

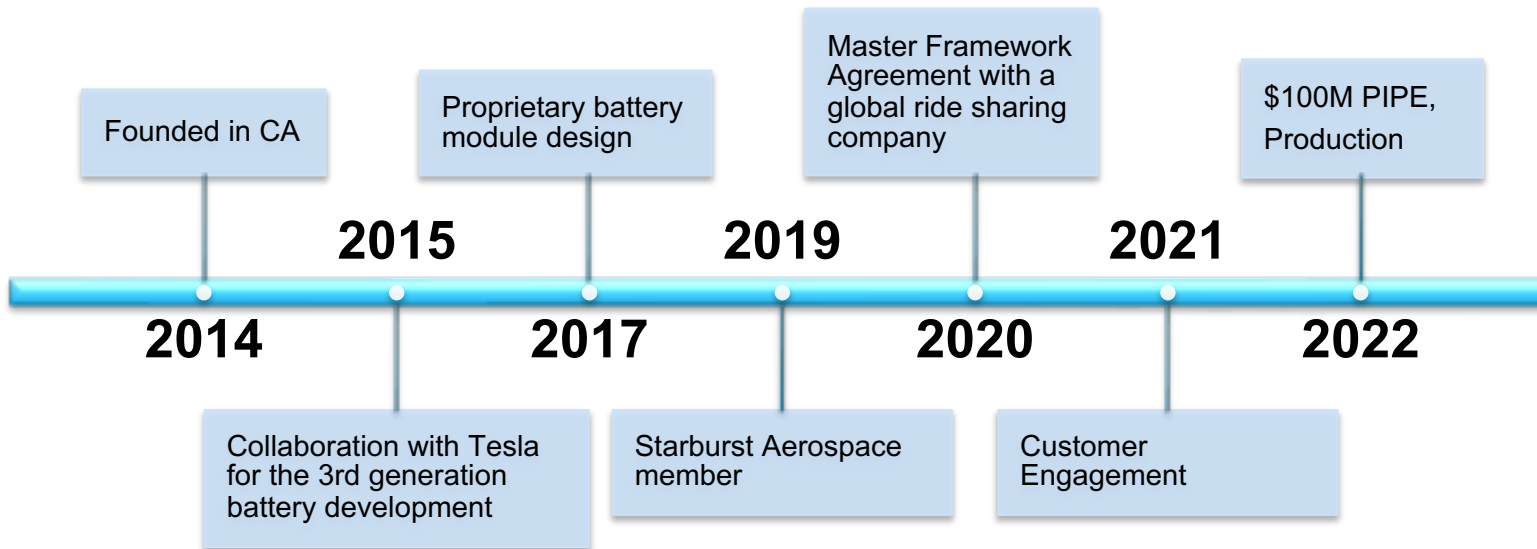
Optimizing for Power and Safety: Electric Aircraft Battery with High Voltage (800v) Modular Design

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MOBIUS energy





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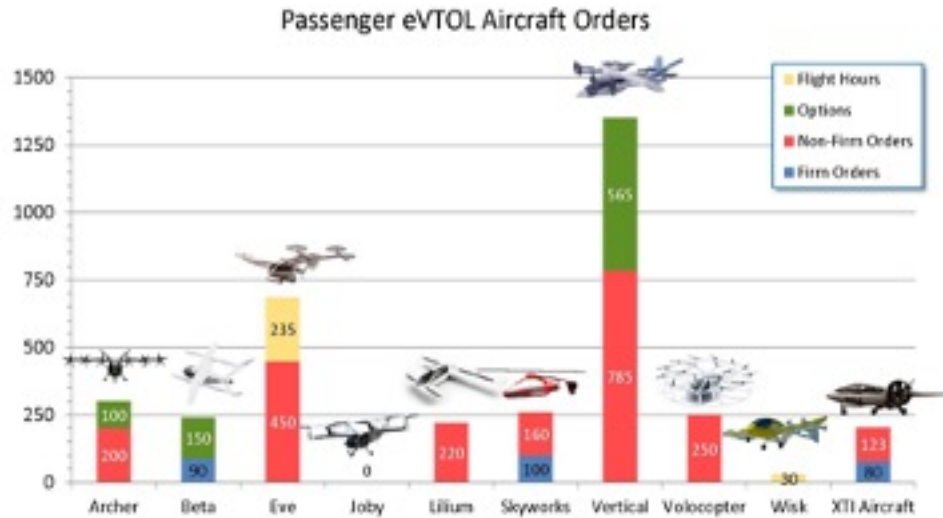


David Samuels
Financial Advisor
Six time CFO, Public company, Private equity
SemaConnect (Sold to NASDAQ: BLNK) Director
and Investor

Business Model (battery module development and service)

- High power battery module first life application → electric aircrafts
- Second life stationary application → mobile super charger, UPS etc.

