

# Mercer Engineering Research Center Capability Overview



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**CMMIDEV / 3<sup>SM</sup>**  
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**We Deliver Solutions**



Controlled Unclassified Information (CUI)

# ***Disclosure Statement***



Providing the warfighter mission-ready F-15s

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## Operating Unit of Mercer University

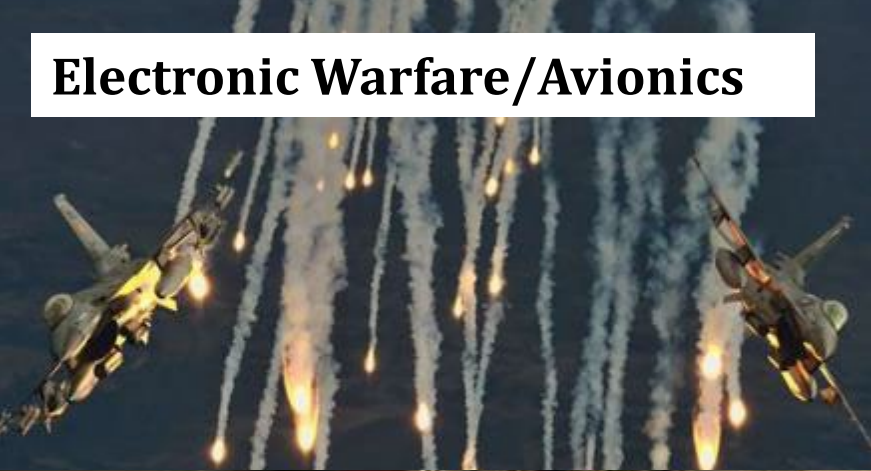
- ▶ Established in 1987 to support/supplement Robins AFB in Warner Robins, Ga
- ▶ Non-profit provider of engineering and research
- ▶ Highly interdisciplinary technical and support staff
  - Multiple engineering and scientific disciplines
  - Reach back to Mercer University Professors and Students
- ▶ Independent engineering assessments/solutions
- ▶ “One stop shop” – design, analyze, build, integrate, test
- ▶ Rapid, cost effective response



