Background

Cargo Plane is a senior design project competing in the International SAE Aero Design competition. We are designing an RC aircraft that will carry payloads of soccer balls and metal plates. Our goal is to build an aircraft that generates high lift at low speeds while carrying a large payload within a small cargo bay.

Requirements/Constraints

- **Maximum Loaded Weight**: 55 lbs
- **Maximum Wingspan**: 10 ft
- **Maximum Power**: 1000 Watts
- **Takeoff Runway**: 100 ft
- **Landing Runway**: 400 ft
- **Cargo**: Soccer Balls and Steel Plates
- **CG Requirement**: Flyable in with and without cargo

Competition Scoring

For the 2022 SAE Aero Design Competition, the team must follow the flight score equation below:

\[ FS = \frac{120*(3*5+W_{Payload})}{b+L_{Cargo}} \]

Wing Specifications

- **Airfoil**: Eppler 423
- **Chord (ft)**: 2
- **Span (ft)**: 8
- **Aspect Ratio**: 4
- **Flap Span (ft)**: 1.5
- **Flap Chord (ft)**: 0.5
- **Aileron Span (ft)**: 1.5
- **Aileron Chord (ft)**: 0.5

Tail Specifications

- **Airfoil**: NACA 0012
- **Horizontal Span (ft)**: 4
- **Horizontal Chord (ft)**: 1
- **Vertical Span (ft)**: 2
- **Vertical Chord (ft)**: 1
- **Tail Moment Arm (ft)**: 4.33
- **Elevator Span (ft)**: 4
- **Elevator Chord (ft)**: 0.25
- **Rudder Span (ft)**: 2
- **Rudder Chord (ft)**: 0.25