The Problem: Powering Electric Flight is Hard



Batteries not included: Your flying car isn't quite ready yet

Lewis Page | 14th June 2021 (Last Updated June 14th, 2021 09:45)

The Battery Supply Problems Faced by Electric Air Taxis

By Brian Garrett-Glaser (/author/bggarrett@laseraccessintel-com) | February 3, 2020

Send Feedback (/contact-us/)

Electric flight is coming, but the batteries aren't ready

Flying requires an incredible amount of energy, and batteries are too heavy

By Andrew J. ... | ... | Aug 04, 2018, 9:20am EDT

- Optimizing for power and safety is hard
 - Wire bonding is not efficient for high power architecture
 - Side cooling is not efficient – tab cooling is x10 more efficient
 - Tab cooling is hard to implement
 - Thermal insulation is not efficient to mitigate thermal runaway
- Optimizing for aerospace requires new approach
 - Liquid cooling is heavy
 - Modular design with low voltage building block (50V-60V) is highly customizable but generates higher overhead and complexity
 - High voltage module can be risky
 - Design for redundancy is a must
- Optimizing for cost-efficient operation requires simplicity
 - Frequent replacement will be a norm in electric aircraft
 - Transition to the second life reuse is inefficient and costly



- Cell to pack design
 - Cylindrical Li ion cell that can hold structural load
 - Optimize bus bar connection for low thermal and electrical resistance
 - Module is a pack with BMS and thermal management system inside
- Innovative thermal management
 - Integration of thermal management system with bus bar
 - Enabling fast cooling with proprietary materials
 - Tab cooling without wire bonding
- Design for manufacturability and reuse
 - Low manufacturing cost
 - Low transition cost to reuse

