Research, Engineering, and Development Advisory Committee REDAC: Sub-committee on Aircraft Safety (SAS) Meeting

Federal Aviation Administration

AVS Research, Engineering and Development

Presented to: REDAC SAS

Date: 8/11/21

Purpose

- Overview of updates to the Aviation Safety R&D Process to be used to produce the FY24 Aviation Safety Research Portfolio
  - Refresher
  - Process Updates
  - Updated BLI Plans
  - Key Portfolio Dates

Refresher

AVS Mission

To provide the safest, most efficient aerospace system in the world through a data-driven, risk-based, systems approach for standards, certification, and oversight.

AVS-sponsored Research

The primary purpose of AVS-sponsored research is to support the development of regulations, standards, and guidance materials needed to meet the FAA safety goals and objectives.

Basic Process Steps

- Formulate Out-year Budget Request (i.e. FY24)
  - FY23 forward
    - Update 5-year BLI Plans
    - Develop Research Project Proposals within each BLI
  - Rank and Budget Program Research Project Proposals
  - Obtain recommendations from REDAC
  - Finalize Aviation Safety Portfolio for submission to OST/OMB
- Execute planned research adjusted for current-year Appropriation Language (i.e. FY22) and other changing conditions

AVS RE&D Management Team (REDMT)

- The AVS REDMT is the Chartered decision-making body with the authority to make decisions based on service/office input and support for the Aviation Safety R&D Program.

- The team is comprised of at least one or two managers from each of AVS Services/Offices that sponsor research

- The team is chaired by the AVS R&D Program Managers in the Office of Accident Investigation and Prevention

- AVS REDMT members lead the BLI Teams

BLI Teams

- A BLI Team is formed around each of the BLIs in the Aviation Safety RE&D Portfolio to plan and execute research.

- The BLI Teams are led by the AVS REDMT Members from Services/Offices (S/Os) that sponsor research within the given BLI with one REDMT member designated as the “lead” for the purposes of organizing and running the meetings.

- In addition to the AVS REDMT members, the BLI Teams are comprised of:

  - Research Sponsors from the S/Os that sponsor research within the given BLI (*i.e. Subject Matter Experts: Chief Scientists & Technical Advisors, Senior Technical Specialists, Aviation Safety Engineers and Inspectors, etc.*)

  - Research Managers from the research offices (i.e. ANG and CAMI) that plan, manage, and execute the research within the given BLI (*i.e. Subject Matter Experts: Program/Project managers, researchers, budget analysts, etc.*)

FY24 Research BLIs & BLI Teams

AVS BLI Ref Number	BLI Title	BLI Team Sponsoring Services/Offices (lead member in bold)	BLI Team Research Offices (BLI Lead organizations in bold)
A11A	Fire and Safety Research	**AIR**	**ANG-E2**
A11B	Propulsion and Fuel Systems*	**AIR**	**ANG-E2**
A11C	Advanced Materials/Structural Safety	**AIR**, AFX	**ANG-E2**
A11D.AI**	Aircraft Icing	**AIR**, AFX	**ANG-E2**
A11D.SDS**	Software and Digital Systems	**AIR**	**ANG-E2**
A11E	Continued Airworthiness	**AIR**	**ANG-E2**
A11G	Flightdeck/Maintenance/System Integration Human Factors	**AFX**, AIR, AAM	**ANG-C1,** AAM-500
A11H	System Safety Management/Terminal Area Safety	**AFX**, AIR, AOV, AVP	**ANG-E2**
A11J	Aeromedical	**AAM**, AFX, AIR	**AAM-600**
A11L	Unmanned Aircraft Systems	**AUS**, AIR, AFX, AAM, AOV, AVP	**ANG-C2**
A11M	Alternative Fuels for General Aviation	**AIR**	**ANG-E2**

*NOTE: Aircraft Catastrophic Failure Prevention Research was incorporated into Propulsion and Fuel Systems Budget Narratives starting in FY19.

