Contact:
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UCI Solar Airplane
Winter '25 Annual Design Review

University of California, Irvine

Summary

Mission Statement:
To create a solar airplane that proves the viability of solar power as an energy source, as well as make a plane capable of providing assistance in humanitarian aid efforts.

Objectives:

1. Must be functional
2. Must be powered by solar panels and batteries
3. Must have a flight time extended by 10% beyond its battery life
4. Avionics and Propulsion equipment must be integrated and easily accessible throughout the aircraft
5. Must include functional landing gear and be capable of performing takeoff and landing using the gear
7. Must fit in a standard truck bed (6.5' x 4.2')
8. GPS and camera must be integrated with acceptable video
quality
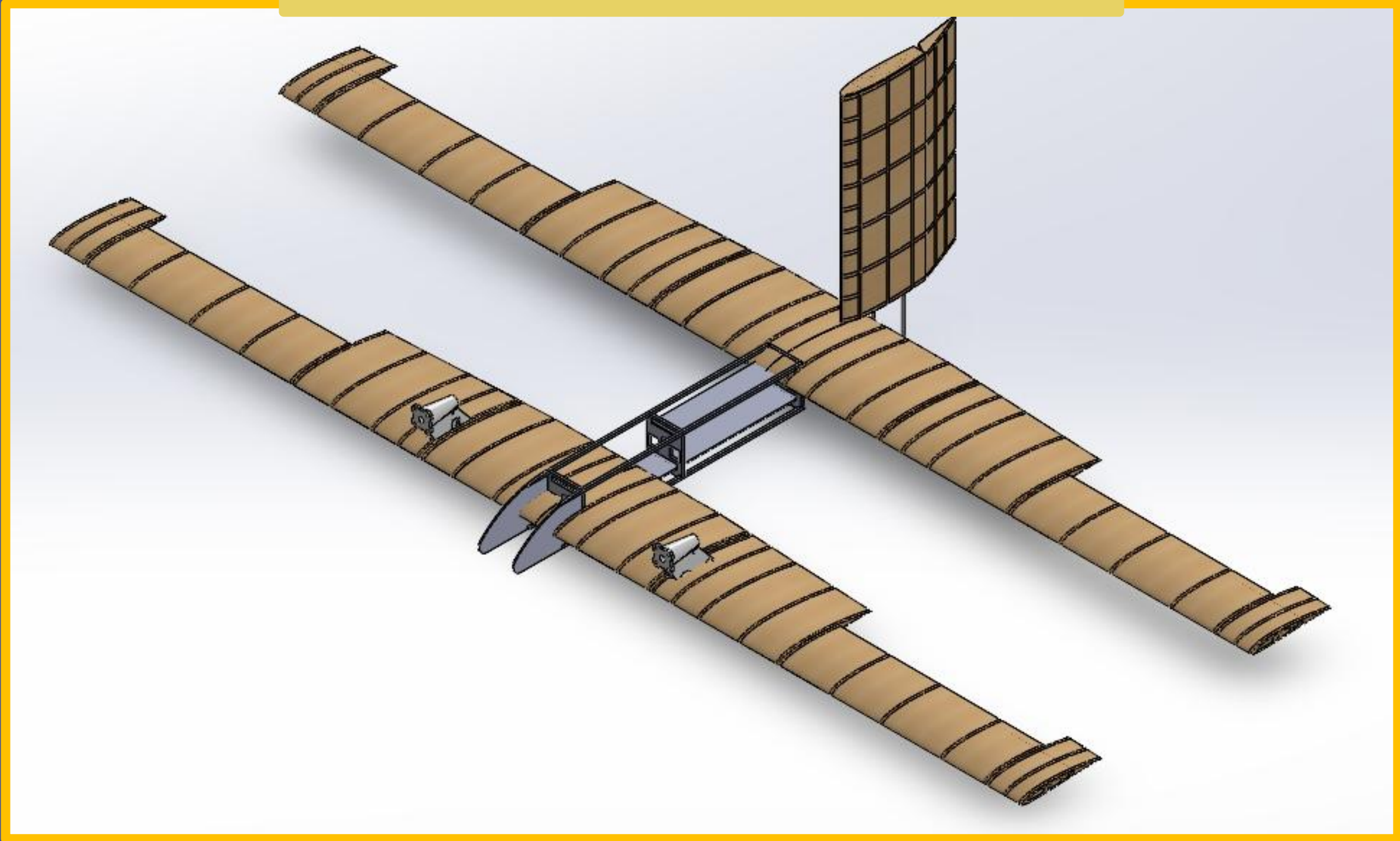9. In-flight data must be given via remote terminal

