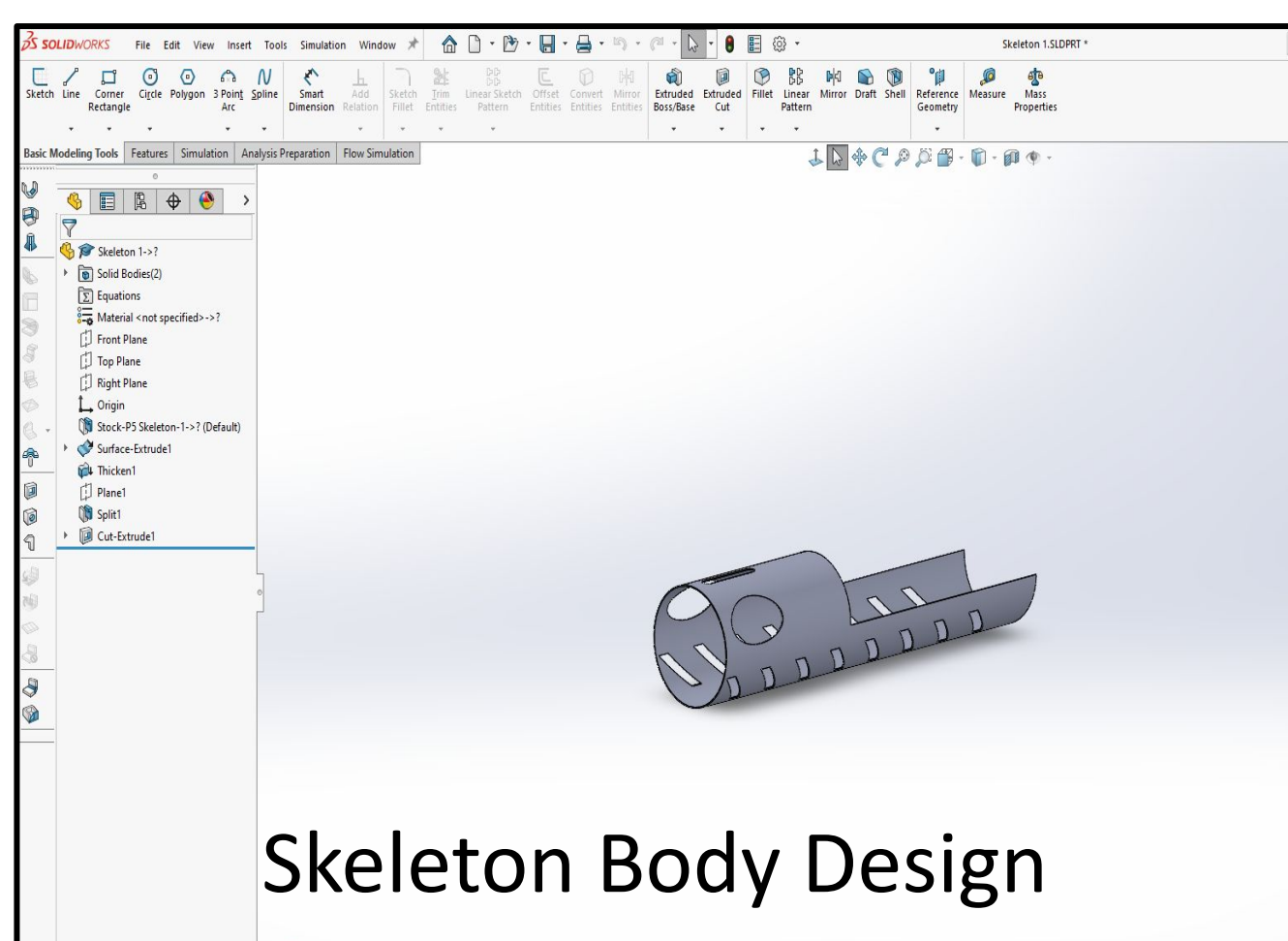




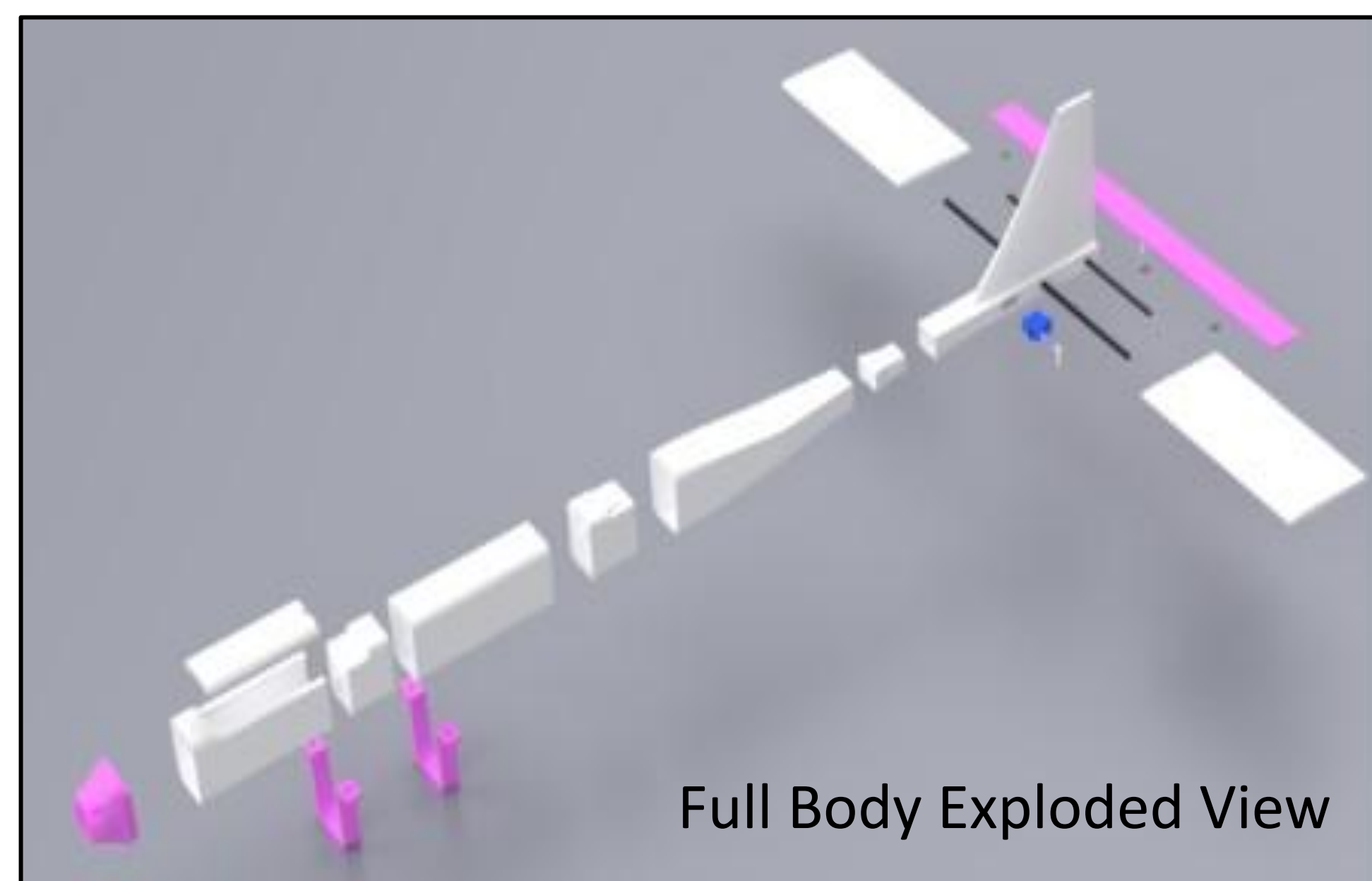
Introduction

A fully 3D-printed RC aircraft was developed for the 3DPAC, evaluated on flight duration (8 s motor limit, 35 ft altitude) and innovation. Structural design and validation were performed using SolidWorks and ANSYS, while aerodynamics were optimized in XFLR5. The wing, fuselage, and empennage were all 3D-printed. Iterative testing led to selection of the SD7037 airfoil and optimized filament materials for strength-to-weight performance. The final design (Prototype 4) demonstrated strong performance, with center-of-gravity optimization enabling stable and controllable flight.

