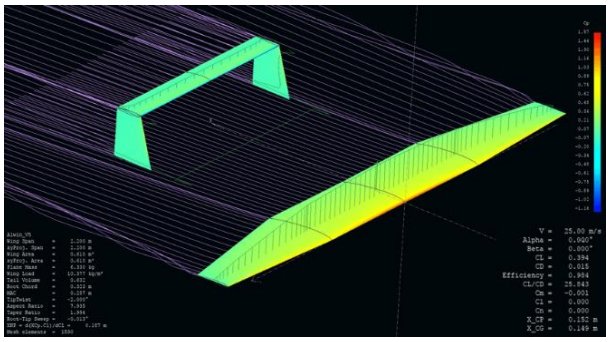
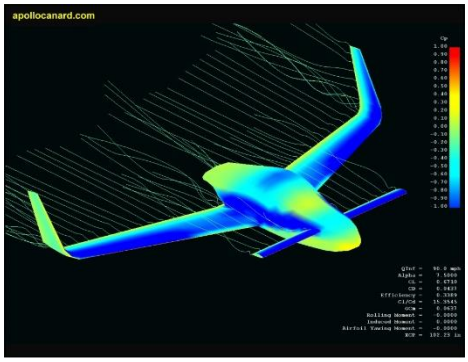
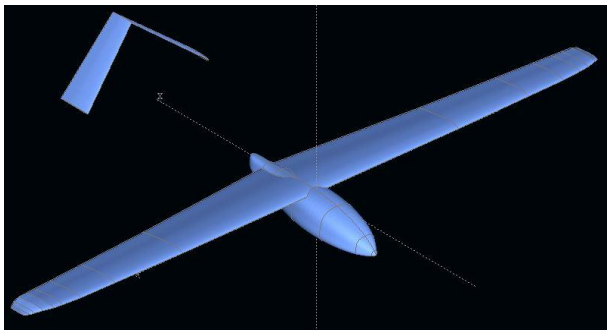
Masterclass: XFLR5 Software

THE UNIVERSITY OF MANCHESTER







Useful links:

XFLR5 for dummies guide: https://github.com/JamesAnthonyColeman/Masterclass-XFLR5

Video demonstration: https://github.com/JamesAnthonyColeman/Masterclass-XFLR5

XFLR5 website (includes interesting guides and information): http://www.xflr5.tech/xflr5.htm

Airfoil tools: http://www.airfoiltools.com/

Aim:

By the end of your session, you will have used the XFLR5 software to recreate your Gertie or a custom aircraft of your choice in XFLR5 and complete aerodynamic analysis and stability analysis.

You'll be able to then use the software to design your own aircraft. Especially for BMFA.

Tasks:

1. Download the software and open it.

2. Complete the ‘Direct Foil design’ stage. This is done by importing the airfoils shown in figure 1 from XFLR5 itself and from airfoiltools.com. (Information found from the video and guide)

