F.L.A.M.E

Fire Locator and Aerial Monitoring Equipment

ANIMAS HIGH SCHOOL
DURANGO COLORADO

Rocket

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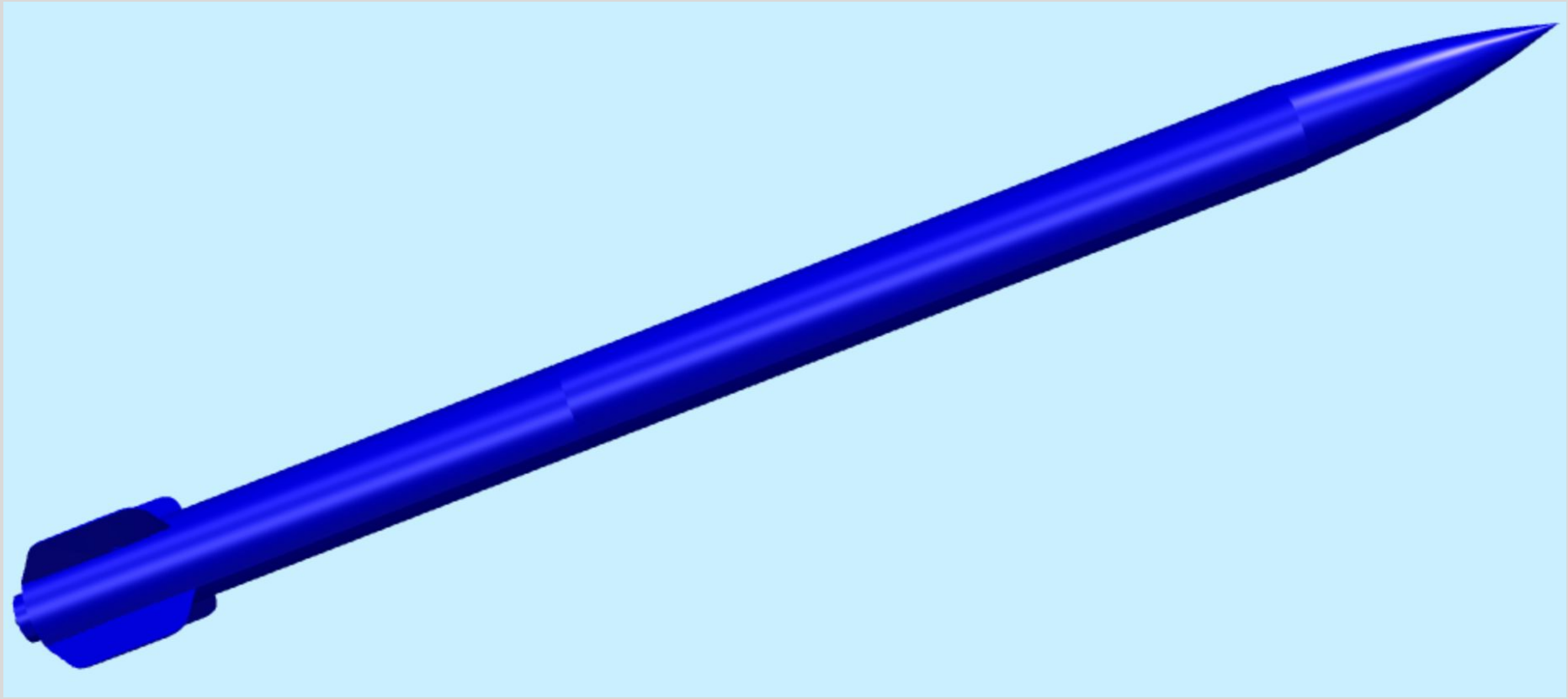

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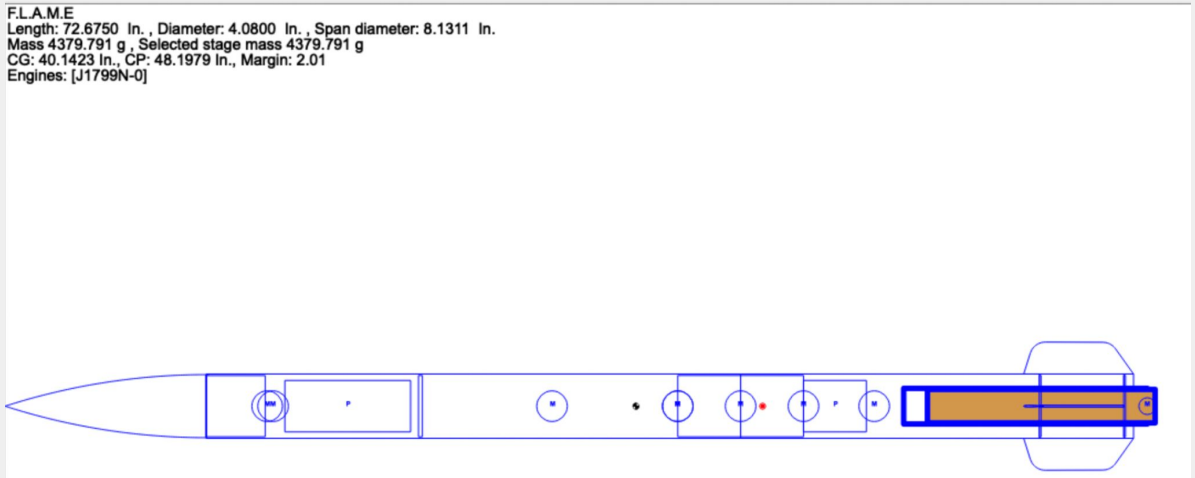
Stability Margin

