REDAC Aircraft Safety Subcommittee
March 2018

Comments on Proposed Budget Impacts on Safety Research

Finding:

SAS appreciates the FAA providing the opportunity to comment on the impacts of the proposed 2019 research budget reductions and notes the flexibility of the AVS staff to quickly provide the SAS with requested insight into the 2019 financial planning. While it is not standard practice for SAS to comment on budget matters we did want to provide the "sense of the committee" as it relates to impacts from the FAA's prioritization of items to be cut. We would encourage, in this limited funding environment, that the FAA consider not simply just deferring future or emerging issue research in favor of existing research but rather consider the pace of industry development in new technology and evolving areas. Overall, we feel there has been a greater emphasis placed on continuing existing research versus investing in the future.

Recommendations:

1) FAA should consider cancelling some of the ongoing research programs and starting some focused work on industry identified emerging issues. By not investing in the future, the FAA will not keep pace with industry and will be at risk of failing to serve the countries' technology development needs.
2) In order for the SAS to be able to better provide input we recommend that FAA provide to the SAS:
    a. The programs, projects, and personnel being 'deferred,' and an explanation of the process used to determine which research programs would be deferred.
    b. The impact of deferring the research and losing the personnel on aviation safety.
    c. The resulting complete waterline (or Mendoza) listing of all research programs

<u>Specific Comments by BLI</u>

A.11.e – Continued Airworthiness

- Proposed deferred activities include "Determine the safety of new electric aircraft". The industry is moving forward with these products at a rapid pace supported by the convergence of technology advances in the field of electric propulsion and autonomous systems. Additionally the REDAC, in recognition of this industry trends, has specifically tasked the SAS to stay abreast of electric aircraft technology including dispatch requirements, energy state management and battery protection schemes. The SAS is concerned that the FAA may not keep pace with these developments and fall behind in their ability to support certification and regulatory efforts with these new aircraft.

A11.h – System Safety Management /Terminal Area Safety

- The SAS notes that the items in this area related to Safety Oversight Management System and Integrated Domain Safety Risk Evaluation Tool are closely related, and in support of, the SAS emerging issue of Real Time System –Wide Safety Assurance. Additionally Real Time System-Wide Safety Assurance has been defined as one of NASA's strategic thrusts. The SAS has been jointly briefed by NASA and FAA on the Research Transition Teams (RTT) related to this subject. There may be further collaboration opportunities between the FAA and NASA, which will allow this important subject to proceed.

A.11.I – Unmanned Aircraft Systems Research

- The 2019 budget identifies that $73M will be spent on UAS across Operations ($51M), Facilities ($18M), R&D ($3.3M) and Grant in Aid for airports ($1M). Any matching spending through the CoE / ASSURE would be incremental to this plan. A continued lack of clarity on the overall UAS plan makes it difficult to assess if the RE&D spend will be meaningful in the context of the overall plan. Based on the stated scope of the 2019 research activities (Literature search and review in support of future regulation) it seems likely that the research activity will be overcome by the pace of "industry" development in the UAS space. At minimum, the research plan should be assessed in the broader context to assure that the research is timely and that the funds will add value to the overall effort.

A.11.J – Aeromedical Research

- The SAS noted in the 2014 'emerging issues' that, "Biomedical research is also needed to develop the psychological and physiological measures from the human operator that will inform the automation system," and "… to ensure that automation on the flight deck and other safety critical applications is designed and implemented in a way to complement the strengths and weaknesses of the human operator." Gene expression research, which feeds into biomonitoring technology, is currently deferred. Other physiological monitoring research has not yet been planned. The SAS is concerned that the FAA will not be able to fund safety-related operator state monitoring research in the short- and long-term, leaving certification and regulatory issues lagging development in the commercial and government sectors. The projected reductions in spend and staffing at CAMI appear to be disproportionate and significant. This is worthy of additional discussion within the FAA.

- The SAS notes that several topics related to this 'emerging issue' are deferred in FY19 because of funding cuts; for example, a) Impact of BASICMED regulation on safety; 2) Gene expression research; and 3) Novel pharmacology research. To ensure defensible practices, FAA medical certification policies must keep pace with developments in science. The SAS is concerned that without funded aeromedical research in these areas, medical standards will fall far behind current medical practice, exposing the Agency to legal challenge and inflicting outdated medical standards on pilots.

A11.n – Commercial Space Transportation

- While not a BLI responsibility area of the SAS we note that commercial space safety is a topic that we defined in 2014 as an emerging issue. We also note that there are deferred safety topics related to developing safety models to reduce overly conservative airspace restrictions for commercial aviation and developing and demonstrating innovative analysis to automatically declare aircraft hazard areas for launch/re-entry. This subject is impacting commercial aviation airspace today and with the planned growth to include many more space launch locations the impact is likely to grow. Also deferred is research into radiation hazards, which will leave unanswered questions about exposure limits for commercial space travelers. SAS believes this issue musty be addressed in FAA planning, sooner rather than being deferred.

General Concerns Regarding Research Budget Cuts:

a. Much of the deferred research is in-house labor and projects, meaning that the cuts will result in the loss of experienced unique individuals who will be, in some cases, impossible to replace. There may be areas of research around the FAA that are extramural and much more able to pause/restart without significant disruption.

b. CAMI and Technical Center experts are often international leaders in their field, and their loss will leave a void potentially affecting international policy and the national interest.

c. Much of the deferred research capability is unique to the FAA, meaning that there is no alternative source for the expertise in the private sector or government. For example, the genomic research at CAMI, which is leveraged by the DOD, will be lost.

d. It is noted that $10M is planned to be spent on Cyber within the Office of the Secretary of Transportation. As this had been identified as an emerging issue by the SAS it would be worthwhile for the sub-committee to understand any of this funding that is intended for research to address safety related threats.

Comments on Electric Aircraft Systems

Finding:

The SAS was requested to consider electric aircraft systems to consider items such as dispatch requirements, energy state management and battery protection schemes. The SAS appreciates the presentation of a "Path to Electric and Hybrid / Electric Engine Regulation" as an initial topic in what is expected to be a much broader conversation of electric aircraft systems. It was noted in this briefing that the FAA is currently involved in several industry committees in this regard. The current view of more electric aircraft or aircraft powered by electric or hybrid-electric propulsion systems is that there will be much more integration of these systems within the aircraft including propulsion systems providing primary flight controls in e-VTOL configurations. This will result in increasingly complex systems and systems of systems (ref 2014 SAS emerging issues) requiring alternate V&V and certification compliance methods.

Recommendations:

FAA should consider proactively developing a national plan or roadmap describing the research required in the area of electric aircraft systems safety to be better prepared for future applications of this technology.