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Aviation Electronics & H₂ Systems

Relevant Projects and Examples for Fuel Cell Systems

Our Expertise

- Fuel cell systems engineering with balance of plant and power electronics
- Integration of fuel cell systems into applications such as drones, aircraft and other platforms
- Advanced system integration including control design and stability analysis
- 8 kW fuel cell system – engineered with proprietary control and software

Our Test Capabilities

- Testbench for 20 kW fuel cell systems
- Fuel cell laboratory for up to 300 kW systems

Flagship Project Example »NEWBORN«

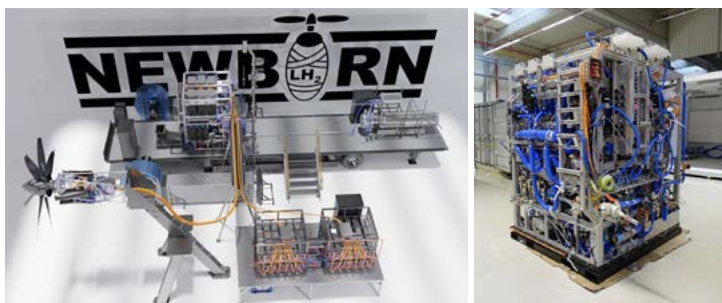
- Ground demonstration of a 1 MW fuel cell system for future fuel cell aircraft in collaboration with 18 EU partners
- Development of HV distribution net, DC/DC converters and balance of plants (BoP) components at Fraunhofer IISB



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© Pipistrel, Honeywell Aerospace / Project NEWBORN



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Development of Electrical Air Compressors

- High power density and high efficient electric motor design
- E.g. high-speed electric machine for compressor applications with 30 kW/kg and 150,000 rpm



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Cell Voltage Monitoring (CVM)

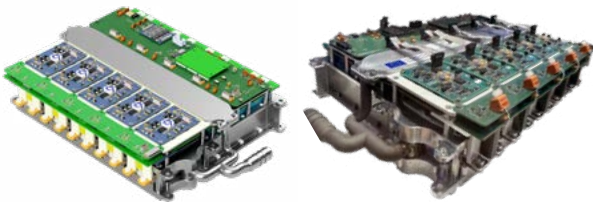
- Modular and scalable CVM based on foxBMS®
- Individual and negative cell measurement with 20 Hz
- 400 channels with cell pitch of 0.9 mm



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Scalable Aircraft DC-DC Converters

- High efficiency (> 99 %)
- High Power density beyond 20 kW/kg
- Integration in fuel cell systems
- Bidirectional coupler for energy storage systems



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Stability Analysis and Grid Integration

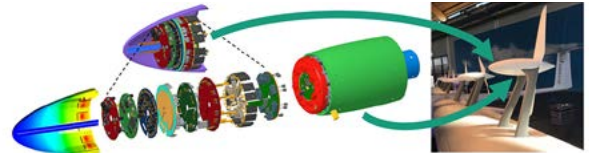
- Development of grid level controls for energy management and power sharing
- Simulation of DC grids normal operation and fault conditions for the evaluation of over-/undervoltage events
- Stability analysis of DC grids

Reference Projects



Development of Inverters

- Scalable, modular, and integrated designs for different applications
- Usage of the latest SiC or GaN devices for highest power density and efficiencies
- High frequency designs up to 100 kHz to drive air compressors



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Development of Cryogenic Power Electronics

- High performance power electronics operatable at -200°C
- Usage of LH₂ via a secondary cooling loop (e.g. LN₂ or GHe) as a cooling source
- Efficiency improvement compared to conventional cooled systems



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