMA Headquarters on August 20-22 to review the status and direction of the FAA Aircraft Safety Research Program. Specific Findings and Recommendations on individual areas of research reviewed and discussed by the subcommittee follow.

#### NextGen - GA Weather Technology in the Cockpit

**Finding:** The subcommittee finds the continued research in this area focused, adequately resourced, and well-defined. Although the near term and strategic plans are thoughtfully created and appropriate, the expected safety benefits are less clear. The emphasis on price point of equipment and usability of information is realistic and will help the development of effective tools and information. The subcommittee received briefings from other agency groups that described a significant amount of research in other areas involving COTS products and software. There is a good possibility that some of the research done in other areas can be of benefit to this area also. Additionally, there is a continuing need to coordinate throughout the agency to make sure products and information reach the industry in a timely manner with minimum resistance from other agency stakeholders.

Following a post meeting discussion, the subcommittee notes that the FAA had previously agreed to provide a better understanding of GA safety benefits in 2014.

<u>Action</u>: The subcommittee requests a briefing on the status of the analysis of GA safety benefits expected from this research activity.

**Recommendation:** The subcommittee recommends that the sponsors of this research interface with other R, E, and D areas to explore COTS possibilities and with the appropriate areas in FAA to facilitate dissemination of tools and information to industry.

#### Flightdeck/Maintenance/System Integration Human Factors

**Finding:** The subcommittee is pleased to see the progress made in the presentation and relevance of human factors research requirements and the involvement of human factors professionals in many different research efforts throughout the agency. The link between human factors research, the outcome of the research and the various projects that benefit from the

research are becoming much more evident. The Subcommittee applauds this progress and hopes to see it continue. One concern the subcommittee has is the apparent difficulty involved in responding to human factors situations that arise in the near term. With the rapid pace of technology changes and their use in aviation, there needs to be a capability for human factors researchers to respond in real time. The subcommittee understands that there is an existing process in place to facilitate this capability but the use of this process seems to be infrequent, especially in the area of human factors research.

**<u>Recommendation</u>**: The subcommittee recommends that FAA review the process for reallocation of funding for current year or following year pop-up requirements to assure this process is user-friendly and encourage its use when research needs arise from rapidly changing situations.

**Finding**: The subcommittee also remains concerned that the funding for human factors research seems to receive a lower priority than might be warranted due to a misunderstanding of how this research supports the broader R, E and D effort it's connected to. The subcommittee understands the concern from human factors research managers that the proper researchers be assigned to relevant projects and the need for human factors experts to be designing and conducting the research. As the aviation industry moves more toward data driven, evidence based risk management, the contribution that human factors research makes to an R, E, and D effort and its importance might be better recognized if human factors research is embedded in the larger R, E, and D effort rather than conducted independently.

**<u>Recommendation</u>**: The Subcommittee recommends that, for funding and functional purposes, FAA explore the possibility of closely aligning human factors research requirements with the other research areas they support, even though those issues might fall outside of the traditional human factors portfolio.

### **Unmanned Aircraft Systems**

**Finding**: The Subcommittee is pleased with the progress made in the area of coordinating and aligning research efforts associated with the routine integration of unmanned aircraft systems. While disappointed that the "integration roadmap" is not yet releasable for the subcommittee to review, we are pleased to hear of the interagency coordination and the realism associated with the FAA's planning efforts. Based upon comments from the FAA, it appears that the agency is fully leveraging investments by NASA and the DoD in related research efforts especially in the area of sense and avoid. The subcommittee sees that many open research questions remain and that the agency has many research challenges ahead as they pursue integration efforts.

<u>Action</u>: The subcommittee requests a briefing on FAA efforts to document research linkages with NASA, DoD, and DHS as well as efforts to identify potential research gaps.

# **Budget Review**

**Finding**: The federal budget environment continues to be in a state of uncertainty that is beyond the control of the FAA. The Subcommittee finds that the research planning process has incorporated sufficient flexibility to adjust to this uncertain budget environment. The Subcommittee also notes that the Joint Planning and Development Office (JPDO) continues to be targeted by Congress as an activity that can be eliminated or cut back.

The Subcommittee encourages the FAA to explore options to either clarify the role of the JPDO or decide if the JPDO responsibilities should be transitioned to other organizations as appropriate.

