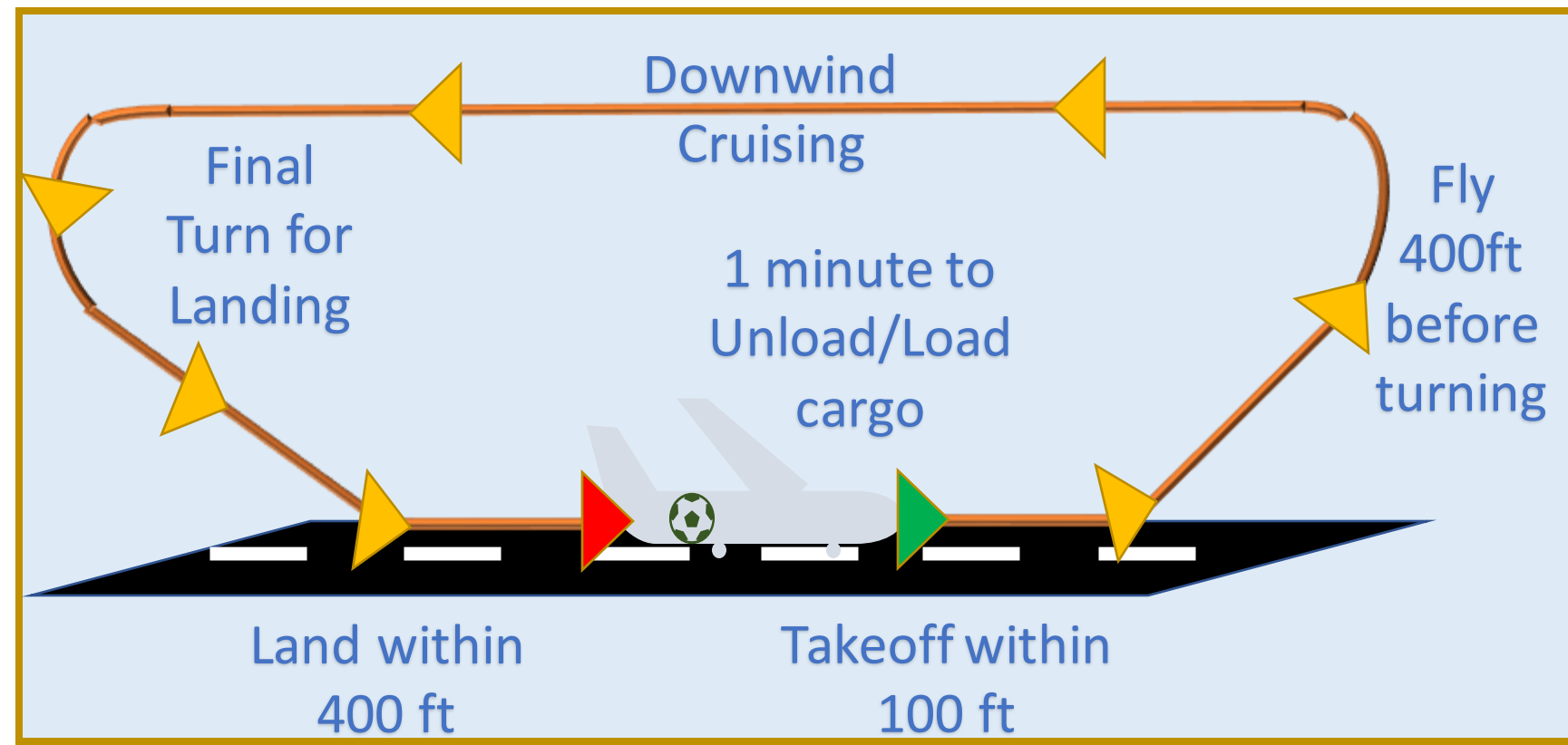


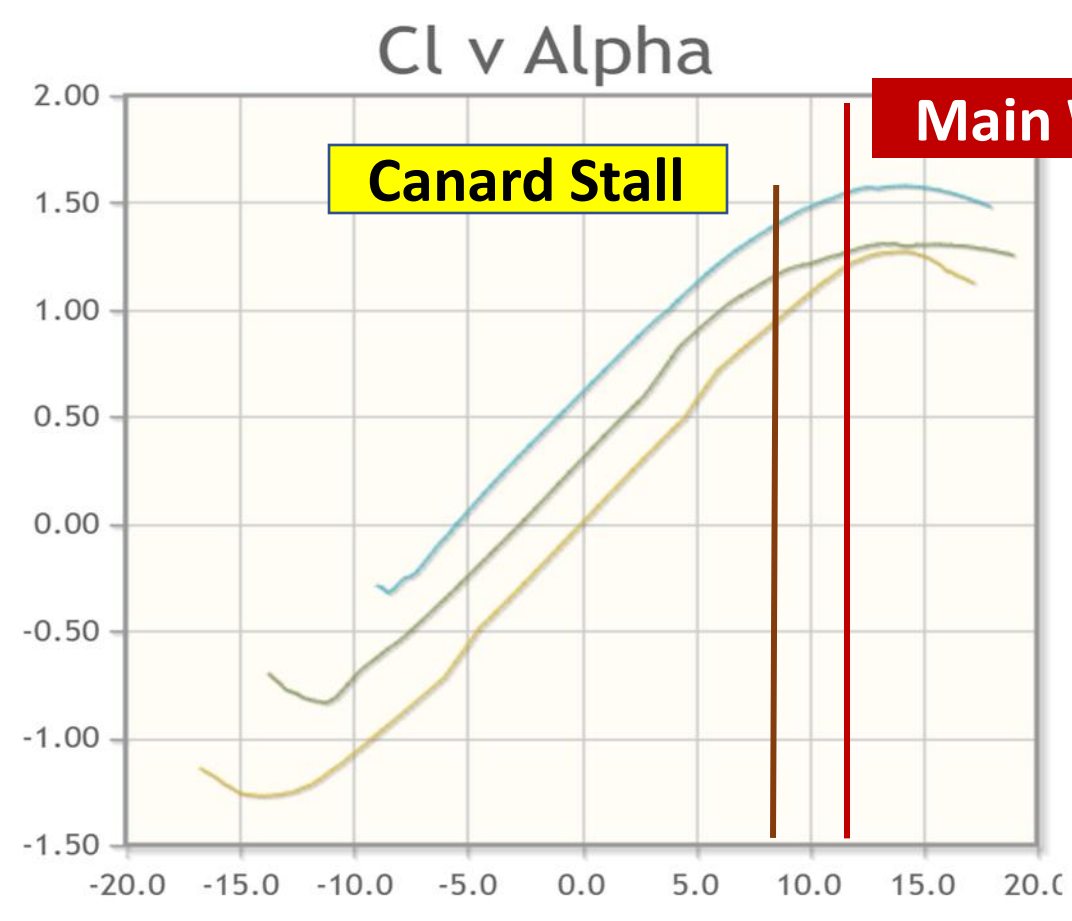
T507 SAE Aero Design Competition East – Aero Propulsions

