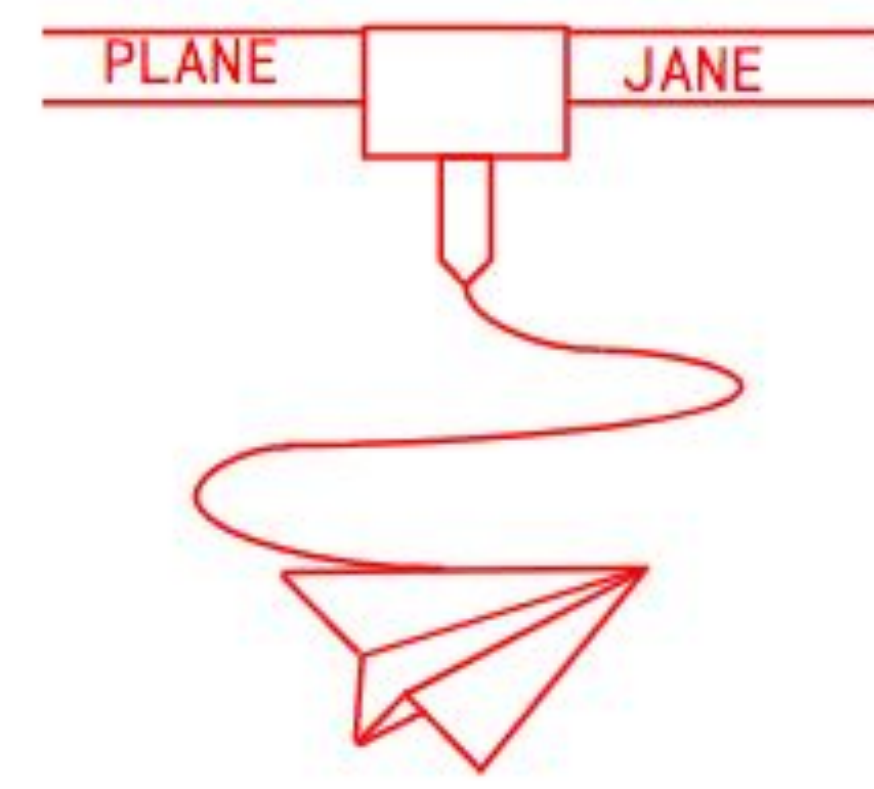




3D Printed Aircraft Competition by Plane Jane



SDSU

Team Members



Scarlett Alexander
Team Leader



Daisy Cuevas
Manufacturing Engineer



Michael Lennon
Design Lead Engineer

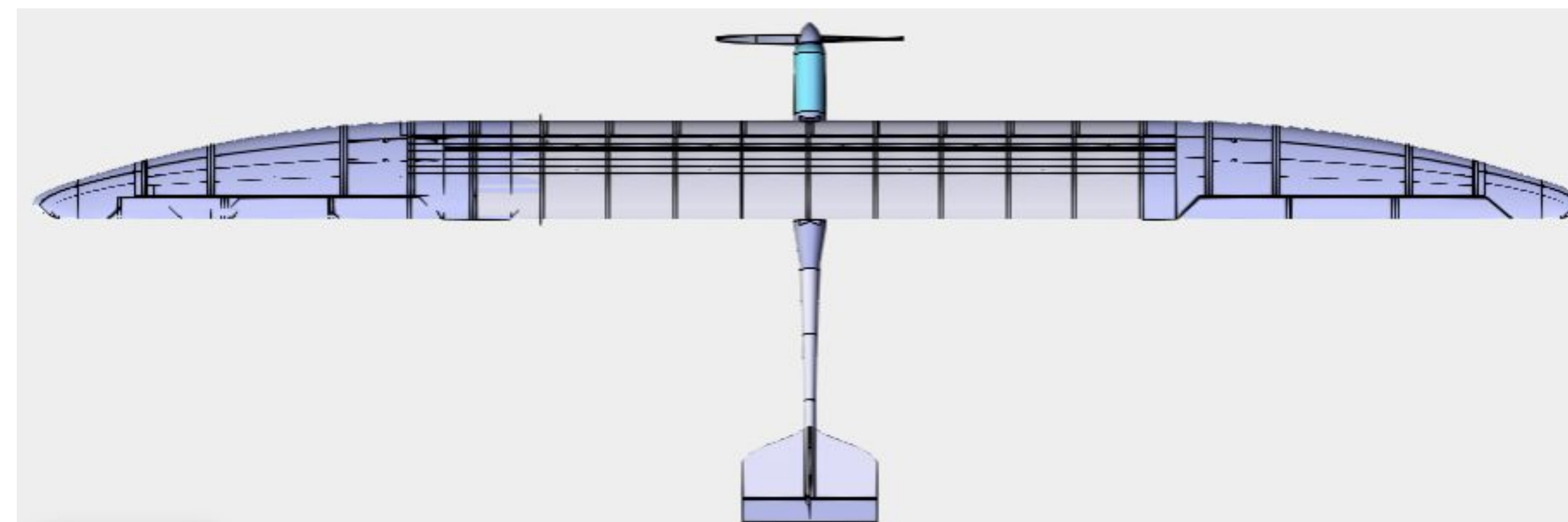


Daniel Hernandez Arzate
Quality Control Engineer

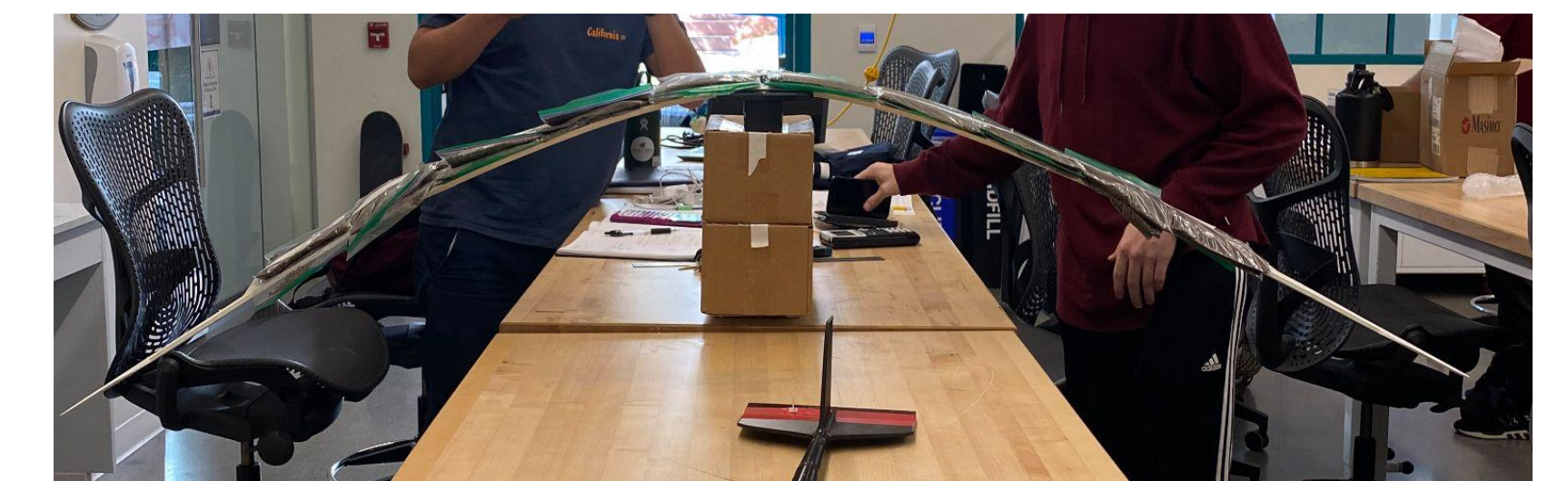


Kyle Higa
