

ELECTRICAL PROPULSION SYSTEMS

Roadmap



**AEROSPACE
TECHNOLOGY
INSTITUTE**

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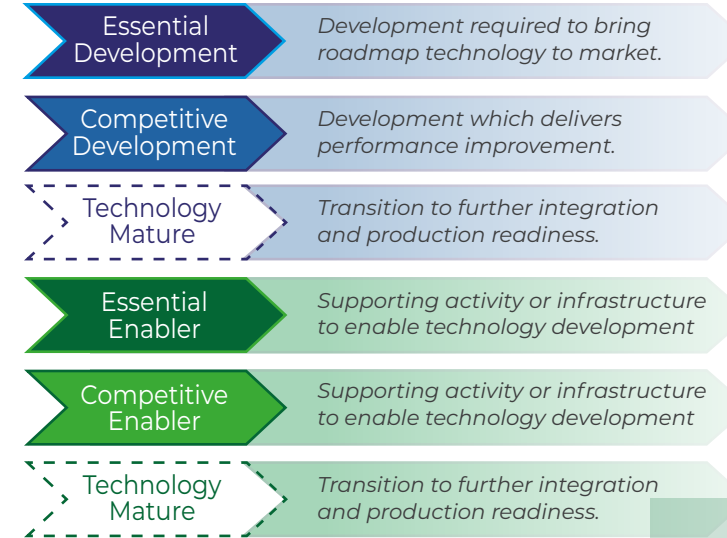
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KEY & LIST OF ABBREVIATIONS

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List of Abbreviations

- CNT – Carbon Nanotube
- EMI – Electro-Magnetic Interference
- HMM – Hard Magnetic Material
- LH₂ – Liquid Hydrogen
- MDO – Multi-Disciplinary (MD) Optimisation
- NPC – Neutral Point Clamped
- PEEK – Polyether Ether Ketone
- PEM – Proton Exchange Membrane
- PM – Permanent Magnet
- SMM – Soft Magnetic Material
- SPM – Surface Mount Permanent Magnet
- TMS – Thermal Management System

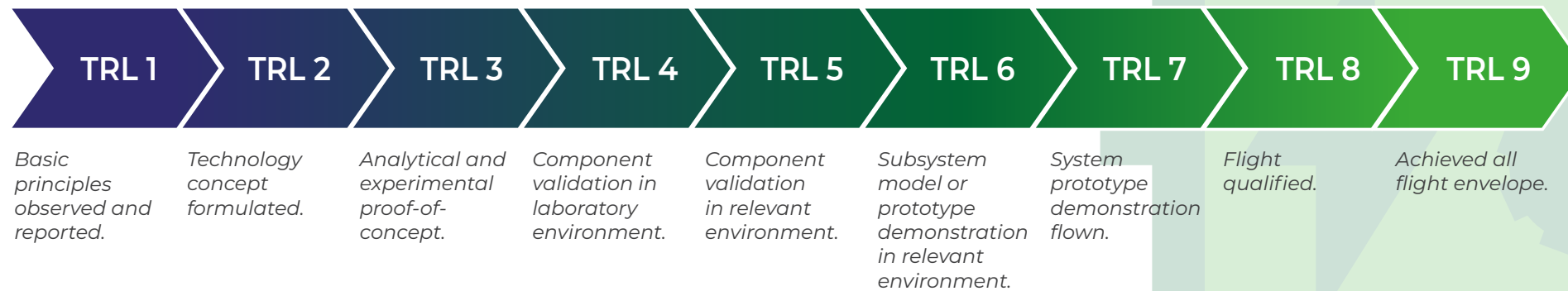


Figure 1 – Technology has been assessed against the NASA Technology Readiness Level (TRL) scale

