Acme Aerospace Inc.

SKURKA AEROSPACE INC

Avionic Instruments
Aerospace for Industry

Hybrid Electric Propulsion
for Light Aircraft & UAS

Electric Propulsion, Power Generation, Energy Storage and Systems Management

Our Team

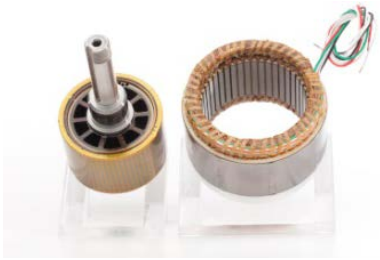
- *Transdigm Companies*
  - *Avionic Instruments*
    - Power Electronics, Motor Control, Processing, Systems Integration, Program Management
  - *Skurka Aerospace*
    - Electric Machines, Sensors, Actuators
  - *Acme Aerospace*
    - Advanced Battery Systems, Chargers, Cell Controllers

Avionic Instruments

- *Aerospace Electric Power Conversion & Management (>35 years)*
- *Avionic Instruments Power Products – New Jersey*
  - *50,000 Square Feet*
  - *195 Employees*
- *Key Processes In House*
  - *Sales & Marketing*
  - *Engineering*
  - *Production*
    - Magnetics
    - PCB
    - Final Assembly
  - *Quality & Reliability*
  - *Procurement*
  - *Accounting*
  - *Repair & Support*

Skurka Aerospace

- *Aerospace Electromechanical Components & Control Units (>60 years)*
- *Location – Camarillo, CA*
  - 70,000 square feet
  - 130 Employees
- *Products*
  - *Electric Motor Products*
    - Would Field & Shaft Rotor Assembly
    - Brush DC Motor
    - Brushless DC Motor
    - AC Induction Motor
  - *Control Units / Controllers*
    - DC and AC Types
  - *Starter Generators*
  - *Starter Motors*
  - *PM Generators/Alternators*
- *In-house capabilities*
  - 20+ engineers on staff
  - Analytical design & modeling
  - Test systems simulation
  - Repair & overhaul






Acme Aerospace

- *Fulfilling Battery and Charger needs (> 50 years)*
- *Acme Battery - Arizona*
  - *40,000 ft²*
  - *80 Employees*
- *Key Processes In House*
  - *Sales & Marketing*
  - *Engineering*
  - *Production*
    - Magnetics
    - PCB
    - Final Assembly
  - *Quality & Reliability*
  - *Procurement*
  - *Accounting*
  - *Repair & Support*

Team Goals

- *Energy Efficiency*
  - *Hybrid (Turbine/Battery) more Efficient than Piston ICE*
- *Low Noise*
  - *Hybrid Mode, Battery (Silent) Mode*
- *Low Maintenance Cost*
  - *Much lower Cost/Hanger Time*
- *Minimize Environmental Impacts*
  - *Lower Fuel Usage (Depending on Mission)*
  - *Lower Emissions*