Design Phase



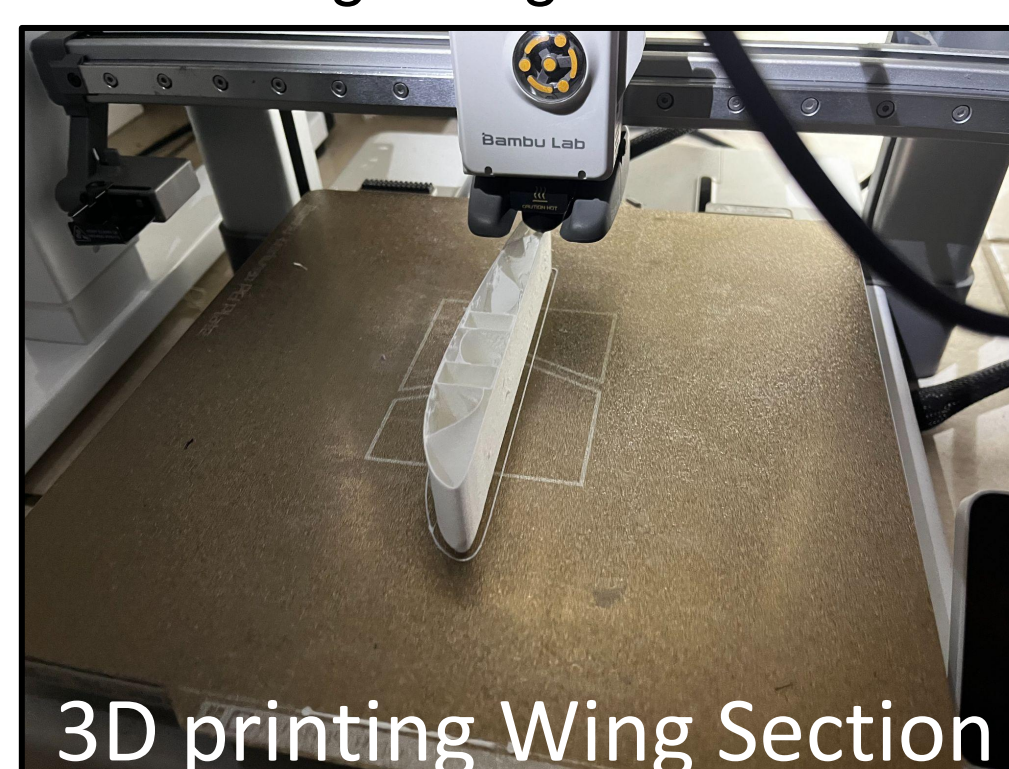
Skeleton Body Design



Full Body Exploded View

Manufacturing & Assembly

- 3D Printing: Utilized Bambu Lab printers (A1 Mini, A1, and X1 Carbon) for fabrication.
- Assembly: Components were bonded using CA glue applied to mating surfaces to ensure a secure and lightweight structure.