Mobius Offers 800 V Battery & Mobile Supercharger



High power module hardware and software using commercial cells available NOW



Cell type agnostic and future proof



Subscription service including maintenance, replacement, and salvage



Fast DC mobile supercharger using second life reuse battery

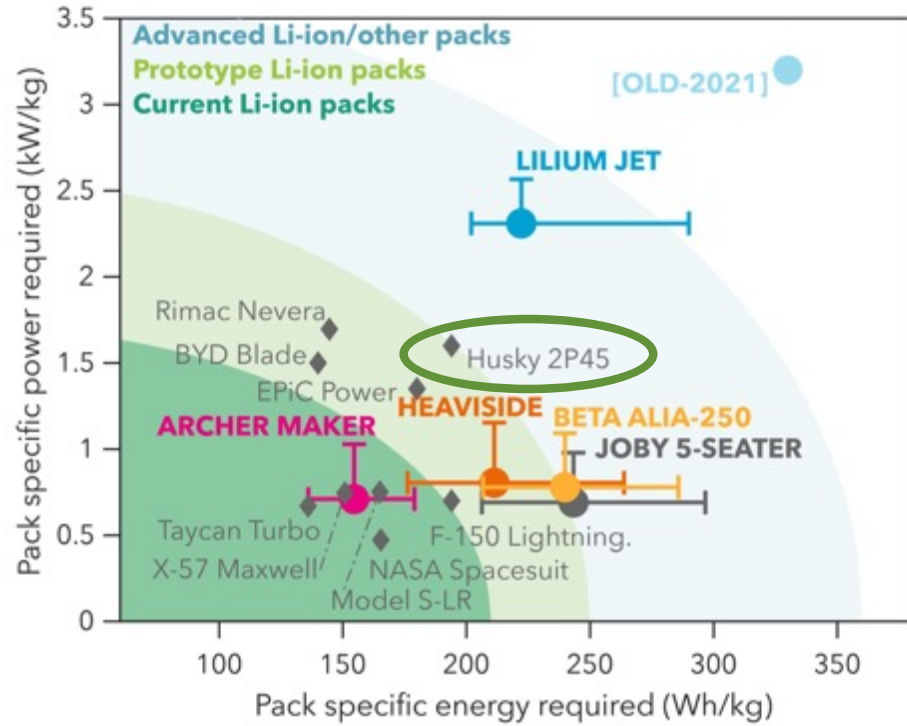


Husky 2P42 Module Specification

- 6.1 kWh capacity
- 500 – 790V operation
- Max power 47kW
- 7C discharge for 6 minutes
- Weight: 33.1 kg
- Specific energy: 184 wh/kg
- Built in contactors
- BMS hardware/software
- Active air cooling
- Non-cell component overhead 20%