Design Parameters

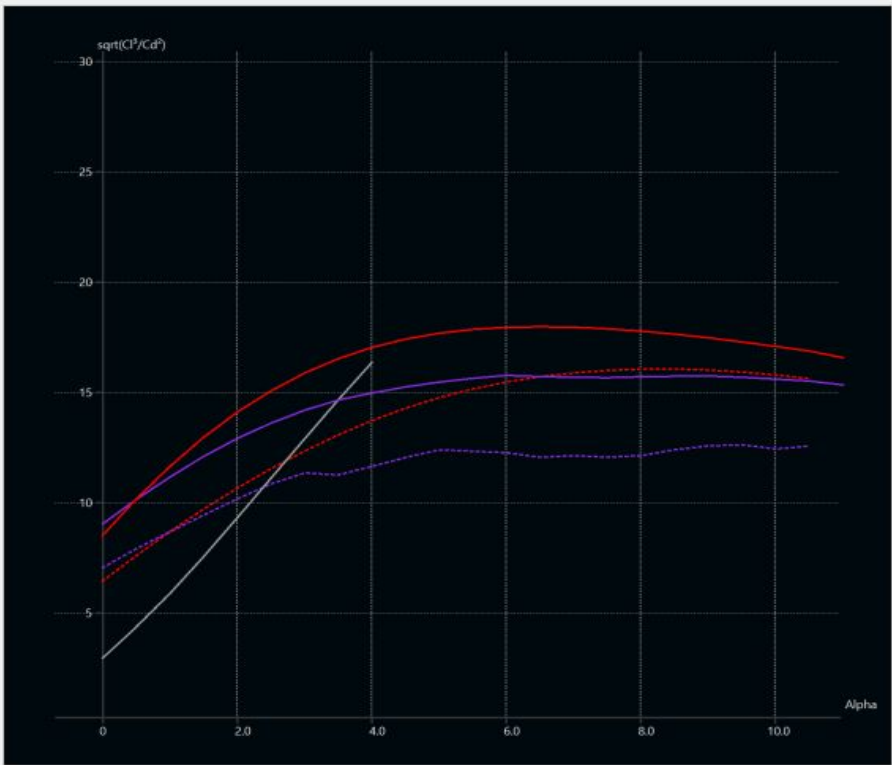| 24-25 Design Parameters	
Wingspan	8 ft
Aspect Ratio	10.6
Nose to Tail Length	53.4 in
Max Fuselage Area	14 ft²
Lift to Drag Ratio	9.24
Fuselage Weight	3.8 lbs
Solar Power Generation	3.6 watts * 36 panels = 129.6 watts

Wing Structure with Solar Panels
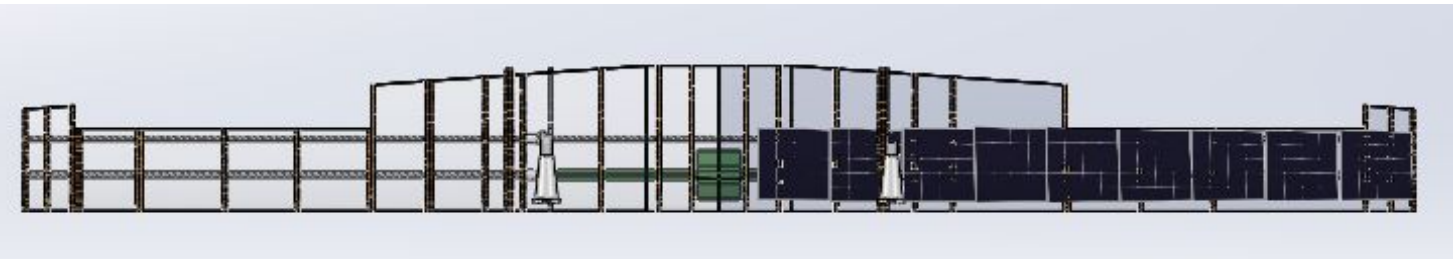
Full Plane Assembly