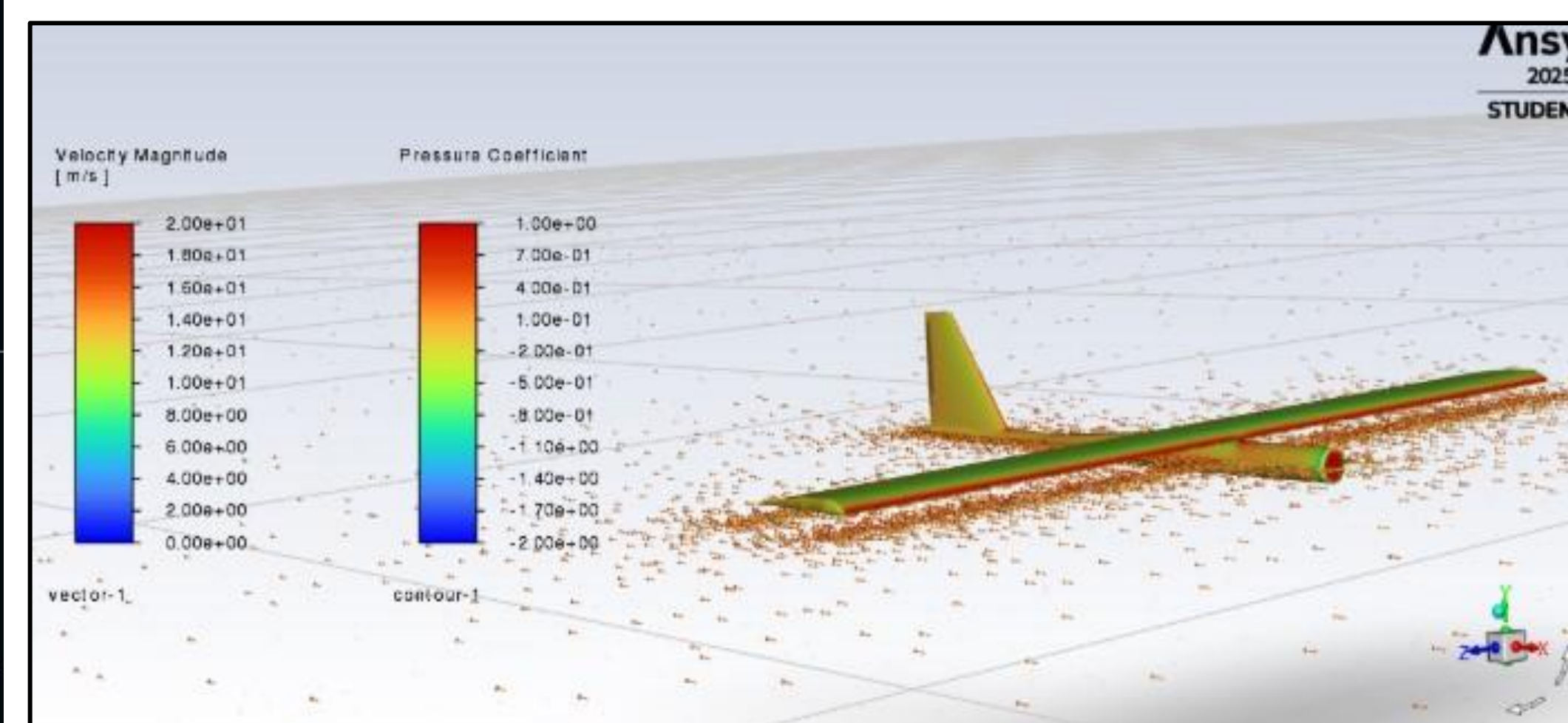