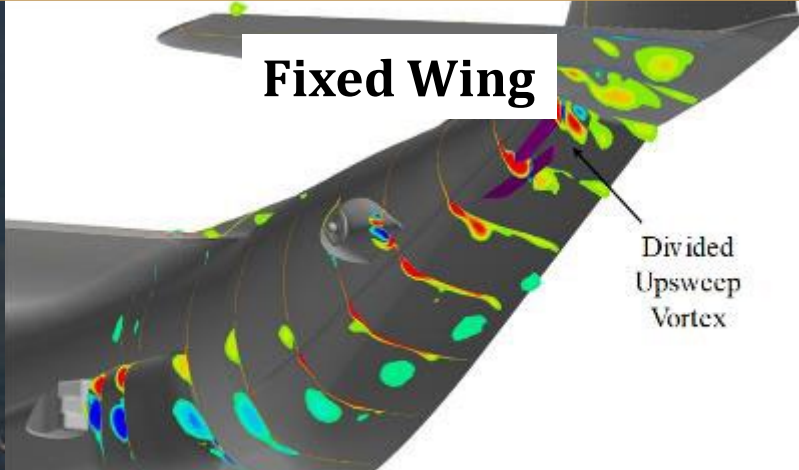


# ENGINEERING PRODUCT AREAS

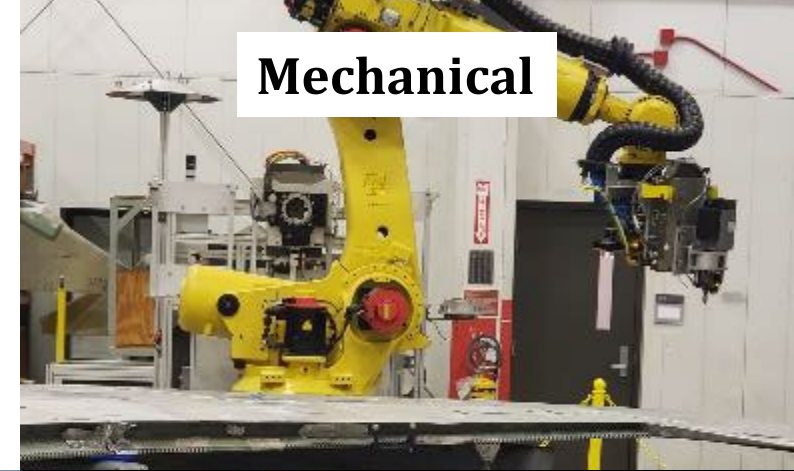
**Electronic Warfare/Avionics**



**Fixed Wing**



**Mechanical**



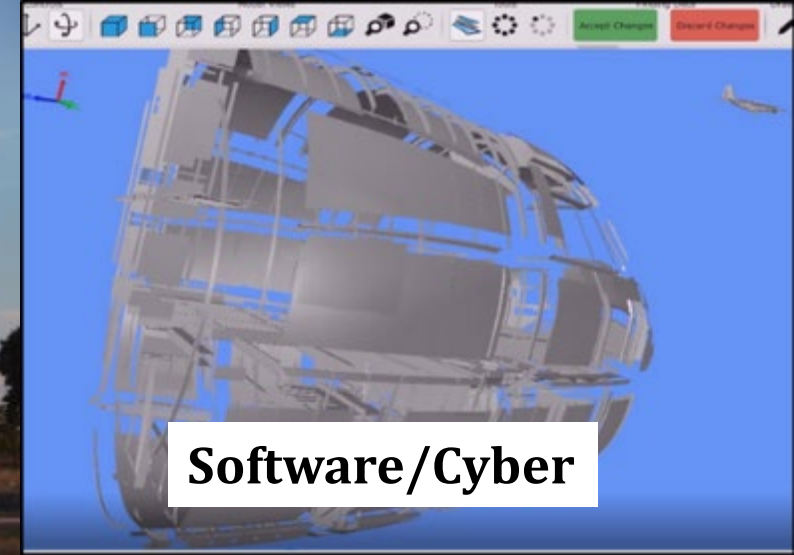
**Logistics/Reliability**



**Rotary Wing**



**Software/Cyber**



# MERC CORE F-15 CAPABILITIES

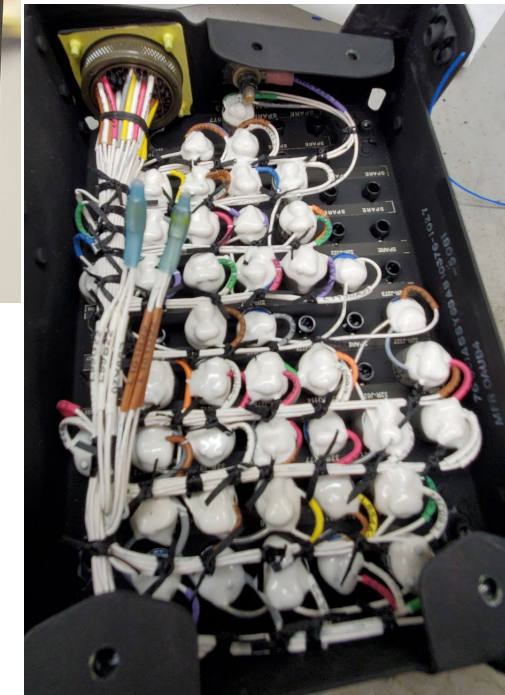


- ▶ Reverse Engineering, Tooling Development, and Fabrication (LRIP)
- ▶ Aircraft Structural Integrity Support (ASIP) Programs
  - Finite Element Analysis / Computational Fluid Dynamics
    - F-15 C/D and E model finite element models
  - Damage Tolerance Analysis & Structural Testing
- ▶ Mechanical and Avionics System Integrity Support Programs
- ▶ Airworthiness Process Development and Refinement
- ▶ Non-Destructive Inspection (NDI) & Corrosion Programs
  - Rewrite 1F-15A-36 NDI procedures
- ▶ Software / Cybersecurity



