**Engineering Simulation and Modelling Group part-funded studentship: project 1**

**Development of in-house capability for unconventional wing design and performance evaluation and wind tunnel testing**

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Environmental concerns in recent years have been brought to the forefront of the aerospace industry, and initiatives like the Clear Sky Act of 2003 have placed a great deal of pressure on manufacturers to chase ever higher fuel efficiencies in their aircraft. Yet, despite great breakthroughs in technology the conventional “tube and wing” aircraft configuration is nearing an optimal performance envelope. To continue improving aircraft efficiency, many design engineers are turning instead to unconventional, disruptive wing configurations. In particular, this project will focus on those configurations with multiple interacting wing surfaces, such as joined and closed wings, as potential a replacement for the Airbus A380 aircraft. However, current engineering codes do not account for the complex flow interactions that take place.

The aim of the proposed PhD project will be the development of a numerical engineering code, designed to allow for the accurate assessment of unconventional wing configurations. This code will initially focus on aerodynamic performance evaluation, and then extend to optimisation coupled with structural/aero-elastic properties in a variety of flight conditions. This process will be validated against high fidelity CFD simulations and wind tunnel experiments to ensure accuracy, and will culminate in a complete process to develop an example wing configuration.

**For an informal discussion about this project**, please email yufeng.yao@uwe.ac.uk.