Cranfield University and ESTACA, France invite applications from suitably qualified British, French and international candidates for a fully funded 3 year cotutelle PhD studentship which will start in September 2023. The studentship includes fees and a stipend equivalent to the UK National Minimum Doctoral Stipend for 3 years. The first 18 months will be based at Cranfield University, UK and the second 18 months at ESTACA, Laval, France.

Unmanned multirotors (e.g. quadrotors) are increasingly being used for military and civil applications. An important issue that potentially limits their applicability is reliability because aircraft are safety critical systems. Multirotors are open loop unstable, hence maintaining control of the vehicle relies on the actuator system; this being the motors for a multi-rotor vehicle. Hence the reliability of the motor propulsion system is extremely important.

The two main advantages of fixed pitch multirotor vehicles are their mechanical simplicity and low cost. Most craft use brushless motors for the motor drive, usually permanent magnet motors. However, Switched Reluctance Machines (SRM) offer higher reliability than the alternatives with the added advantage of lower cost and high efficiency. The disadvantages are that they have a lower power density (important for weight sensitive applications) and also have higher torque ripple.

The overall aim is to improve the reliability and performance of multi-rotor air vehicle systems by using SRMs for the propulsion system. An SRM has been designed for optimal performance for multirotor aircraft and a prototype constructed. The motor needs to be implemented on a multirotor aircraft. To do this, fault tolerant motor control algorithms need to be designed, implemented on an embedded computer, and tested.

- Application deadline: 19 Jul 2023
- Award type: PhD
- Start date: 25 Sep 2023
- Duration of award: 3 years
- Eligibility: UK, France, EU, Rest of World

**Entry requirements**

Engineering Diploma, MSc/MEng or good BSc/BEng in Engineering, Physics or Applied Mathematics with an interest in electrical machines and embedded control systems. The PhD studies will be conducted in English.

**Funding**

Sponsored by Cranfield University and ESTACA, France – this is a joint Cotutelle PhD.

**Further details contact**

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**How to apply**

https://www.cranfield.ac.uk/research/phd/satm-aero-application-of-switched-reluctance-machines-to-multirotor-propulsion-phd