Aviation Engineer

CAD Design



Tests

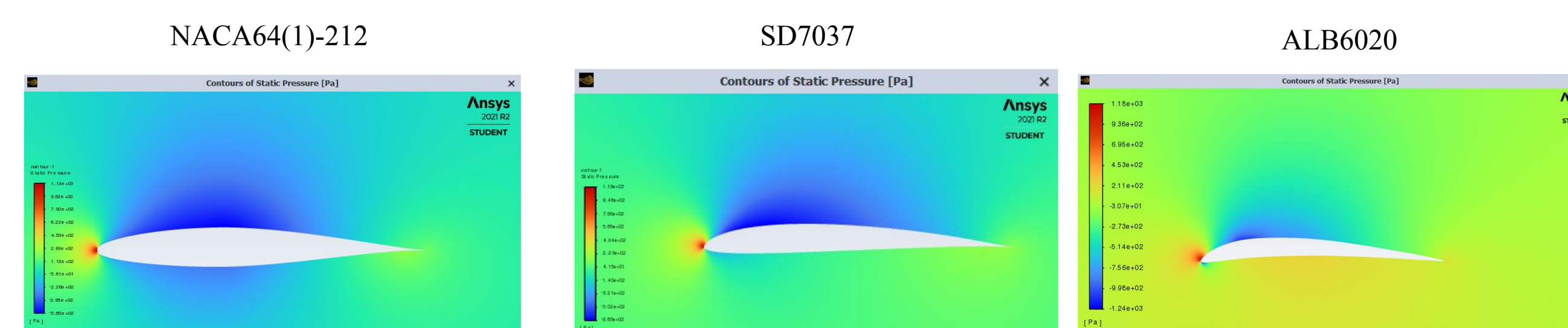


Wing loading tested to see how strong our wing was, where the wing would break, and how much weight it would take to break it. Our goal was to have our wing withstand twice the weight of our whole plane because the maximum force it would undergo during flight is two g's. Our wing actually held almost 4x the weight of our plane!

