

# Advanced Electrical Power Systems

To reduce weight and maintenance costs, whilst increasing efficiency and flexibility, mechanical, hydraulic and pneumatic equipment onboard aircraft are being replaced by electrical systems. Furthermore, the integrated electrical systems that are starting to emerge offer new opportunities for further operational flexibility and system optimisation.

The School of Electrical and Electronic Engineering is working on solutions to many of the challenges created by the more-electric revolution in aerospace systems:

- High-performance, engine-embedded, fault-tolerant generation systems
- High integrity power electronics and motor drive systems
- Torque-dense electrical actuation systems
- High-power, high-voltage power system architectures
- Prediction and prevention of partial discharge phenomena
- Power system management techniques including power quality, stability, energy storage, protection and condition monitoring
- Analysis, modelling and simulation techniques for complex electrical systems

- Rolls-Royce University Technology Centre (UTC) in Electrical Systems
- Hosting the SEAS DTC integrated electrical power networks evaluation facility, a 100 kVA experimental platform for UAV electrical systems

# Research areas

By drawing on the strengths of the Power Conversion and Electrical Energy and Power Systems Groups within the School of Electrical and Electronic Engineering, we are able to offer the breadth and depth of expertise that is needed to devise and

design advanced power systems for future aerospace applications. Our research ranges from the analysis and control of electrical machines and power electronic circuits to the overall management and protection of electrical systems.

## Research facilities

- 100 kVA intelligent electrical power networks evaluation facility
- Well-equipped power electronics laboratories
- Environmental chambers and high voltage test facilities
- Suite of industry standard computer simulation packages
- Range of dynamometer rigs for electrical machine and drive system testing
- Calorimeter for precision measurement of machine and drive system losses



## Relevant postgraduate study

### MSc in Electrical Energy Conversion Systems

From 2008 the Power Conversion Group will offer an MSc in Electrical Energy Conversion Systems. Starting from the fundamental principles of electrical machine and power electronic energy conversion, the course will show how complete autonomous electrical systems such as those found on aircraft and ships may be analysed and designed.

### Further taught programmes

The Electrical Energy and Power Systems Group offers several MSc programmes covering terrestrial power systems: power system plant, load flow analysis, embedded generation and economics.

### Research degrees

The Power Conversion and Electrical Energy and Power Systems Groups together provide one of the largest concentrations of electrical power expertise in any UK university and offer a lively, well-supported environment for research training in all aspects of electrical power engineering.

## Academic staff



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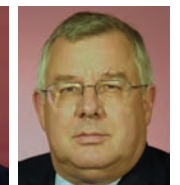
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