# <u>Strategic Plan</u>

**Finding**: The Subcommittee was encouraged by the approach taken to document current research opportunities in the draft Strategic Plan. The Subcommittee strongly supports the development and use of a stable methodology by which research opportunities are developed and routinely assessed against measurable outcomes. Alignment of research initiatives with broader AVS safety goals is critical to ensure research efforts materially and measurably contribute to safety in the years to come.

The current draft strategic plan, as outlined for the Subcommittee, largely captures todays existing opportunities and research already underway or identified. The Subcommittee members look forward to providing feedback and sees opportunities to mature a research priority identification process which includes 'top down' direction and full review among other FAA lines of business and key industry bodies.

# **Continued Airworthiness: Maintenance and Inspection**

**Finding**: The Subcommittee finds this work to be relevant and well defined. The work covers a broad range of activities to include composites and electronic devices. The Subcommittee also commends the FAA for using the flexibility of the pop-up process to deal with Corrosion Prevention and Control concerns and for gathering information to address other upcoming maintenance issues. The Subcommittee encourages the FAA to continue to support this area as planned.

# **Continued Airworthiness: Structural Integrity Metallic**

**Finding**: The Subcommittee finds this work to be relevant and well defined. It was noted that the future Active Flutter Suppression research could be reduced if the expected funding allocation from Congress is not increased. The Subcommittee finds this particular activity to be aligned with technology trends in future aircraft structural designs and encourages the FAA to support this area as planned.

### **Continued Airworthiness: Electrical Systems**

**Finding**: The Subcommittee finds that the Electrical Systems research activity is a highly leveraged program taking advantage of industry (Boeing, Honeywell), University (UDRI), Inter-Agency (DOD, NASA) and industry (SAE, S&T) capabilities to produce results responsive to sponsor requirements.

The Subcommittee encourages the FAA to explore funding alternatives which would support research on non-flammable electrolyte lithium batteries for aerospace applications (currently planned for FY 2016 funding) starting in FY 2014.

# **Fire Research and Safety**

**Finding**: The Subcommittee finds that the Fire Research and Safety program continues to be responsive to clearly stated and anticipated requirements. Stable funding allows the program to produce timely results with flexibility to respond proactively to both current and emerging needs. The Subcommittee encourages FAA not to overlook research opportunities focused on ignition prevention and sharing of key materials flammability research findings with the small/general aviation aircraft industry to promote adoption of known safe materials.

Readers of this report are encouraged to read the attached article written by Dr. Ann Harlan, former Director of the FAA William J. Hughes Technical Center. It is an excellent example of the high quality research and analysis being performed in the FAA Fire Research and Safety Program.

# **Continued Airworthiness: Flight Control Mechanical Systems**

**Finding**: The Subcommittee is pleased to hear FAA research activity in the areas of stall recognition and recovery and low speed awareness/alerting is being coordinated with the numerous other FAA and non-FAA sanctioned bodies of research looking into these areas. Also encouraging is the balance of focus between Part 23 and Part 25 airplane safety opportunities. It is, however, challenging for Subcommittee members to fully grasp the total amount of research underway in the area of 'loss of control'. The interrelation between airplane requirements (envelope protection, alerting/warning methods, etc.), pilot training and human factors aspects must be regularly reviewed to minimize the chance of conflicting risk mitigation strategies.

# **Continued Airworthiness (Propulsion Systems): Engine NDE**

**Finding:** The research being conducted in this area was found to be relevant and progressing at a pace thought to be reasonable in light of budgetary challenges. The Subcommittee encourages FAA to closely review planned volcanic ash related research for future relevance, given the tremendous amount of work already accomplished through ICAO to maintain safe, efficient operations in times of volcanic eruption

# Safety Management Systems

**Finding**: The Subcommittee finds this work to be relevant and well defined. The work covers a broad range of data analysis activities. The Subcommittee was curious as to why the FAA feels that all research would be complete by FY 2016.

The Subcommittee notes the absence of FY 2016/2017 funding.