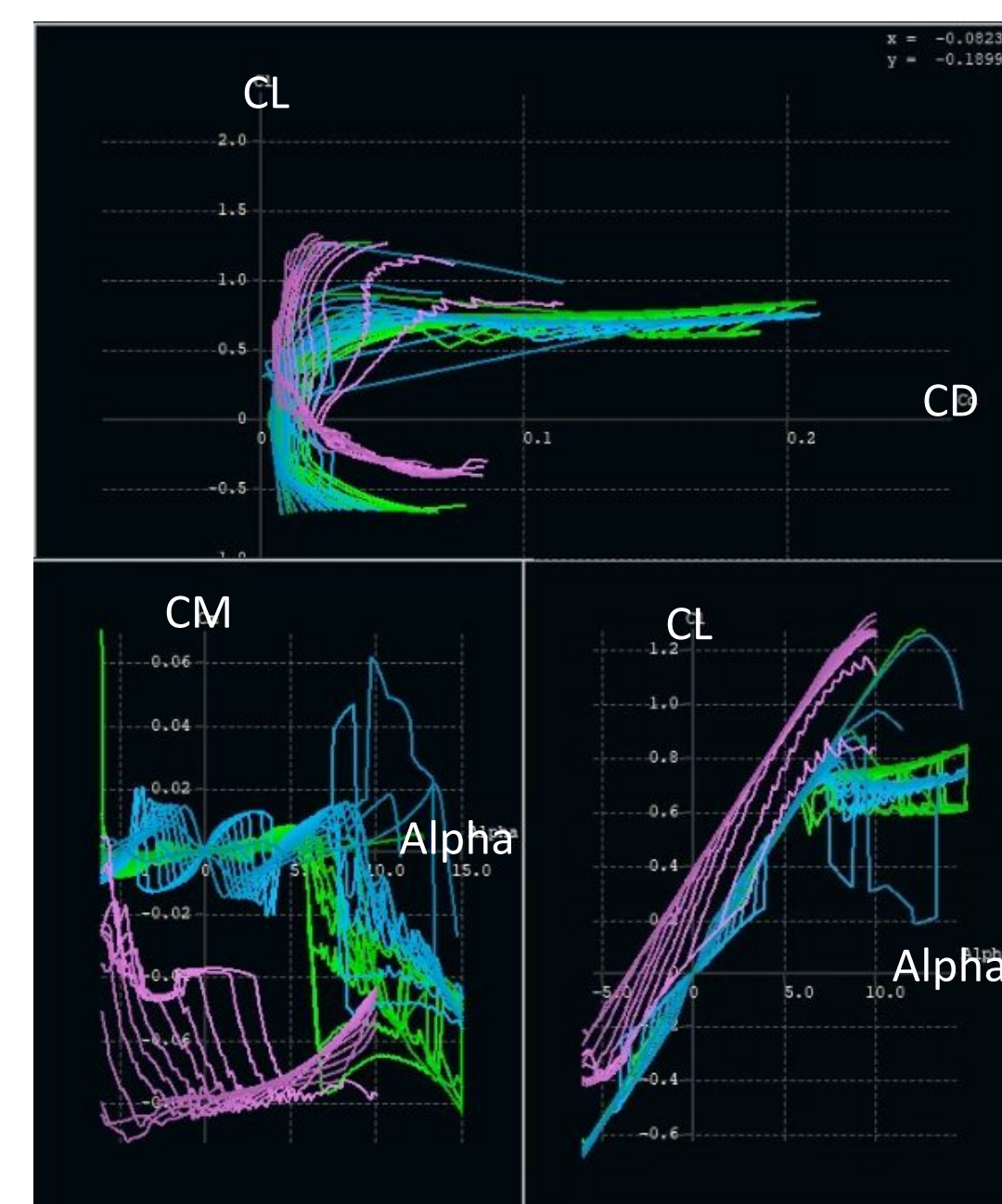
3D printing Wing Section



