



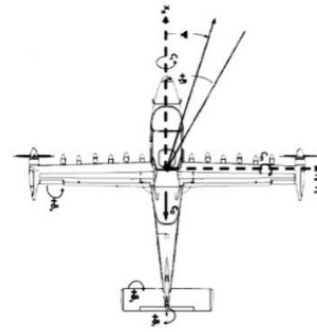
## A Full-Service Firm Offering Aircraft Designs, Manufacturing, Integration, and Testing

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



**X-57 "MAXWELL"**

## *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
  - Access to CATIA through strategic partners
- Formal Technical & Marketing Presentations
  - Examples: OV-1 per DoDAF V2.0, etc.
- Reverse Engineering Methods
- Subject Matter Experts in Hybrid & Electric Propulsion for Air Vehicles
  - 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*

- TAO-Terminal Area Operations Tool
  - *TAO is for short-field operations including powered lift for hybrid & electric*
- “Brainer Net”
  - 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
  - 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
  - Designs & Analysis tools developed in MATLAB and Visual Basic; with consideration for MDO
- Noran Engineering
  - Neiworks-For rapid structures design iterations during the design phase
  - 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
  - For light machining & rapid prototyping
- Composites Molding & Vacuum Bag Tooling
- General Machine/Mechanics Shop Equipment
  - Strong relationships with local shops

## *Testing*

- Flight Testing Operations Facility: 6,400 sq. ft.
- 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