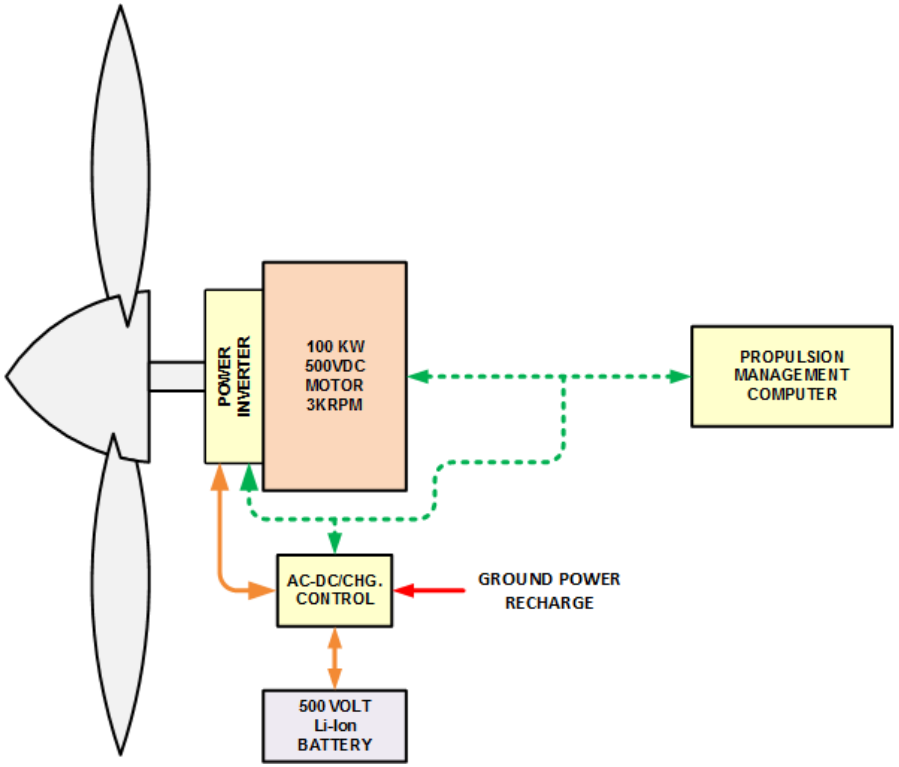
Markets Served

- *GA, Private, Recreational*
  - *Personal use,*
- *Air Taxi*
  - *Intercity Short Run Taxi Service*
- *Trainer*
  - *Civil, Military Primary Flight Training*
- *Special Mission Military*
  - *Quiet, Low, Slow*
- *UAS*
  - *Civil, Military Low Signature ISR*

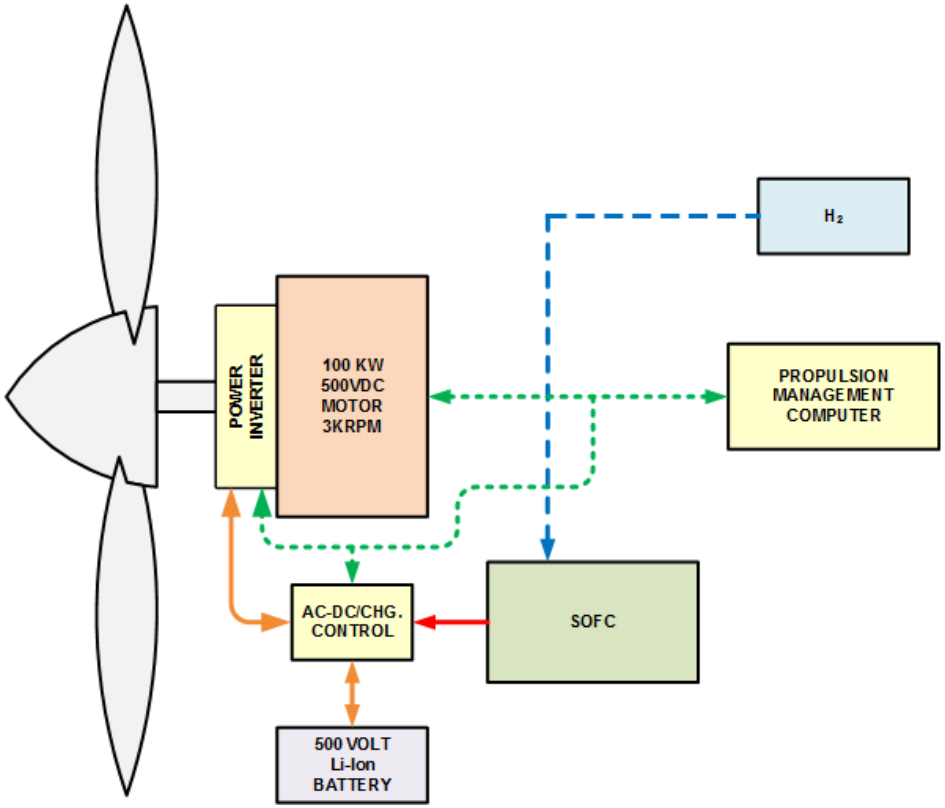
Architectures

- *Battery Electric*
  - *Ground Recharge Li-ion Battery*
- *Fuel Cell Hybrid*
  - *SOFC to Augment On-wing battery*
- *Turbine Hybrid*
  - *On-wing Recharging, Direct Motor Drive Power*

