Empirical Systems Aerospace, Inc (ESAero) is an aerospace engineering company that preforms design, analysis, manufacturing, testing, & prototyping services for systems ranging from conceptual aerospace designs to aircraft seeking supplemental type certificates by providing...

- **Rapid System Development**
- **Aerospace System Manufacturing for Manned and Unmanned Aircraft up to 10,000 lbs.**
- **Customized Project Planes Structured for Efficiency to Meet Larger Program Goals of Cost or Time**
- **Hands-On Development & Testing to Achieve Customer Goals Utilizing State-of-the-Art Software**
- **“Out of the Box” Thinking and Engineering**
- **On-Demand Niche Engineering Team to Supplement On-Going Projects**
- **Quality Assurance: AS9100:D**

**Rapid Excellence/Cost Effective**

Since 2003, ESAero has served the needs of the engineering industry through its work on entrepreneurial concept development, aircraft modifications, military & commercial conceptual air vehicle designs, subscale technology demonstrators, hybrid propulsion system research & development, and niche engineering support. All with a focus on quality, cost, and time.
Core Components & Capabilities

Aircraft Hybrid & Electric Propulsion / Full System Vehicle Integration: Manned and Unmanned Aircraft

For 17 Years Empirical Systems Aerospace, Inc. have been and are subject matter experts in the fields of hybrid & electric propulsion and full system vehicle integration for unmanned aircraft. From the sealed convergent electric propulsion technology of NASA’s X-57 “Maxwell” & environmentally conscious “ECO-150” Transport Aircraft to the hybrid & integration needs of the Air Force Research Laboratory, U.S. Army, AeroVironment, Electricore, General Atomics, & Boeing. ESAero stands alongside with the vanguard of the aeronautic future. Because at ESARO The Sky is Just the Beginning...

Design

• Engineering Design Workspace: 8,400 sq. ft.
• Individualized In-House Design Codes for Conceptual Aircraft and Component Design
• SolidWorks 3D mechanical design software
  o Access to CATIA through strategic partners
• Formal Technical & Marketing Presentations
  o Examples: OV-1 per DoDAF V2.0, etc.
• Reverse Engineering Methods
• Subject Matter Experts in Hybrid & Electric Propulsion for Air Vehicles
  o PANTHER-Propulsion Airframe iNTegration for Hybrid Electric Research
    • Design software created to address the highly-coupled Propulsion-Airframe-Thermal integration design space for electric aircraft
o TAO-Terminal Area Operations Tool
  ▪ TAO is for short-field operations including powered lift for hybrid & electric

• “Brainer Net”
  o Brainstorming and mapping process to outline vehicle requirements and sketch strawman configurations to adequately innate the conceptual design process

Analysis

• Manufacturing Analysis, DFX
• Payload & Air Vehicle Mission Analysis
• In-House Optimized Parametric Codes
  o DoeTECH
    ▪ A Visual Basic with-in Excel Program-Used for detailed mission performance, concept analysis, and independent verification/validation

• Altair Hyperworks
• ANSYS CFD Flo for Computational Fluid Dynamics
• Turbo Electric Distributed Propulsion (TeDP) & Terminal Area of Operations
  o Designs & Analysis tools developed in MATLAB and Visual Basic; with consideration for MDO

• Noran Engineering
  o Neiworks-For rapid structures design iterations during the design phase
  o NeiFEMAP & NeiNASTRAN-For detailed structural analysis of final components & systems
    ▪ Compatible with MSC Products: ESAero has access to MSC NASTRAN & PATRAN through strategic partners

Manufacturing

• Manufacturing & Integration Facilities: 20,100 sq. ft.
• Inventory & Integration Clean Room: 1,000 sq. ft.
• Environmentally Controlled ESD Room / Systems Integration Lab: 800 sq. ft.
• Design for Manufacturing
• LRIP Drone Production with Established Supply Chain
• K2 KG-3925 39” X 25” 3-Axis CNC Machine
  o For light machining & rapid prototyping
• Composites Molding & Vacuum Bag Tooling
• General Machine/Mechanics Shop Equipment
  o Strong relationships with local shops
Testing

- Environmental Test Capability
- Certified SUAS Pilots on Staff with Use Permit & Access to Oceano Airport
  - On-Airport location provided efficient ground testing & flight test planning
- Construction of Component & System Test-Rigs as required
- Instrumentation System Design & Integration with Prognostics and Health Management

Niche Engineering Support

- ESAero is Capable and Experienced at Supporting Niche Engineering Roles in Support of a Specific Project or Need
  - ESAero has served in this capacity for a variety of clients.
- ESAero Provides Niche Engineering Support in any of the Four Main Service Areas
  - Design
  - Analysis
  - Manufacturing
  - Testing