

Design

The objective is primarily focused on creating a light aircraft that can provide as much lift as possible. To accomplish this, the aircraft will utilize the Selig 1223 airfoil with Gurney flap attachments.

Background

The purpose of this project is designing and manufacturing a cargo aircraft to compete in the SAE Aero West competition on April 24, 2016.

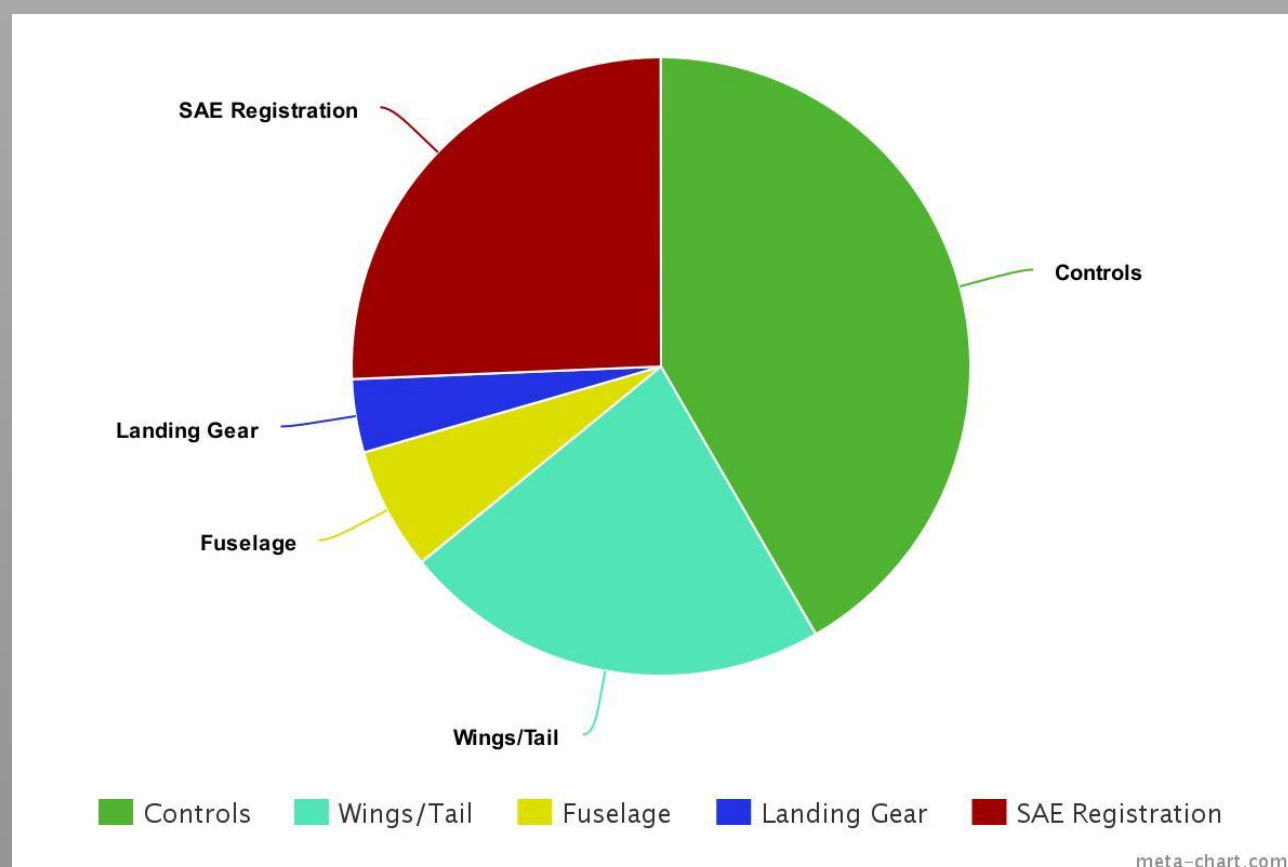
Goal

Engineer a battery powered aircraft capable of carrying a payload of 30 pounds for the SAE Aero West Competition.

