
R-12

Permanent Magnet Applications and Innovations for Future Air Mobility

DEXTER magnetic technologies

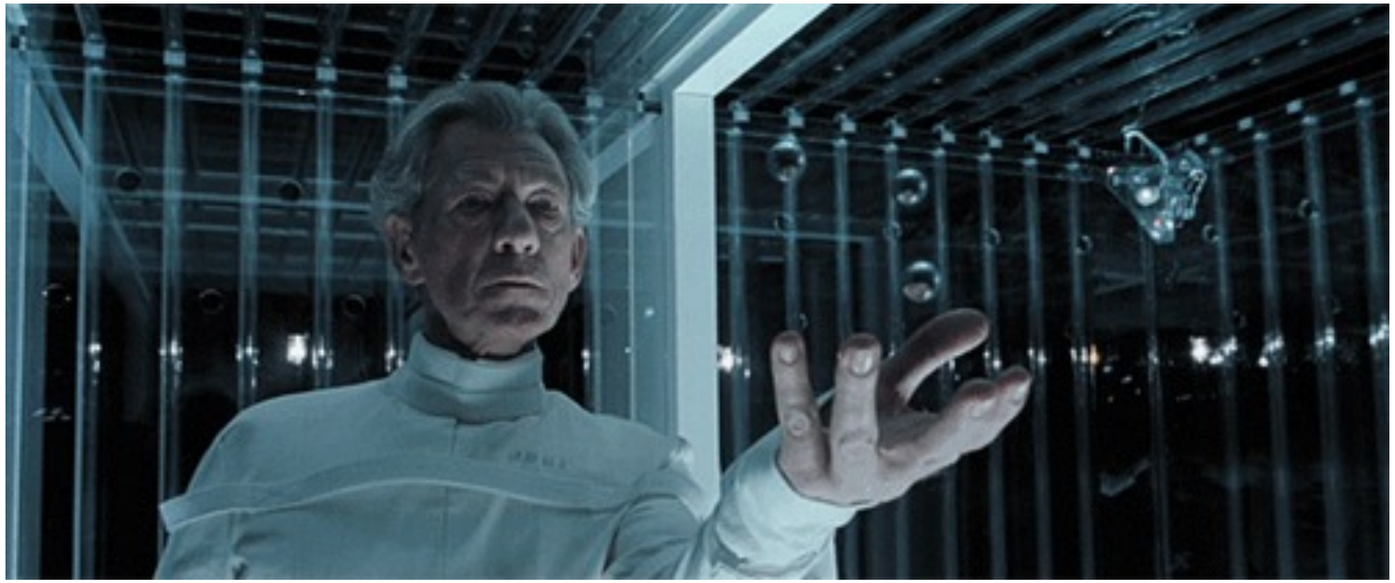
2023 – THE EVTOL SHOW USA, PALO ALTO CA

AGATA NORRIS

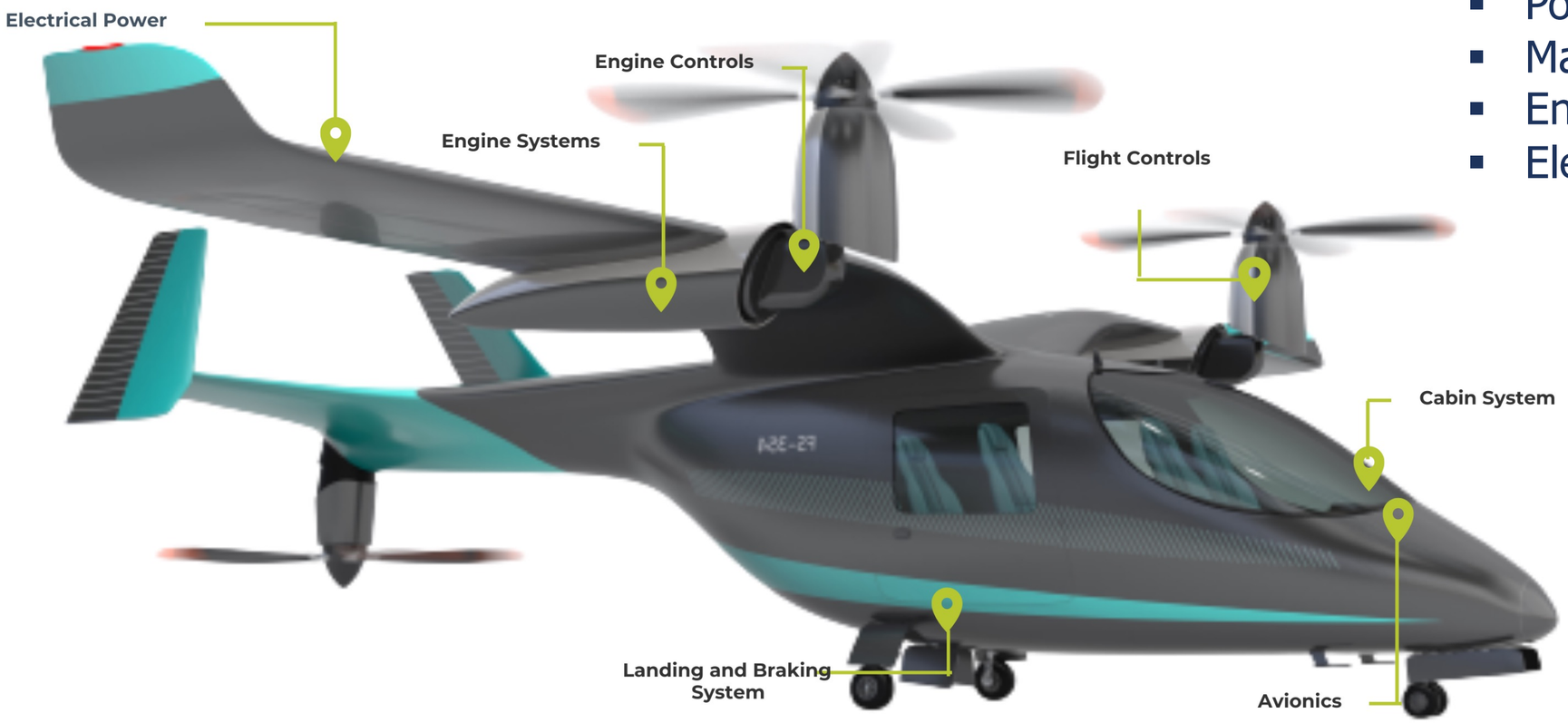
AEROSPACE & DEFENSE MARKET MANAGER

Importance of Permanent Magnet Materials in Aerospace

- Types:
  - Hard magnets
  - Soft magnets
- Applications:
  - Motors
  - Generators
- Materials:
  - Neodymium
  - Samarium cobalt
  - Alnico
- Advantages
  - Reliability
  - Lightweight and Compact
  - Long-term Stability
  - Independence from External Power



Magnetic Assemblies and Applications



Key Applications

- Actuators and Control Systems
- Sensors and Instrumentation
- Power Generation
- Magnetic Shielding
- Energy Storage
- Electric Propulsion

