

ABOUT US

ATLAS – the Advanced Technologies Lab for Aerospace Systems – is a multi-disciplinary manufacturing environment and an engineering education program to prepare engineers and educators for the *Factory of the Future* and to aid the current workforce in seamlessly adapting to advancements in the workplace.

ATLAS provides a neutral ground for advanced manufacturing research and development with state-of-the-art machines, software and processing options.

ADVANCED TECHNOLOGIES LAB FOR AEROSPACE SYSTEMS



CAPABILITIES & EQUIPMENT

- Automated Manufacturing
 - Automated Fiber Placement (AFP) and Automated Tape Laying (ATL) for thermoset, thermoplastic, CMC, and dry fiber material systems.
 - Electroimpact System 1 (1/4" and 1/2" AFP with Laser| 6", 9", and 12" ATL) – 36' X-Axis and 15,000 lb Rotator
 - Electroimpact System 2 (1/4" and 1/2" AFP with Variable Spot Size Laser) – 72' X-Axis, 30,000 lb Rotator, and Dual-Axis Rotator
 - Coriolis System (1/4" AFP) – 26' X-Axis
 - Mikrosam Dual Robot System (1/4" AFP & 2" ATL) for Tool-less Manufacturing – 30' X-Axis and Filament Winding
 - Laser and Humm3 heating options for thermoplastic materials
 - Integrated 6 x 20-foot Vacuum Table and Rotators for AFP
 - Mikrosam Slitter-Rewinder Machine with In-Process Laser Inspection System
 - Fiber Patch Placement (FPP) – Additive 3D Fiber Layup Technology for Complex Composite Parts
 - KraussMaffei 450 Ton Spin-Form with Dual 1400 Injection Units and Rotary Turn Table
 - Integrated Polyurethane ColorForm and High-Pressure Metering Systems
 - Integrated FiberForm IR Oven
 - ENGEL V-DUO 1900 US Ton Industrial Press with Thermoplastic Capabilities
 - Integrated Robot, (IR) Oven, Injection Molding Unit, and HP-RTM System
 - Electroimpact Scalable Robotic Additive Manufacturing (SCRAM)
 - Additive (Polymer and Metals), Subtractive, and Thermoplastic AFP
 - 5' Dia. Vertical Rotator & 5,000 lb Horizontal Rotator (7' Dia. & 16' Build Volume)
 - 6.5' x 13' Heated Build Table and 27' X-Axis
 - Automated Thermoplastic Welding with Closed-Loop Controls and In-Process Inspections
 - Induction, Resistance, and Ultrasonic Welding
 - Autoclaves
 - 13 x 26-feet with 800 deg-F / 200 psi Capability
 - Integrated Wireless Temperature Sensors and Rheometer for Material State Monitoring [Access to 3 x 6-feet and 6 x 12-feet NIAR autoclaves]
- High-Fidelity Inspections
 - Dual Tube Dual Detector NSI X7000 X-Ray CT System
 - Micro-focus (up to 5µm resolution) & Mini-focus X-ray Tubes; X-ray Energies from 10kV- 450Kv; Flat Panel Detector & Linear Diode Array Detection Technology
 - In-Situ XCT Scanning with Load Fixture, Extensometer, and DIC
 - Capable of scanning large components up to 60 in diameter x 60 in tall nominal scan envelope
 - ZEISS Xradia 520 Versa Submicron 3D X-ray CT System
 - 160kV high-energy microfocus X-ray source & staging
 - Ultrasonic (MAUS): Pulse Echo testing, MIA Testing, Resonance Testing, Pitch Catch, Phased Array
 - Pulse Thermography
 - Shearography
 - Acoustic Emission (16 Channel System)
 - GOM and Vic 3D Digital Image Correlation Systems (Microscopic 5MP to 29 MP)

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CERTIFIED
ISO 9001

CAPABILITIES & EQUIPMENT (CONT.)

- Structural Test & Evaluations
 - Electrodynamics Test Systems (670 lbf Max Capability at 200Hz)
 - Permanent Magnet Shakers for Modal & Structural Analysis
 - Planar Biaxial Testing (Axial: 55-kip / Torsion: $\pm 10,000$ in-lbf)
 - Large-Scale Test Rig (6' x 38' x 16' test envelope)
 - Over 40 MTS Structural Actuators (Range: 10 - 110-kip)
 - MTS AeroPro™ Software and MTS FlexDAC™ 20 Data Acquisition System (40 Control Channels and 400+ Strain Channels)
- DMG MORI 5-Axis High-Precision Machining
 - Ultrasonic 85 -Ultrasonic Superimposition of the Tool Rotation
 - DMU 340 Gantry



HIGHLIGHTED RESEARCH PROJECTS

- AFRL – Advanced Material Characterization and Structural Certification (AMCSC)
- AFRL – Modeling for Affordable Sustainable Composites (MASC)
- AFRL/Boeing – Composite Airframe Life Extension (CALE)
- AFRL/Lockheed – Quantification of Aging from Long-term Exposure (QALE)
- AFRL/Northrop – Fail-Safe Technologies for Bonded Unitized Composite Structures (FASTBUCS)
- Army – Combat Capabilities Development Command Aviation & Missile Center (CCDC) – Rotorcraft Inspection and Repair, Composites Training, and Adhesive Characterization
- FAA – Joint Advanced Materials & Structures (JAMS)
 - Certification Efficiency and Safety, Damage Tolerance of Composites, Inspection and Teardown of Aged In-Service Bonded Repairs, Structural joints (Adhesive and Thermoplastic Welds), and Sandwich Damage Growth
- NASA – Advanced Composite Consortium (ACC)
- NASA – High Rate Composite Manufacturing (HiCAM)
- Navy – Process Simulation Models and Noninvasive In-Situ Material State Monitoring for Detection of Process-Induced Damages in Polymer Composites
- Navy – Fatigue Damage Initiation and Progression of Composites and Bonded Joints under Variable Amplitude Cyclic Loading
- Navy – Electrodeposition of Nanocrystalline Coating on Additive Manufactured Parts for Enhanced Structural Performance
- NTSB Composite Aircraft Crash Investigations

CONSORTIUM MEMBERSHIPS & RESEARCH PARTNERSHIPS

- Composite Materials Handbook (CMH-17)
- FAA Joint Advanced Materials & Structures (JAMS)
- Kansas Aviation Research & Technology (KART)
- NASA Advanced Composite Consortium (ACC)
- NASA High-Rate Composite Manufacturing (HiCAM)
- Navy Composites Manufacturing Technology Consortium (CMTC) - The Composite Consortium



WICHITA STATE UNIVERSITY