Analysis

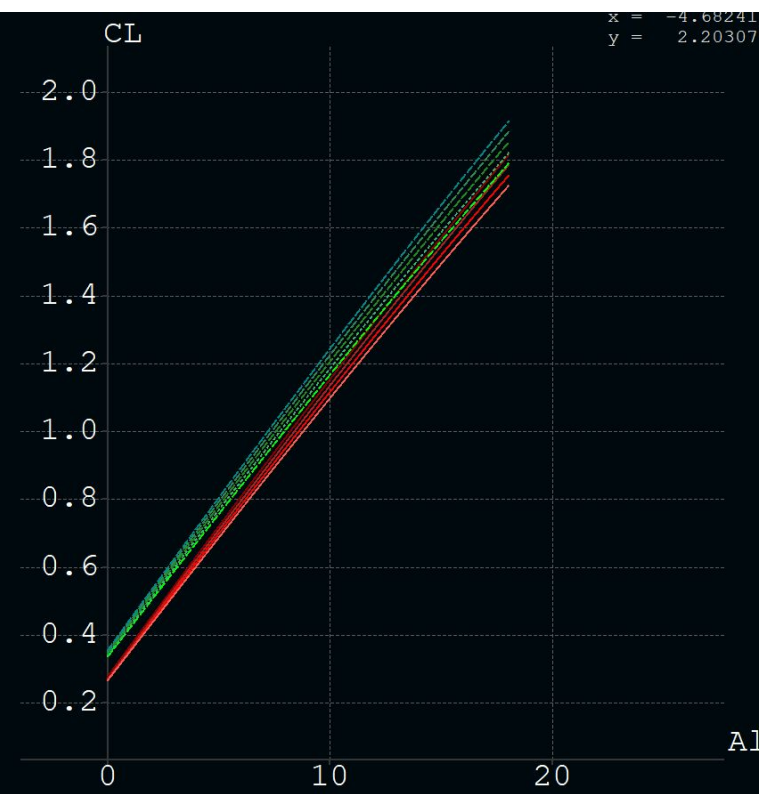Airfoil Analysis

Aerodynamic Performance vs. Angle of Attack

Coeff. of Lift vs. Angle of Attack
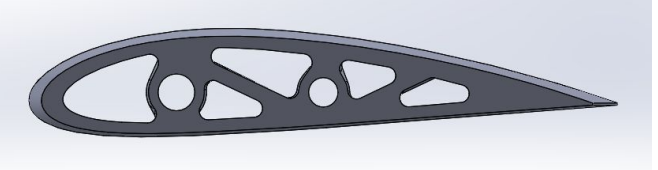

Solar Airplane 23-24
——— T1-35.0 ft/s-VLM1

Tandem - NACA 4418 both
•••••• T1-25.0 ft/s-VLM1-10.0lb-x1.4f
——— T1-35.0 ft/s-VLM1-10.0lb-x1.4f

Tandem - SD7037 both
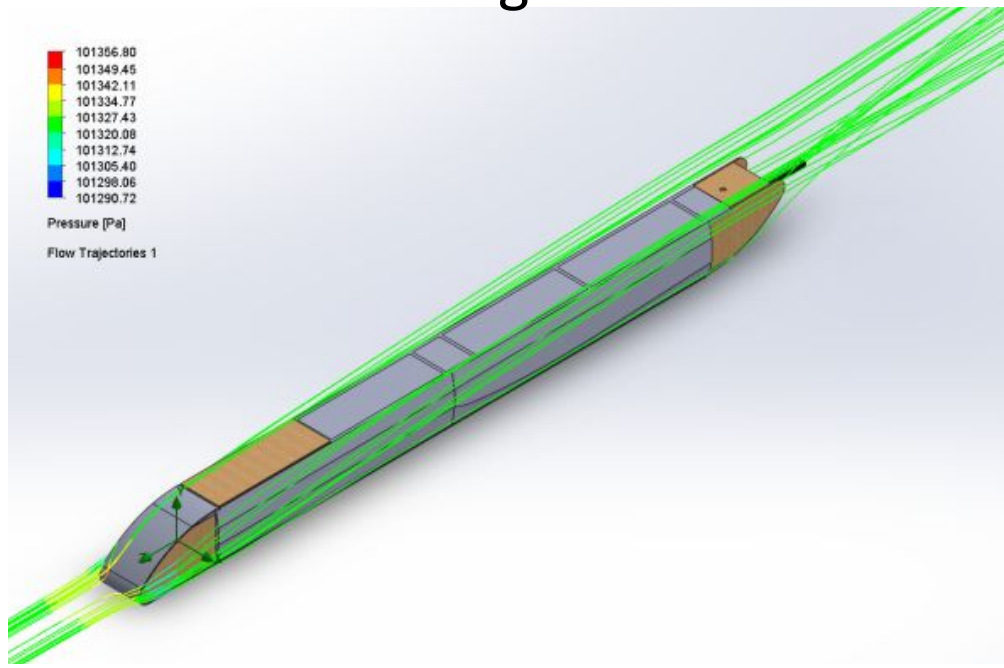•••••• T1-20.0 ft/s-VLM1-10.0lb-x1.4f
——— T1-35.0 ft/s-VLM1-10.0lb-x1.4f

