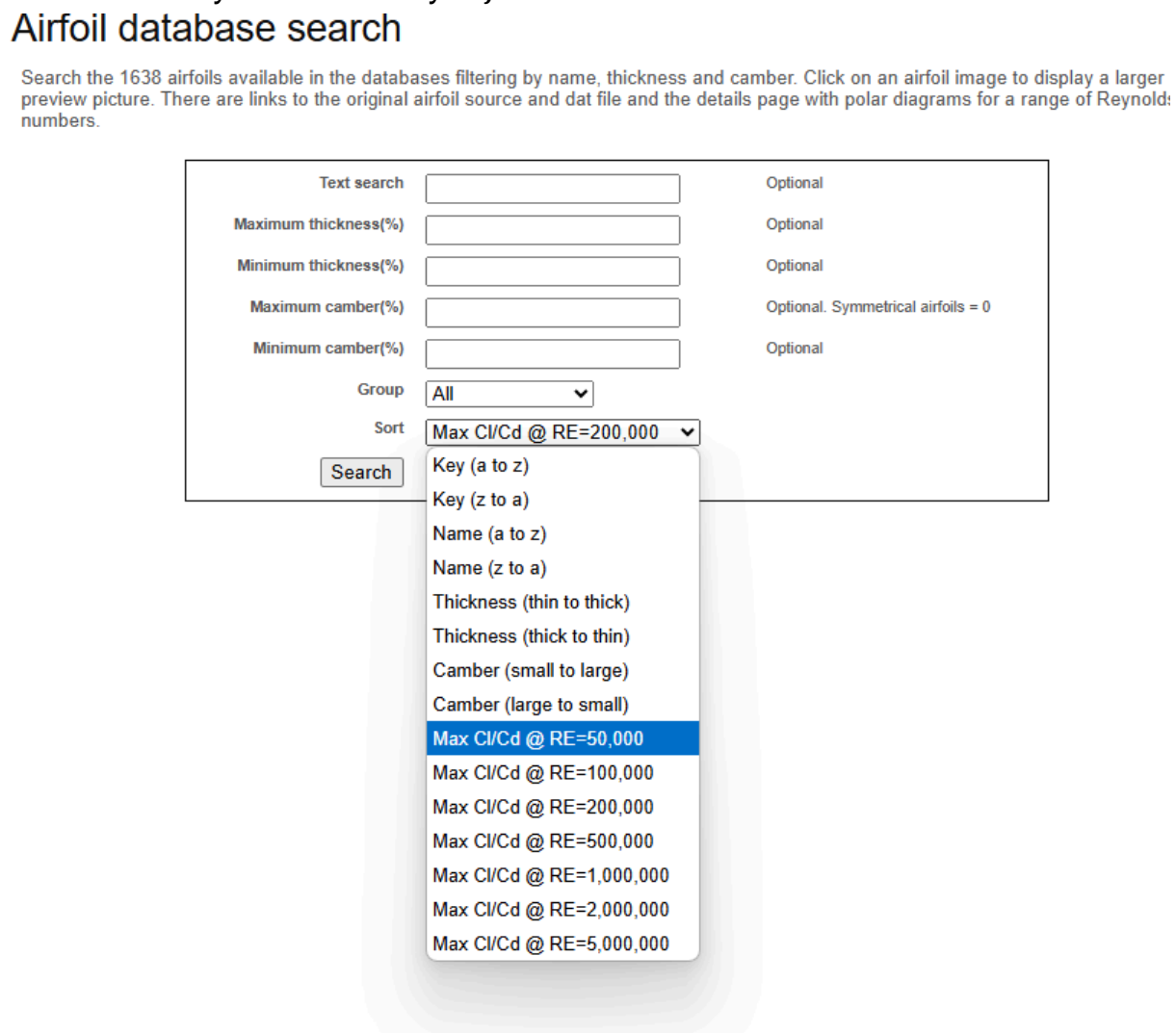
CAD and CFD Wing Design Competition

The aim for this competition is to design and analyse half a wing (must be a symmetrical design) with dimensions less than (span x chord x thickness) 0.75m x 0.2m x 0.1m (half the wing must fit in a box of these dimensions, and we will CFD half the wing to get the results). You will assess the wing at an angle of attack of 0 deg and 15 deg. Both simulations will be with atmospheric air at 10m/s.

Watch the CAD tutorial to get started

Suggested steps: (Feel free to skip or add features to your wing, the only rule is it fits in the described box [see above].)

1. http://airfoiltools.com/calculator/reynoldsnumber go to this website and calculate the reynolds number for your design.
2. Use http://airfoiltools.com/search/index and sort by lift to drag at Reynolds number you just calculated.



3. Use the onshape plugin shown in the youtube tutorial to import a wing cross section and extrude to form a wing

Watch the CFD tutorial to learn how to run the simulation

Compulsory steps: (make sure the simulation volume you use is big enough not to interfere with the flow around the wing)

4. Use simscale.com to import and simulate airflow at 0 deg and 15 deg AOA (angle of attack) at 10m/s. Use the tutorial below to help, as you are designing half a wing one side must be set to the symmetry condition all others must simulate a side open to the free stream of air.
   External Aerodynamics of an Ahmed Body

To have a valid entry:

- Two completed SimScale simulations must be completed, one at 0 deg. angle of attack and the other at 15 deg. Both with the free air speed set to 10m/s. All values must be left at default unless otherwise shown in the video. E.g. Reference Area must be left at 1.

- You must upload a onshape file of your design even if it was made using another CAD program, this can be done by importing the design.

- The wing must be judged to be of a reasonable size to the dimensions of the box *[dimensions less than (span x chord x thickness) 0.75m x 0.2m x 0.1m]* (no extremely small designs, minimum recommended span is 0.4m), although you are allowed to make as complex a design as you like extremely thin elements may be disqualified due to being unrealistic and exploiting the simulation (see Formula 1 car aero parts to understand the limit of manufacturing aerodynamic elements). Using small elements on a surface (e.g. to simulate roughness) are allowed.

- If any calculations of lift to drag ratio are incorrect it is your responsibility to contact tag49@cam.ac.uk with the name you used on your entry to correct the issue.

- Make your submission using this link before the 25th August: https://forms.office.com/Pages/ResponsePage.aspx?id=BHB_DPEnhE2_REEspHGgrVPBoAuhrypDjWhRo6AQbzZUQVIzSENVWkhUMlo1MkUxMDFBS1VXMVVCWi4u