

JOINT ADVANCED MATERIALS & STRUCTURES CENTER OF EXCELLENCE

The Joint Advanced Materials and Structures Center of Excellence

CoE Member Schools

- The joint center consists of two groups and includes twelve institutions
- AMTAS (Advanced Materials for Transport Aircraft Structures)



- CECAM (Center for Composite and Advanced Materials)



The Joint Advanced Materials and Structures Center of Excellence

Goals for the Advanced Materials Center



- Address the engineering and science issues associated with safety regulation and product certification of advanced materials
- Ensure equivalent or higher levels of safety relative to existing technology
- Establish engineering standards and unique skills training for advanced materials
- Nine technical areas to be studied, others beyond identified will be added as needed
- Develop an advanced materials, forms and processes “knowledge base”

- Define and prioritize activities by directly linking to applications relevant to specific regulation and certification needs.
- Support FAA guidance & policy development and solve safety problems by bridging experiences from the field.
- Interface with international organizations, which are developing engineering standards
- Transfer the technology beyond normal means through the training of engineers and technicians
- Coordinate the research efforts of academia, industry and government agencies
- Extend partnerships beyond research initiatives with programs that address technology transfer, continuous education and training of the engineering workforce



- The initial technology areas to be addressed by the Center include:
 - Structural Substantiation
 - Damage Tolerance and Durability
 - Bonded Joints Processing Issues
 - Maintenance Practices
 - Material Standardization and Shared Databases
 - Advanced Material Forms and Processes
 - Cabin Safety and Crashworthiness
 - Life Management of Materials for Improved Aircraft Maintenance Practices
 - Nanotechnology for Composite Structures

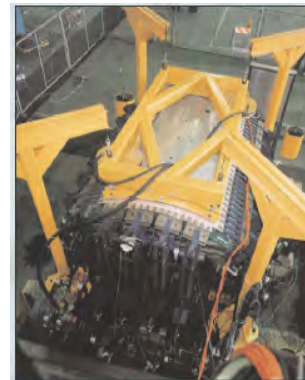


Common JAMS CoE Initiatives

Across all technical focus areas

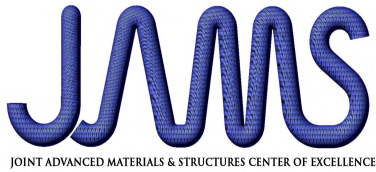
- **Work with industry** to study issues and validate design details, analysis procedures, materials and processes for advanced aircraft structure.
- **Work with international standards organizations** (e.g., ASTM, SAE P-17, CACRC, TTCP and MIL-HDBK-17) to establish engineering guidelines.
- **Develop coursework and conduct workshops** to train the workforce.

- The FAA William J. Hughes Technical Center is the nation's premier aviation research and development, and test and evaluation facility
- The Technical Center serves as the national scientific test base for the FAA.
- Technical Center programs include:
 - Testing and evaluation in air traffic control
 - Communications
 - Navigation
 - Airports & aircraft safety
 - Security.
- They also include long-range development of innovative aviation systems and concepts, development of new air traffic control equipment and software, and modification of existing systems and procedures
- Located 10 miles northwest of Atlantic City, and covering over 5,000 acres, the Technical Center consists of state-of-the art laboratories, test facilities, support facilities, the Atlantic City International Airport (ACY), and a non-commercial aircraft hangar.



- Advances Materials/
Structural Safety
- Aging Aircraft
Research
- Aircraft Catastrophic
Failure Prevention
- Airport Research &
Development
- Atmospheric Hazards
- Propulsion/Fuel
Systems
- Fire Research &
Safety
- Risk Analysis
- Flight Safety
- General Aviation /
Vertical Flight (F&E)
- Unmanned Aerial
Systems