Assembly Prep

Simulation

Multiple software tools were used to evaluate aerodynamic and structural performance:



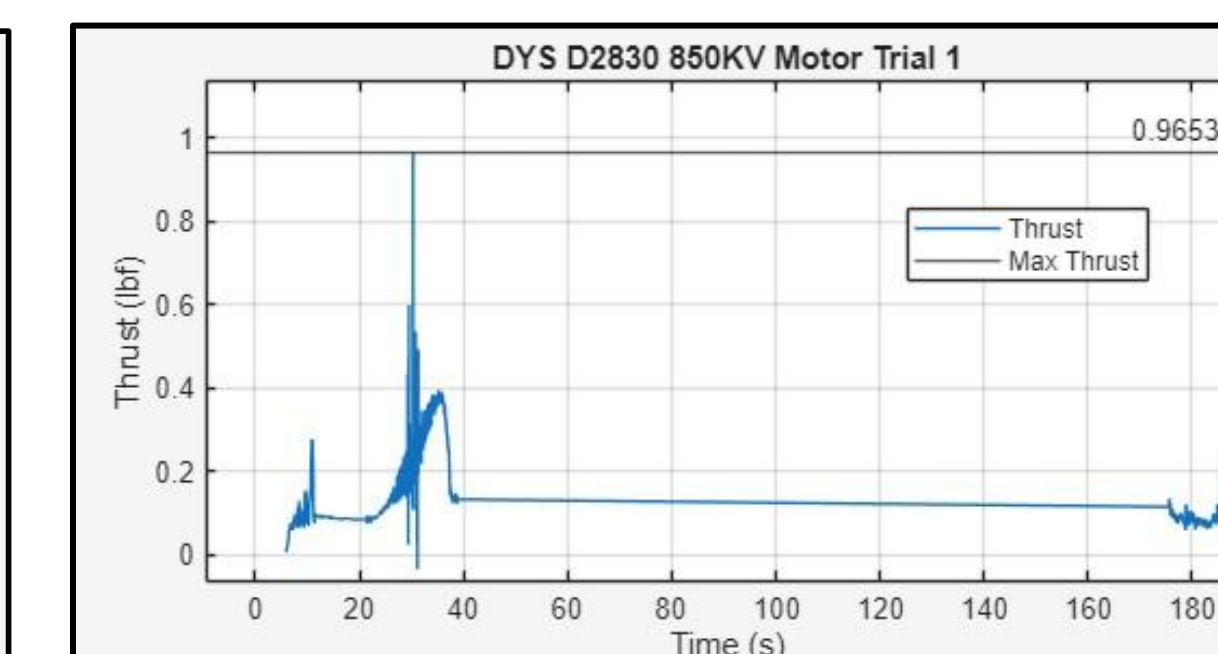
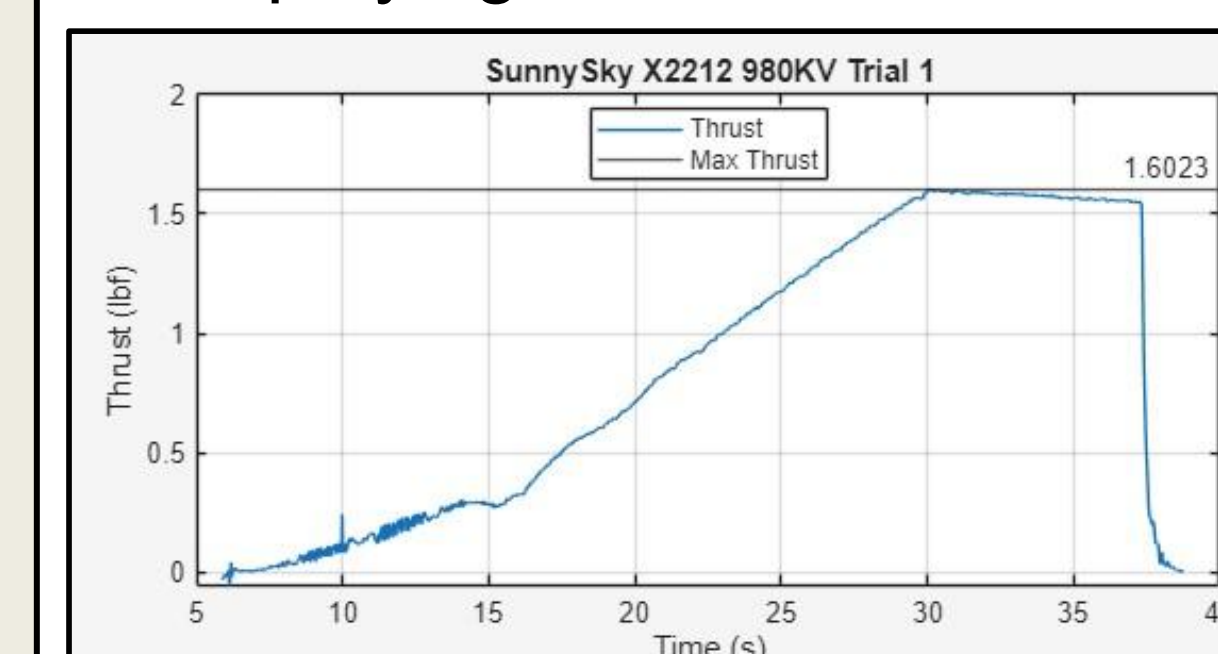
ANSYS CFD

Testing & Results

- Electronics Test
- Bench Test
- Flight Test
- Motor Test
- Spar Deflection Test

