UCI Cargo Plane 2019-2020
"AE-20"

UCI Samueli School of Engineering
University of California, Irvine

Background

UCI Cargo Plane participates in the Society of Automotive Engineers (SAE) Aero Design West Competition. This competition provides engineering students exposure to real-life engineering challenges in the aerospace industry.

Goal

Our goal is to win the SAE Aero Design West Competition. In order to achieve this goal, we must create a bush plane design that can operate from short runways while carrying outsized cargo.

Requirements

Maximum Loaded Weight: 55 lbs.
Maximum Wingspan: 10 ft.
Maximum Power: 1000W
Takeoff Runway: 100 ft.
Cargo: Size 5 Soccer Balls & Steel Plates
CG Requirement: Flyable in empty and loaded configuration

Current Status

Our team has completed the first SolidWorks Design and Assembly. We are currently manufacturing the plane to begin testing.

Next Steps

With the completion of the SolidWorks design and assembly, we are on track with this year's goals. Our next step is to complete manufacturing and testing by the end of the year. Using the results from testing will help us to make adjustments for redesigning.

The Bigger Picture

This project reflects the challenges we as engineers will face in the industry. Different aerospace companies design an aircraft tailored to a customer's needs, then compete to gain a contract. This year, the "customer" wants to deliver "large vehicle storage tanks", these storage tanks are represented by soccer balls. The other requirements stated in the competition rules also represent real world problems.

Contact Information

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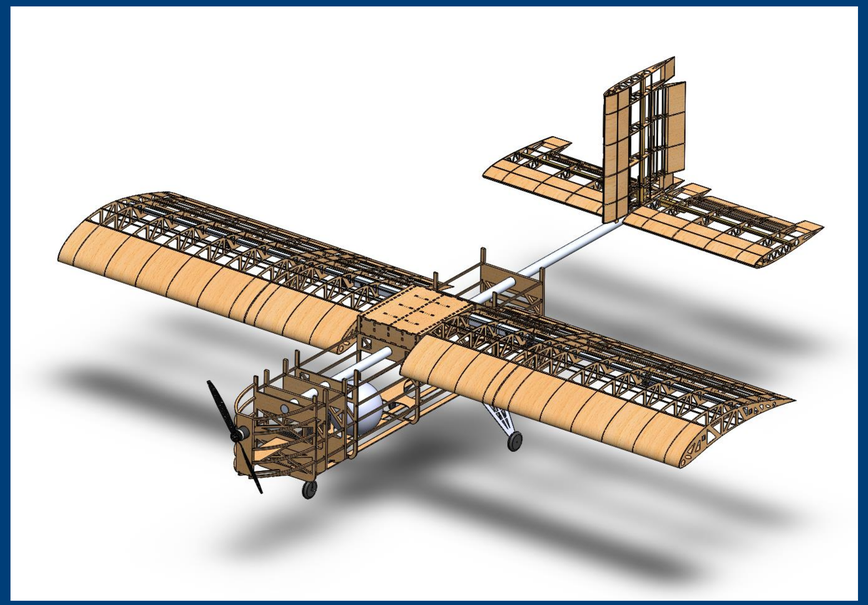
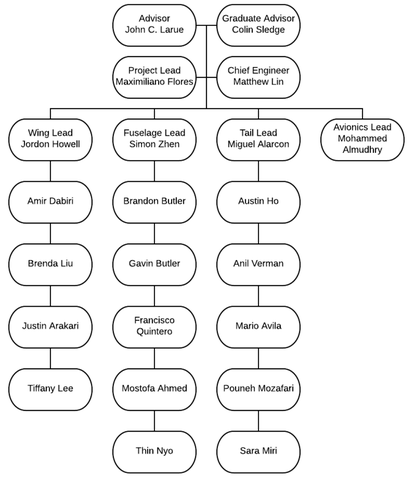
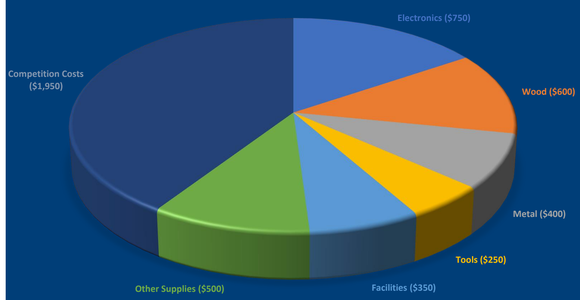
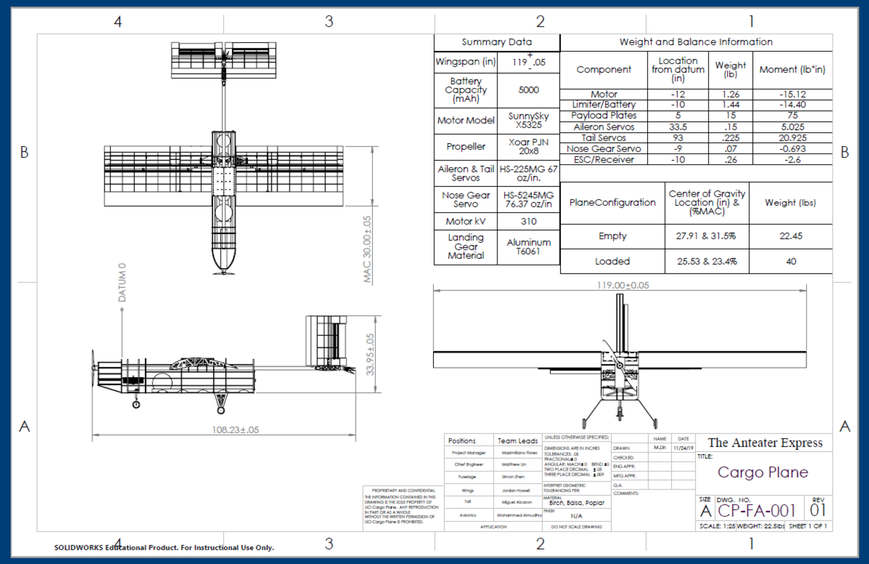


Cargo Plane 2019-2020



CARGO PLANE BUDGET





Wing Specifications	
Airfoil	Eppler 423
Chord	2.5 ft
Span	10 ft
Planform Area	25 ft^2
Aspect Ratio	4
Aileron Span	29.9 in
Aileron Chord	9 in
Flap Span	15.8 in
Flap Chord	9 in

Tail Specifications	
Tail Airfoil	NACA 0012
Horizontal Tail Volume Coefficient	.60
Horizontal Tail Span	4.41 ft
Horizontal Tail Chord	1.50 ft
Horizontal Tail Planform Area	6.62 ft^2
Horizontal Tail Aspect Ratio	17
Horizontal Tail Moment Arm	5.667ft
Vertical Tail Volume Coefficient	.06
Vertical Tail Span	1.82 ft
Vertical Tail Chord	1.5 ft
Vertical Tail Planform Area	2.73 ft^2
Vertical Tail Aspect Ratio	14.58
Vertical Tail Moment Arm	5.398 ft
Elevator Span	17.6875 in
Elevator Chord	6.3 in
Elevator Aspect Ratio	2.81
Elevator Planform Area	111.43 in^2
Rudder Span	15.625 in
Rudder Chord	6.3 in
Rudder Aspect Ratio	2.48
Rudder Planform Area	98.44 in^2

Research and Design → SolidWorks Design and Assembly → Manufacturing → Testing → Flight Test #1 → Redesign → SAE Design Report Due → Flight Test #2 → SAE Competition (April 3rd - 5th)