

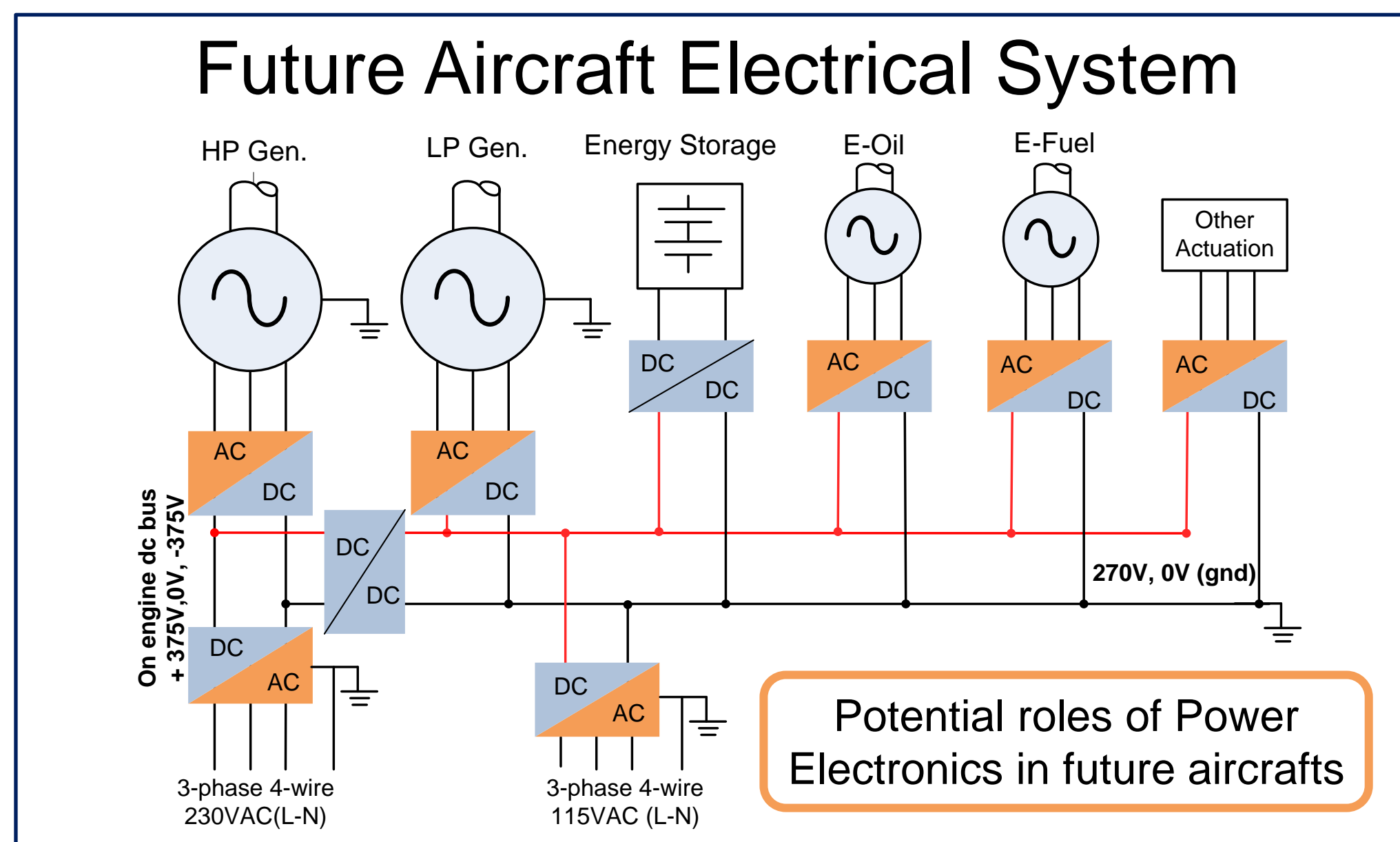
Rolls-Royce@NTU Corporate Lab

Development of High Power Density Converters for Aerospace Application

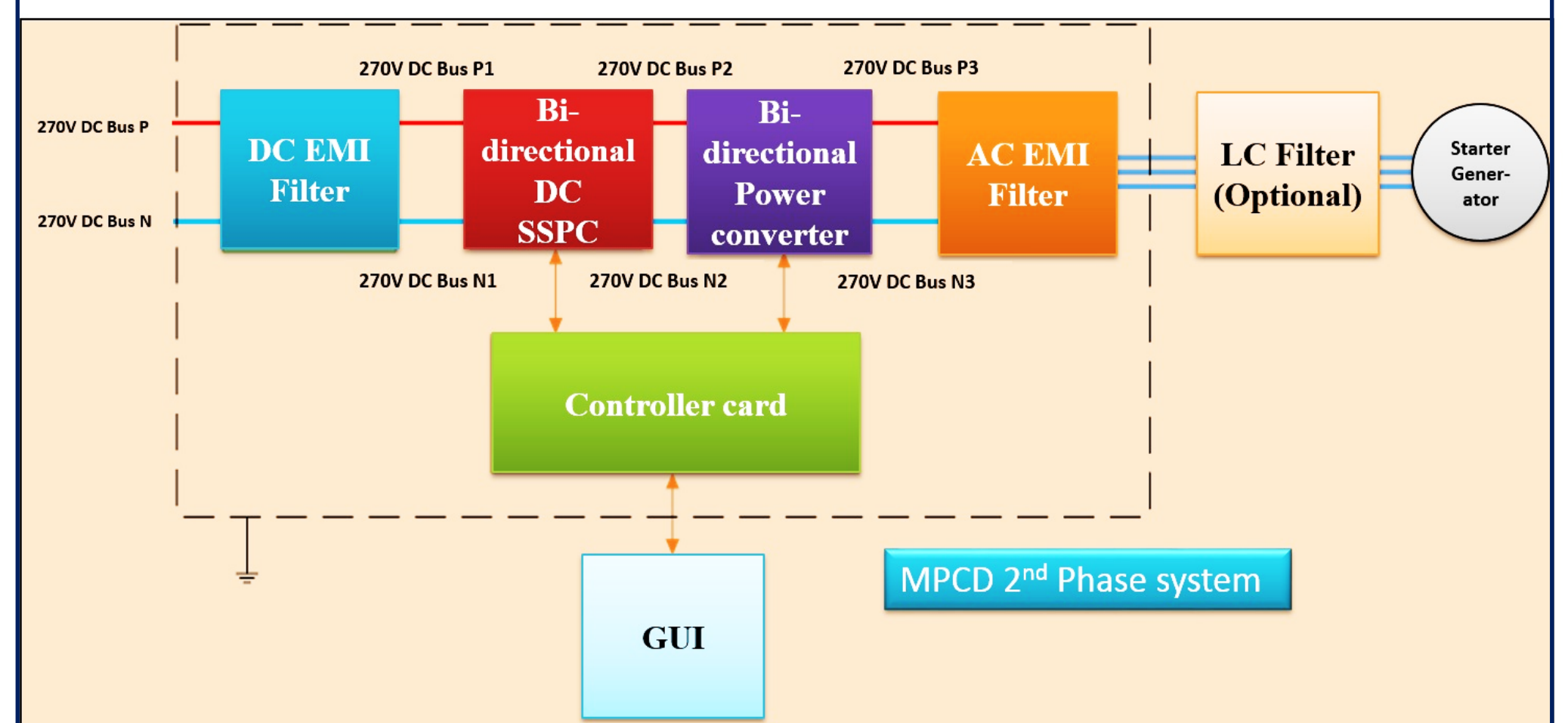
Objective:

- Develop and demonstrate key technologies required to push power density barrier for aerospace power converters.
- Design integrated SSPC and Converter system and demonstrate single lane functionality with the starter generator and future scalability.

