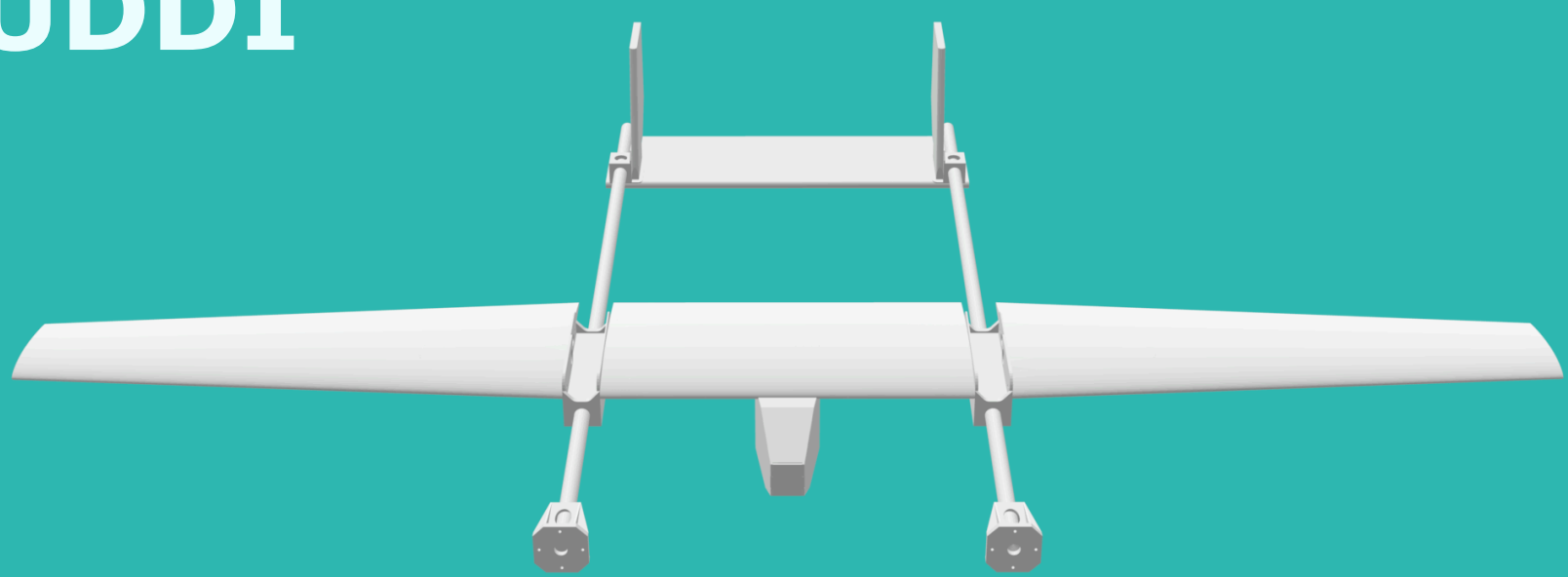


VTOL ANALYSIS FOR AN AGILE FIXED-WING UAV

Joaquim Bolós Fernández, Tom Richardson

This project analyses specific phases of take-off and landing in order to set a criterion when it comes to assess BUDDI's VTOL capabilities. Later on, a potentially enhanced BUDDI configuration with a higher pitch response is presented, aiming to reduce battery consumption and manoeuvre elapsed time. Consequently, by minimising duration and power consumption of these manoeuvres, operational flight time can be increased.