Requirements

- Sum of height, width, and length less than 175 in
- No fiber-reinforced plastic (landing gear & motor mount excepted)
- Single Motor
- 1000 Watt power limiter
- Payload bay dimensions 4" x 4" x 10"

Budget



Costs:

SAE: \$800
 Controls: \$1300
 Landing Gear: \$120
 Fuselage: \$200
 Wings/Tail: \$700

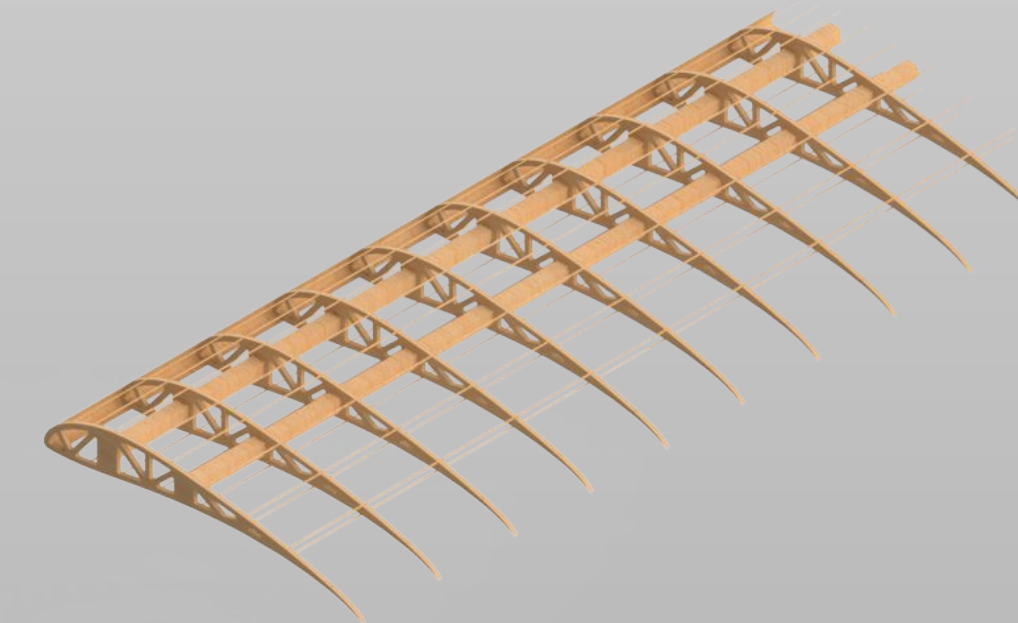
Total: \$3120

Wing

- Rectangular wings of 7.6ft span and 1.75ft chord.
- Biplane configuration.
- Gap of 1ft, Stagger of 1.15ft, Decalage of 3°.
- Highly cambered Selig 1223 airfoil.
- Gurney Flaps attached for increasing lift during takeoff.
- Aluminum spars with balsa ribs
- Microlite wing surface.



