

FAA Joint Centers of Excellence for Advanced Materials (JAMS)



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Statutory Bases for JAMS

FAA Reauthorization Act of 2024

SEC. 1005. ADVANCED MATERIALS CENTER OF EXCELLENCE ENHANCEMENTS.

- (1) CONTINUED OPERATIONS.—The Administrator shall continue operation of the Advanced Materials Center of Excellence.
- (2) PURPOSES.—The Center shall—
- (A) focus on applied research and training on the safe use of composites and advanced materials, and related manufacturing practices, in airframe structures; and
 - (B) conduct research and development into aircraft structure crash worthiness and passenger safety, as well as **address safe and accessible air travel of individuals with a disability**, including materials required to facilitate safe wheelchair restraint systems on commercial aircraft.”

Statutory Bases for JAMS

FAA Reauthorization Act of 2024

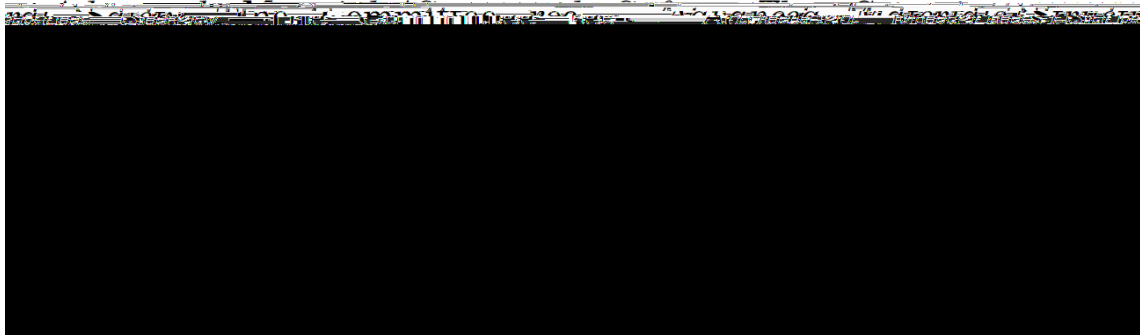
SEC. 1005. ADVANCED MATERIALS CENTER OF EXCELLENCE ENHANCEMENTS – (Continued).

RESPONSIBILITIES.—The Center shall—

- (1) **promote and facilitate collaboration** among member universities, academia, the Administration, the commercial aircraft industry
- (2) carry out research and development activities ... in relevant areas of study, which shall include—
 - (A) **all structural materials**, including—
 - (i) **metallic and non-metallic based additive materials, ceramic materials, carbon fiber polymers, and thermoplastic composites;**
 - (ii) the **long-term material and structural behavior of such materials;** and
 - (iii) evaluating the resiliency and **long-term durability of advanced materials in high temperature conditions** and in engines for applications in advanced aircraft; and
 - (B) **structural technologies**, such as additive manufacturing, to be used in applications within the **commercial aircraft industry, including traditional fixed-wing aircraft, rotorcraft, and emerging aircraft types such as advanced air mobility aircraft;** and
- (3) conduct research activities for the **purpose of improving the safety and certification** of aviation structures, materials, and additively manufactured aviation products and components; and
- (4) conducting research activities to **advance the safe movement of all passengers**

JAMS Funding Source

- Congress is providing directed funding for JAMS through the FAA research and development budget
- JAMS funding is primarily provided through the FAA **Advanced Materials/Structural Safety** research program and associated budget line item
- Congressional direction is outlined in an Explanatory Statement that refers to applicable House/Senate Report for that Fiscal Year
 - FY24 research budget direction is provided in Transportation-HUD Senate Report 118-70:



**\$10M directed to
JAMS in FY24**

FY23 Advanced Materials Research Objectives

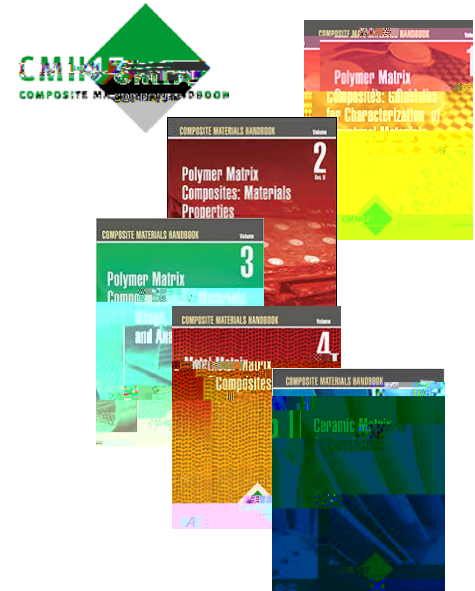
- 1. Develop guidelines for characterizing new material forms and assessing manufacturing maturity**
 1. Develop new material database protocols
 2. Evaluate equivalence for changes to materials and processes relative to an existing database
 3. Evaluate key process parameters and key characteristics for selected new materials and processes, as well as effectiveness of manufacturing control and inspection methods including in-situ monitoring and NDI
- 2. Evaluate long-term material and structural behavior and associated maintenance activities**
 1. Evaluate aging effects on selected material or structural detail
 2. Evaluate fatigue and damage tolerance behavior of bonded joints
 3. Evaluate fatigue behavior of metallic AM materials
- 3. Evaluate and characterize dynamic behavior of advanced structures to drive new test and certification standards and guidelines**
 1. Evaluate analytical methods for evaluating composite seat performance
 2. Evaluate analytical methods for modeling bird strike of composite structure
 3. Investigate dynamic behavior of composites and other advanced materials/processes
- 4. Develop efficient methods for characterizing composite and additive manufacturing details and elements to tie to best practice design and certification principles**
 1. Develop one or more standards and supporting data evaluation protocols for characterizing/testing mid-level composite building block configurations
 2. Develop one or more standards and supporting data evaluation protocols for characterizing/testing mid-level additive manufacturing building block configurations
 3. Evaluate non-structural behaviors of advanced materials and processes

JAMS Research Output

- Technical reports published by the FAA Technical Center
 - Publicly-accessible repositories consistent with the DOT's Public Access such as Repository & Open Science Access Portal at the National Transportation Library
- Industry standards such as those published by SAE and ASTM
- Data and best practices in MMPDS and the Composite Materials Handbook (CMH-17)
- FAA Policy and Guidance
- Training Materials



[FAA Technical Library @NTL](#)



Research Goals

- AVS-Sponsored Research Development Process is in revision
 - Looking forward, research will be guided by FAA Strategic Thrusts, service events, and industry input
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Structures, Materials, and Manufacturing Strategic Thrust

- Purpose:
 - Improve certification readiness and methods
 - Understand the safety risks associated with introduction of new materials, manufacturing methods, and structures, and develop ways to mitigate them
 - Develop and evaluate certification protocols and manufacturing and maintenance practices for advanced materials and structures to support their safe implementation
- Program Goals:
 - Understand and document fundamental behaviors of emerging materials and structures,
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