#### Software Digital Systems

**Finding**: The Subcommittee finds this work to be relevant and extremely important. The Subcommittee was especially pleased with the newly established collaboration between NASA and the FAA to create joint research teams, conduct technical exchanges, and establish joint research roadmaps. The subcommittee observed there are similar research efforts at the DoD which may also be synergistic.

### **Aeromedical Research**

**Finding**: The Subcommittee finds that the ongoing requirements for Aeromedical Research are connected to the outputs and outcomes of the research, and results are being produced as planned. The Subcommittee appreciated the explanation of how requirements are defined and prioritized through the TCRG and AVS processes and coupling to the research is maintained. The Subcommittee further observes that maintaining capabilities in this area can be expensive, and encourages CAMI to continue use of all available funding processes, such as was used to upgrade key facilities.

### **Advanced Materials and Structures**

**Finding:** The application of a safety management approach to define future research and desired outcomes is strongly supported by the Subcommittee. Further, it is encouraging to see research efforts to improve certification efficiency to help introduce products and technology that increase safety but are currently faced with significant certification costs. The Subcommittee encourages FAA to continue the good coordination and involvement with industry stakeholders.

### Propulsion & Fuel Systems

**Finding**: The Subcommittee finds this work to be relevant and well defined. The development and refinement of DARWIN is planned to be completed in FY15. This activity has provided industry with a critical tool for improving and certifying the damage tolerance of engine rotor components. Although follow on work has not yet been identified beyond FY15, the Subcommittee anticipates legitimate requirements will emerge.

### **Aircraft Icing**

**Finding**: The Subcommittee finds this work to be relevant and well defined. The new SLD rule, anticipated in 2014, still lacks readily available and proven means of compliance to capture the anticipated safety benefits. The Subcommittee encourages FAA to maintain focus in this

area. As new aircraft designs are introduced and operational capabilities expand, the need for research in aircraft icing will continue to be critical into the foreseeable future. The experience, skills, and capabilities needed to support icing research are unique and must be intentionally nurtured and groomed. Although the FAA currently has world class icing expertise, the Subcommittee continues to be concerned that without a concerted focus the FAA will have difficulty replacing and maintaining this unique and necessary capability overtime.

The Subcommittee encourages the FAA to plan for and implement a process to ensure that the skills and technical capabilities to support future icing research and certification requirements are developed and maintained.

#### Weather Program

**Finding:** The subcommittee recognizes the important of the weather research program in improving safety and efficiency in the national airspace system. The program is large and diverse, thus creates challenges in ensuring the activities are appropriately coordinated. While the research is well articulated and appears appropriate, the operational outcomes in terms of impacts on safety and efficiency are sometimes obscure. This program could benefit from the FAA's movement to articulate operational outcomes associated with its research especially in efforts to prioritize research efforts.

#### **Terminal Area Safety**

**Finding**: The subcommittee supports the research being performed in the area of Terminal Area Safety and finds it is well structured and relevant. The stall recovery training research is progressing well with clear recognition of the degree of difficulty in accurately simulating this condition. The close coordination between this research and related research in other areas is commendable and needs to continue. The runway friction research aimed at reducing runway excursions is progressing well. As this research continues, additional focus will need to be placed on transport category aircraft. The effort on quick turning information from incidents and issues to simulator training is especially noteworthy. The subcommittee supports and encourages high quality, positive, effective training but also hopes that it will not take an inordinate amount of time for the loss-of-control training to reach the industry.

#### NextGen - Alternative Fuels for GA

**Finding**: The SAS received a presentation on the status of the two-phase program to implement the recommendations of the Unleaded Aviation Gasoline Transition Aviation Rulemaking Committee to support availability of a replacement fuel for leaded aviation gasoline. The committee noted that although not performing every option that the ARC recommended, the FAA program of research is in line with the recommendations. It was further noted that a

steering group has been formed, and industry's direct involvement is expected to be heavily leveraged in order to deliver the outputs.

### Aircraft Catastrophic Failure Prevention Research

**Finding:** The Subcommittee found the briefing on the Aircraft Catastrophic Failure Prevention Program thorough and reflected positive activity in an area considered to be of high value. The Subcommittee was encouraged to see an upcoming transition of focus from metals to composite material in the coming years. The Subcommittee noted the continued refinement of analytical tools created by this activity is considered to be of high importance.