M. Louis-Charles, A. Moya, S. Pinto, C. Riley, N. Wright

2 Requirements

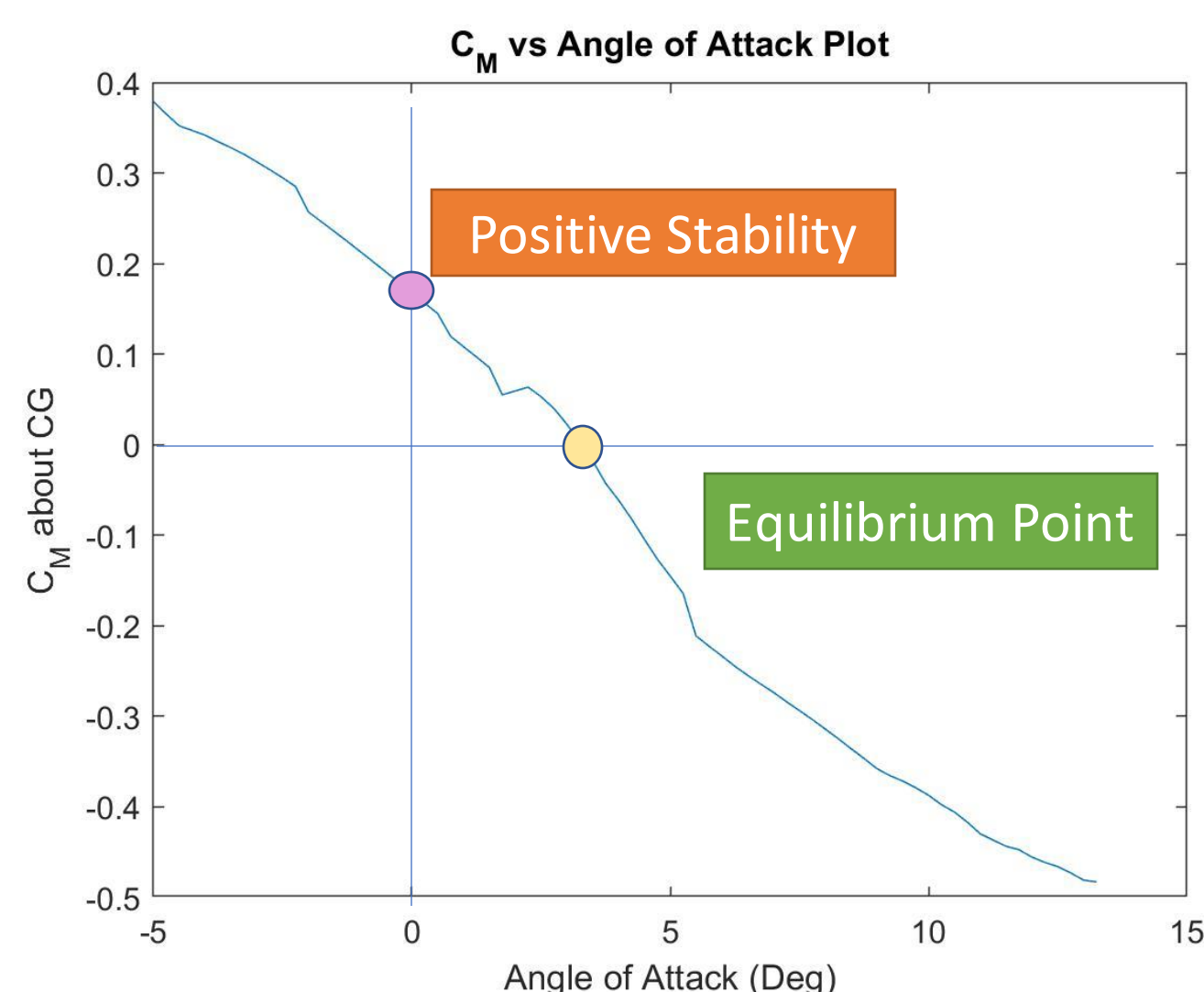


3 Airfoil Selection



- Canard planes require canard stall before main wing
- This creates a natural feedback loop to stabilize the plane

4 Stability



KEY:

Cl : Coefficient of Lift

Alpha : Angle of Attack (AoA)

Cm: Coefficient of Moment about Center of Gravity

- Positive Stability – Plane have a natural tendency to take off
- Positive Equilibrium Point – The plane flies at a positive angle when cruising

1 Objective

The objective of the aero-propulsion team is to ensure that the plane takes off, completes the flight path, and lands while carrying a payload

