

Team 9 Fly-WU





Mission Description

The objective of this year's project was to design "A Storable Semi-Autonomous Emergency Supply Aircraft." The goal is to build an aircraft which can accurately and autonomously deliver significant amount of supplies to the designated drop zone and complete 5 laps with the fastest time.

Team Members



Sajith Pillai
Structures

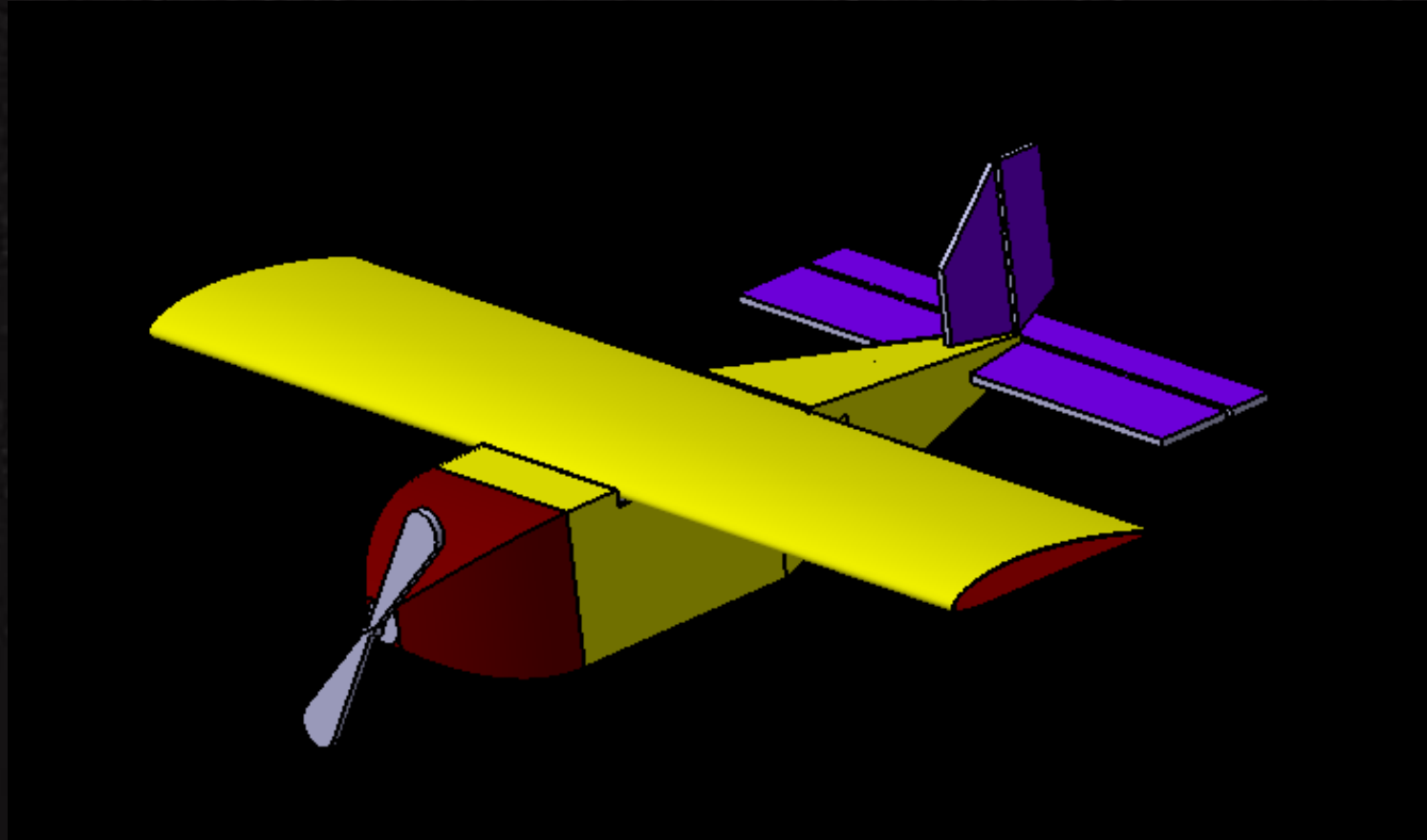


Sarvesh Shrestha
Propulsion

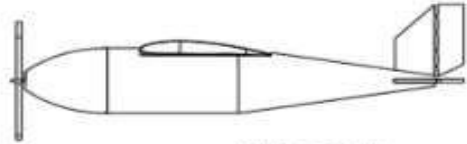


Pritansh Tayade
Stability & Controls

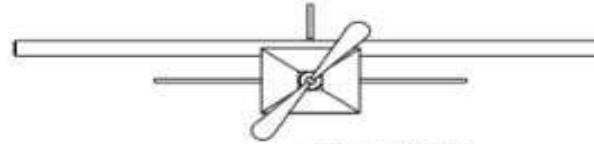
Isometric view



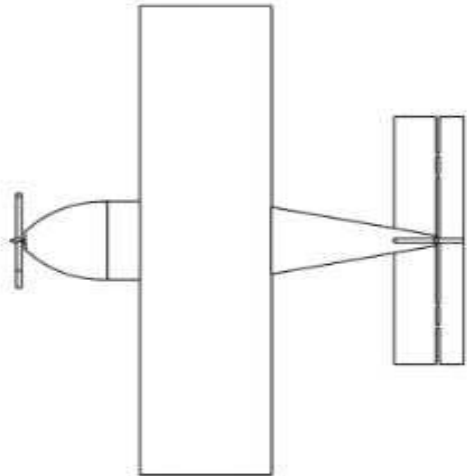
Three view drawing



Side view

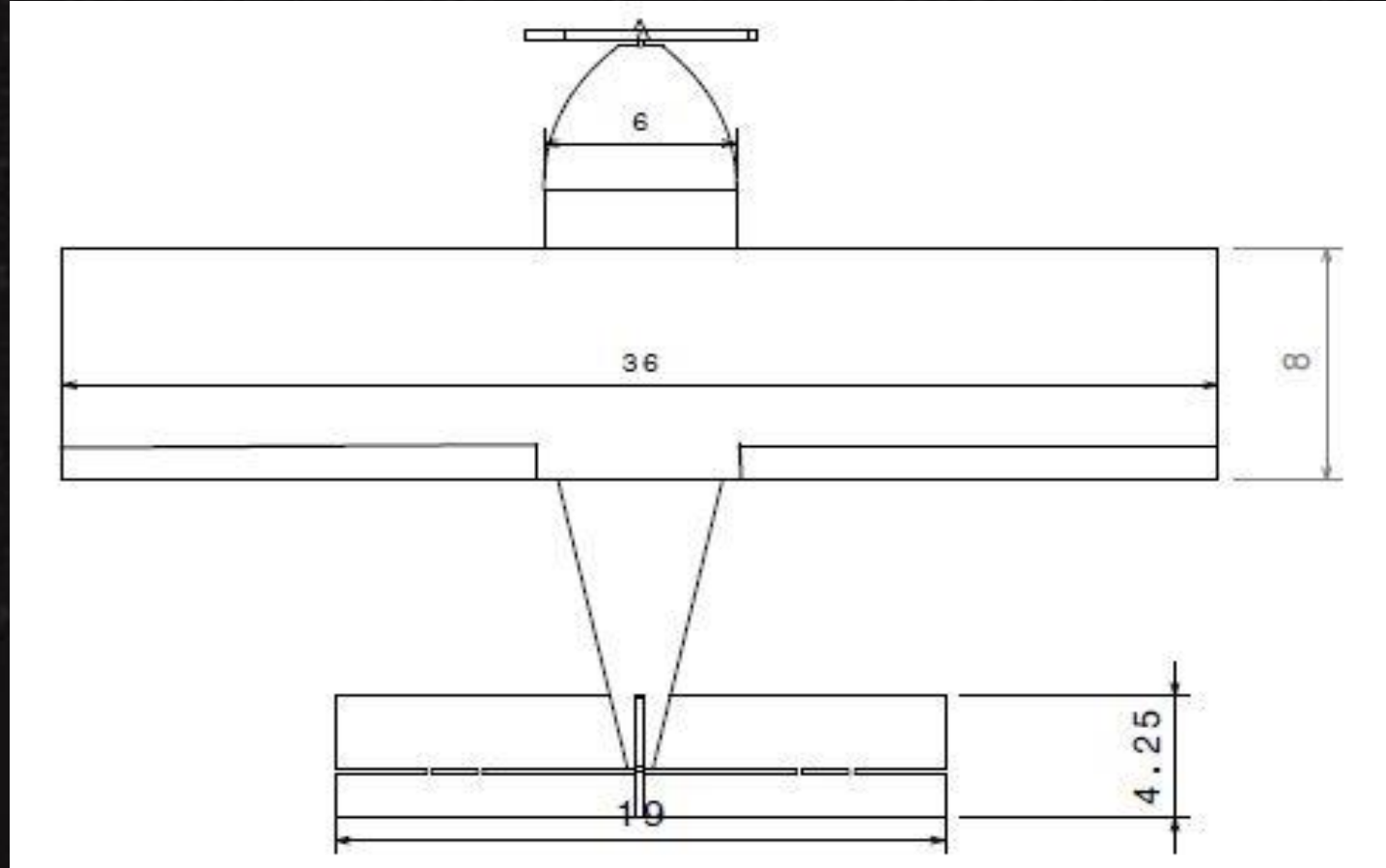


Front View

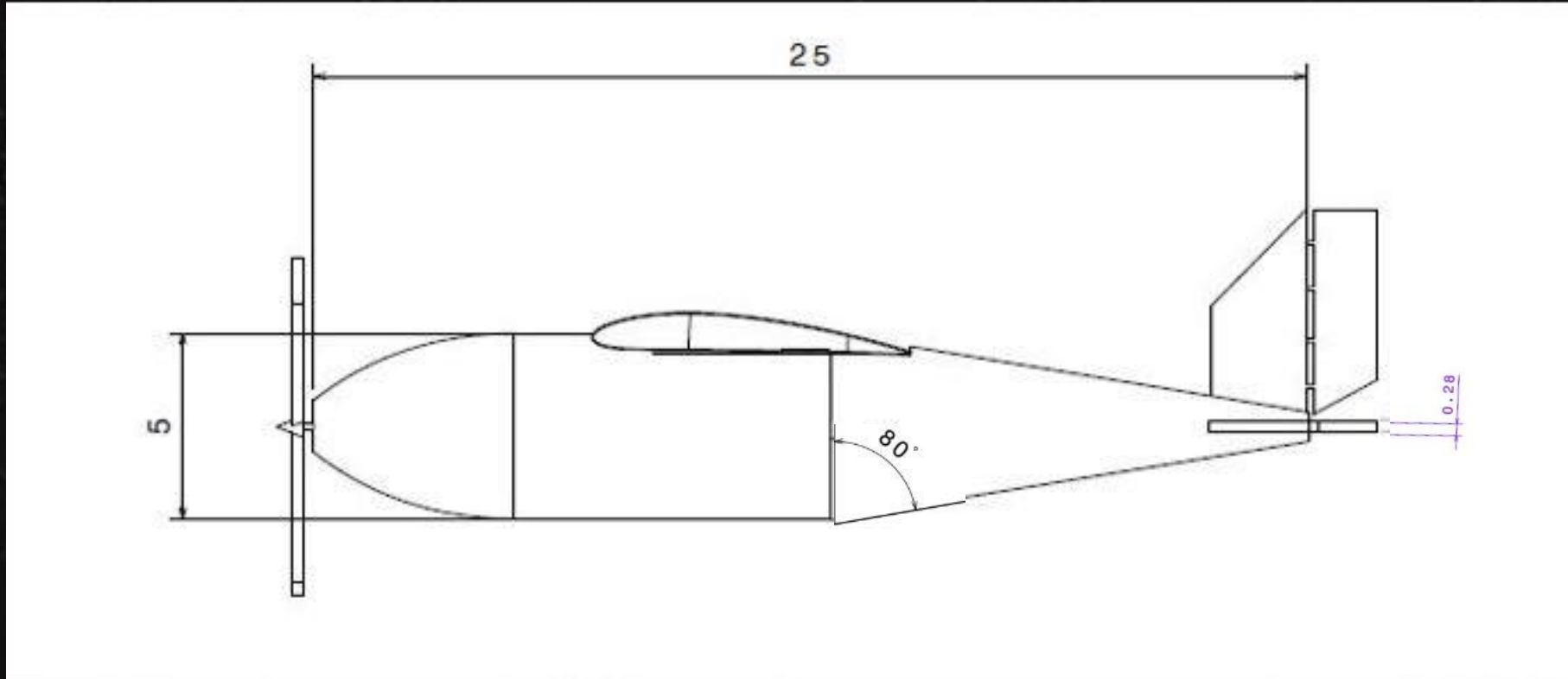