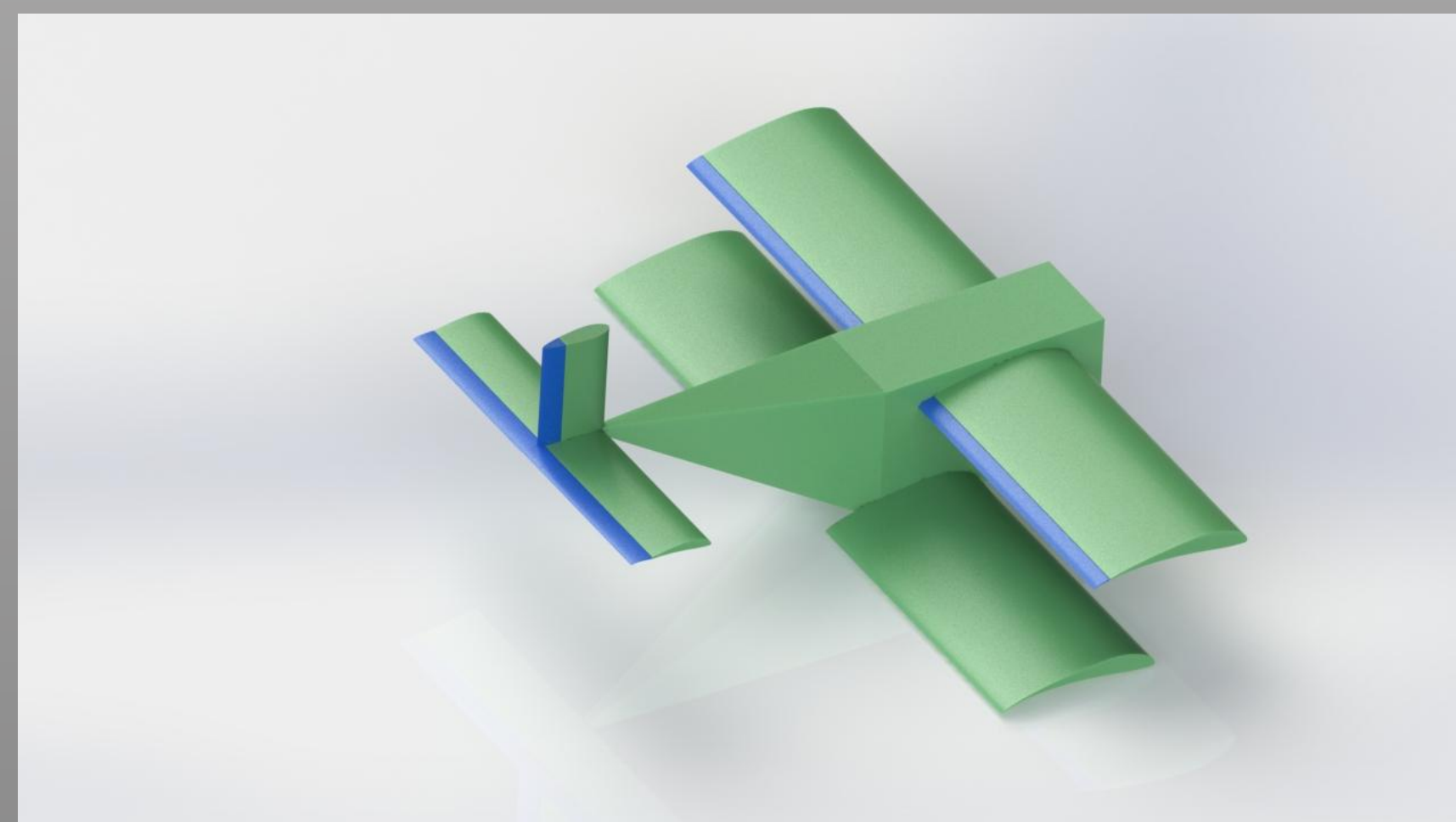
This picture shows the 11" x 4" x 0.5" model wing during a wind tunnel test to determine optimal GF size. The wooden beam at the bottom is the GF.



Pictured above is a balsa wing with a truss design structure and square spars. The wing will have a leading edge and gurney flap on the trailing end.

Tail

- Conventional empennage configuration
- 5085MG servos attached to vertical and horizontal stabilizers
- Symmetric NACA 0012 airfoil



Fuselage

- 28 x 10 x 14 full scale dimensions
- Manufactured with birch plywood bulkheads and balsa wood stringers
- Laser cut design in RapidTech facilities
- Hollow aluminum rod integrated for structural support

Landing Gear

- Tricycle (nose gear) Arrangement
- Main gear, 18"x5"x8" aluminum 6061-T6, fixed to fuselage
- Nose gear: high tensile music wire, 6061-T6 aluminum and aircraft quality 4130 alloy steel tubing
- 3" Tires: Threaded lightweight tires

Controls

- Remote Controlled
- Ailerons, Elevator, and Rudders controlled by servos.
 - Servos: small motors that move primary flight control systems

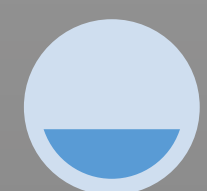


Pictured right is the DX8 Controller, capable of 8 channels and a 2.4 GHz band frequency.

Team Breakdown

Tyler Gorman	Team Lead, Landing Gear
Madara Wijetunga [Lead]	Wing
Kelsey Safar	Wing, Fuselage
Michelle Antimie	Wing
Ryan Min [Lead]	Tail
Stephanie Pearce	Tail, Laser Cutting
Robert Foster [Lead]	Fuselage
Romik Mejlumyan [Lead]	Landing Gear
Ronnel Jamir	Motor, Controls
Santiago Correa [Lead]	Motor, Controls
Joshua Bae	Motor, Controls

Contact Information:
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Fall

- Design
- Analysis
- CAD Model
- Test Models



Winter

- Manufacturing
- SAE Design Report
- Final design
- Tests



Spring

- Complete Testing
- SAE Competition
- Final Report