RR business sector: Aerospace

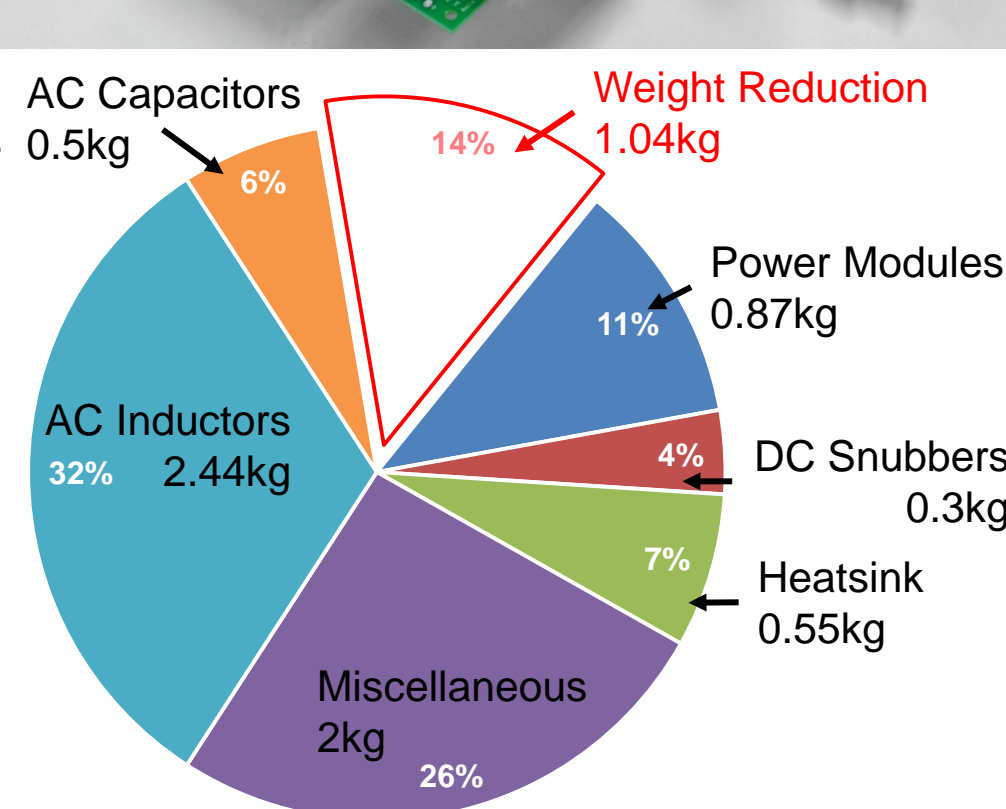
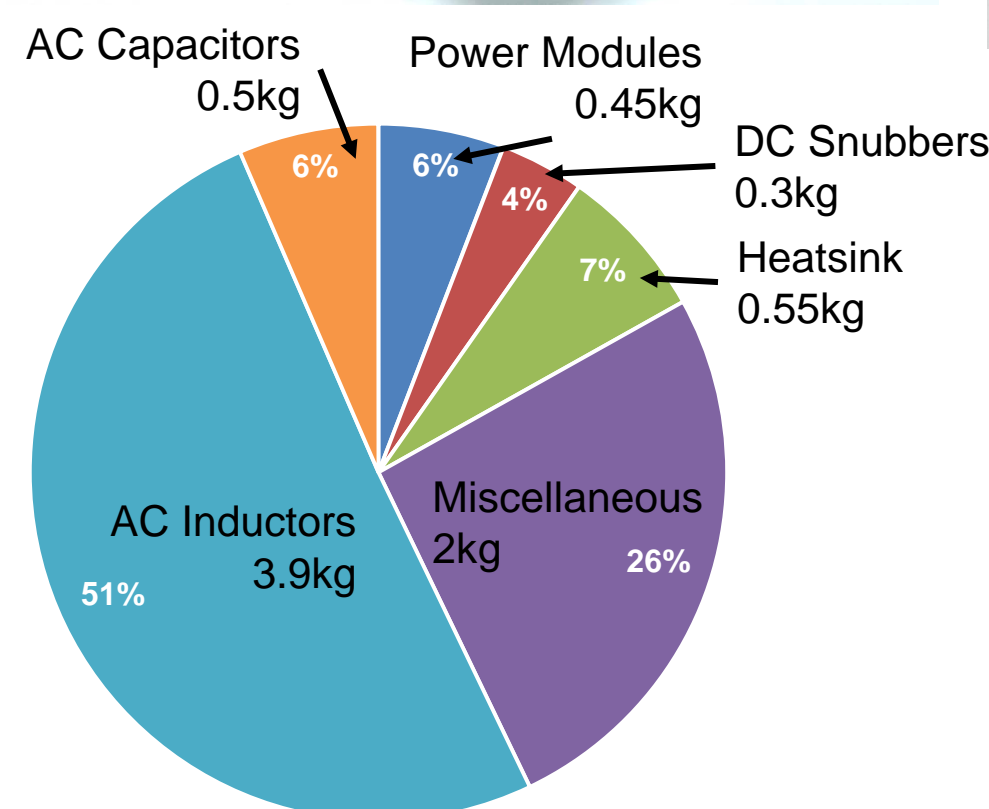