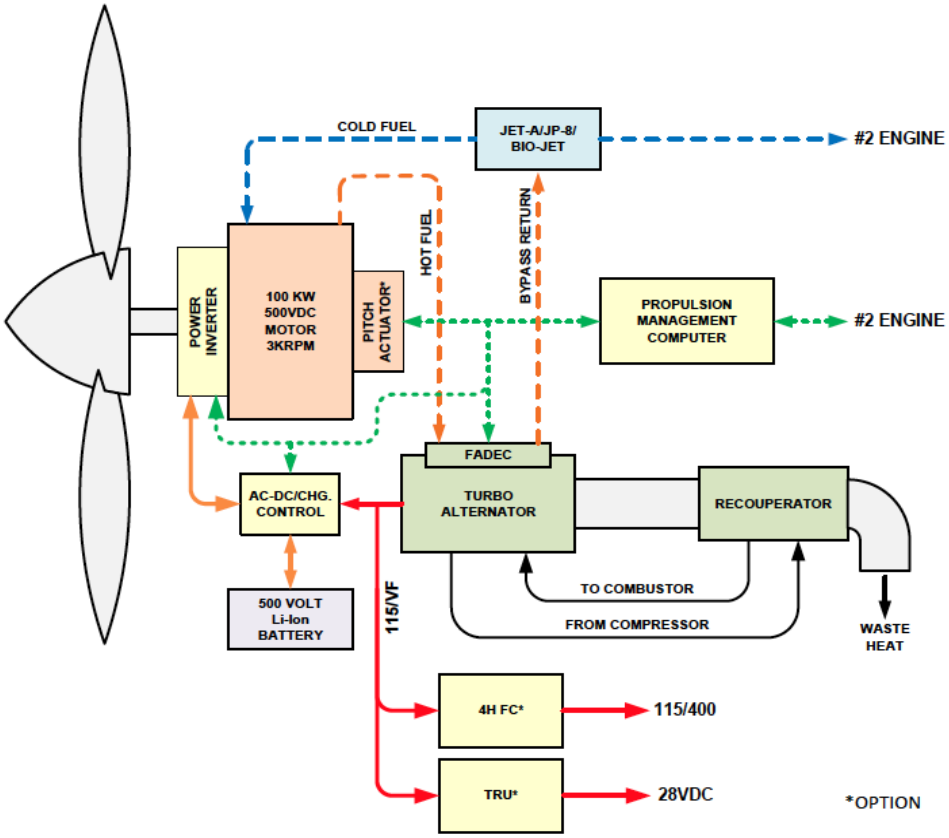
Battery Electric



Fuel Cell Hybrid

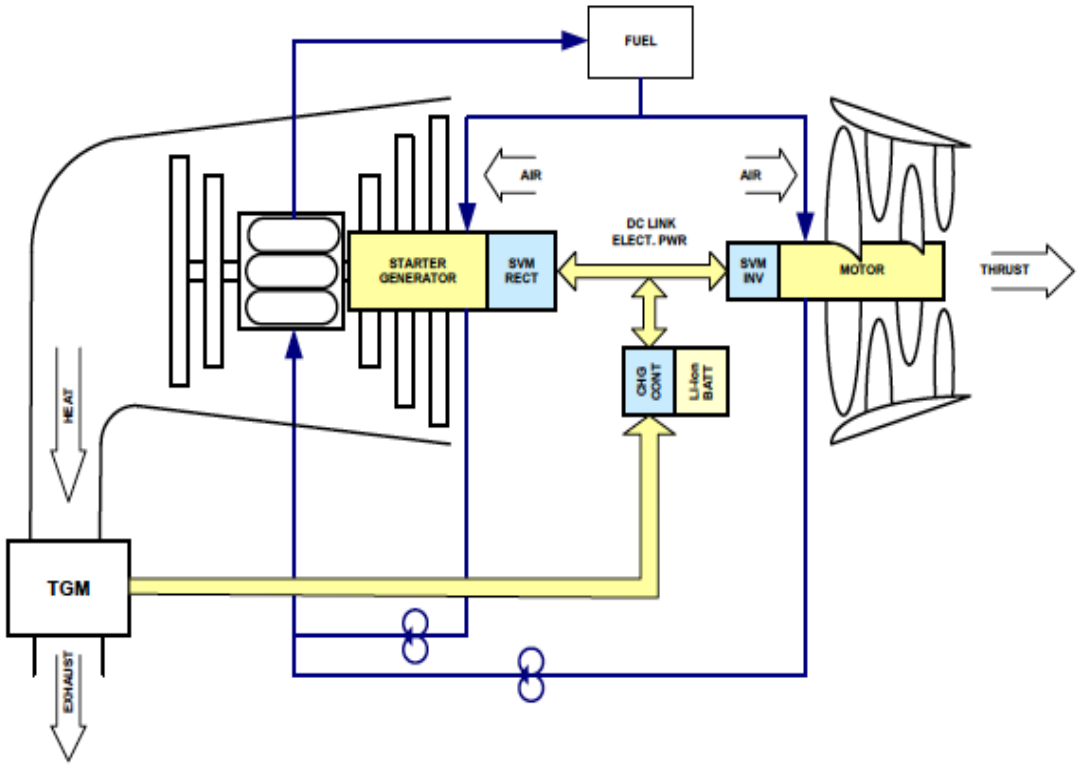


Turbine Hybrid



Propulsor Architecture

Ducted Fan (Propulsor)—Applied to Battery, FC, Hybrid Propulsion Schemes



Sizing, Objective System

- *Target Performance*
  - *Shaft Power: 150SHP @ 2,400 RPM (112KW)*
  - *Takeoff/Climb: 110% (123KW)*
  - *Cruise Power: 65%-75% (78KW)*
  - *Cruise Speed: 130MPH*
  - *Ceiling: 13,000Ft*
  - *Range: 400NM (Battery + Alternator, 45Min Reserve)*
    - 10 Gallons/Hour Benchmark

System Objectives

- *Retrofit – Targeted Airframes, MRO Kits*
  - *Light GA, Air Taxi*
- *OEM – Bespoke Solutions, Fully Integrated*
  - *GA Systems*
  - *UAS Systems*
  - *UUV/ROV Systems*