Top view

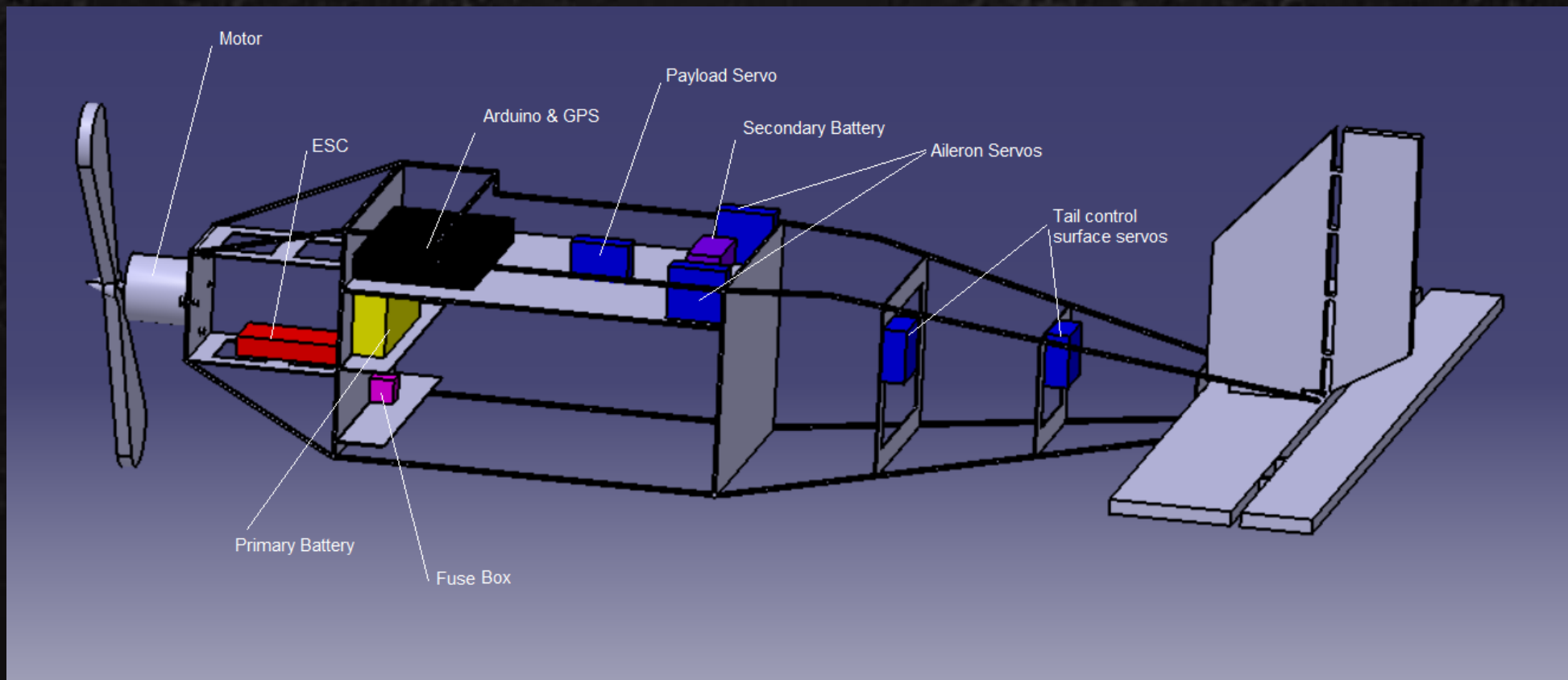
Dimension



Dimension



Layout View





Specification

- Total weight: 2 lbs
- Weight without payload: 1.484 lbs
- Cruise speed: 60 ft/s
- Stall speed: 32ft/s
- Maximum speed: 80ft/s
- Minimum turn radius: 30 ft
- Total Vehicle cost: \$800



Specification-Aerodynamics

- Airfoil: NACA 4412
- Drag coefficient : 0.029
- Wing Area: 288 sq-inch
- Wingspan: 36 inch
- Maximum lift coefficient: 1.11
- Maximum lift to drag ratio: 18.3



Specification-Structures

- Materials Used: Basswood, Balsa, Lite plywood and Coverlite
- Wing Design:
 1. Bending Moment: 51.75 lb-inch
 2. Shear Force: 5.7 lbs
 3. Deflection: 0.13 inch
 4. Number of Spars: 2
 5. Primary Spar: 30% of chord
 6. Secondary Spar: 80 of chord