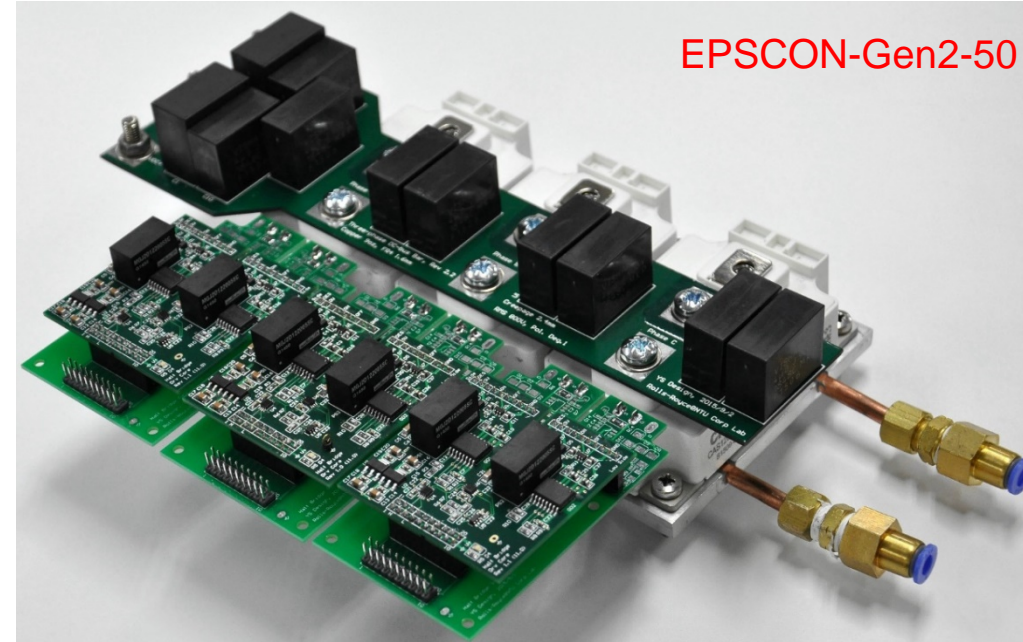
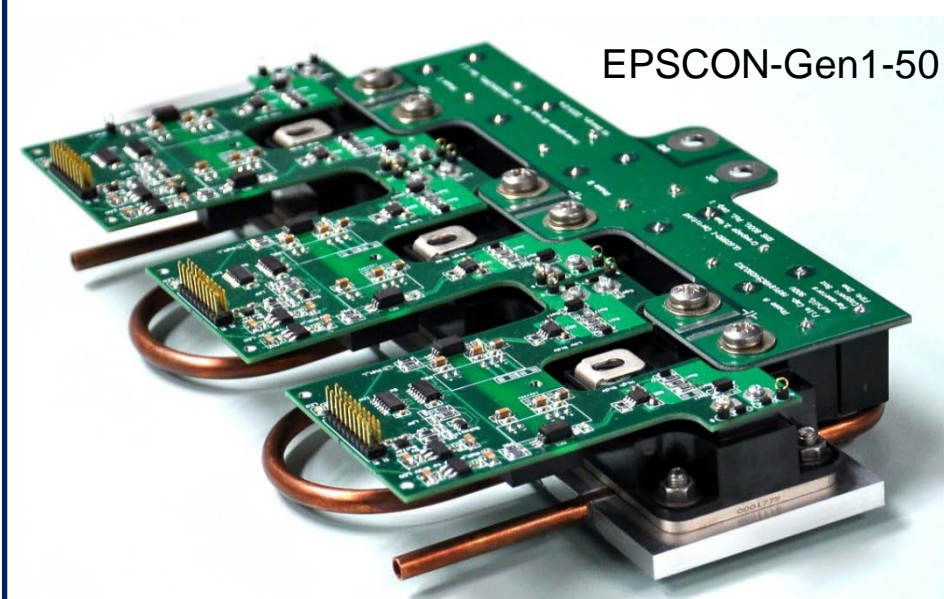


