



Projects on small inflatable aerial vehicles (i-UAV)

Please come and discuss possible topics with one of us:

Pier Marzocca (MAE), **E. Bollt** (MCS), **B. Helenbrook** (MAE), **Ken Visser** (MAE).

Subject areas supervised include *Design of Inflatable Unmanned Aerial Vehicles*, *Numerical and Experimental Aerodynamics*, *Morphing Control*, and *Flight Instrumentation*. Any topics within the following or related areas can be discussed and **potentially** agreed to.

Possible Topics (*multiple projects possible*):

- Design and Construction of i-UAV
 - Design optimisation
 - Further miniaturisation of concept
 - Research and explore new design, airframe, propulsion, and/or control concepts;
 - Optimisation of propeller designs for i-UAV
 - Testing
- Manufacturing Design for i-UAV Prototype Components
 - Complete structural design and analyses
 - Tooling design and construction
 - Component manufacture
 - Deployable systems
- Unsteady Aerodynamics
 - Adapt panel code CFD to low Re
 - Reduced order flow modelling
 - Aerodynamic refinements
- Stability and Control Analyses of the i-UAV
- Morphing Control Systems:
 - Explore use of “smart” materials, structures, and actuators.
- Wind Tunnel Model Airframe Modules:
 - Wind tunnel testing of the one or more configurations;
- Create Flight Simulation Model(s)
- Component(s) Testing
- Testing of Launch Mechanism(s)
- Flight Instrumentation and Control
 - Integrate novel sensors and flight control systems
- Flight Testing
 - Develop flight test platforms and systems
- Autonomous Flight Controller Design
 - Development, and
 - Testing for the i-UAV
- Development of Concept-of-Operations (CONOPS)
- Explore Concepts for
 - Indoor operation
 - Outdoor operation