



Federal Aviation
Administration

JAMS

JOINT ADVANCED MATERIALS & STRUCTURES
CENTER OF EXCELLENCE

The Joint Centers of Excellence for Advanced Materials

The Joint Center of Excellence (COE) for Advanced Materials (JAMS) was established in January 2004 to assist in ensuring the safe and reliable application of composites and advanced materials to commercial aircraft. The Center is a joint effort of the Center of Excellence for Composite and Advanced Materials (CECAM) led by Wichita State University and the Center of Excellence for Advanced Materials in Transport Aircraft Structures (AMTAS) led by the University of Washington. The COE is a leader in international coordination of research, development, and standardization for structures constructed from these composites and advanced materials.

The common goal of this joint center is to create a cost-sharing academic, industrial and governmental partnership. The members are forging a union between the public sector, the private sector and academic institutions to create a world-class capability to identify solutions for existing and potential advanced materials and structures issues.

The main focus of this partnership is the research, engineering and development of information used to assure safety and standardize certification of existing and emerging structural applications of composites and advanced materials. Specifically, projects include the evaluation of past applications, performance of applied

research and the development of standard engineering practices.

This Joint Center of Excellence, working with industry and government, also plays an important role in technology transfer, training, and continuing education for the aircraft industry and regulators. JAMS strives for international standardization; develops consensus for developed protocols; identifies standardized criteria for material and process control; and promotes shared material databases worldwide.

The total amount of grants awarded to JAMS in FY21 is \$13,896,186. JAMS members and industry affiliates have provided at least 100% matching contributions.



Website: <http://www.jams-coe.org>

Research Areas:

- Damage tolerance of advanced composite structures
- Durability of adhesively bonded structure
- Additive manufacturing technologies
- Crashworthiness of composite airframes and seating systems
- Environmental and aging effects on in-service composite structures
- Lightning strikes on composite airframes
- Emerging material systems and innovative production technologies
- Maintenance and inspection of composite structures

FAA Sponsoring Office:

Aircraft Research Division - ANG-E2

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JAMS Research Projects:

- Polymer based additive manufacturing (am) guidelines for aircraft design and certification
- Joint metal additive material database definitions
- Evaluating the criticality of inherent anomalies / defects on the fatigue behavior of am metallic parts
- The effect of machine and machine-to-machine variability on mechanical properties of metal am materials
- Nanomechanical characterization of adhesive bondlines
- Adhesive bond qualification guidance for aircraft design and certification
- Durability of bonded aerospace structures
- Evaluation of aged bonded rotor blades
- Impact damage tolerance guidelines for stiffened composite panels
- Development and evaluation of fracture mechanics test methods for sandwich composites
- Effects of the use of cleaning and disinfectants chemicals/processes on aircraft interiors materials
- Post-crash fire forensic analysis on aerospace composites
- Composite engineer and maintenance technician online courses – modifications and implementation
- Lightning strike of composite structures
- Effects of new jet fuel exposure on aerospace composites
- Advanced fiber reinforced polymer composite materials guidance for aircraft design & certification
- Resin infused fiber reinforced materials guidelines for aircraft design and certification
- Safety and certification of discontinuous fiber composite structures
- Technology readiness assessment for stitched and unstitched resin infused composites
- Ceramic matrix composite materials guidelines for aircraft design and certification
- Core materials qualification guidance for aircraft design and certification
- Thermoplastic welding process qualification protocols for aircraft design and certification
- Airframe crashworthiness testing and simulation - composites and metallic business jet section
- Development of higher level building block testing standards
- Evaluation of parameters used in progressive damage models
- Static strength variability between composites and metallic with respect to overload factors

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CECAM Member Universities:

- Wichita State University
- Mississippi University
- University of California San Diego
- Auburn University



AMTAS Member Universities:

- University of Washington
- Washington State University
- Oregon State University
- Florida International University,
- University of Utah