Below are motor thrust testing

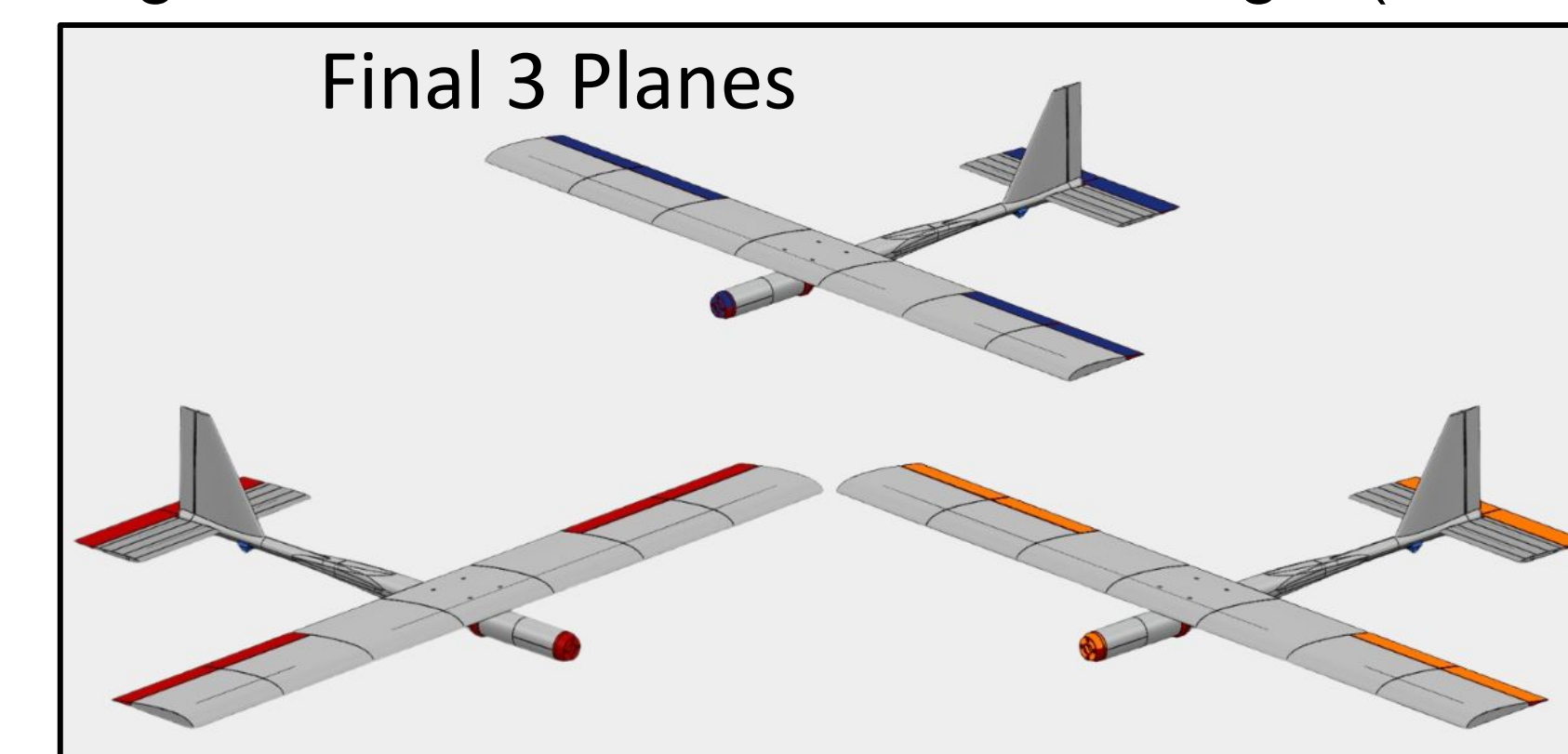
- Displaying thrust and vibration



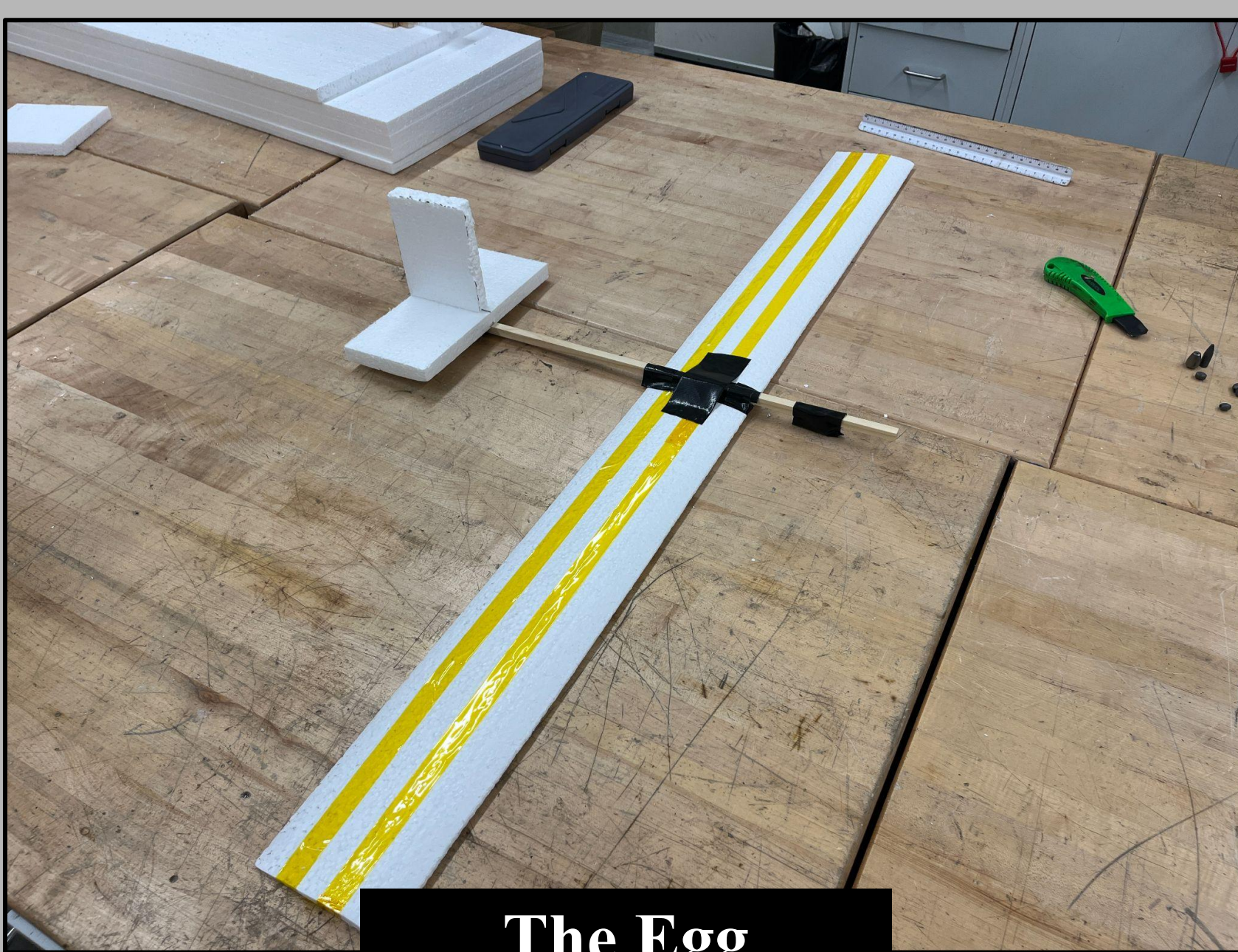
Conclusion

- Fully 3D-printed RC aircraft developed for 3DPAC
- Optimized weight and strength through iterative design
- SD7037 airfoil and print settings improved performance
- Validated using XFLR5, SolidWorks CFD, and ANSYS
- Testing confirmed stable, controllable flight (Prototype 4)

Final 3 Planes



Prototypes



The Egg



Hatchling



Fledgling



Osprey Mk1