- Aircraft Components Fire Test Facility
- Air Flow Induction Test Facility
- Category I Reconfigurable Approach Lighting System Test Bed
- Chemistry and Material Sciences Laboratory
- Dynamic Vertical Drop Test Facility
- FAA Engine Nacelle Fire Simulator
- National Fire Extinguishing Agent
- Full-Scale Fire Test Facility
- Full-Scale Curved Panel Test System
- Materials Fire Test Facility
- National Pavement Test Facility
- Propulsion and Fuel Systems Test Facilities
- Runway Friction Laboratory
- Video Landing Loads Facility



Organizations Sponsoring Research



FAA Directorates and Certification Offices

ANM

ACE

ANE

AIR

AFS

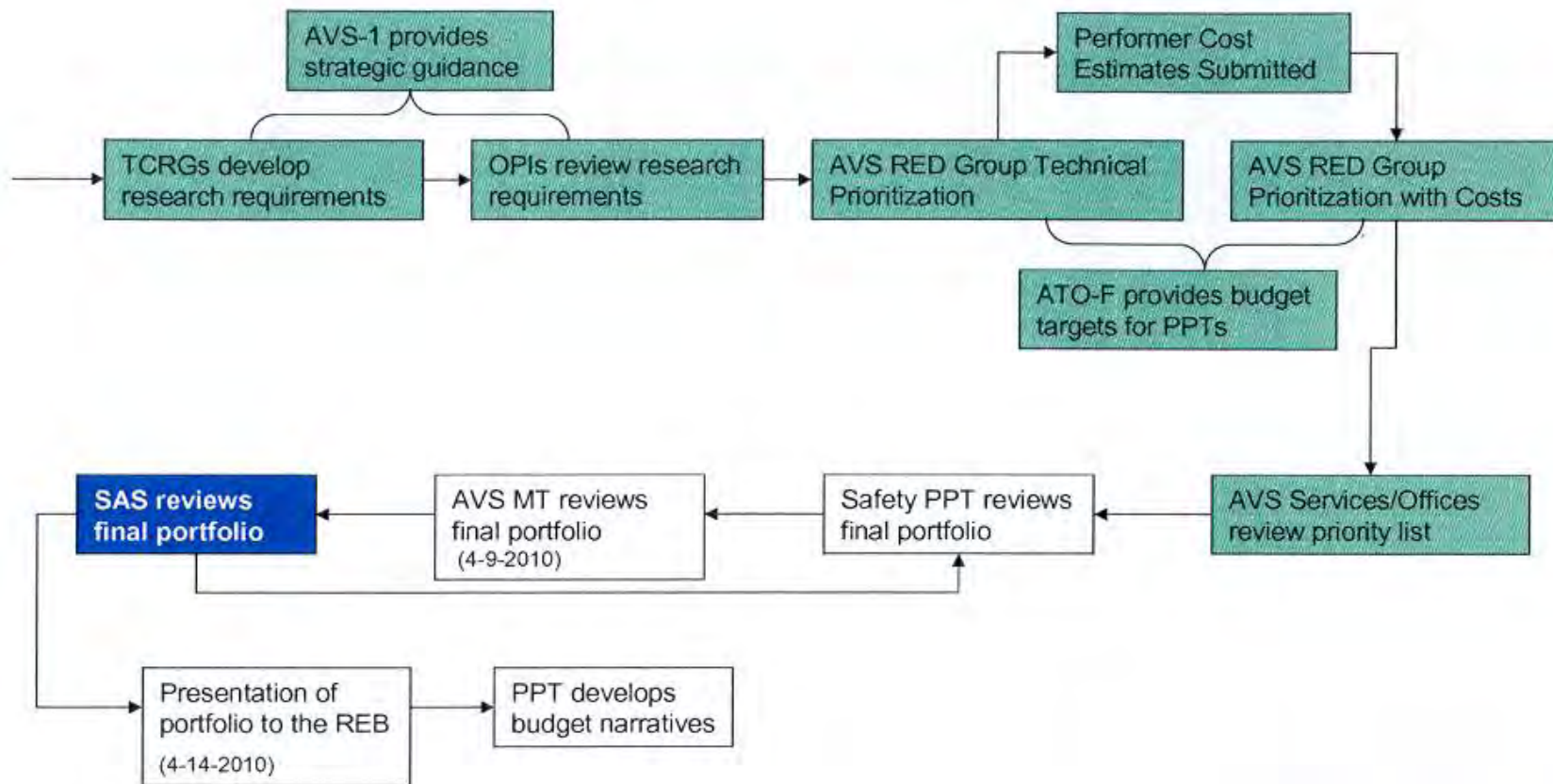
ASW

The Joint Advanced Materials and Structures Center of Excellence



Research Process Advanced Materials and Structural Safety

Overview of FAA Research Prioritization Process

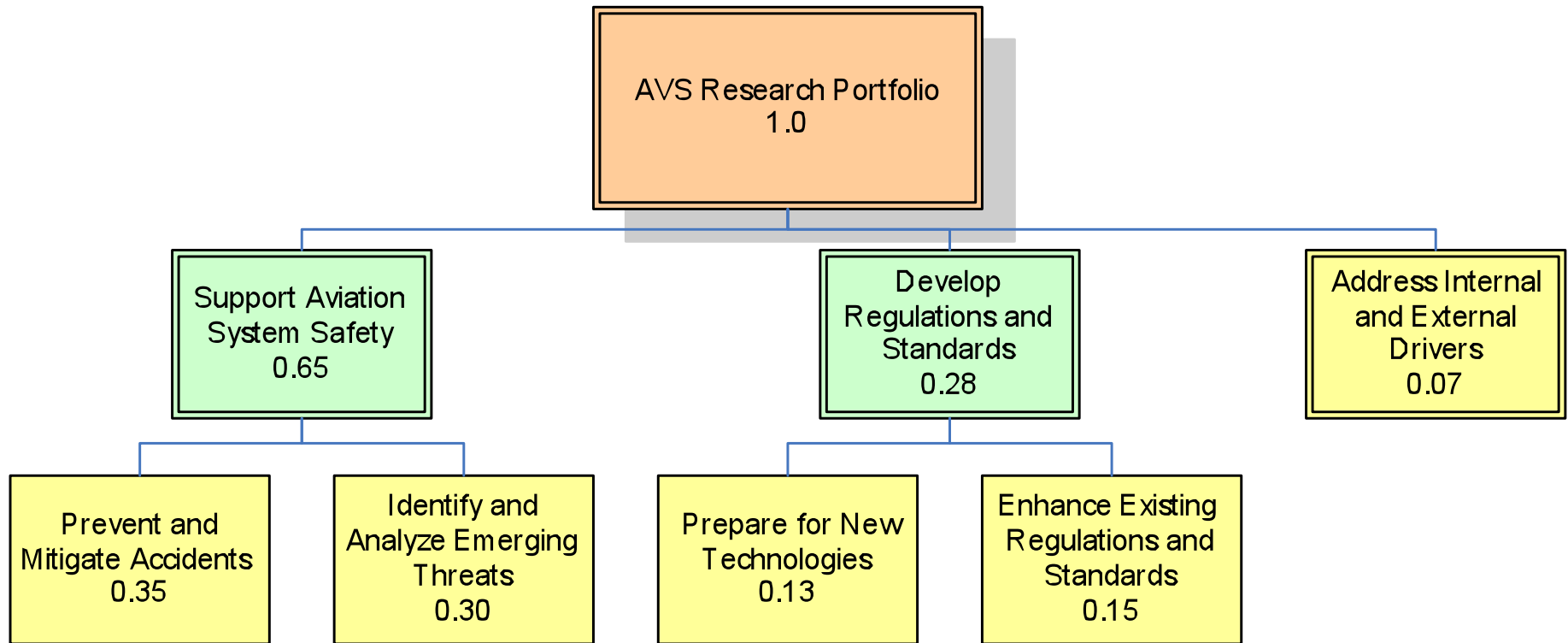


The Joint Advanced Materials and Structures Center of Excellence

Identifying and Prioritizing Research Requirements

- RANKING TECHNICAL NEEDS. As new technical requirements are identified, they are presented to the appropriate Technical Community Review Group (TCRG). The organizations represented on any one TCRG may include:
 - Office of Accident Investigation (AAI);
 - Aircraft Certification Service (AIR);
 - Office of Aerospace Medicine (AAM);
 - Flight Standards Service (AFS);
 - Air Traffic Oversight Office (AOV)
 - Office of Rulemaking (ARM);
 - NAS Weather Office (AJP-B)
 - Human Factors Research and Engineering Group (AJP-61);
 - Research Planning Group (AJP-62);
 - Airport and Aircraft Safety Group (AJP-63); and
 - Civil Aerospace Medical Institute (CAMI)
- TCRG members are responsible for bringing requirements originating from technical area stakeholders from within their own organization and industry.
- TCRGs review and rank all technical requirements within their area of responsibility.

Graphic Representation of Research Ranking Criteria with Importance Weighting



FAA System Safety Objective