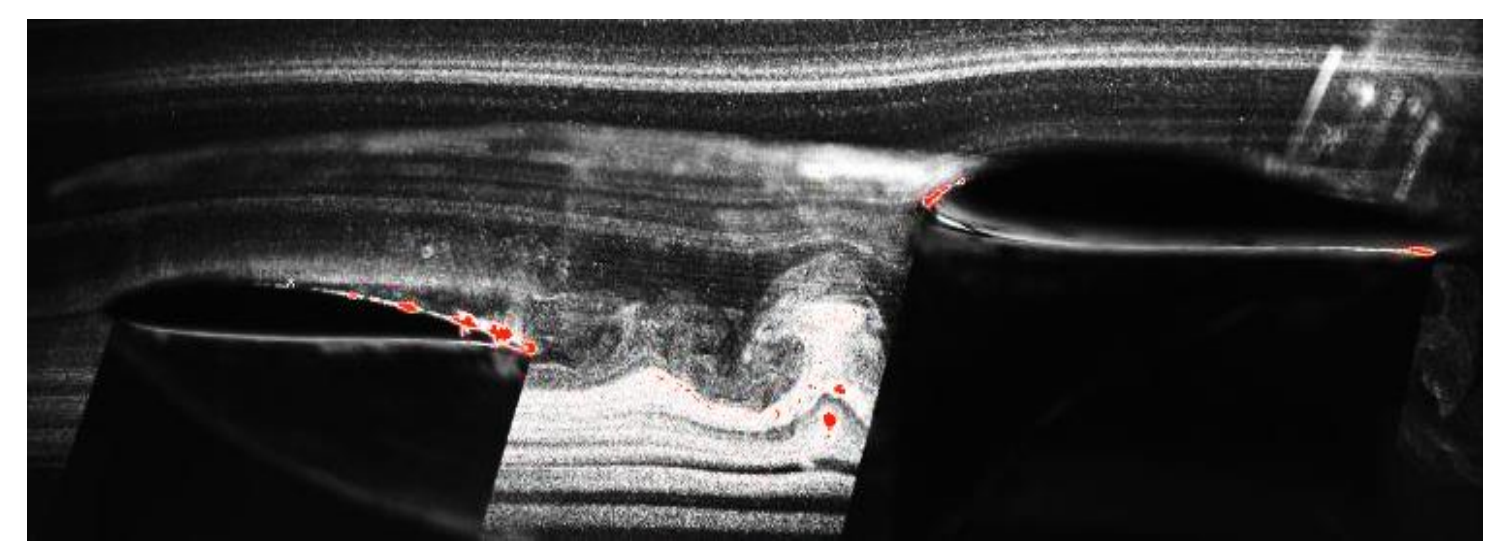
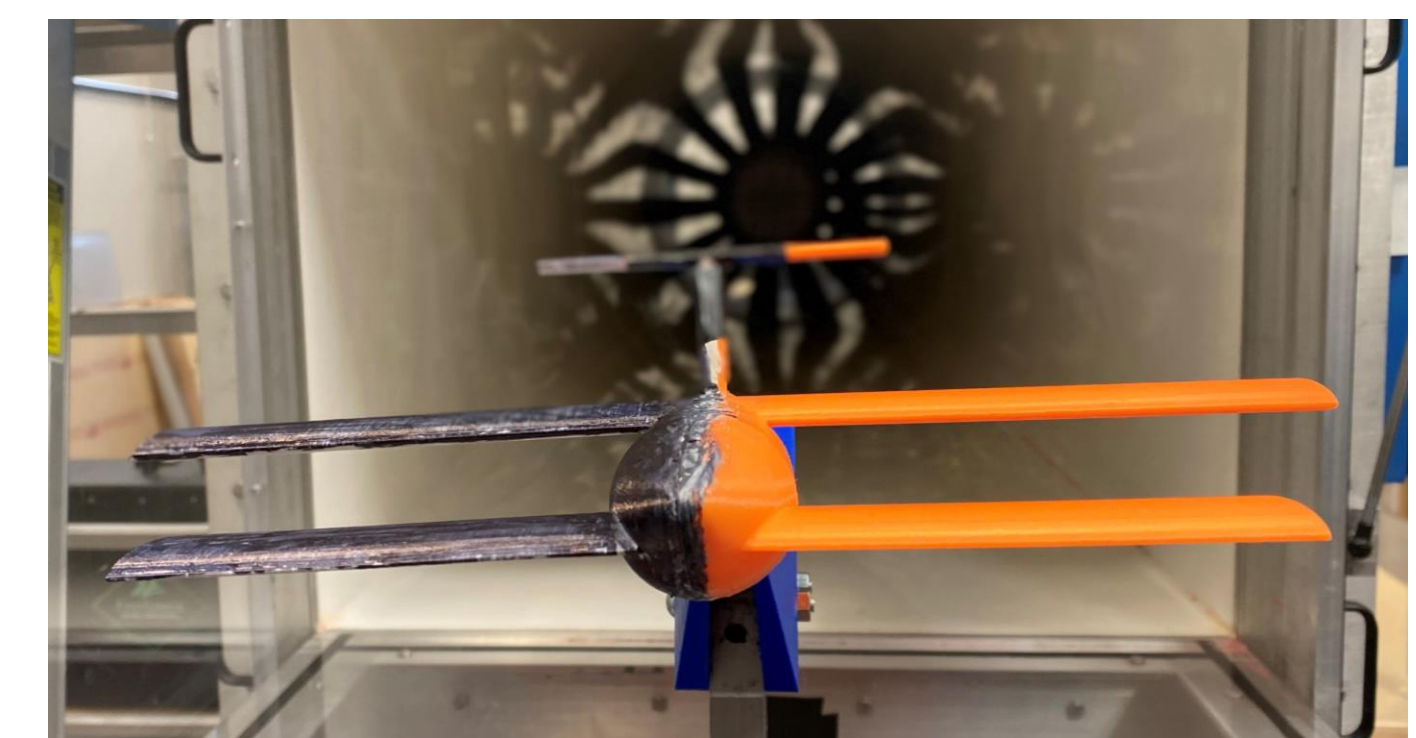
Propeller

