Who We Are

• **Description:** Emerging leader in certifiable, high-power, scalable powertrains for electric aviation.

• **Products:** Energy storage systems, DC fast-charging stations, and electric propulsion systems.

• **Key Markets:** Aerospace & Defense, Automotive, Marine, and Industrial Traction

• **History:** Founded in February 2016. Foundational / core IP and technology dates to as early as late 90s under Phillips Aerospace

• **Locations:** North Logan, UT (HQ) & Los Angeles, CA (Innovation site)

• **Employees:** 70+ (prior experience at Boeing, Collins, Honeywell, Rolls Royce, Safran, Cummins, ATK, Ford, General Atomics, L3, Northrup Grumman, Sig Sauer, Infineon, etc.)

• **Primary Shareholders:** Founders, Boeing & Safran

• **Other:** AS9100, ISO9001 Certified
EP Systems’ mission is to power Transportation’s Electric Renaissance to make the world cleaner and more connected through the adoption of safe and advanced electric propulsion systems.
The Problem

Safety & Certification
- Batteries operate with the risk of flash events, thermal runaway and catastrophic failures (e.g. loss of power & propulsion)
- Certification framework still in development for high-voltage and high-power aerospace propulsion batteries

Cost
- Aerospace batteries require complex computing and controls to ensure reliability
- Traditional aerospace systems are highly customized to the aircraft

Weight
- Aerospace batteries require significant power and must safely operate in adverse conditions, requiring additional design features that adds considerable weight
- Cell technology currently does not provide a bridge between heavy, high-power batteries and lightweight, high-energy batteries

Infrastructure
- Significant airport capex investment is required to build charging infrastructure
- Fast-charge technology is a key enabler to all electric systems
- Electrical distribution networks are complex and costly to install

A Critical Impediment to Electric Propulsion in Aviation is Inadequate Energy Storage Technology
## Key Benefits

<table>
<thead>
<tr>
<th>Safety &amp; Certification</th>
<th>NASA and FAA certified at the industry highest safety standards</th>
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<tbody>
<tr>
<td>Weight</td>
<td>Light weight, low-cost, high power output in a compact design</td>
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<tr>
<td>Cost</td>
<td>Lower development cost and faster time to market</td>
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<tr>
<td>Infrastructure</td>
<td>Lower cost of ownership / attractive ROI for operators</td>
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**State-of-the-art thermal containment and battery management system prevents fire or explosion while delivering power to the aircraft.**

**Lithium-ion based cell chemistry and battery technology offerings with highest level of energy per unit of weight applicable for demanding aerospace applications.**

**Platform-agnostic unique modular battery design enables rapid adaptability and scalability to large, global fleets.**

**Fully integrated ecosystem that extends battery life through active battery management and best-in-class charging technology.**

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**EP Systems’ technology embeds discrete features into its energy solution that address multiple critical impediments.**
A Solution for Every Application

ALL-ELECTRIC

EPiC ENERGY
TRAINER / THIN HAUL / EVTOL
SYSTEM: 205WH/KG
20% PACKAGING OVERHEAD
2000+ CYCLES @ 80% DoD
10C DISCHARGE
3C CHARGE RATES

HYBRID-ELECTRIC

EPiC POWER
HYBRID / EVTOL / MILITARY
SYSTEM: 180WH/KG
23% PACKAGING OVERHEAD
2000+ CYCLES @ 80% DoD
30C DISCHARGE
3C+ CHARGE RATES

MICRO-HYBRID

EPiC ULTRA
HYBRID / APU / REGIONAL / MILITARY
SYSTEM: 115WH/KG
25% PACKAGING OVERHEAD
7500+ CYCLES @ 80% DoD
70C DISCHARGE
4C CHARGE RATES
40, 60, 80AH APU
Numerous Applications

- eVTOL
- RETROFIT
- TRADITIONAL AERO
- FIXED WING
EPiC Battery Module Delivers Superior Performance Through a Single Scalable Solution

- Cell technology overcomes power vs. energy tradeoffs typical of Lithium-ion batteries by delivering an optimal combination of specific energy (260 Wh/kg) and specific power (4,000 W/kg)
- Cell analytics and evaluation capabilities enable enhanced optimization for aircraft
- Battery module contains thermal runaway at the lightest packaging overhead ever demonstrated (<20% of total module mass)
- Integrated power management design reduces weight and improves life
- Advanced control techniques enable >20% longer life, more efficient energy use and lower operating cost
- 3C fast charging capabilities enables 20-minute aircraft turnaround times

**The EP Systems Difference**

- Fully integrated in-house development, design, and engineering
- Entrenched end-to-end customer relationships
- Certification expertise
- Advanced research facilities drive breakthrough advancements

**Venting**

- Full Containment of Fire & Explosion
- Harmful Gases and Materials Vented Outside Aircraft per Regulations

**Data / Comms Connector**

- Embedded in Module to Reduce Weight and Installation Complexity
- Continuous Data Logging of Key Battery Parameters
- Enables Big Data Analytics to Support Fleet

**Enclosure**

- High Temperature Composite Case ruggedized for Aviation Environment
- No Vehicle Firewall Needed

**Thermal Management**

- Liquid Cooling w/Minimal Coolant Volume Requirements
- Low-Maintenance Connections
- On-Board/Off-Board Reservoir Integration

**Power Connector**

- Patented Module-to-Module Connector
- Power Cable Elimination
- High Current Capability
- High Voltage Safety
- Robust to Thermal and Mechanical Environment

**Mounting Locations**

- Mounting in Any Orientation
- Space-Claim Flexibility
- 16 Total Mounting Points
- Resilient to Aircraft Vibration

- Full Containment of Fire & Explosion
- Harmful Gases and Materials Vented Outside Aircraft per Regulations
World Class Partnerships

Strategic Partnerships

Boeing and Safran announced a joint investment in EP Systems in a Series A funding round in September 2019

*BOEING*

World's largest aerospace company and leading provider of commercial airplanes, defense, space and security systems

“EPS’ battery technology meets Boeing’s high standards of safety and can enable significant cost savings for customers. The strategic investment accelerates the development of clean, quiet and safe urban air mobility solutions”

- Brian Schettler, Managing Director of HorizonX Ventures

*SAFRAN*

International high-technology group, operating in the aircraft propulsion and equipment, space and defense markets

“Safran will collaborate with EPS to offer our customers electric or hybrid electric-propulsion systems with a level of performance that sets us apart from competition”

- Alain Sauret, Safran Electrical & Power President

Public-to-Private Partnerships

“It’s really innovation all over, I think it’s a huge success story, but it relied on NASA and [EP Systems] partnership.”

- Sean Clarke, Principal Investigator for the X-57 at Armstrong Flight Research Centre

“I see EPS as the key leader in aircraft battery manufacturing. Having them in Utah creates an anchor for future vehicle manufacturing and a significant advantage in the development of a new transportation system.”

- Jared Esselmen, Aeronautics Director, Utah Department of Transportation
Thank you.