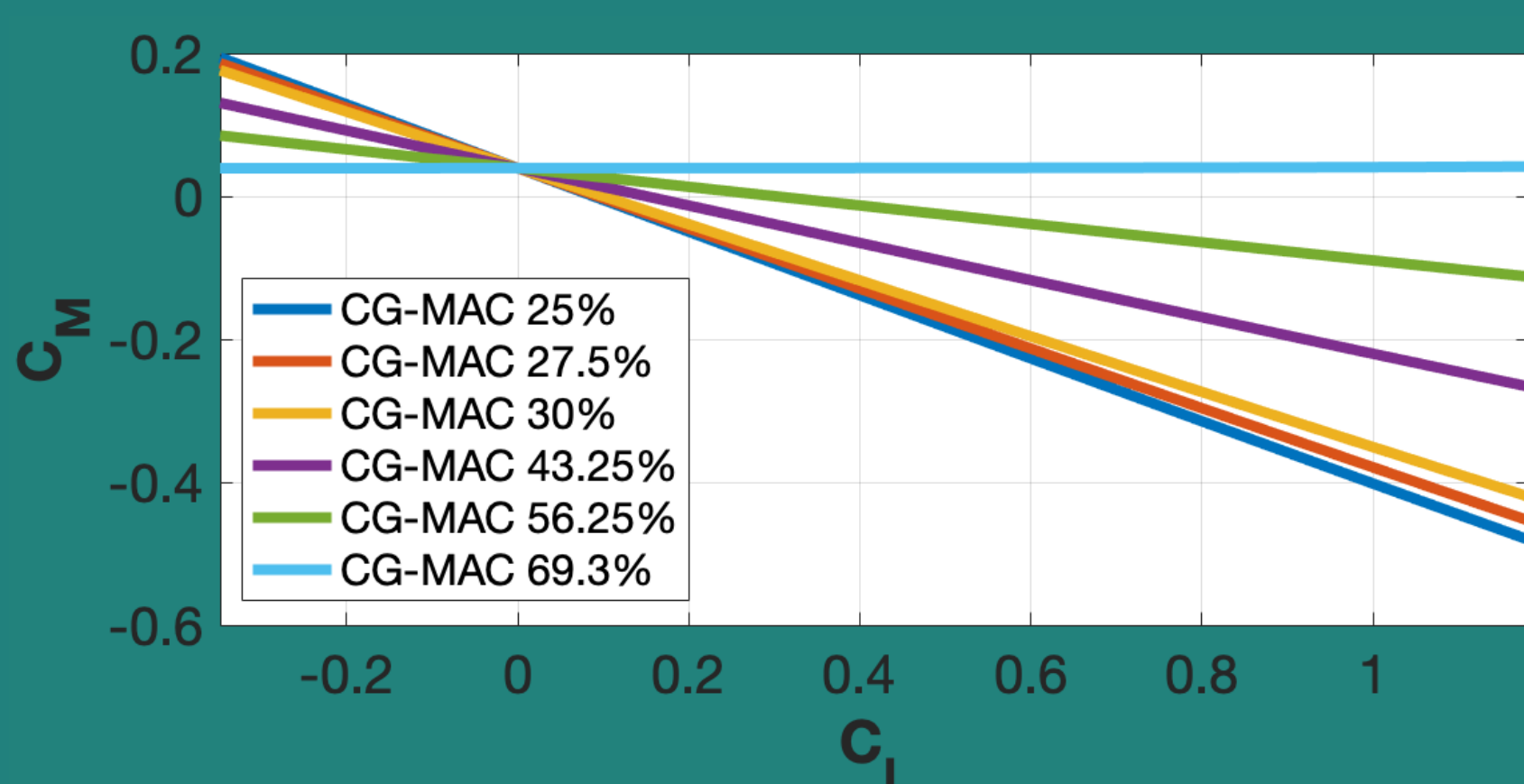
BUDDI



CONFIGURATION PROPOSAL

For a faster and more efficient transition into hover, pitch response is increased by shifting the centre of gravity along the longitudinal axis to reduce static margin. Analogous stability analysis is conducted to assess to what extent variation in CG can make BUDDI unstable.

XFLR5 STABILITY ANALYSIS FROM BUDDI AERODYNAMIC MODEL



CONCLUSIONS

- Analysis successfully determined key parameters to validate the feasibility of the proposed configuration.
- In proposed modification, pitch response will most certainly increase, but further investigation is required to assess overall performance

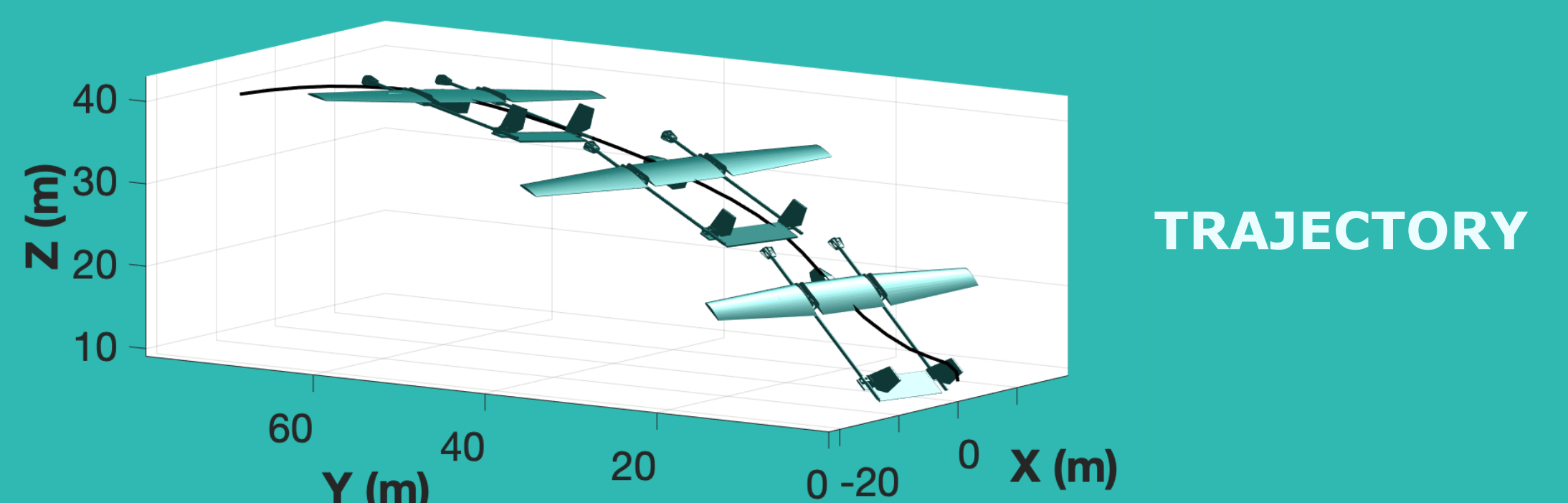
ANALYSIS FROM FLIGHT TESTING

Data is interpreted and modified if needed. Key figures or values that assess vertical take-off and landing phases are obtained.