- **Potential to Prevent or Mitigate Fatalities and Injuries**

- EVIDENCE - There is evidence of:

- 1. Past accidents/incidents that this requirement will address (either prevent or mitigate), or
- 2. Potential accidents/incidents that could occur that this requirement will address (either prevent or mitigate)

- IMPACT - The outcome of the requirement (if successful) will have a positive impact on the prevention of accidents/incidents or mitigation of fatalities and injuries if there is an accident/incident.

- NOTE: Assessments may be required to evaluate the risks of potential accidents or incidents. These assessments will determine if further research or analysis is needed to understand or validate a hazard or risk.

» Rank	Evidence	Impact
» 1	High	High
» 3	Low	High
» 5	High	Low
» 7	Low	Low
» 9	None	None

FAA System Safety Objective

(Continued)

- **Identify and Analyze Emerging Threats**

- EVIDENCE - There is evidence of a significant need to develop advanced methods of predicting hidden and emerging system safety risks and to apply such methods to determine how to mitigate the predicted risks.
- IMPACT - The outcome of the requirement (if successful) will have a positive impact on the effectiveness of the organization to predict system safety risks and to identify mitigation strategies.
 - NOTE: The focus of this criterion is on developing and applying methods to address system safety risks; in other words, the requirement is to develop a methodology that will be used by the FAA and others on a continuing basis for risk prediction and mitigation. These criteria are **not** intended for requirements that are developing solutions to known risks or for requirements that may include an analysis of a specific risk to develop a solution to a threat. For example, this criterion does **not** apply to developing inspection techniques to find damage in composite structures. Nor does it apply to an analysis of icing accidents that results in the development of certification guidance.

