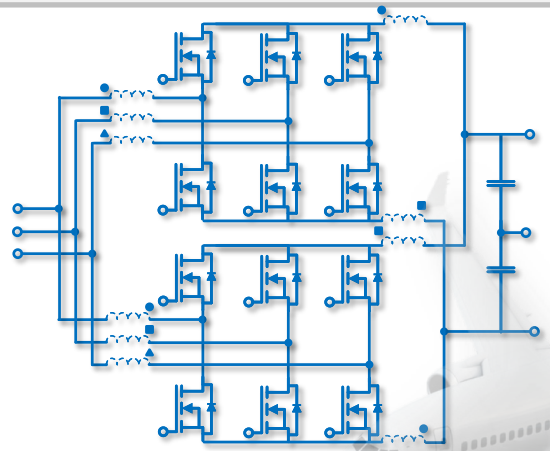
Virginia Tech - CPES Academic member

Project Title: 100 kW SiC-based Generator Rectifier Unit for Variable Frequency Airborne Applications

Objectives: Demonstrate a liquid-cooled 100 kW three-phase ac-dc SiC rectifier unit with > 99% efficiency and >120 W/in^3 power density.

Major Milestones: Three-phase SiC active rectifier unit

Deliverables: 100 kW SiC Rectifier Unit



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WBG Technology Impact

1. 1.2 kV SiC MOSFET module qualified for 200 °C, and rectifier system capable of operating at high altitude (> 30,000 ft).
2. Suitable for aviation and other transportation systems utilizing variable frequency generation.
3. Timeframe for commercialization: 36 months
4. State-of-the-art IGBT units achieves 97 % efficiency, 80 W/in^3 power density. The proposed SiC-based solution targets 99 % efficiency, a power density of 120 W/in^3, and operation with a junction temperature at 200 °C.

Additional impacts

1. Cooling and passive component cost savings will offset the additional cost of WBG devices promoting WBG-based converters.
2. The proposed technology will boost the adoption of WBG devices in aviation applications, creating high-end new jobs in the aviation, semiconductor, and power electronics industries.
3. Graduate and undergraduate students will be trained in the use of 1.2 kV SiC power modules and airborne electrical systems.
4. The proposed project will help the US retain the global lead in power electronics for aerospace systems.