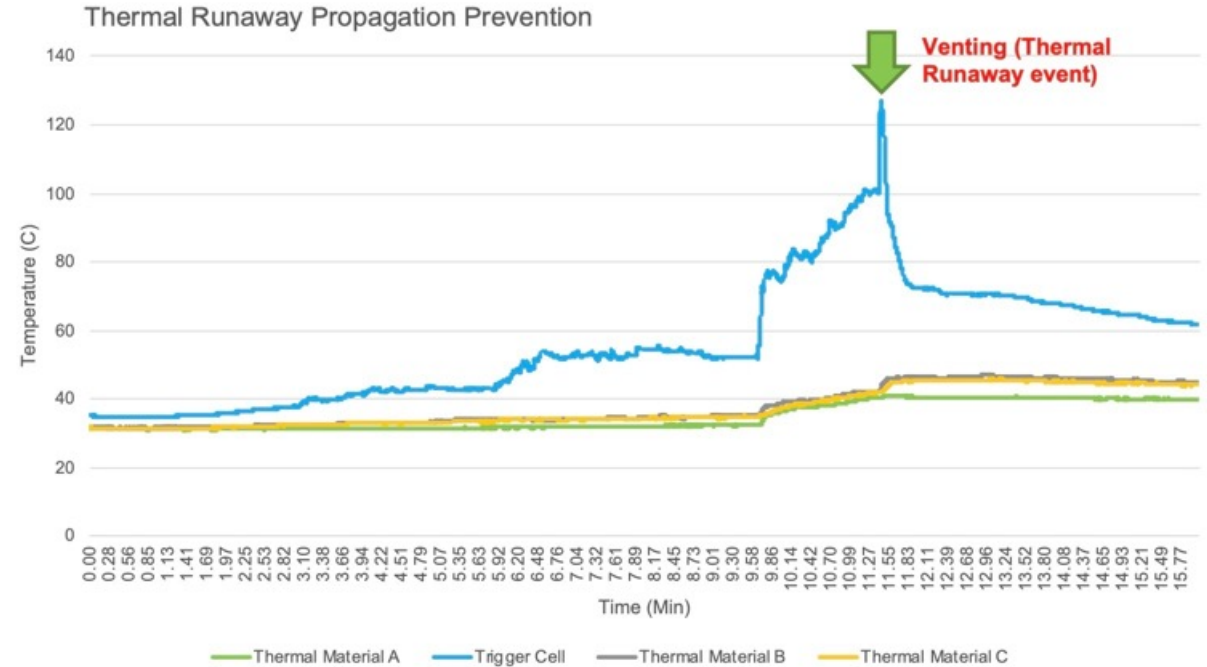
Optimizing for Power and Safety



Updated eVTOL Battery Requirement Chart

Source: Shashank Sripad's LinkedIn Posting Nov 9, 2022

- Husky has the best combination of power and energy

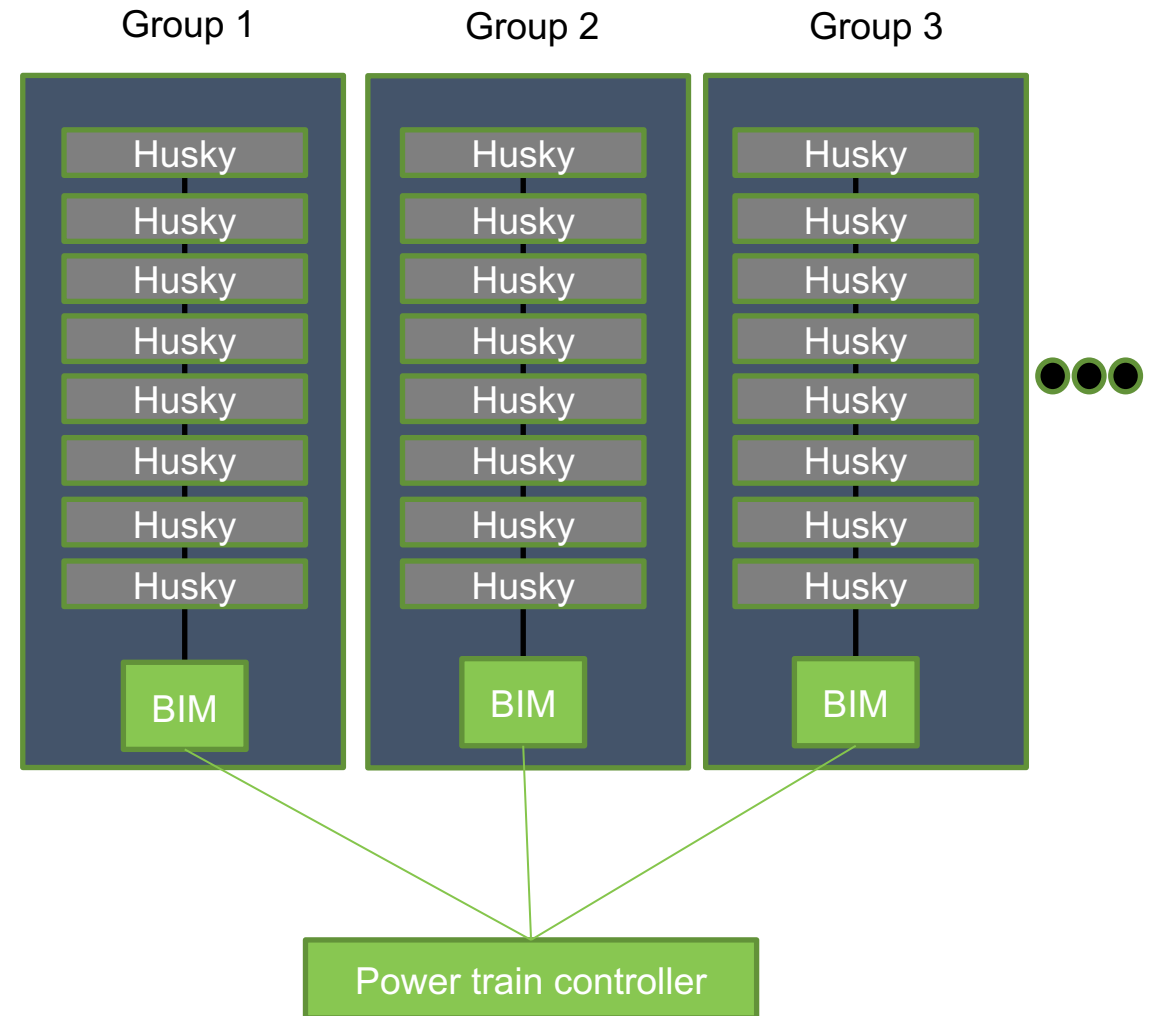


Thermal Runaway Propagation Prevention Test (Mobius.energy)

- Proprietary technology mitigates risk of thermal runaway propagation
- Lightweight module design with active air cooling

System Level Connection Scheme

- Husky makes fundamental building block
 - Energy storage
 - Independent temperature/SOC/current sensor
 - Independent enable/disable of high voltage output
- Battery interface module links modules into groups
 - Multiple modules connected in parallel provides multiple redundancies at group level
 - Multiple groups connected in parallel provides multiple redundancies at system level
- Multiple groups placed in parallel to reach system energy requirements



Second Life Reuse in Mobile Supercharger

- Fast DC mobile charging system with no additional cooling system
- Plug & play second life reuse
- 36kWh and more at 100kW or 350kW



Husky Battery



1st Life in Aircraft



2nd Life in Mobile Supercharger

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