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Integrated, Intelligent Modular Power Electronic Converter
Horizon 2020 – Mobility for Growth, call H2020--MG--2014_TwoStages: 636170-- I2MPECT

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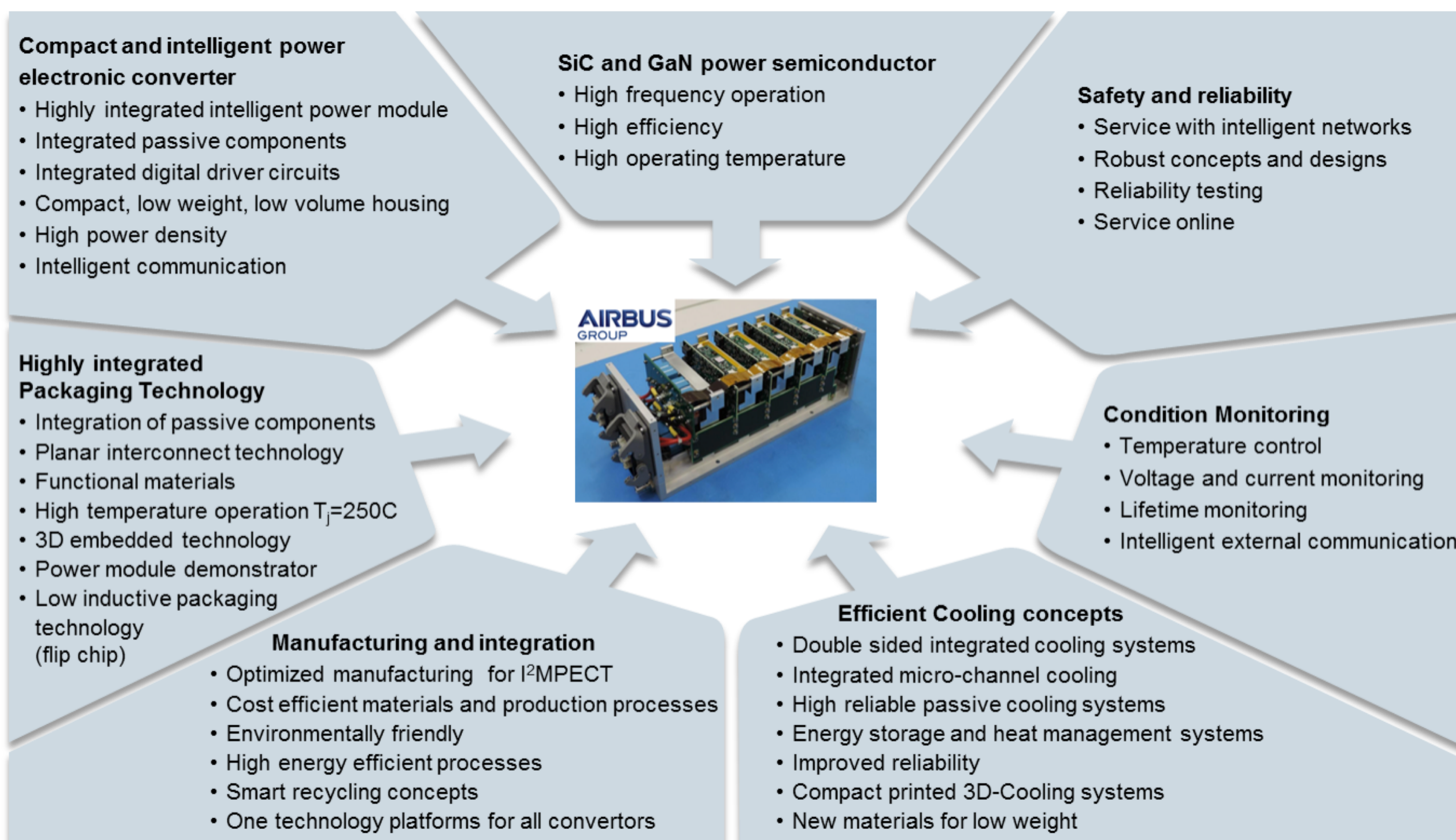
Integrated, Intelligent Modular Power Electronic Converter

Presented by Bruno ALLARD (INSA, Fr) on