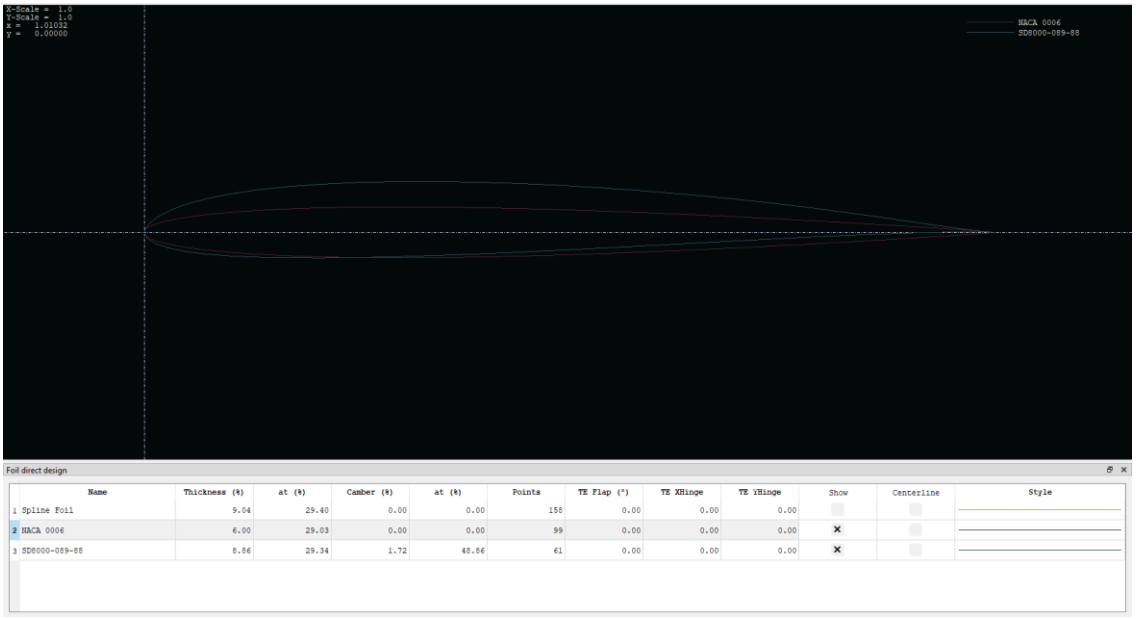


Figure 1: Direct foil design for Gertie

3. Complete either a ‘Batch analysis’ or a ‘multi-threaded batch analyses’ for appropriate variables shown in figure 2.

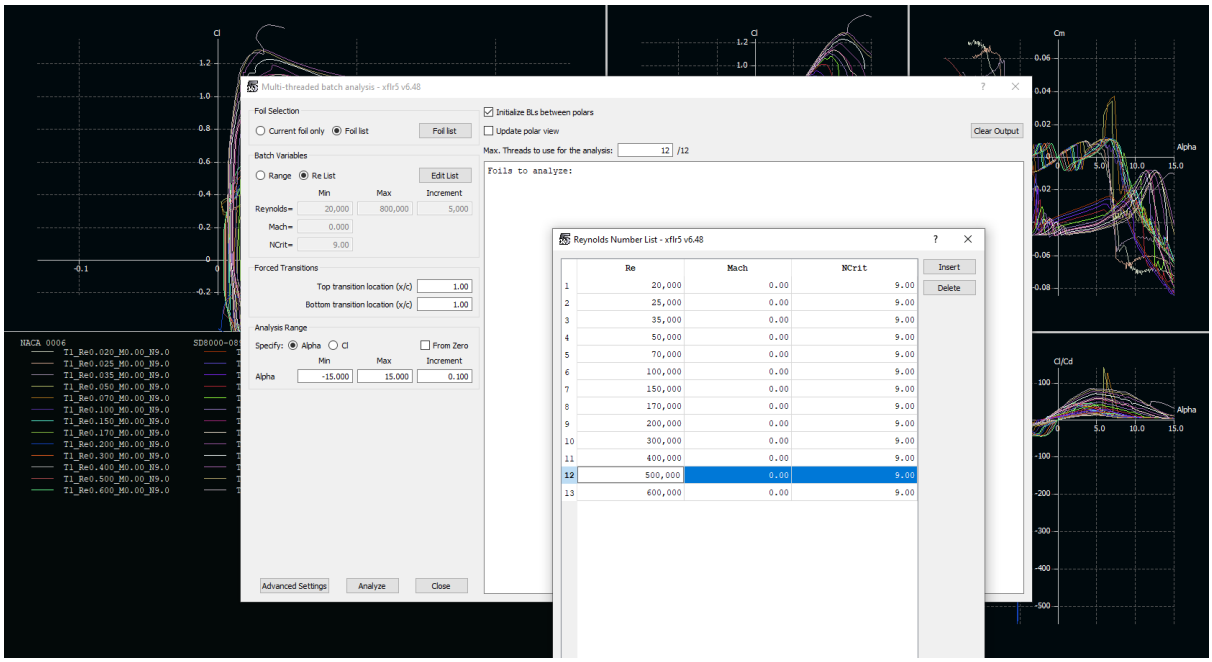


Figure 2 Multi-threaded batch analysis

4. Build Gertie in the ‘Plane Editor’ tool shown in figures 3 -10.

