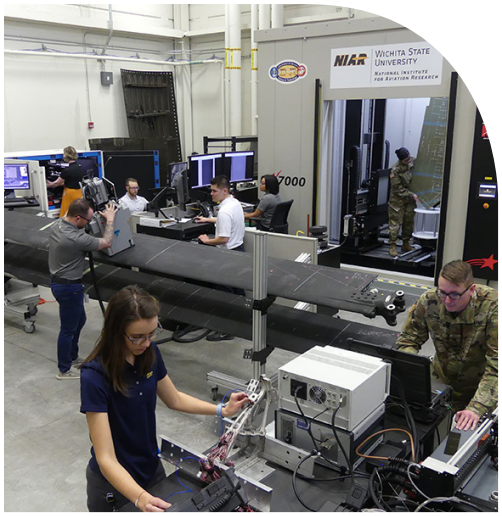
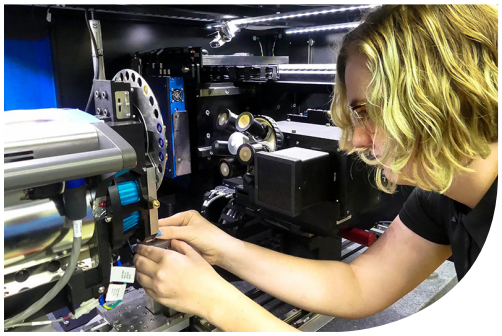
ABOUT US

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 (¼" and ½" AFP & 6", 9", and 12" ATL) – 36' X-Axis
    - Coriolis System (¼" AFP) – 26' X-axis
    - Mikrosam Dual Robot System (¼" AFP & 2" ATL) – 15' X-Axis
    - Automated Dynamics (3" ATL)
    - Laser and Humm3 heating options for thermoplastic materials
  - Integrated 6 x 20-feet Vacuum Table and Rotators for AFP
  - Slitter-Rewinder Machine with In-Process Inspection System
  - Fiber Patch Placement (FPP) – Additive 3D Fiber Layup Technology for Complex Composite Parts
  - ENGEL V-DUO 1900 US Ton Industrial Press with Thermoplastic Capabilities
    - Integrated Robot, Infrared (IR) Oven, and Injection Molding Unit
  - 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 Rheometers [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 & stagingo
    - Ultrasonic (MAUS): Pulse Echo testing, MIA Testing, Resonance Testing, Pitch Catch, Phased Array
    - Pulse Thermography
    - Shearography
    - Acoustic Emission (16 Channel System)
    - Digital Image Correlation (Microscopic 5MP to 29 MP)
- Structural Test & Evaluations
  - Electrodynamic Test Systems (670 lbf Max Capability at 200Hz)
  - Permanent Magnet Shakers for Modal & Structural Analysis
  - Planar Biaxial Testing (Axial: 55-kip / Torsion: ±10,000 in-lbf)
  - Large-Scale Test Rig (6 x 38 x 16-feet 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)

WARUNA SENEVIRATNE, PhD
ATLAS Director
Sr. Research Scientist
(Composites & Structures)

(316) 978-5221
waruna@niar.wichita.edu
www.niar.wichita.edu

CAPABILITIES & EQUIPMENT (CONT.)

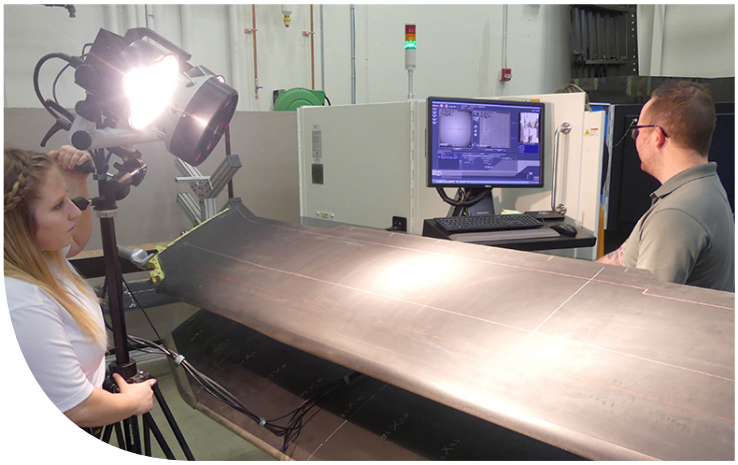
- Computer-Aided Simulations & Analysis
  - High-Performance Computing
  - Manufacturing Simulations and Process Modeling
  - Residual Stress and Failure Analysis
- Training
  - Composite Hands-on Training (Manufacturing, Inspections, Repair, and Testing)
  - Metals Hands-on Training
  - Ultrasonic 5-Axis CNC (DMG Mori Ultrasonic 85)

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)
  - Progressive Damage Analysis, Rapid Tools, and Laminate Cure Defects Process Model Development
- 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

CONSORTUIM 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



NIAR® Wichita State University
National Institute for Aviation Research