behalf of the project consortium

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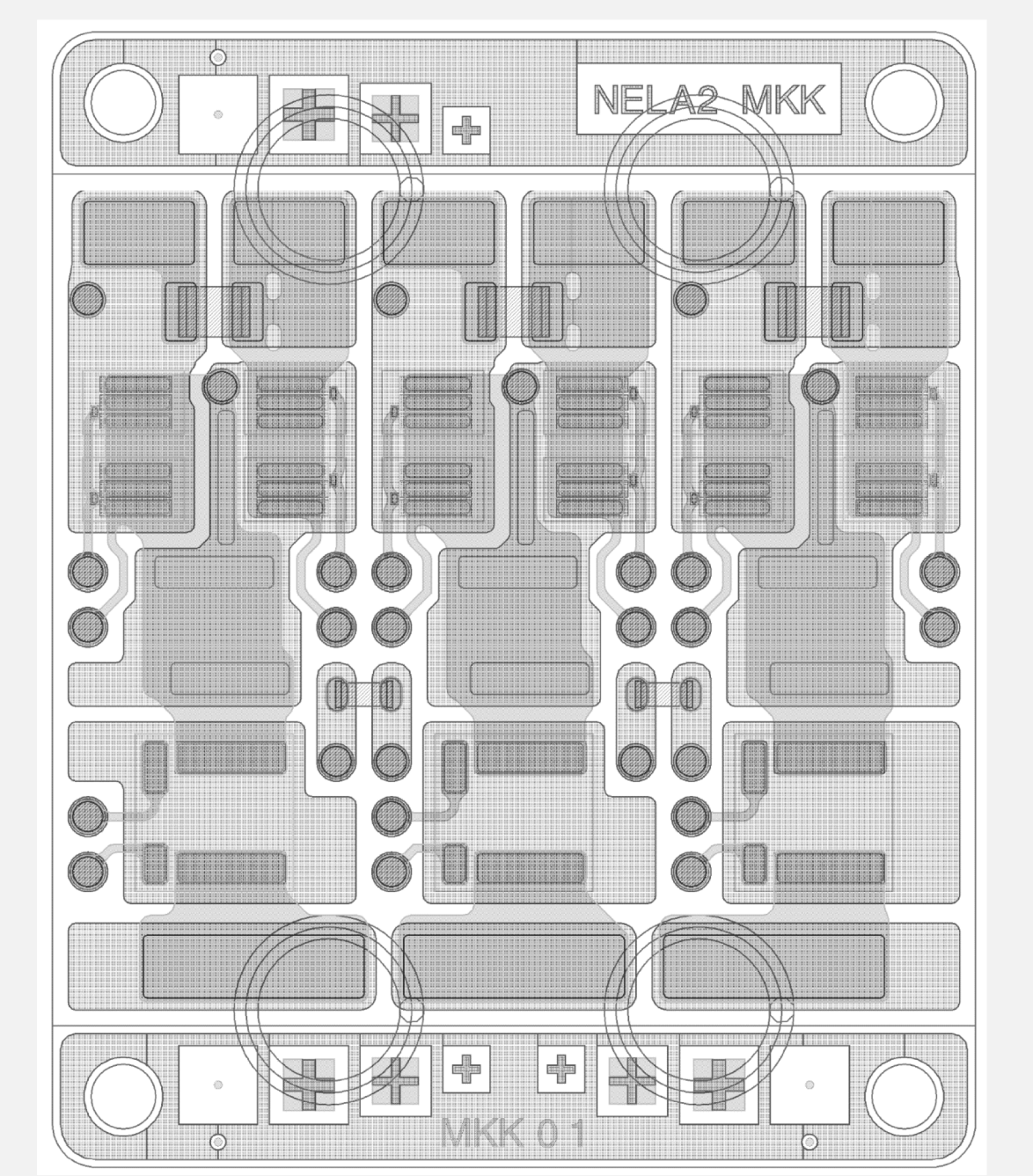
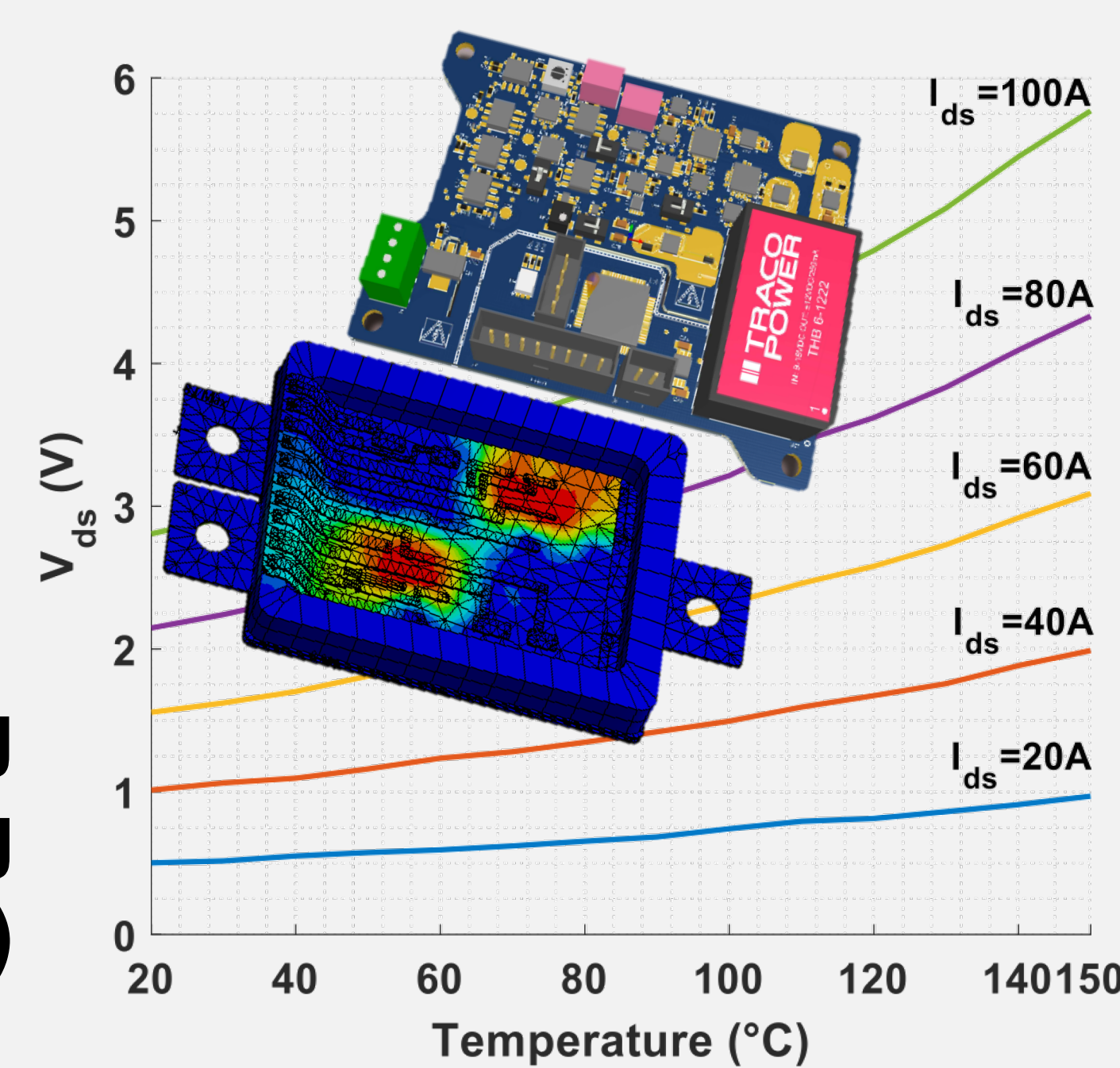