ELECTRIC MOTOR ROADMAP

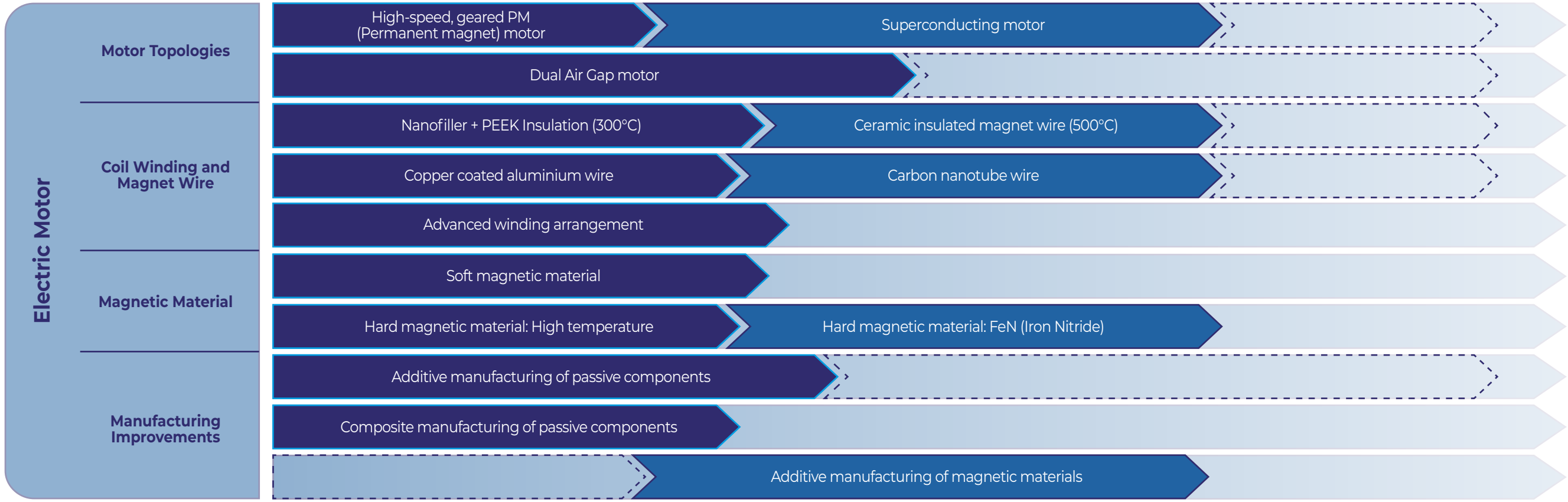


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POWER ELECTRONICS ROADMAP

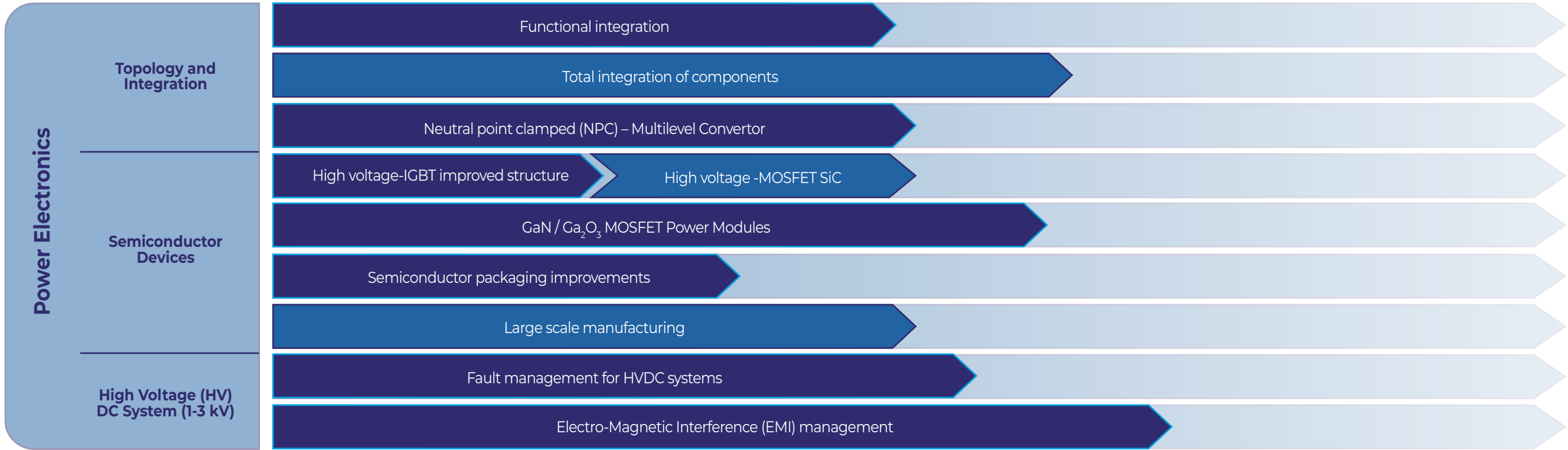


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THERMAL MANAGEMENT (ELECTRICAL SYSTEM) ROADMAP

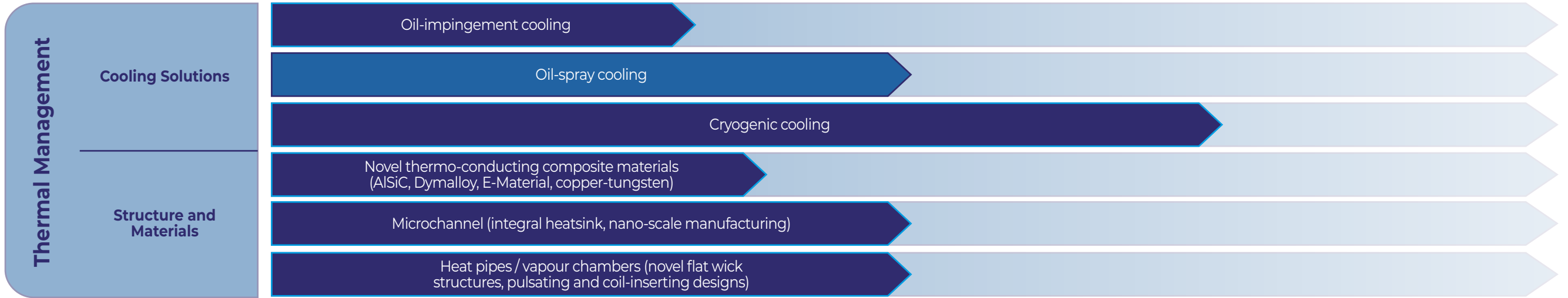


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ABOUT FLYZERO

Led by the Aerospace Technology Institute and backed by the UK government, FlyZero began in early 2021 as an intensive research project investigating zero-carbon emission commercial flight. This independent study has brought together experts from across the UK to assess the design challenges, manufacturing demands, operational requirements and market opportunity of potential zero-carbon emission aircraft concepts.

FlyZero has concluded that green liquid hydrogen is the most viable zero-carbon emission fuel with the potential to scale to larger aircraft utilising fuel cell, gas turbine and hybrid systems. This has guided the focus, conclusions and recommendations of the project.

This report forms part of a suite of FlyZero outputs which will help shape the future of global aviation with the intention of gearing up the UK to stand at the forefront of sustainable flight in design, manufacture, technology and skills for years to come. To discover more and download the FlyZero reports, visit ati.org.uk

ACKNOWLEDGEMENTS

Lead authors

Keval Mehta
Electrical Powertrain Specialist

Co-authors

Dr. Wasim Bhatti
Powertrain Lead.
Nigel Town
Industrial Supply Chain Architect

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These roadmaps have been developed with a view to accelerate zero-carbon technology development and maximise the potential future value for the UK. They are unconstrained by the availability of funding.



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