Dimensions – 18 in x 10 in

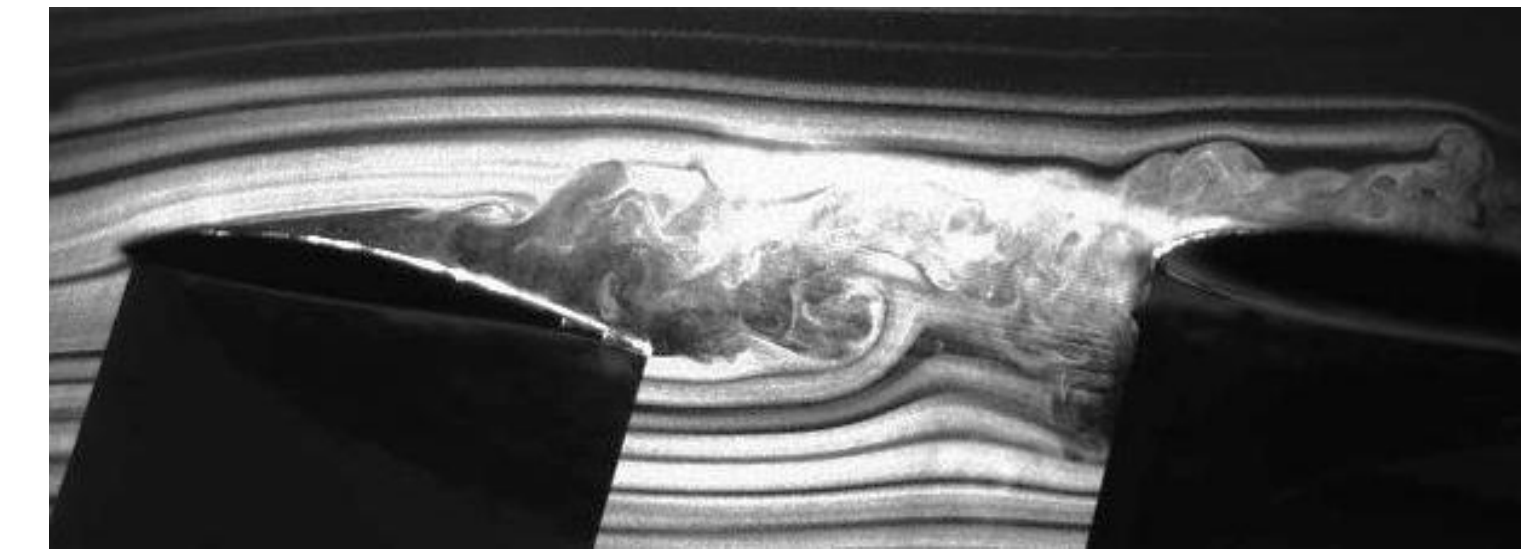
Thrust produced -- 222 lbf

5 Wind Tunnel Testing

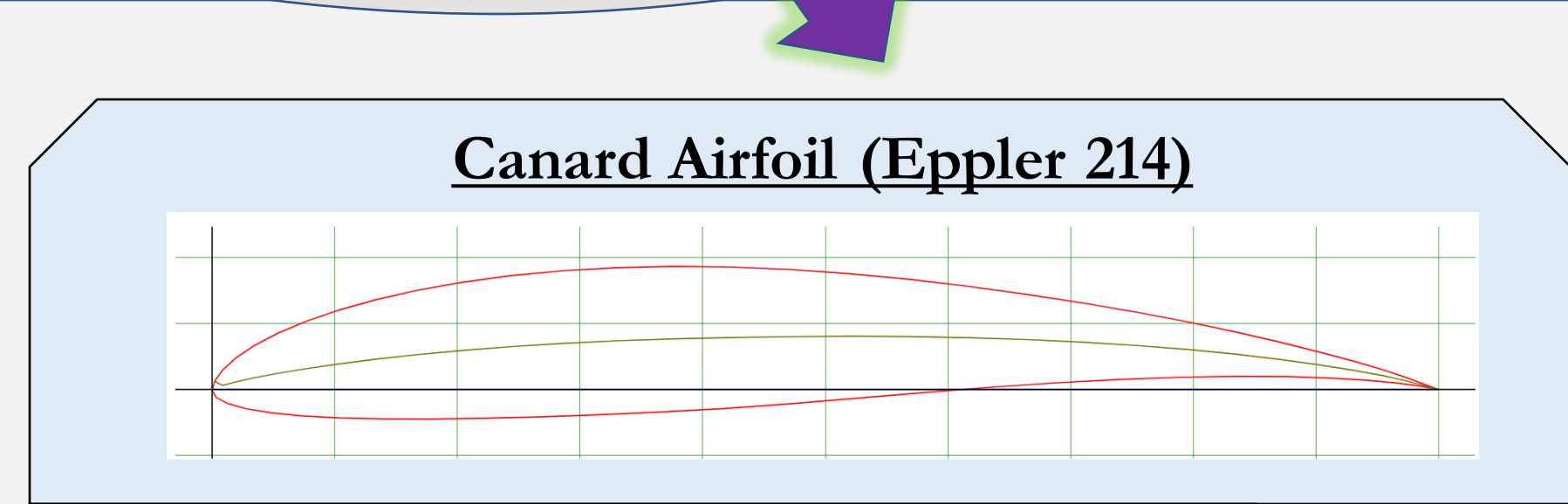
