Aviation Safety Research Strategy

Office of Senior Technical Experts, AIR-20

National Airspace System (NAS) Operations

March 19, 2024

Federal Aviation Administration

STEP SENIOR TECHNICAL EXPERTS PROGRAM
ADVANCING SAFETY THROUGH SCIENCE

Aviation Safety Strategy

Why are we Doing This?

- Establish research goals and gain support from industry & other USG agencies
- Guide FAA investments in internal (people/labs) and external research
  - Influence research ideation in priority areas
- Inform future research appropriations and other research
- Inform and leverage research plans of NASA, other USG, industry and academia

Common Misconceptions

- The strategic thrusts focus on FAA-sponsored research
  - Reality: Aviation safety is a shared responsibility with industry, and we aim to influence their research
- The strategic thrusts should lead to program plans and specific deliverables
  - Reality: The thrust provide direction and acceleration – in many cases the destination is unknown
- All FAA research that is important should be connected to a strategic thrust
  - Reality: There are and will continue to be other priorities

FAA Role in Aviation Safety Research

SAFETY

Evaluate a Risk or (potential) Mitigation

INNOVATION

Develop a Technology/ Solution in Public Interest

READINESS

Increase a Technology's Certification Readiness

IMPROVEMENT

Improve Certification/ Oversight Methods

Certification Readiness

Aircraft Certification, Pilot Certification, Operator Certification

Readiness Phase	Research	Policy	Practice
Normalization Predictable and repeatable certification requirements and methods that assure safety	Data to inform best methods	Rules, ACs and Standards	Trained/ experienced industry and regulatory workforce
Application Individual projects can be certified with sufficient information to assure safety, may use tailored criteria	Data to inform decisions Study of modeling, test methods Study of application concepts (use of technology) Experimental demonstration	Issue Papers, Special Conditions, Exemptions, Waivers and Equivalent Levels of Safety	Utilize technology specialists
Discovery Adequate knowledge to know what topics need to be addressed to assure safety	Study of basic properties Study of concepts of use		

Research, Engineering and Development Advisory Committee (REDAC)

The REDAC evaluates FAA research needs in five areas:

- National Airspace System (NAS) Operations,
- Airport Technology,
- Aviation Safety,
- Human Factors,
- Environment and Energy

Strategic Thrusts

Operational Safety: Identified safety risks for U.S. aircraft and operations in U.S.-controlled airspace are mitigated to acceptable levels.

Safety Analytics and Risk Synthesis: Potential safety risks are identified before they manifest as risks and are evaluated in the context of the aviation system.

Future of Oversight: The FAA continuously improves the effectiveness of oversight to ensure the aviation system meets public expectations.

Emerging Entrants: Enable the safe introduction of drones and advanced air mobility.

Sustainable Flight: Normalize the safety requirements and compliance for technologies and operations for sustainable aviation.

Public Health Preparedness: Prepare the aviation transportation sector to be resilient in the face of new or re-emerging infectious disease.

Strategic Thrusts (cont.)

Increasing Automation and Complexity: Assure the safety of increasingly complex automation and human interaction, normalizing the safety requirements and compliance to introduce automation for safety and more efficient operations.

Digital Engineering: Use digital engineering to improve safety and reduce the lifecycle costs of aircraft and operational safety assurance.

Artificial Intelligence: Develop methods to assure the safety of AI and identify methods to use AI for safety.

Structure, Materials and Manufacturing: Normalize the safety requirements and compliance for new materials and manufacturing techniques.

Next Steps

- AVS has developed ten Strategic Research Thrust Areas that reflect long term research needs.
- The FAA would like to share these draft strategies with the REDAC and request feedback on how the research portfolio can help achieve the vision outlined in each area.
- These Thrust Areas have been used now to inform FY24 priorities. The FAA would also like feedback to include specific proposals for FAA research that we may include in the immediate execution year.
- In the spirit of discussing research crossover areas, the FAA would like to propose a Joint working group of the following subcommittees: Human Factors & Aviation Safety. The intent would be to identify key areas common to both subcommittees and how common research should be briefed across subcommittees (e.g. System Safety Management, as an example).