**NOTE: Previous to the finalized FY22 President's budget Aircraft Icing and Software and Digital Systems were together in a single BLI

Process Updates

- **BLI Plans:** Reworked and Updated BLI Plans to be more top-down and strategic with executive sign-off.
- **Research Project Proposals:** Clarified definitions, roles & responsibilities, improved alignment with FAA R&D Program, and strengthened the connection to the BLI Plans.
- **Obtain recommendations from REDAC:** Beginning to use the BLI Plans to communicate program and status with SAS.
- **Ranking and Budget Programming:** Clarified pairwise question definitions and strengthened the connection to the BLI Plans.
- **Finalize Aviation Safety Portfolio:** Strengthened connection to the BLI Plans.

Updated BLI Planning

5-Year BLI Plans

Original Intent of Plans

- Top-down and more strategic
- 5-Year planning (*with annual/regular updates*)
- Annual (1 year) budgeting is just a slice of the full 5-Year Plan, as opposed to developing an annual “single year” plan

State from last year

- Mostly bottom-up (i.e. continuation of existing research projects and projects grouped into programs)
- BLI Teams worked independently and the Plans were not consistent nor fully integrated at the AVS and FAA Level

Updated Planning

- Added a specific requirement/need pre-planning activity for each S/O
- Updated and standardized information required in the BLI plans
- Standardized the use of projects across program
- Added line-of-sight tie between S/O desired Operational Capabilities, Safety Outcomes, and the Research Project Proposals

S/O Requirements/Needs for Research

- **Operational Capability:** The desired future ability to do something new in the aerospace ecosystem (i.e. new technologies and/or operations). For example, *electric propulsion in air taxi operations* would be an operational capability.
  - In the context of the BLI Plans, these are the future abilities that require/need research to inform the safety regulations and standards that will allow these.
  - Each Service/Office provides a prioritized list of their the Operational Capabilities they are seeking to enable in the future.

- **Outcome:** The measureable safety goal that will be used by the S/O sponsor to verify achievement of the targeted operational capability.

- **Research Questions/Outputs:** The description of the gaps in knowledge/data/etc. the Service/Office needs to inform their regulations and standards to enable the Operational Capabilities.
  - In the context of the BLI Plans, an OC can have many Research Questions/Outputs
  - Each research question/output generates a separate Research Project Proposal.

FY22-27 BLI Plans: Sponsor pre-planning

Service/Office (S/O) Sponsor Requirements/Needs Definition:

- ❑ Individual REDMT Members work within respective S/Os to:
  - ❑ Define the Requirement Essential Elements of Information (EEI)
    - ❑ Operational Capabilities and desired Safety Outcomes
    - ❑ Primary Sponsor Points of Contact
    - ❑ S/O Operational Capability Priority
    - ❑ Proposed BLI Assignment
  - ❑ Conduct Gap Analysis
    - ❑ Determine what information or data is currently unavailable that is needed to achieve the targeted operational capability
    - ❑ Determine the Research Questions & Research Outputs needed to fill the gaps
  - ❑ Obtain S/O Executive approval

BLI Plan Preparation:

- ❑ BLI REDMT Members and the BLI Team members update Parts 1 & 2 of the BLI Plans
  - ❑ BLI Scope
  - ❑ S/O prioritized Operational Capabilities and desired Safety Outcomes
  - ❑ Research Questions and Research Outputs for each Operational Capability
  - ❑ S/O Executive signature

SAS Discussion Question

- Given that some of the Operational Capabilities defined herein are the technologies and operations that industry wants to introduce into the airspace ecosystem, how can the REDAC-SAS help the FAA identify and prioritize potential Operational Capabilities for the FAA to consider in future years?

Key Portfolio Dates

06/21/2021
- Kick-off FY24 Portfolio Build

8/10-11/2021
- Summer/Fall SAS Meeting

10/1/2021
- FY22 Begins

10/7/2021
- Tentative Summer/Fall full-REDAC

2/10/2022
- FY24 AVS Draft Portfolio

3/TBD/2022
- Winter/Spring 2022 SAS Meeting

4/TBD/2022
- Tentative Winter/Spring full-REDAC

6/1/2022
- FY24 FAA Portfolio sent to OST

Questions I can answer?

Back-up Materials - NONE