Fuselage CFD

Wing FEA

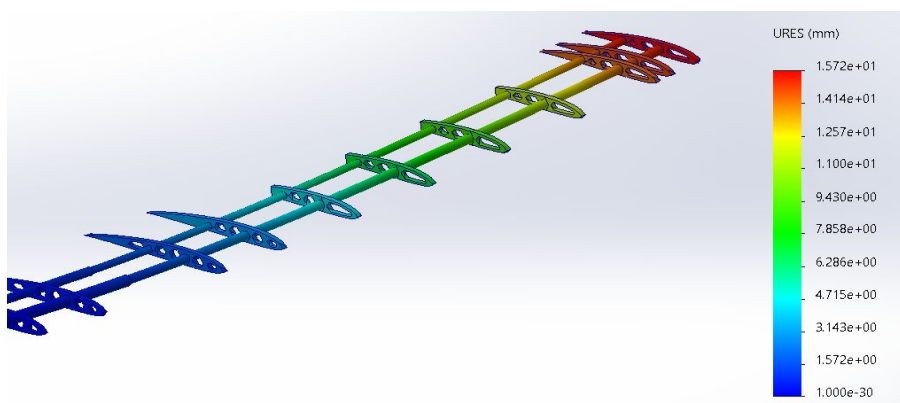Final Airfoil

Propulsion

Motor Performance

Solar Panel Performance

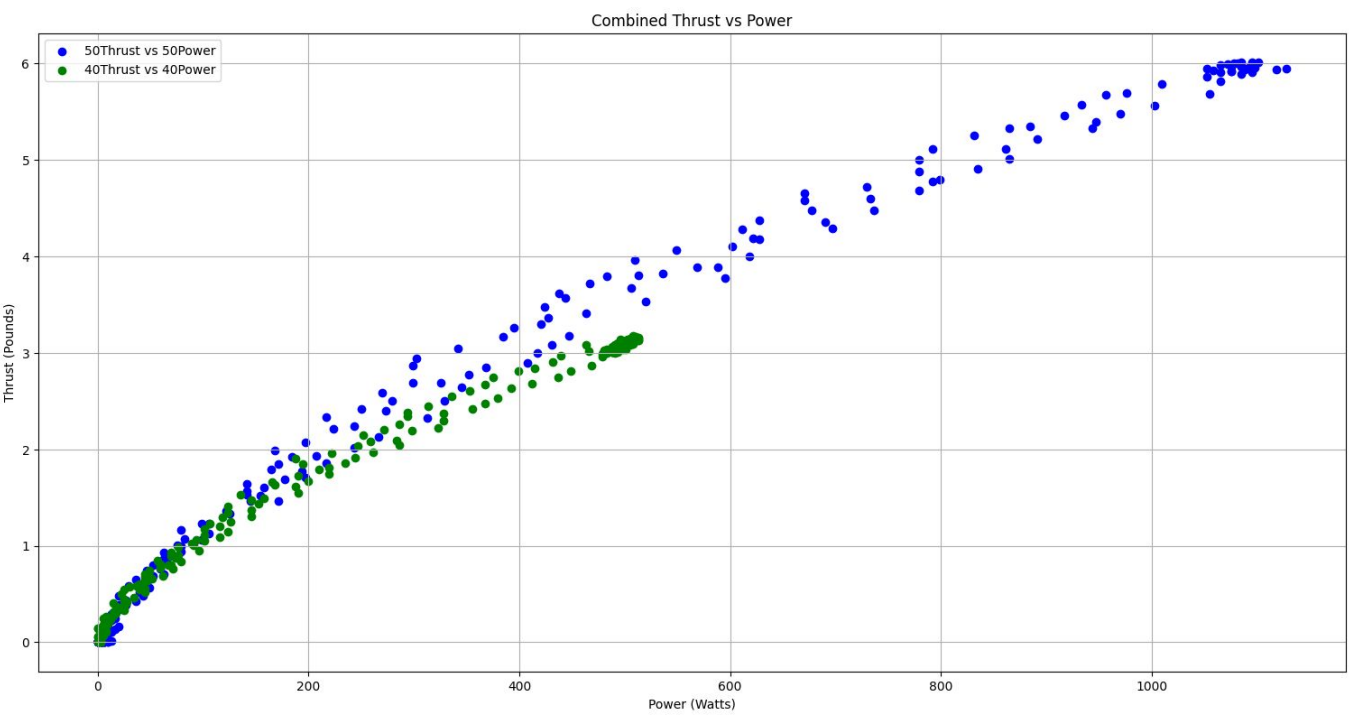