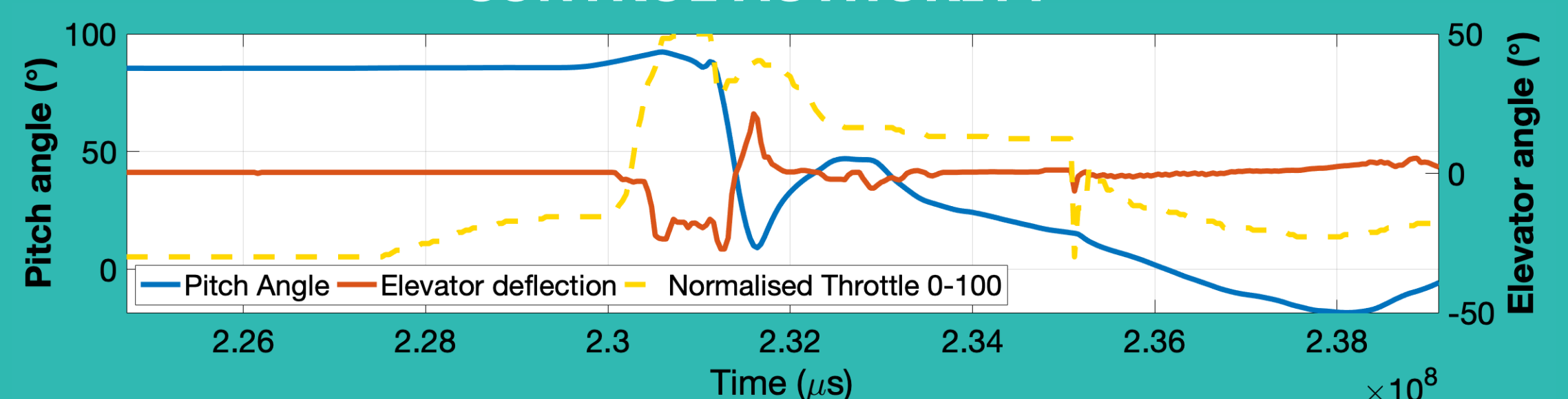
LANDING - Three phases :

Transition into hover - Hover - Transition out of hover

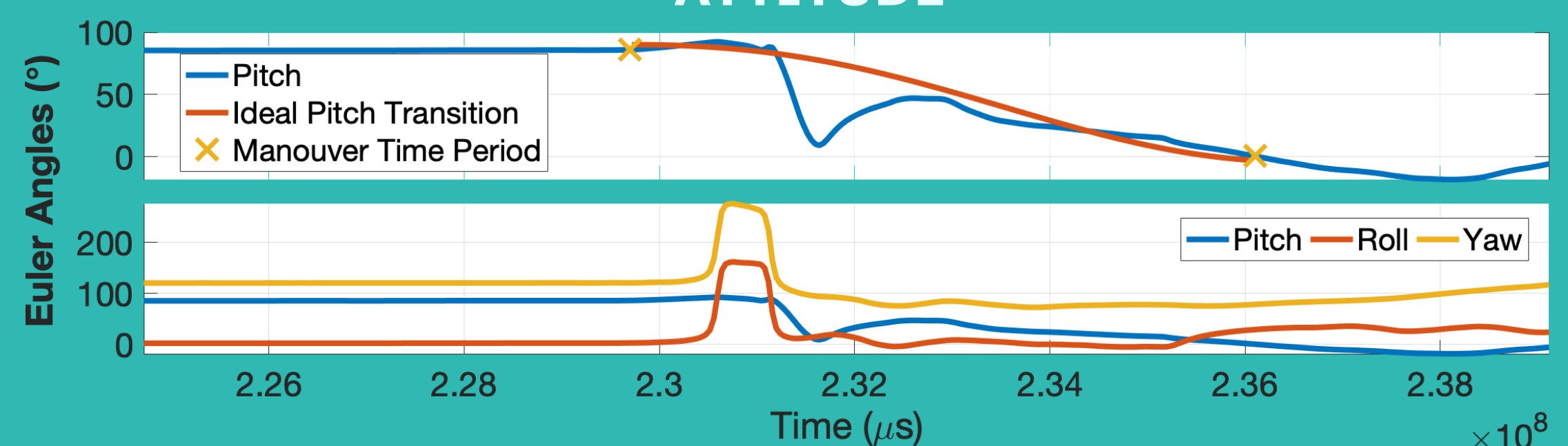
TAKE-OFF - phase itself



CONTROL AUTHORITY



ATTITUDE



AIRSPEED & ALTITUDE