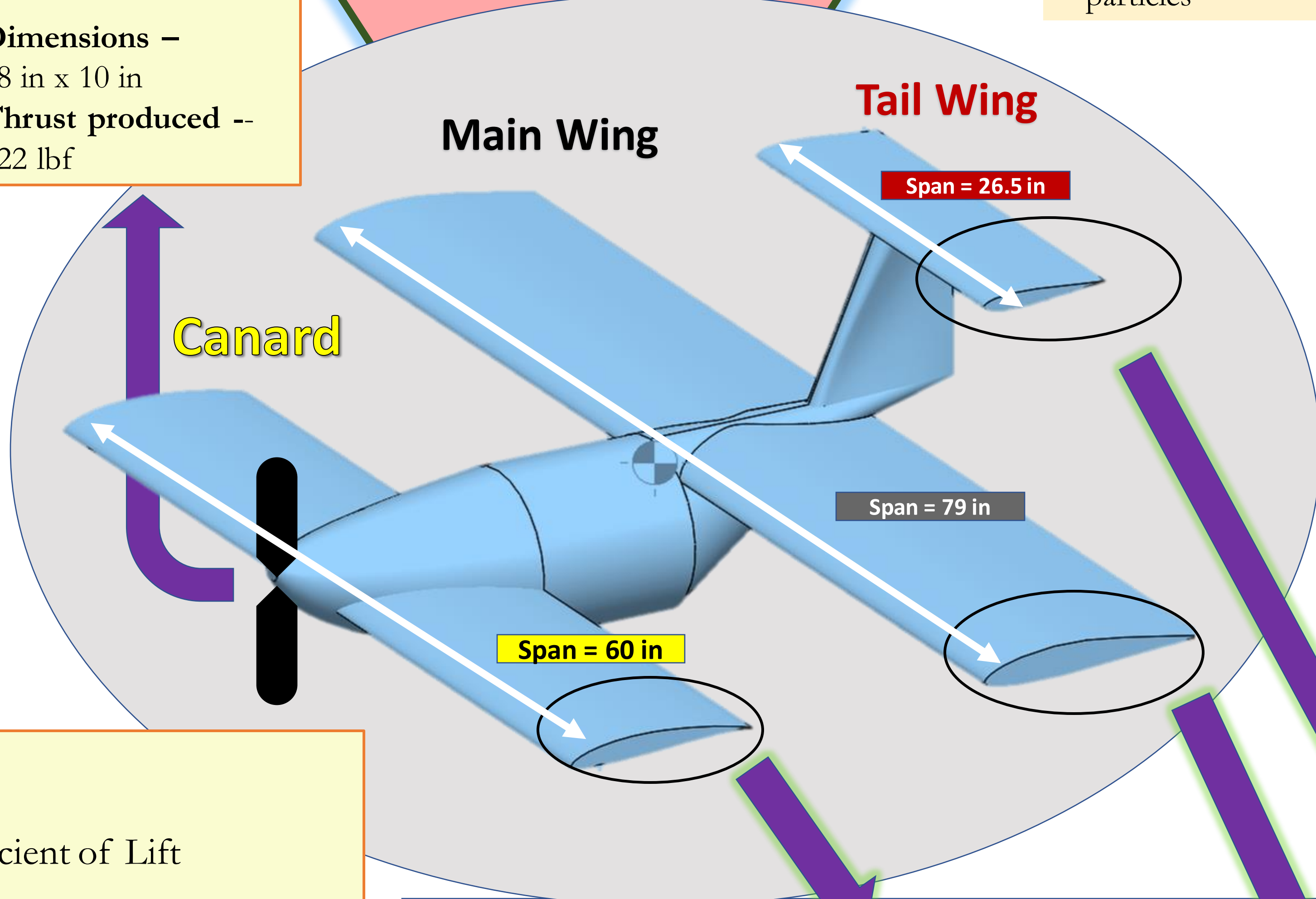
- A 2:13 scaled model used to determine flow
- Smoke tests to see airflow
- Using a laser to illustrate air particles