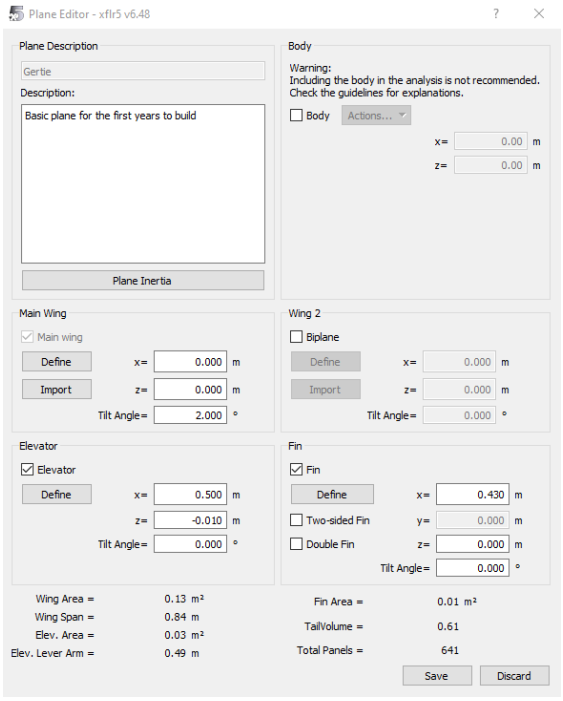


Figure 3 Plane design

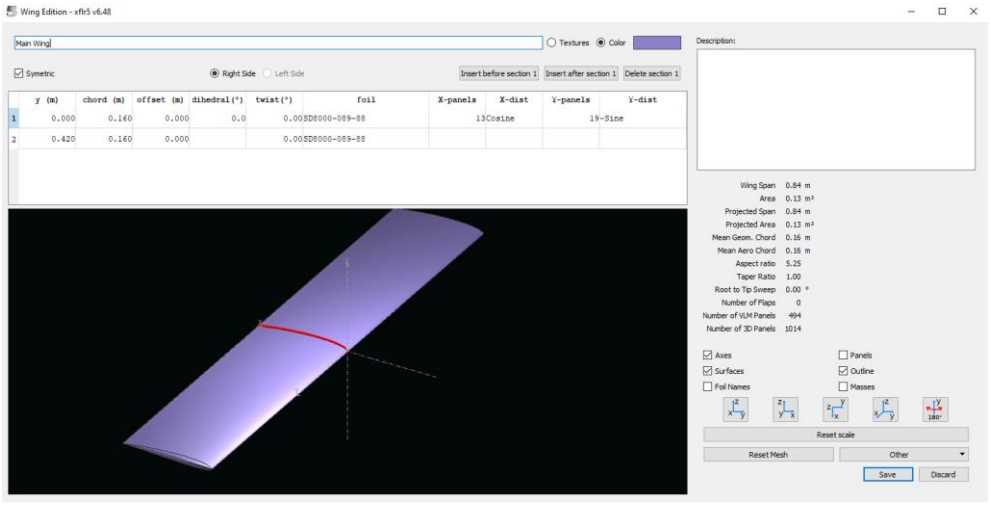


Figure 4 Main wing

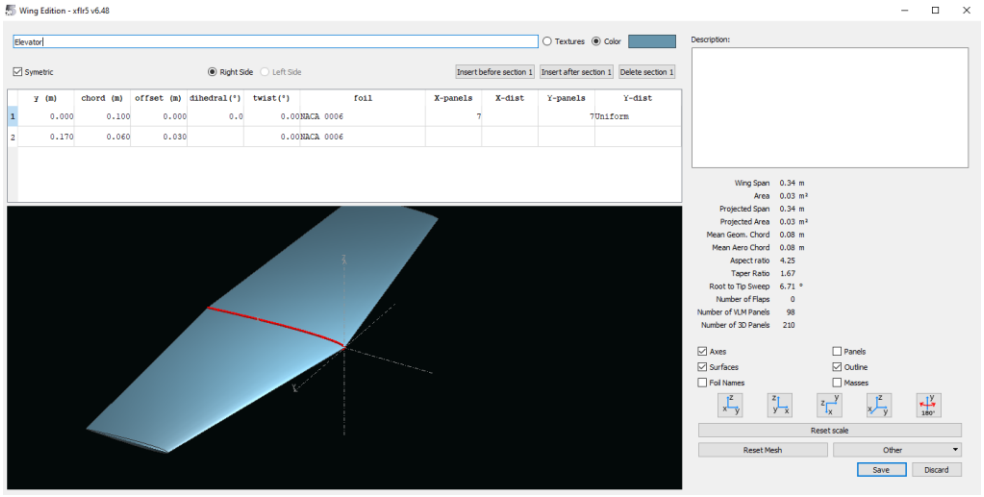


Figure 5 Elevator

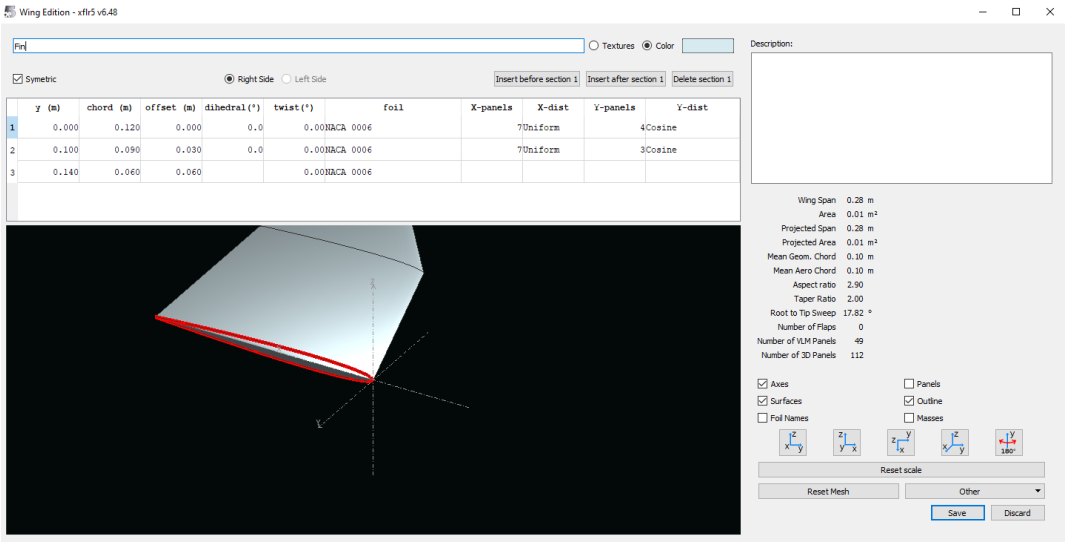


Figure 6 Fin

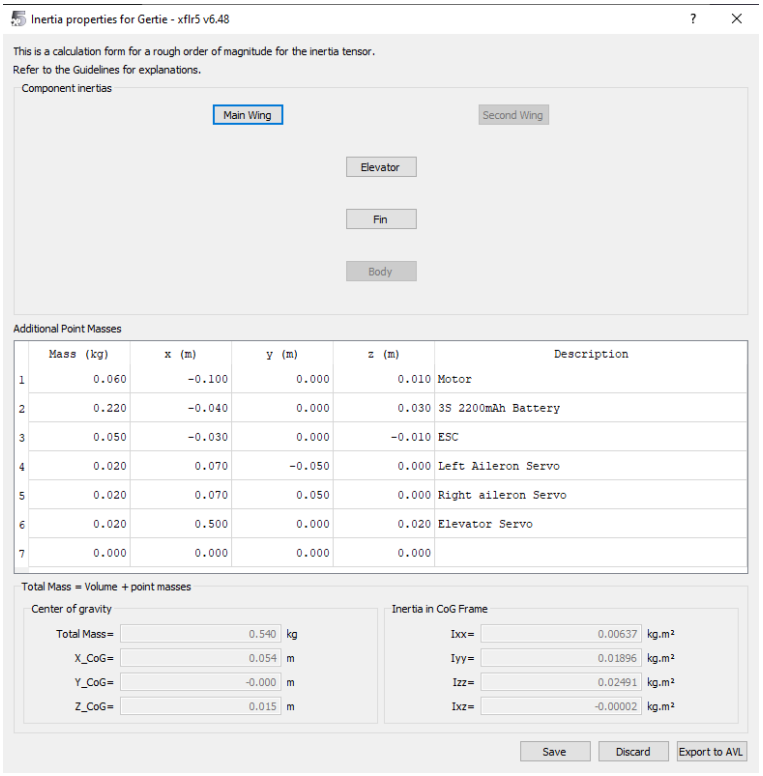


