FUTURE PROPULSION AND SYSTEMS CAPABILITIES STATEMENT

EXPERTISE: The Future Propulsion and Systems thematic group features a range of expertise for **current and future propulsion systems**. **Systems integration** is a key component of our expertise, covering both the **optimisation and build** of propulsion systems spanning **electrical and hybrid propulsion systems**. Key examples of our integration track record can be found within these CleanSky2/Horizon 2020 projects:

- **EMINEO** - Electrical Machines and Drives for Next Generation Aircraft
- **ORCHESTRA** - Optimised Electric Network Architectures and Systems for More-Electric Aircraft
- **AERIS -** Advanced simulation of two-phase flow in aero-engine bearing chambers and internal gearboxes

Specific areas of expertise lie within and across the following themes:

Propulsion Systems	Electrical Machines	Power Electronics & Batteries	Power Systems & Control	Analysis Techniques	Thermal	System Risk & Reliability
Future and decarbonised propulsion	Electrical machine design	Power Electronics	Innovative onboard architectures & topologies	Experimental & computational fluid dynamics	Thermal management	Risk and reliability
Electric propulsion	Motor drives	Modular battery systems	Optimised energy/power management including AI-based	Rotor & high-speed machine dynamics	Cooling systems	Fault diagnostics
Aircraft gas turbine engines	Winding technology	Aircraft electrical power systems	Advanced modelling/simulation and Digital Twins	Flow control and turbulence modelling	Combustor aerothermal technology	Aircraft fleet maintenance & prognostics
Satellite propulsion	Electromagnetic modelling	High e-performance applications	Electric power quality and stability	Material characterisation	Ultra-low NOx combustion systems	Safety

PEOPLE: Over **250 academics and researchers** work within and across this diverse range of research themes to deliver novel, cross-disciplinary, integrated research projects to both industry and research funders.

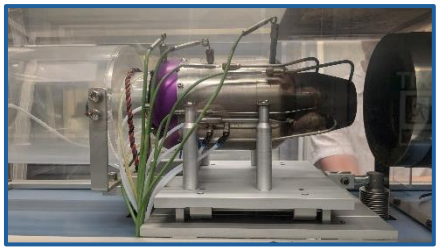
RESEARCH FACILIITES: Across our research entities, we can provide access to:

Power Electronics and Machine test facilities (up to 2MW)	Advanced machining technologies	Micro gas turbine for testing fuel	On premise HPC service
Mechanical testing and structural evaluation	Extensive range of Additive Manufacturing machines	Large closed-return wind tunnel with experience of testing engine nacelles and wing-props	Hybrid fuel cell/electric propulsion system validation (up to 45000ft)

TRACK RECORD: Our specialist aerospace teams at UoN work in partnership with a range of major aerospace companies and SMEs. We have an extensive track record in securing key UK and EU funding as well as from the Royal Society, British Council, RAEng, Research England, APC and industry.

UKRI Engineering and Physical Sciences Research Council · UKRI Innovate UK · Aerospace Technology Institute · Horizon 2020 Programme · Clean Sky · Clean Sky 2 Joint Undertaking · Clean Aviation

Power Electronics and Machines test facilities



Instrumented micro turbine for gas turbine and fuel research

University of Nottingham · IAT Institute for Aerospace Technology

https://www.nottingham.ac.uk/aerospace