Hyundai Electric Aircraft Development

Safe · Quiet · Affordable · Passenger Centered

Together We can!
Hyundai H₂ Fuel Cell Development

1998

1st fuel cell R&D team
Project Mercury JV with United Technologies Corp.
Resulted in the Mercury II prototype

2001

1st tech demonstrator
Hyundai Santa Fe FCEV
Range: 230 mi.
Top speed: 80 mph

2013

1st commercial launch
Hyundai Tucson FCEV
Range: 370 mi.
Top speed: 93 mph

2018

1st week-long range
Hyundai Nexo Blue
Range: 415 mi.
Top speed: 111 mph

2020

1st commercial fuel cell truck
Hyundai XCIENT
Range: 250 mi.
Top speed: 53 mph

Hyundai is 2019 market leader in fuel cell vehicle sales

Together We Can!
**Fuel Cell Propulsion Opportunities**

- **Payload-Range**
  - Design Payload (lbs) vs. Design Range (mi)
  - Battery vs. Fuel Cell

- **Refuel/Recharge Time**
  - Refuel/Recharge Time (min) vs. Range (mi)
  - Fuel Cell vs. Battery

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*Fuel cell enables longer range and higher operational tempo.*
Aviation Fuel Cell Technology Needs

Hydrogen Storage:
- 10k psi gaseous storage 1:20 fuel to tank weight ratio
- Cryogenic liquid storage operational challenges
- Solid state hydrogen storage is desirable

Batteries:
- FC Electric aircraft need large battery systems
- High specific power – different cells from BEV
- Aircraft concept must accommodate FC system and battery installation

Thermal Management:
- Fuel cells are only ~50% thermally efficient
- Low grade heat requires significant TMS equipment
- Aircraft concept designed to accommodate TMS

Technical challenges require industry innovation
Aviation Fuel Cell Certification

Currently no coverage for fuel cell propulsion systems in Part 33

Consensus standards and accepted means of compliance need to be adapted/developed for all fuel cell system components

Opportunity for industry collaboration to define a safe and effective framework for fuel cell certification

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