**MERC** MERCER  
ENGINEERING  
RESEARCH  
CENTER  
An Operating Unit Of Mercer University

- ▶ Lighting Trim Panel (P/N: 68A810376)
  - Modified from the -1027 to the -1031 configuration
  - Installation of variable resistor for the Disorientation Recovery Function (DFR) indicator
- ▶ Urgent requirement to ensure mission critical capability
- ▶ 35 modified panels delivered in less than 90 calendar days
  - MERC developed the modification procedures and the acceptance test procedures
  - MERC inspected each panel for workmanship and resistance measurement prior to delivery



# F-15 SUPPORT EXAMPLES

## F-15 Nose Landing Gear (NLG) Fixture Kit

- ▶ MERC reverse engineered and fabricated F-15 NLG alignment fixtures (RE668310001)
  - Matched form/fit/function of original McDonnell Douglas drawings
  - Compatible with aircraft variants C/D/E/SA
- ▶ Incorporated ECOs into final Tech Data Package
- ▶ Documented required updates to T.O.
  - Provided cross-reference between legacy and new PNs
- ▶ Validation testing accomplished at Robins AFB on F-15E

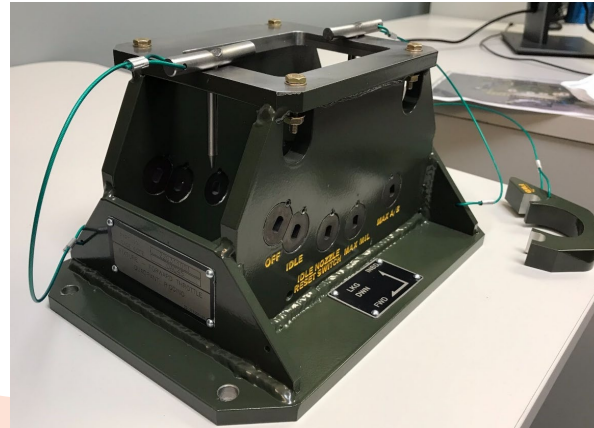
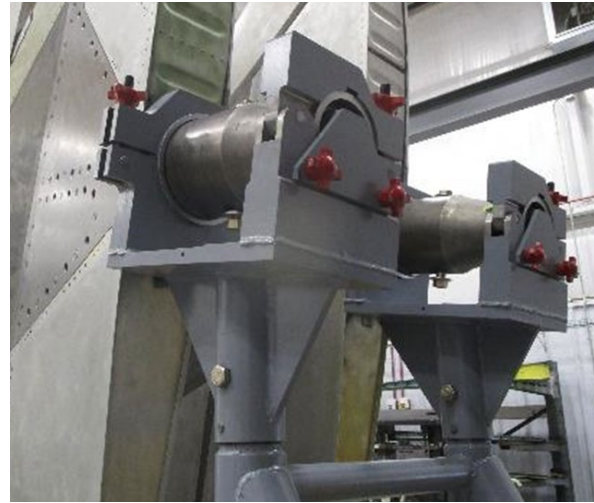
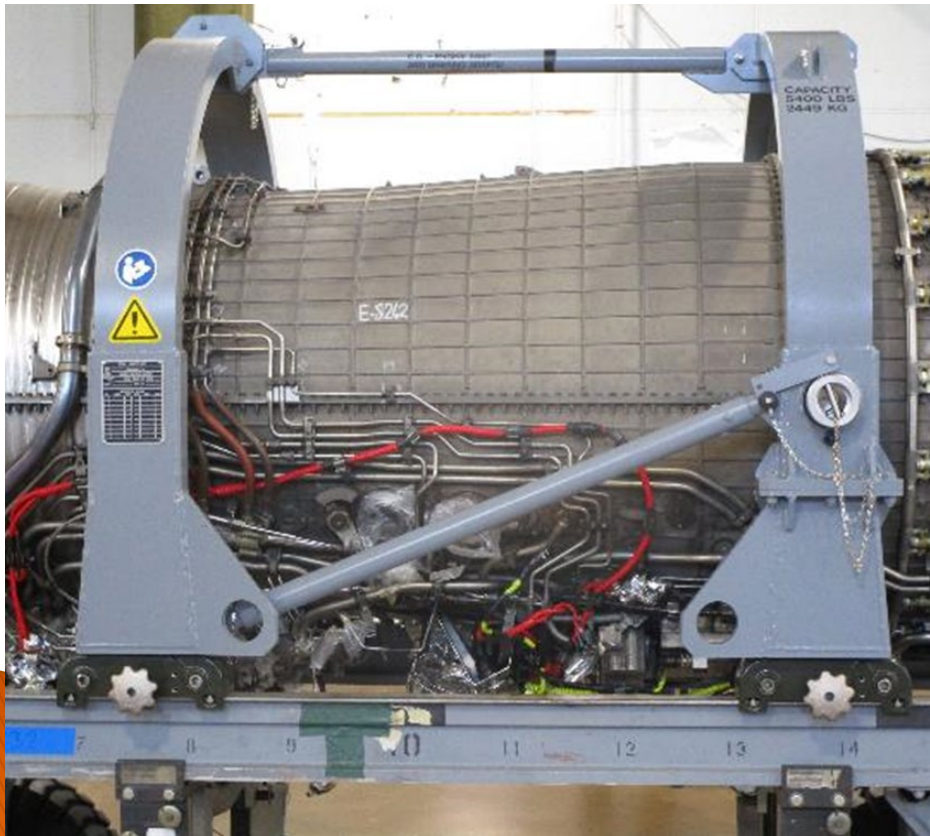