Problem Statement

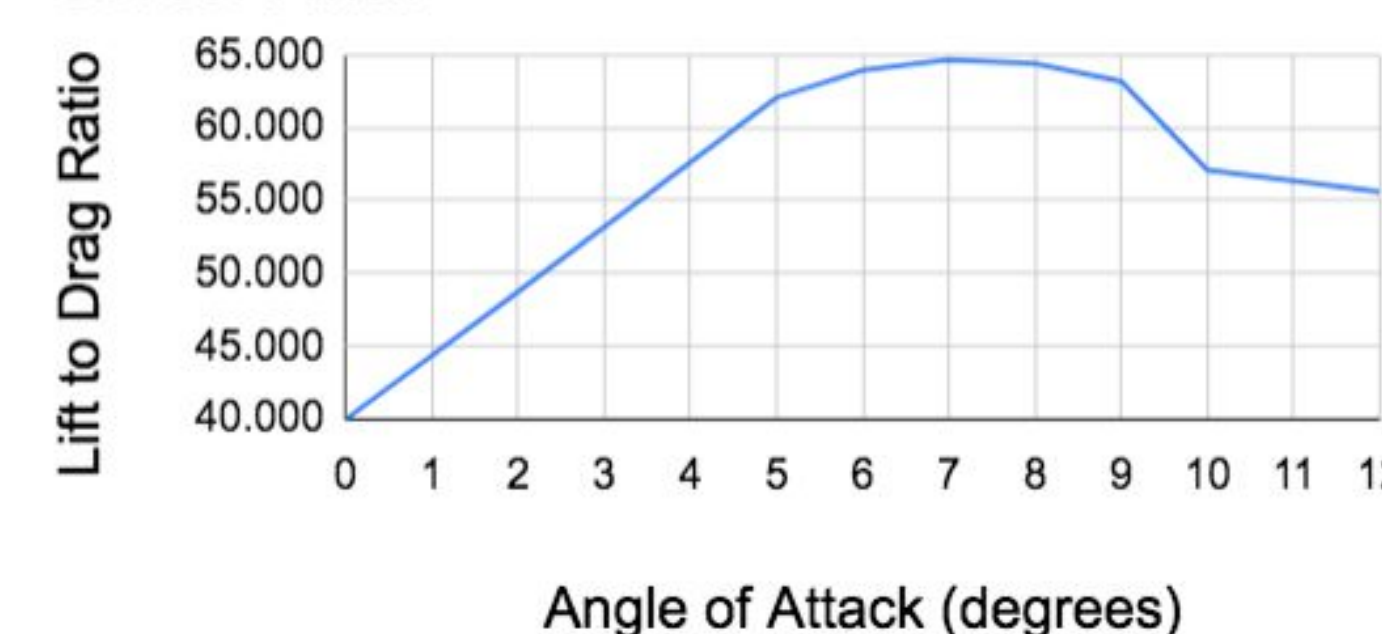
Design a primarily 3D printed aircraft with the goal of maximizing flight duration. Its path of flight must not deviate for more than 3 seconds outside of a designated 300' x 160' x 30' space. Motor power may only be used during the initial 8 seconds of flight.

