



Expertise in aircraft electrification and urban air mobility

Cranfield can provide a whole range of expertise and major facilities, including Cranfield's global research airport, to drive forwards aircraft electrification and urban air mobility. We have over 100 academic staff with relevant expertise.

	Topic	Prime contacts	Expertise
Cranfield global research airport with extensive large scale rigs and test facilities for this transformative future technology.	Aircraft design and systems engineering	Professor Howard Smith Professor Shijun Guo Dr Craig Lawson Dr Huamin Jia Dr Tim Mackley Professor Essam Shehab Dr Joni Pelham Professor Guy Gratton	Whole aircraft design, thermal and battery management, modelling and simulation, trajectory optimisation and the overall impact on Air Traffic Management (ATM). Aircraft avionics integration architecture, data buses, airborne system and software functions development and design, and safety assessment. Systems Engineering including design of large scale thermal management rigs. Digital twinning. Air transport management. Experienced experimental/flight test pilot including electric aircraft.
	Aircraft propulsion	Professor Vassilios Pachidis Professor David MacManus Dr Panagiotis Laskaridis	Technoeconomic Environmental Risk Analysis (TERA). Propulsion integration. Hybrid gas turbine performance, aerodynamic integration of electric propulsion, modelling and analysis of integrated hybrid electric including thermal management, system architecture, size and match electrical, energy storage, thermal management and propulsion modules and advanced energy management.
	Unmanned Aerial Systems (UAS) technology	Professor Antonios Tsourdos Dr Hyo-Sang Shin Dr John Economou Dr Argyrios Zolotas	AI based control strategies for UAS power management, trade-off between fuel consumption and flight duration, design and sizing of propulsion systems, thermoelectric power generation, autonomous ground recharge stations and Unmanned Air Traffic Management (UTM).
	Batteries, energy storage, electric motors and generators	Dr Daniel Auger Professor Patrick Luk Dr James Whidborne Dr Kim Blackburn Dr Marko Tirovic	Management of Ultralight batteries, characterisation, algorithms to estimate internal state of charge/health and test facilities. High power density motors, modelling and feedback control of motors, generators and electrical systems, rapid charging, superconducting propulsion and wireless power transfer on-the-fly. Battery swap techniques and cooling system. Electric brake actuation.

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Cranfield global research airport with extensive large scale rigs and test facilities for this transformative future technology.	Materials	Professor Krzysztof Koziol Professor Stewart Williams	High performance copper composite wires and pure carbon nanotube wires, nanocarbon composites for lighter motor housing, nanotube/graphene films for electric anti-icing, fire resistant nanocarbon composites, piezoelectric and thermoelectric generators for on-board sensors and nanocarbon based electrical machines. Wire + Arc Additive Manufacturing (WAAM) to incorporate conductive and insulating tracks.
	Integrated Vehicle Health Management	Professor Ian Jennions Dr Suresh Perinpanayagam Dr Ip-Shing Fan	Prognostics health management, reliable power electronics, health monitoring of motors/generators, self-learning, self-monitoring conscious aircraft and fault resilience.
	Rotorcraft	Professor Vassilios Pachidis	Aerodynamic modelling, aeroelastics, mission profiling, hybrid and turboelectric power plant modelling, systems modelling and power plant management, noise prediction, investment cost analysis, airport and air traffic system assessments.
	Airline ecosystem and power supply	Professor Keith Mason Mr Andrew Foster Dr Thomas Budd Dr Henrik Rothe	Vehicle recharging infrastructure and airport design, airline economics and route development, integration of electric aircraft into legacy systems and supply chains, environment impact, passenger experience and acceptance and regulation.
	Production and distribution of electrical power	Professor Phil Hart	Electrical power generation and distribution, energy harvesting, power charging, machines, motors and drives and power storage.
	Aviation and the environment	Professor Neil Harris Professor Jim Harris Dr Adrian Williams Dr Iq Mead Dr Simon Jude Dr Toby Waine Dr Monica Rivas Casado	Airborne atmospheric measurement (with FAAM – the Facility of Airborne Atmospheric Measurement – which is based at Cranfield). Airport design and the environment and grey-green-blue infrastructure integration and design. Airport air quality measurements, assessing ecosystem services, climate impacts and lifecycle impacts. Application of drones for remote sensing of environmental features, and interpretation of earth observation and UAV data for agritech and environmental applications.
	Cranfield Aerospace Solutions Limited	Paul Hutton	Design, build and test fly capability for whole new electric and hybrid-electric aircraft concepts with all relevant CAA/ EASA approvals.
	Urban Air Mobility (UAM)	Dr Abbas Fotouhi Professor Emel Aktas Professor Michael Bourlakis Professor Iain Gray Professor Graham Braithwaite	Multi-modal fleet management systems. Urban intermodal transport. Future urban and smart supply chains. Urban Air Mobility draws on all of the above.