» Rank	Evidence	Impact
» 1	High	High
» 3	Low	High
» 5	High	Low
» 7	Low	Low
» 9	None	None

Safety Regulations and Standards

- **Enhance Existing Safety Regulations and Standards**
 - EVIDENCE - There is evidence of a deficiency (need to improve current regulations and standards) or gap (something not covered in current regulations and standards) in existing regulations or standards that this requirement will address
 - NOTE: In this usage, safety regulations and standards is meant to encompass directives, advisory material, means of compliance practices, rulemaking, policy letters, and any official document issued by any organization in FAA.
 - IMPACT - The outcome of the requirement (if successful) will have a positive impact in addressing deficiency or gap in existing regulations or standards.

» Rank	Evidence	Impact
» 1	High	High
» 3	Low	High
» 5	High	Low
» 7	Low	Low
» 9	None	None

Safety Regulations and Standards (Continued)

Prepare for New Technologies, Aviation System Changes, or Next Generation System Operational Improvements

- **EVIDENCE** – There is evidence of a need to:
 - 1. Develop improved knowledge or understanding of an anticipated new technology+ that this requirement will provide.
 - 2. Develop improved knowledge or understanding of a pending change in the NAS* that this requirement will provide
 - 3. Facilitate FAA alignment with the Operational Evolution Partnership, and
 - 4. Enable FAA to support capabilities needed to achieve the NextGen operational improvements
 - NOTE: Bullet 1 is not developing new technologies, this is preparing for new technologies being developed by someone other than the FAA so that the FAA can approve for use in the NAS. For example, this criterion does not apply to a requirement that is developing a new technology to de-ice an aircraft or for aircraft inspection.
- **IMPACT** – The outcome of this requirement (if successful) will have a positive and timely impact on the FAA’s ability to address an anticipated new technology or NAS change.