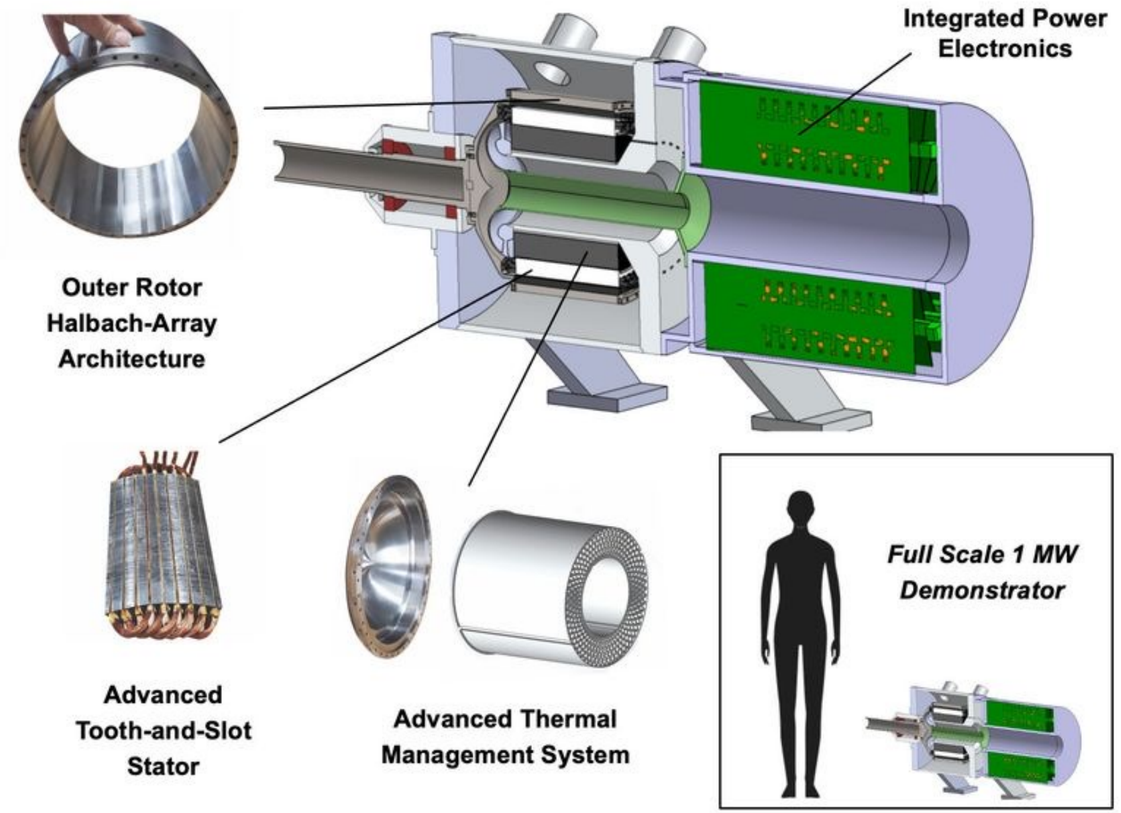
Aerospace Decarbonization

- Reduced Emissions
- Noise Reduction
- Energy Source
- Battery Production and Recycling
- Aircraft Efficiency

Innovations - Megawatt Motor for Electric Aircraft

The MIT megawatt motor includes several key enabling technologies:

- A high-speed permanent magnet outer rotor
- A low loss tooth-and-slot stator
- An advanced heat exchanger, and integrated, high-performance power electronics



Comparison of Different Rotor Sleeves of Highspeed Permanent Magnets

Aspect	Steel	Aluminum	Composite Materials	Titanium
	↑	→	→	→
	↓	↑	↑	↑
	↑	↑	→	↓
	→	↓	↑	↑

Aircraft Electrification Challenges

- **Weight Reduction**
- **Thermal Management**
- **Electromagnetic Interference**
- **Cost**

THANK YOU!

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