# F-15 SUPPORT EXAMPLES

## F-15 Equipment and Tooling Support

- ▶ Reverse engineering and fabrication of additional F-15 maintenance tools and fixtures





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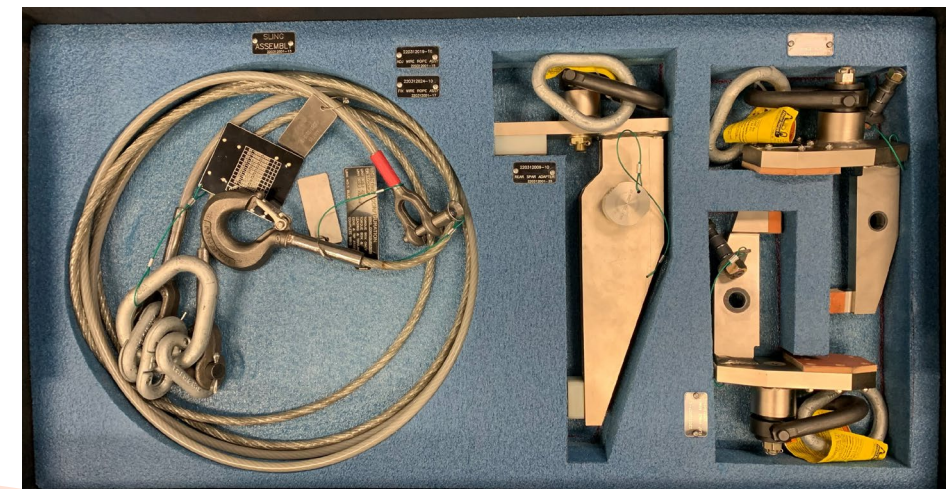




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# F-15 AIRCAT AND SOFTWARE DEVELOPMENT

- ▶ AIRCAT: Automated Inspection Repair Crack/Corrosion & Aircraft Tracking
  - Custom suite of software tools designed to track service life and maintenance actions to support reliability and availability improvements
  - Flight data and inspection data provides individual aircraft and component history
  - **International version currently in use for other airframes (available for F-15)**
- ▶ ICARR: Inspection, Crack/Corrosion, and Repair Recording
  - Software tool for recording inspections, findings (ie. cracks, corrosion), and repairs
  - Damages found can be documented in an interactive 3D CAD viewer
  - Maintenance and engineering status reporting
- ▶ Technical Assistance Requests
  - Software tool for reporting and tracking TAR status & resolution
  - **International version currently in use**
- ▶ Action Items
  - Software tool for reporting and tracking Action Items by Country, Organization, and Office of Primary Responsibility (OPR)

# F-15 AIRCAT AND SOFTWARE DEVELOPMENT

- ▶ AIRCAT International version currently in use is hosted on-site at MERC
- ▶ MERC engineers are credentialed in several industry-standard cybersecurity certifications
- ▶ Network / System Security
  - Defense-in-depth
  - Security Onion
  - Router / Firewall
  - Access Control Lists
  - CAC enabled







<https://www.merc-mercer.org/>

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