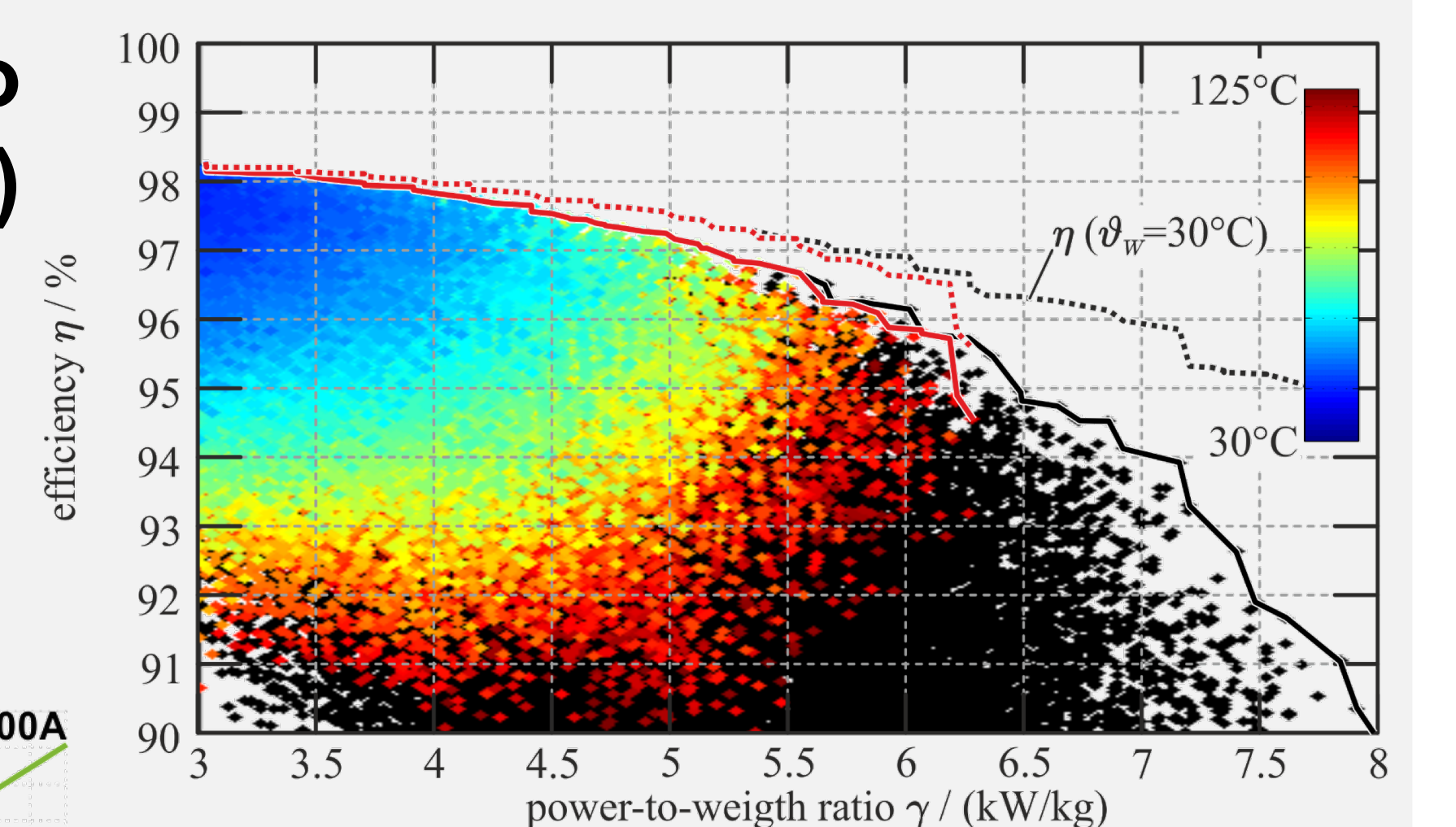
Develop and demonstrate an innovative, ultra-compact, highly reliable and efficient power electronic converter with extended functionalities for aerospace applications.