Figure 7 Inertia

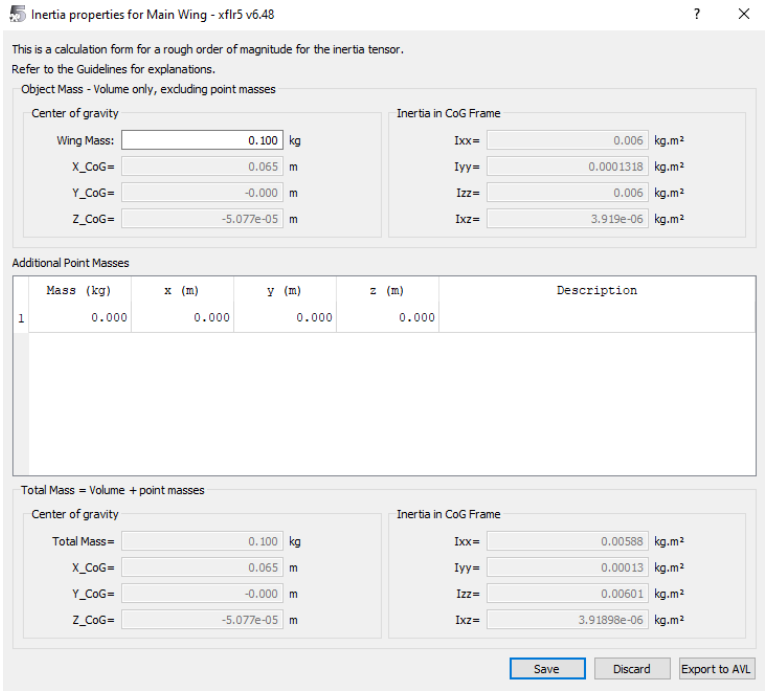


Figure 8 Main wing inertia

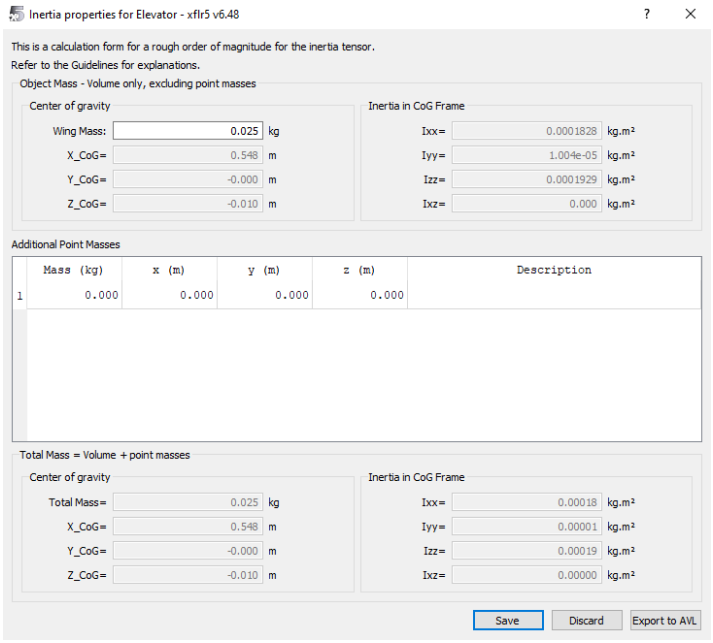


Figure 9 Elevator inertia

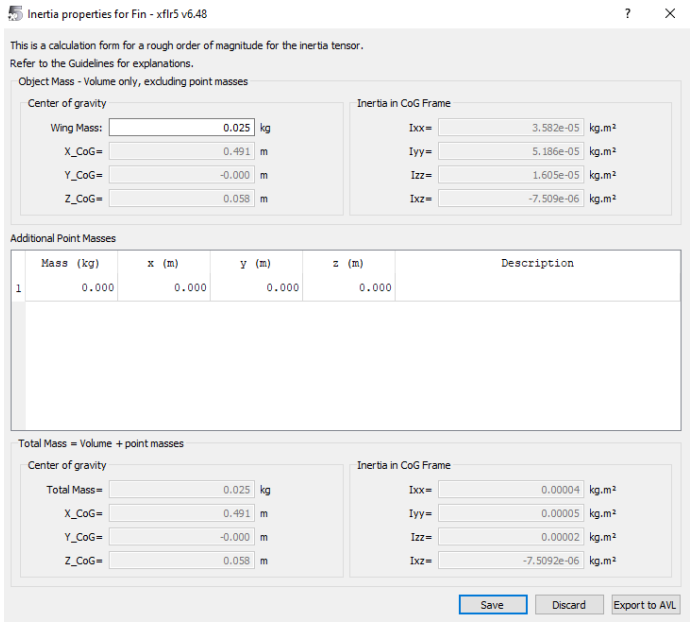


Figure 10 Fin inertia

5. Complete ‘Define an Analysis’. Information shown in figure 11.

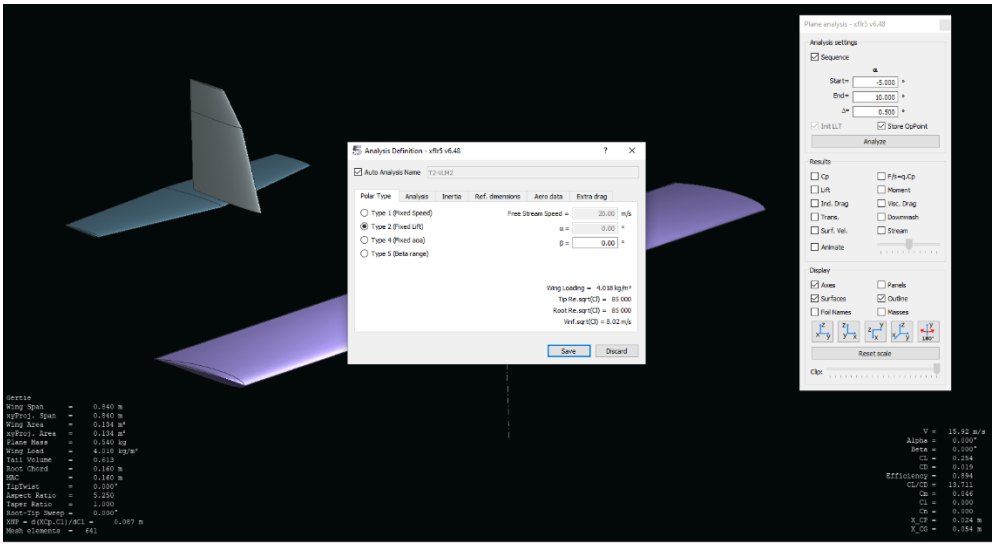