Design Analysis



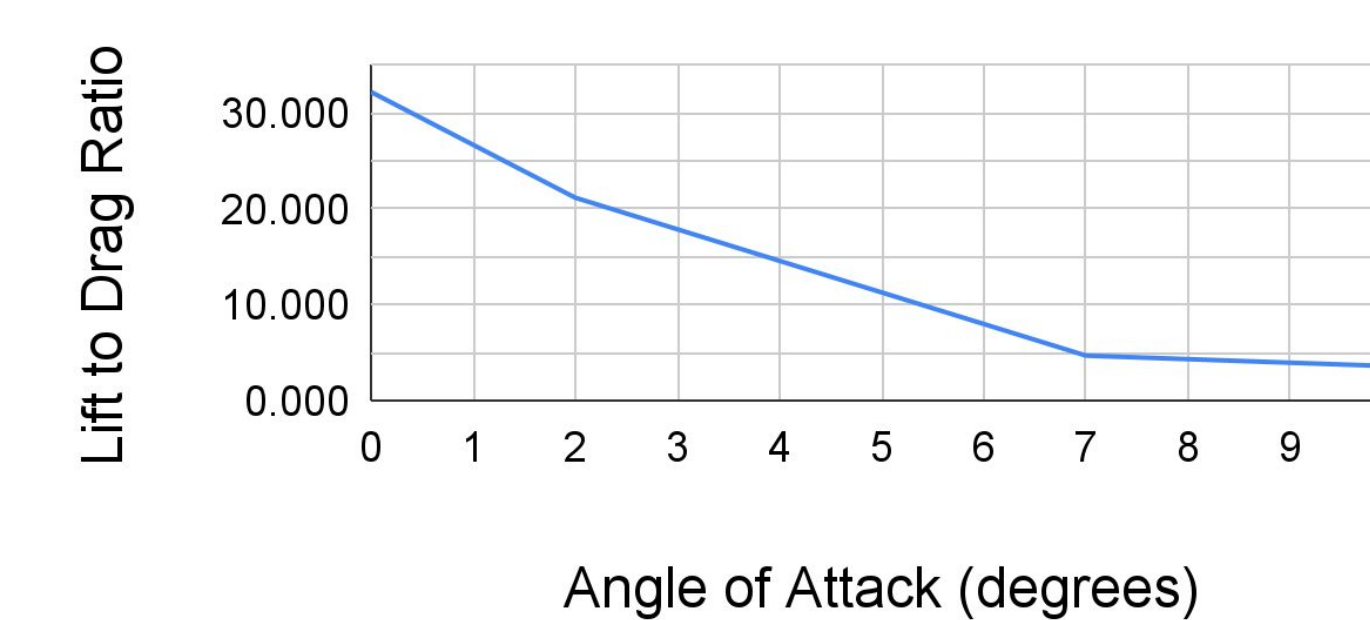
Lift-Drag Ratio vs Angle of Attack

SD7037 Airfoil

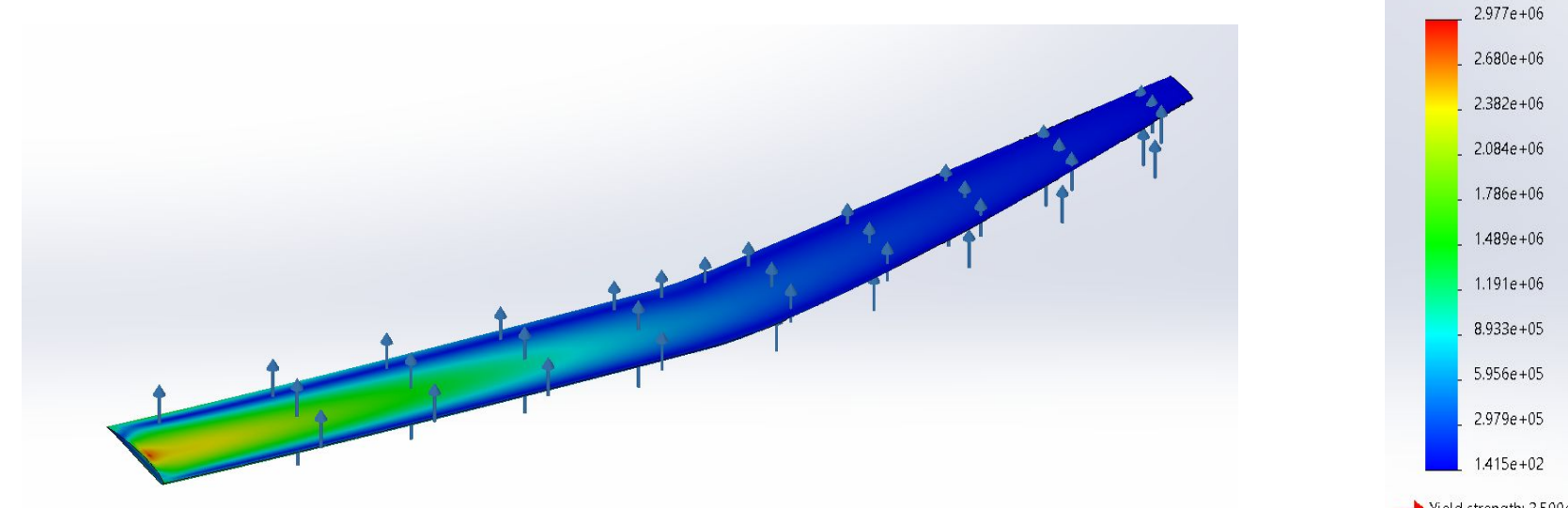


Lift-Drag Ratio vs Angle of Attack

ALB6020 Airfoil

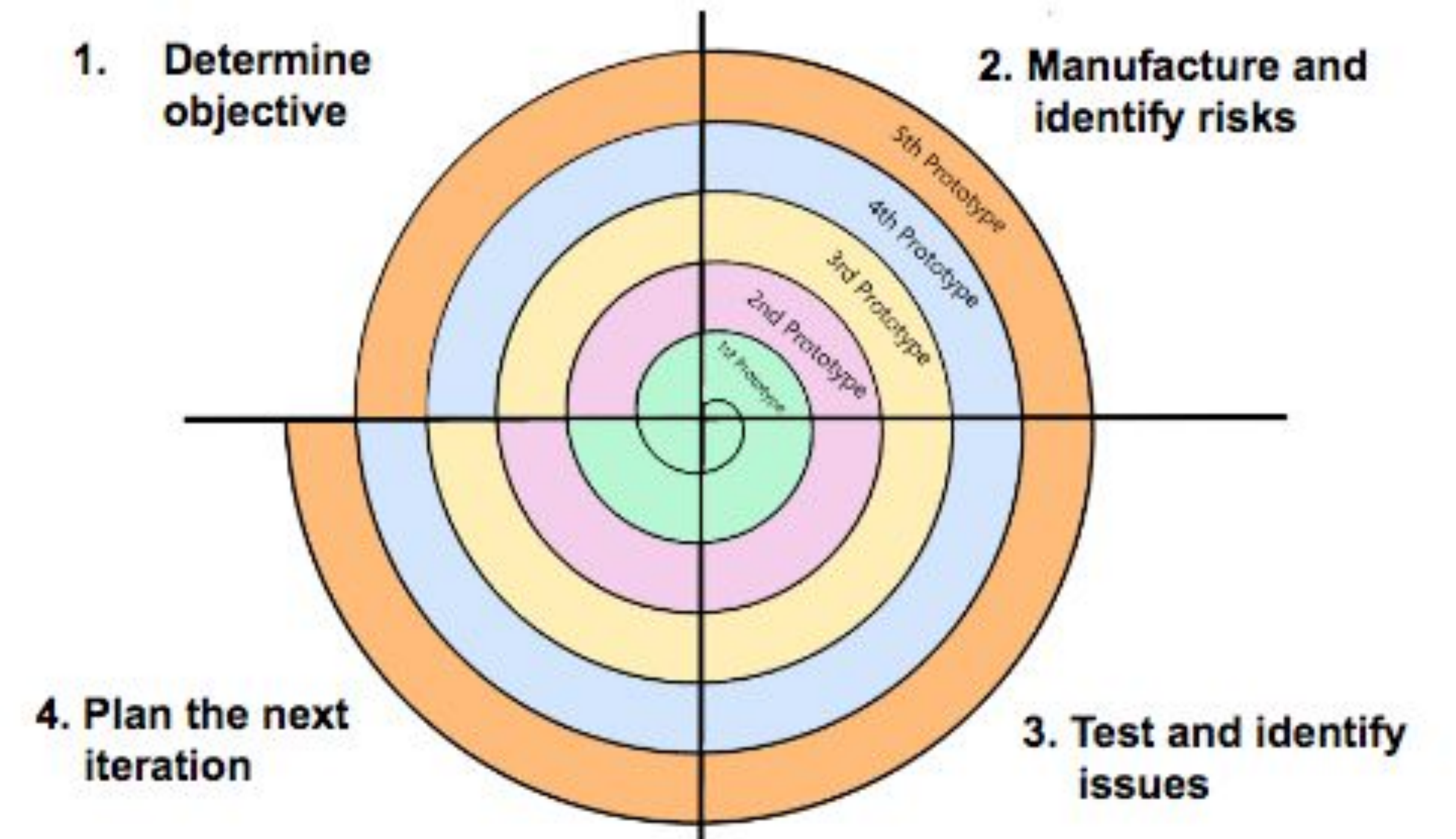


Three airfoils were analyzed in ANSYS. The SD7037 and ALB6020 performed the best with the lowest static pressure acting on them. The SD7037 had the highest lift-drag ratio at a 7 degree angle of attack. The ALB6020 had the highest lift-drag ratio at a 0 degree angle of attack.



Stress Distribution in Expected Flight Conditions

Prototype Process



- Foam Plane
- 1st Wood Wing/1st 3d Fuselage
- 2nd Wood Wing/2nd 3D Fuselage
- 1st 3D Wing/1st Topology Fuselage
- 2nd 3D Wing/2nd Topology Fuselage