- Explore:
 - innovative 3D packaging and cooling concepts, by integration of full SiC power electronics (switches and diodes)
 - ultra-compact passives and intelligent gate drive
 - novel control and health monitoring techniques with intelligent external communication.
 - reduction of certification cost by modularization and standardization
- The key objective:
 - 3% increase in efficiency
 - Use of SiC and GaN components being able to cut the losses in power module by about 60%.
 - Increased switching frequency: further loss reduction in electric machines due to lower harmonic distortion
 - Modular highly integrated power electronics building blocks
- Significant increase in power density:
 - 2kW/kg today to at least 10kW/kg in given conditions and potentially 15kW/kg in more long term future
 - highly compact and flexible 3D design, integrated 3D packaging technologies
 - innovative cooling technology
 - cost effective production by new technologies



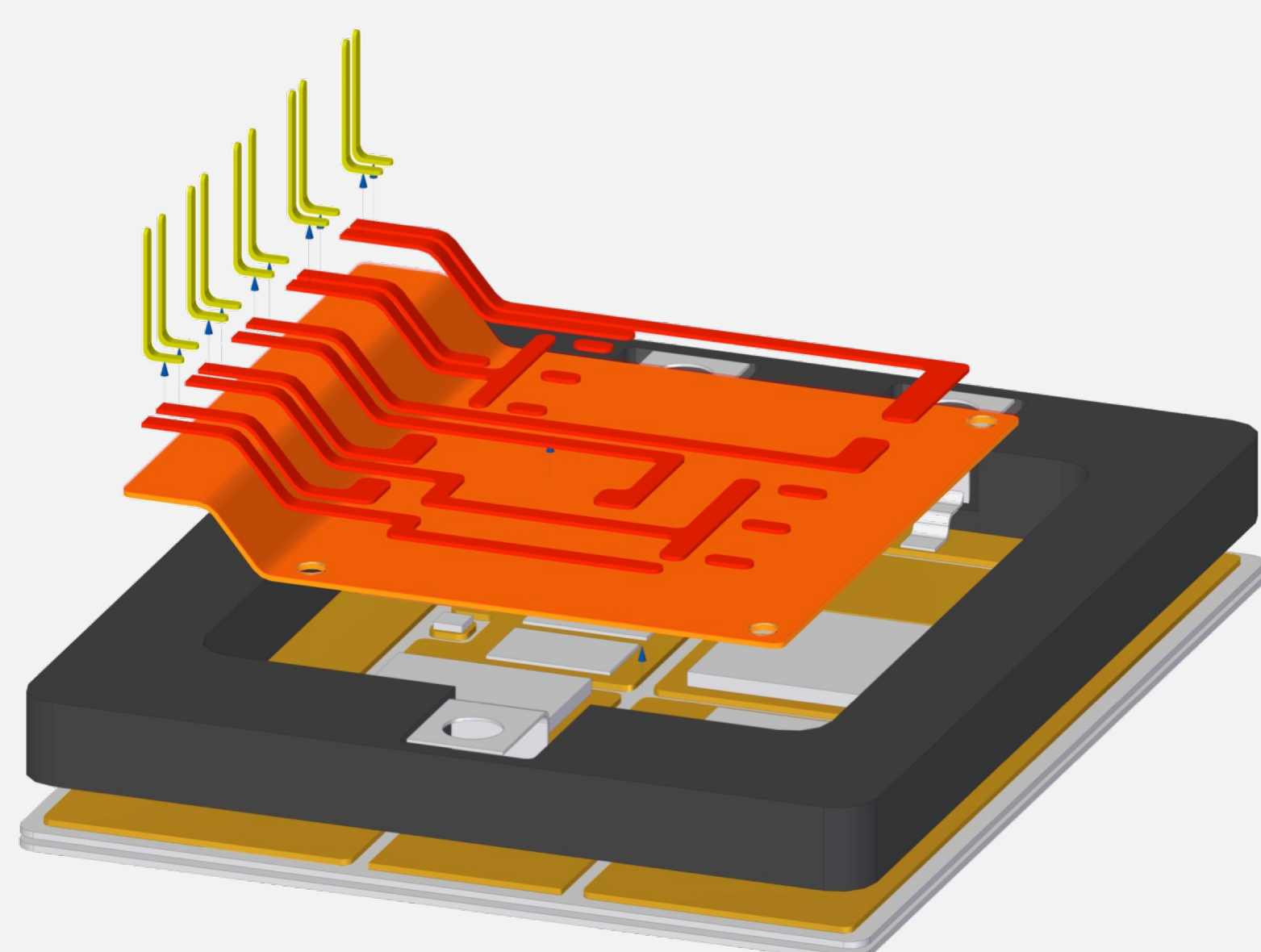
Early proposals

Weight/Efficiency Pareto optimization (ETH Zurich)

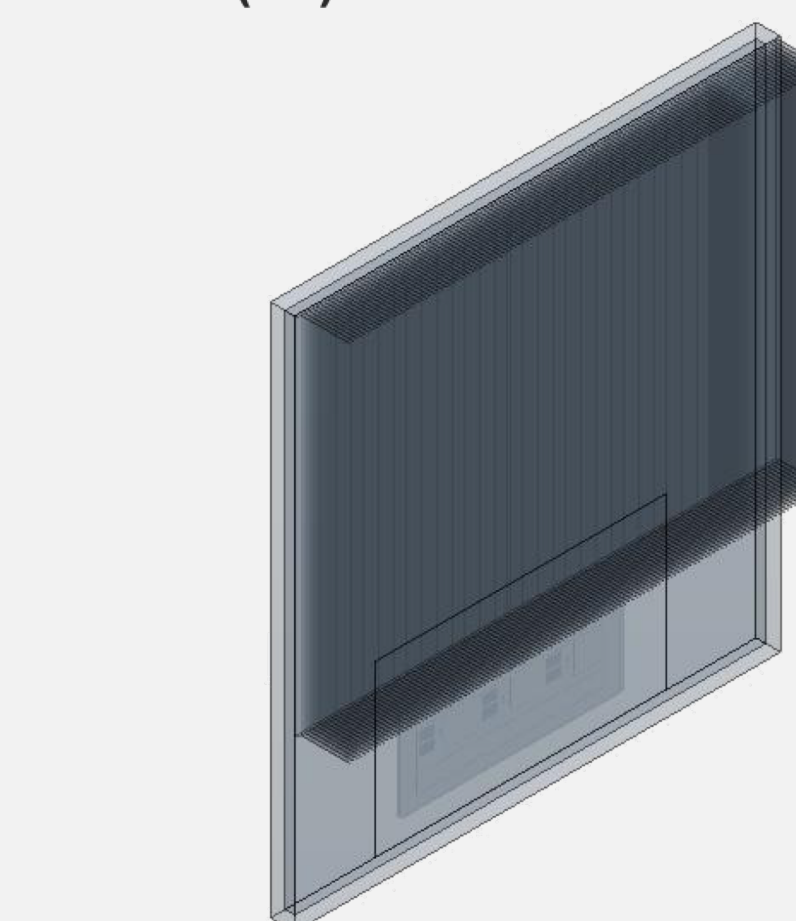
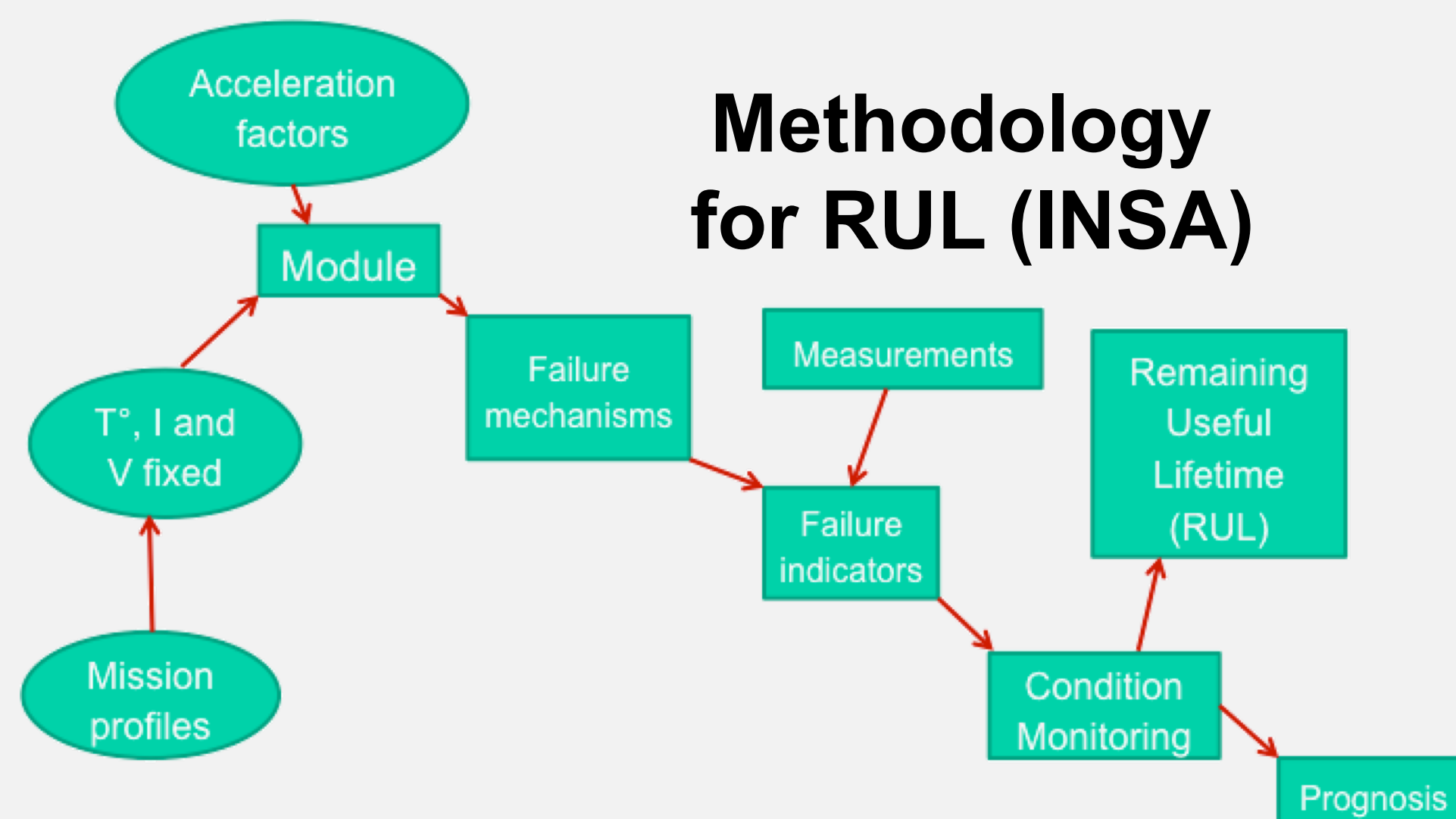


Microchannel heatsink technology (Siemens)

Electro-thermal modelling and condition monitoring (Univ. Sheffield)



Flex-cover technology (Dynex)



Two-phase heat transfer device with integrated fins (INSA)