» Rank	Evidence	Impact
» 1	High	High
» 3	Low	High
» 5	High	Low
» 7	Low	Low
» 9	None	None

+ New technology is defined as technology not presently addressed by existing regulations or standards or new applications for existing technology not presently addressed by existing regulations or standards.

* Communications, navigation, surveillance, and weather equipment on board aircraft necessary for basic and elective operations in the NAS

Other Influences to Which the FAA Responds

- **Answer Internal[⊃] and External Drivers[†]**

- EVIDENCE - There is evidence that this requirement will directly support commitments made in response to external drivers and/or will meet the documented objectives of internal drivers.
- IMPACT - The outcome of the requirement (if successful) will positively address the issue identified by the internal or external organization.

» Rank	Evidence	Impact
» 1	High	High
» 3	Low	High
» 5	High	Low
» 7	Low	Low
» 9	None	None

⊃ FAA Flight Plan, Operational Evolution Partnership, National Plan for the Next Generation Air Transportation System, AVS Business Plan, AVS RE&D Strategic Guidance, AVS Service and Office Plans, and joint FAA/industry initiatives and plans like CAST.

† Congressional authorization and appropriations, Presidential and Congressional Commissions, Inspector General, General Accounting Office, and NTSB recommendations, international harmonization, or public and aviation industry interests.

Future Vision of Research Process

- Lifecycle approach to RE&D.
- Develop and prioritize each RE&D requirement once only.
- Identify clear end goal desired, quantitatively whenever possible.
- Identify gaps requiring research.
- Identify distinct phases of research with specific exit criteria for each phase.
- Program funds for all phases and authorize funds for each phase contingent upon successful completion of prior phase exit criteria.
- Monitor research. Implement results. Measure accomplishment of end goal and assess further actions as needed.



IN THE NEWS

The 2007 JAMS Technical Conference will be held July 10-12 at the FAA William J. Hughes Technical Center in Atlantic City, NJ. Stay tuned for more information!

The FAA Composite Damage Tolerance and Maintenance Workshop was held July 19-21 in Chicago, IL. The FAA Joint Advanced Materials and Structures Center of Excellence played a key role in this workshop.

Presentations are available for download via the link below.

[2006 FAA Composite Damage Tolerance and Maintenance Workshop](#)

WHAT IS JAMS ALL ABOUT?

On December 18, 2003, the first day of the second century of flight, the Federal Aviation Administration announced the initiation of a Center of Excellence in Advanced Materials also to be known as JAMS (the FAA Joint Advanced Materials and Structures Center of Excellence). The center is a joint award to two separate consortiums: the Center of Excellence for Advanced Materials in Transport Aircraft Structures (AMTAS) led by the University of Washington and the Center of Excellence for Composites & Advanced Materials (CECAM) led by Wichita State University.

For more information on what JAMS is all about [click here](#).

© 2007 Joint Advanced Materials & Structures. All rights reserved.

JAMS Presentations:
<http://www.jams-coe.org>



Navigation menu: About Us | What's New | Services | Resources | Document Viewers | Library Intranet

Home >> FAA William J. Hughes Technical Center Library

William J. Hughes Technical Center Reference and Research Library

[Search Library Catalog](#)

A New [RSS Feed](#) is now available for
FAA Commercial Opportunities

[Text of Scroll Message](#)

Use the above button to search the catalog.

The collection contains technical reports (many are digitized), aviation, engineering and FAA materials.

If you don't find it in the catalog send an [email request](#)

To search other transportation libraries select "Resources" tab

Library [RSS News Feed](#)

To view many reports you will need the free Adobe Reader®



FAA Technical Reports:
<http://actlibrary.tc.faa.gov>

The Joint Advanced Materials and Structures Center of Excellence