100-kW Power Converter with integrated DC Solid-State Power Controller and EMI Filtering

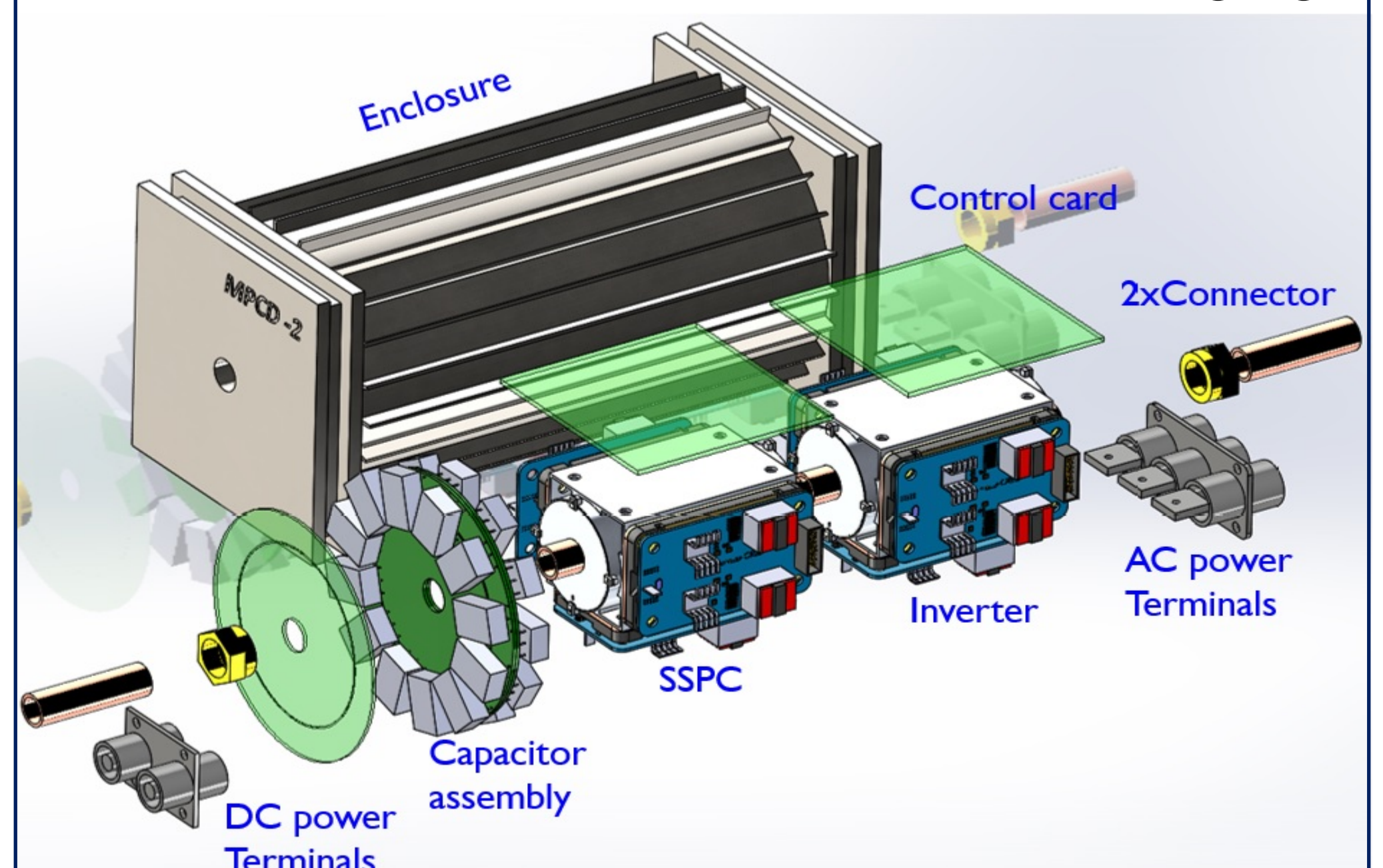


50-kVA SiC Converter Prototypes

Parameter	EPSCON-Gen1-50	EPSCON-Gen2-50
Nominal AC Voltage	230 V 400 Hz	
Nominal DC Voltage	750 V	
Switching Frequency	60 kHz	100 kHz
Weight	7.7 kg	6.66 kg
Power Density	6.49 kW/kg	7.51 kW/kg
Efficiency	98.53%	97.91%



100-kW power converter concept packaging



- Compact four-quadrant converter operation integrated with Static Switch Power Controller (SSPC).
- Fault management capability by SSPC.
- Lightweight and low-resistant thermal management solution capable of using lubricant oil coolant.
- Master controller for operational guidance and monitoring.
- CAN and Ethernet network for internal and external communication supported via GUI.

Acknowledgment: This work was conducted within the Rolls-Royce@NTU Corporate Lab with support from the National Research Foundation (NRF) Singapore under the Corp Lab@University Scheme

Contact person: Amit Gupta[∗], Josep Pou[‡]

[∗]Rolls-Royce Electrical, Applied Technology Group, Singapore

[‡]School of Electrical and Electronic Engineering Nanyang Technological University, Singapore

[#]Rolls-Royce@NTU Corporate Lab, Nanyang Technological University, Singapore