Specification-Propulsion

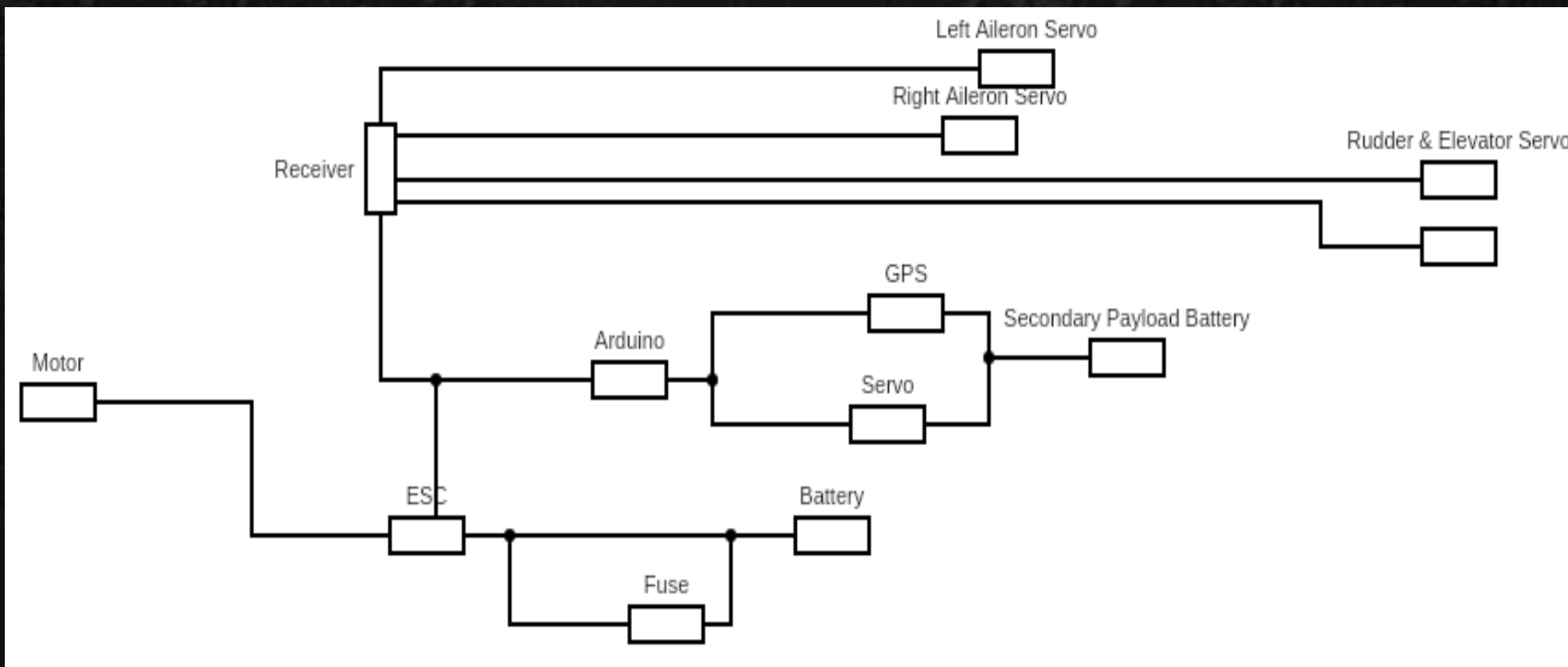
- Engine: Great Planes Rimfire .15 35-36-1200 Outrunner Brushless
- Propeller: APC 11x7 Thin Electric Propeller
- Battery: Venom Fly LiPo 3S 1500mah 35C UNI 2.0 Plug
- ESC: Castle Creations Talon 60 6S 60A HeavyDuty BEC
- Maximum Power Available: 105W
- Maximum Current Draw: 40 A
- Total Propulsion System Weight: 0.7 lbs



Specification-Stability & Control

- Servo: Futaba S3102 Aircraft Micro Metal Gear Servo
- CG location: 7.2 inch
- Static Margin: 12.89%
- Elevator deflection for trim at cruise: 2.8 degree
- Elevator deflection for trim at MP: 0.55 degree
- Maneuver Margin: 8.65 inch

Wiring Overview



Dropping mechanism

The aircraft is equipped with an Arduino chip mounted with a GPS module. The team decided to use the GPS module as it can read coordinates of any pre-defined plain. Arduino is programmed to sense the input signals given by the GPS module and trigger the servo. The servo is soldered to a plate which is connected to four legs with pins where the balls hang. When the servo gets triggered it will push the plate and move the four legs in forward direction. The pins will release the ball corresponding to the trigger and drop all four balls at once

- Number of Balls: 4

Thank You