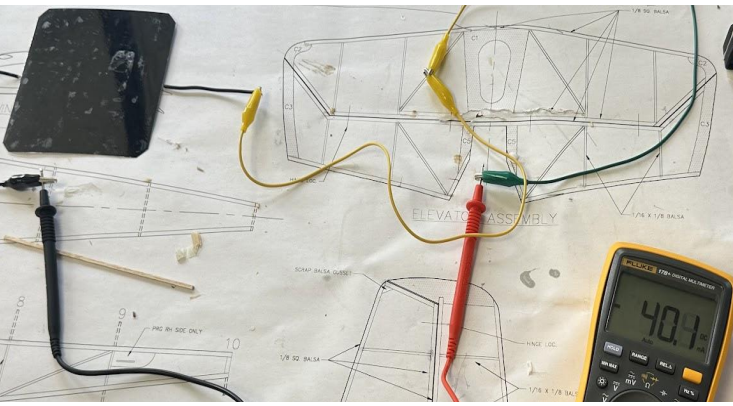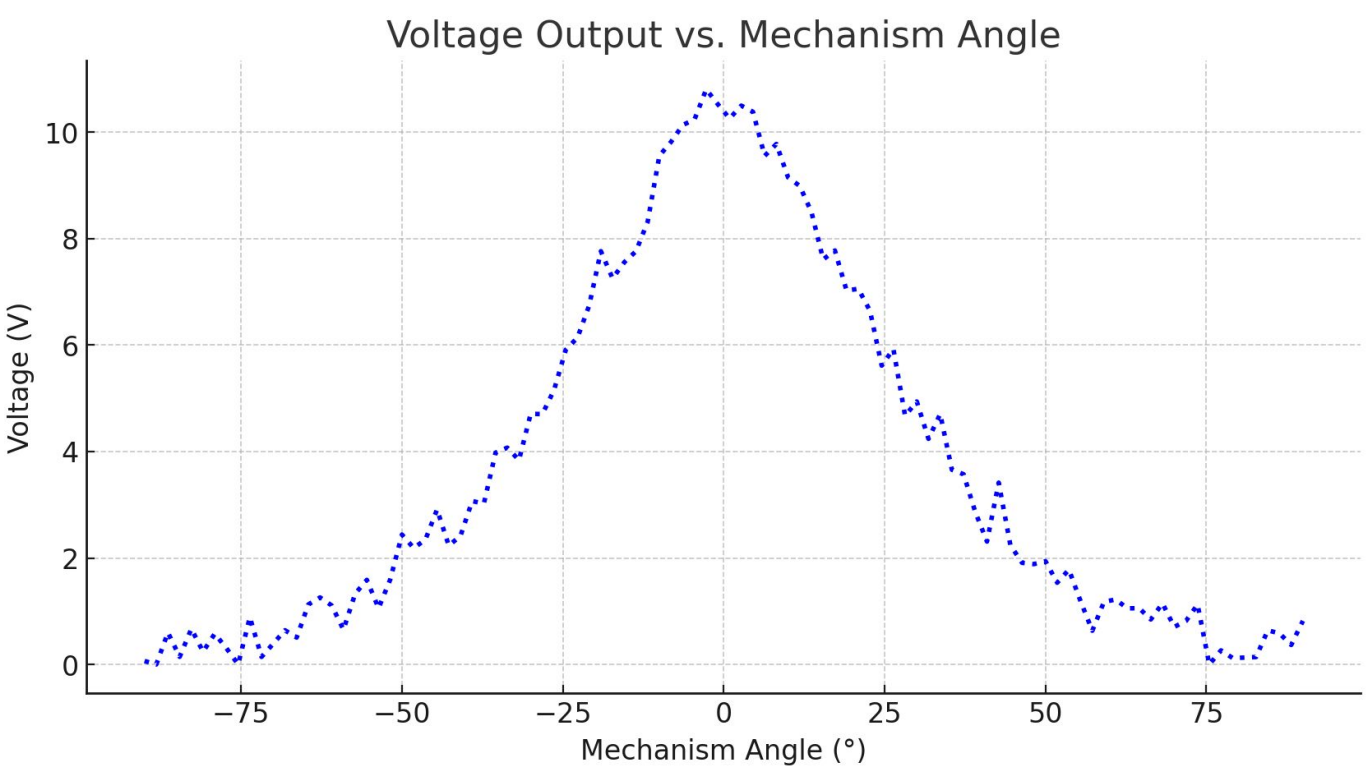Voltage Output vs. Mechanism Angle

Full Electrical Circuit
Features: Energy Generation, Signal Transmission, and Propulsion Systems