Figure 11 Analysis definition

6. Complete ‘Define a stability analysis’ as shown below.

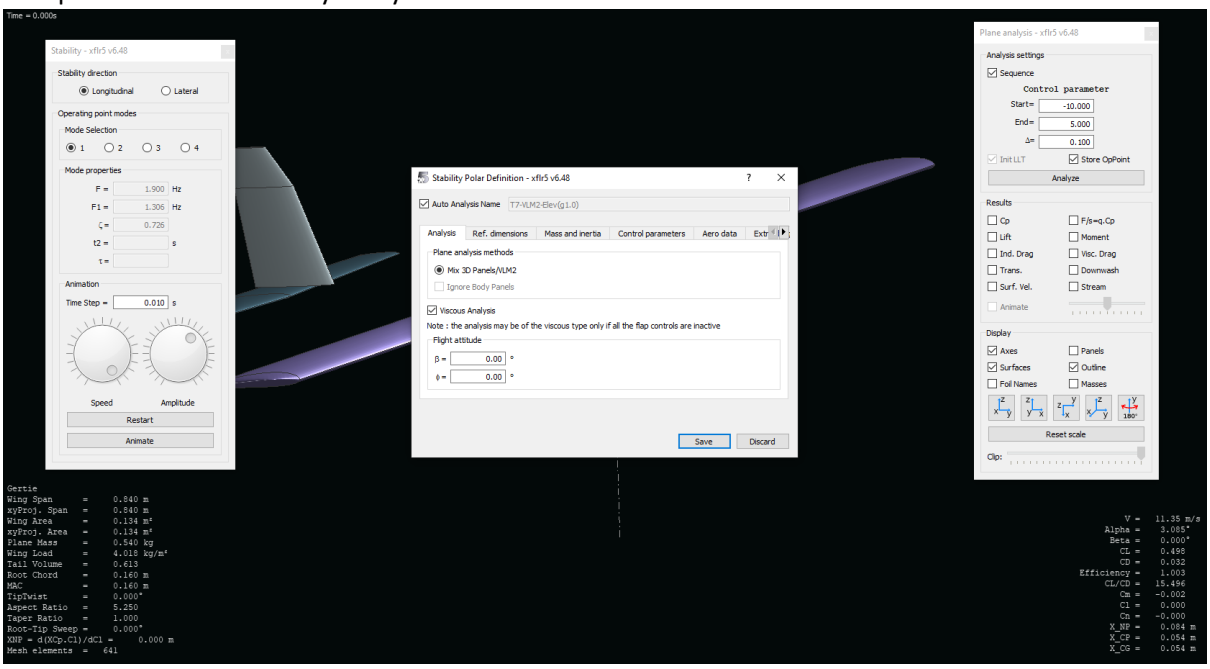


Figure 12 Stability analysis

The end

Congratulations! This is a key piece of software used by the UAV society and in industry. Hopefully you’ll see that this software, although it may look complex in certain areas, is not so difficult to use and you will feel comfortable creating your own aircraft.

The next Masterclasses will be in Aircraft design where you will learn the ‘canon’ aircraft design method used for all aircraft and all the variations that can be used with pros and cons.

Hope to see you there!