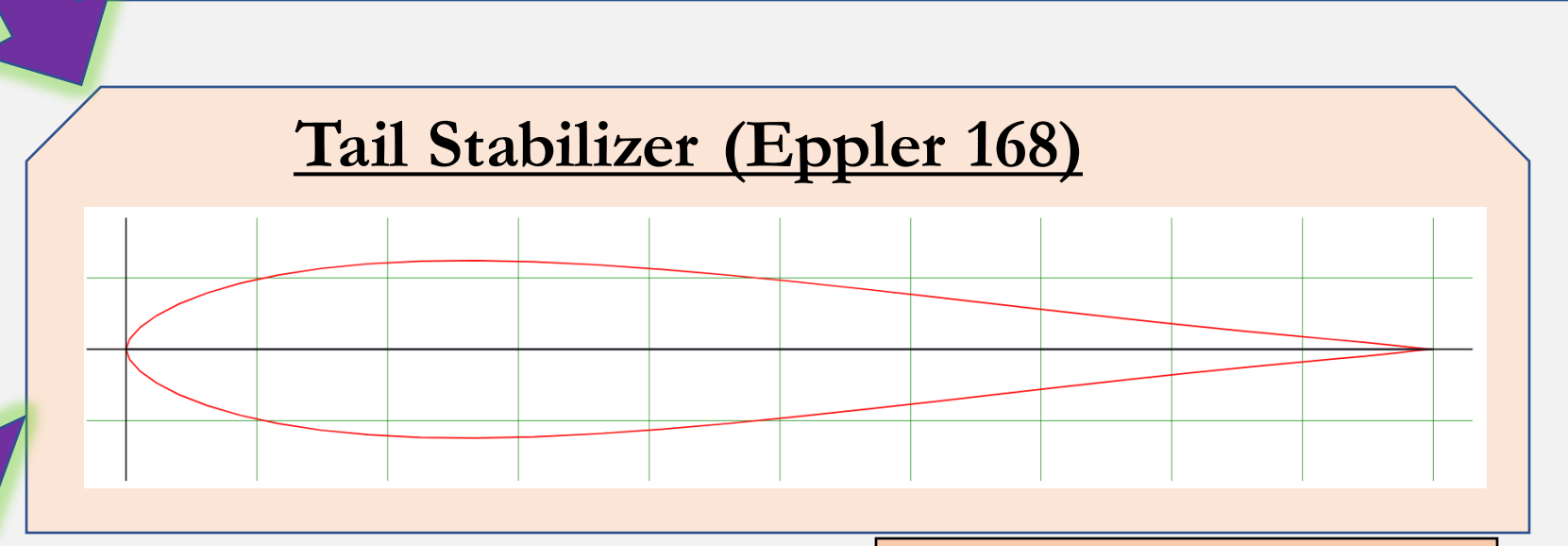
- Take off angle of 5°
- Confirms canard has no effect on the main wing



- Stall – No Lift
- Stall angle of 12°
- Effects on the main wing



- The Canard has more surface area per inch to achieve more lift with a smaller span
- The main wing keeps the flow attached, improving stability
- Produces lift even when the canard has stalled



- The tail helps maintain stability