Margin with motor: 2.01
CG: 40.1, CP: 48.2



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Dimensions

Length: 72.7in
Body tube Diameter: 4.08

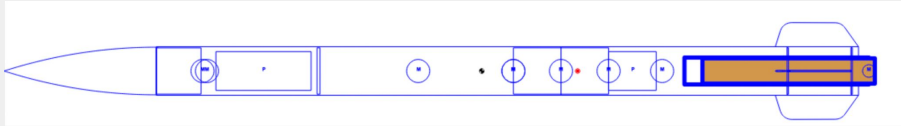
Sustainer length: 25in (fiberglass)

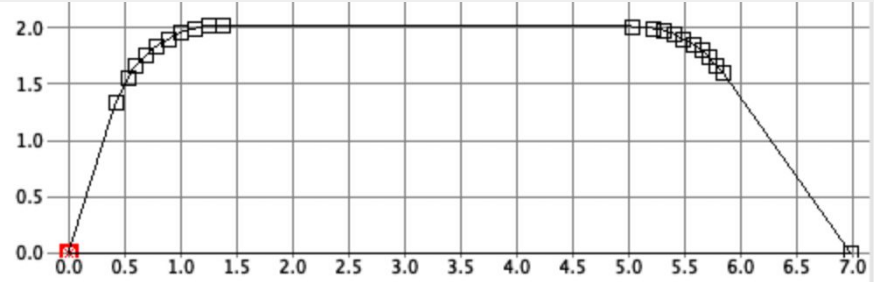
Payload tube length: 34in (fiberglass)

Nose cone length: 12.8in (Ogive shaped)

Fin count: 4 (fiberglass)
Fin thickness: .1181in (3mm)

Root chord: 7in
Tip chord: 3.5in
Semi Span: 2in





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Dimensions

Drogue Parachute Dia: 18.5 in (nylon)

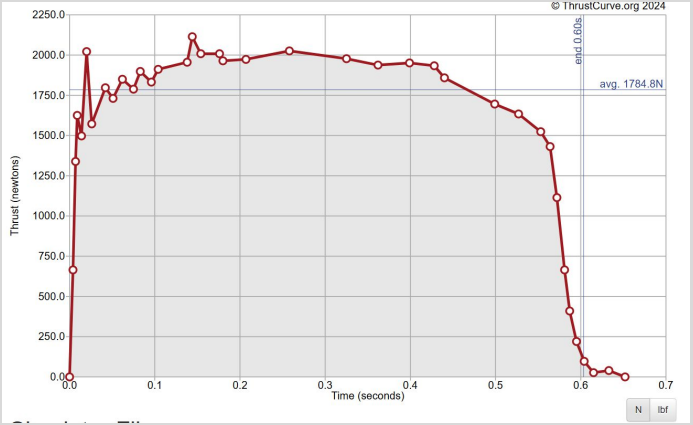
Main Parachute Dia: 61in (nylon)

Electronic bay/coupler length: 8in (fiberglass)

Motor mount tube Dia: 54mm (fiberglass)

Motor

Primary: J1799N



This motor gets us near our desired altitude and has high initial thrust for initial stability of a heavy rocket.

Secondary: J401fj

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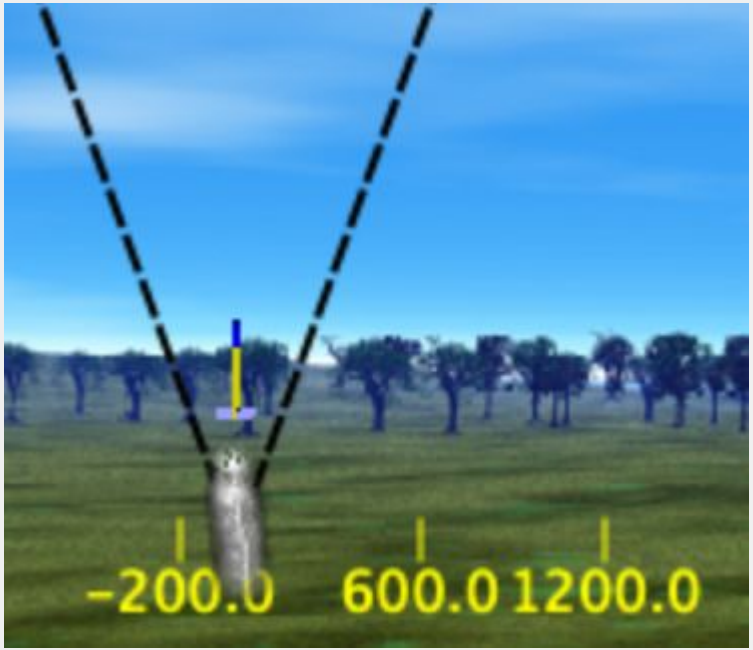
Start of launch numbers

Launch guide length: 120.0 In.
Velocity at launch guide departure: 113.7616 MPH
Thrust to weight ratio at launch guide departure: 46.463
The launch guide was cleared at : 0.129 Seconds
User specified minimum velocity for stable flight: 29.9996 MPH
Minimum velocity for stable flight reached at: 9.8711 In.



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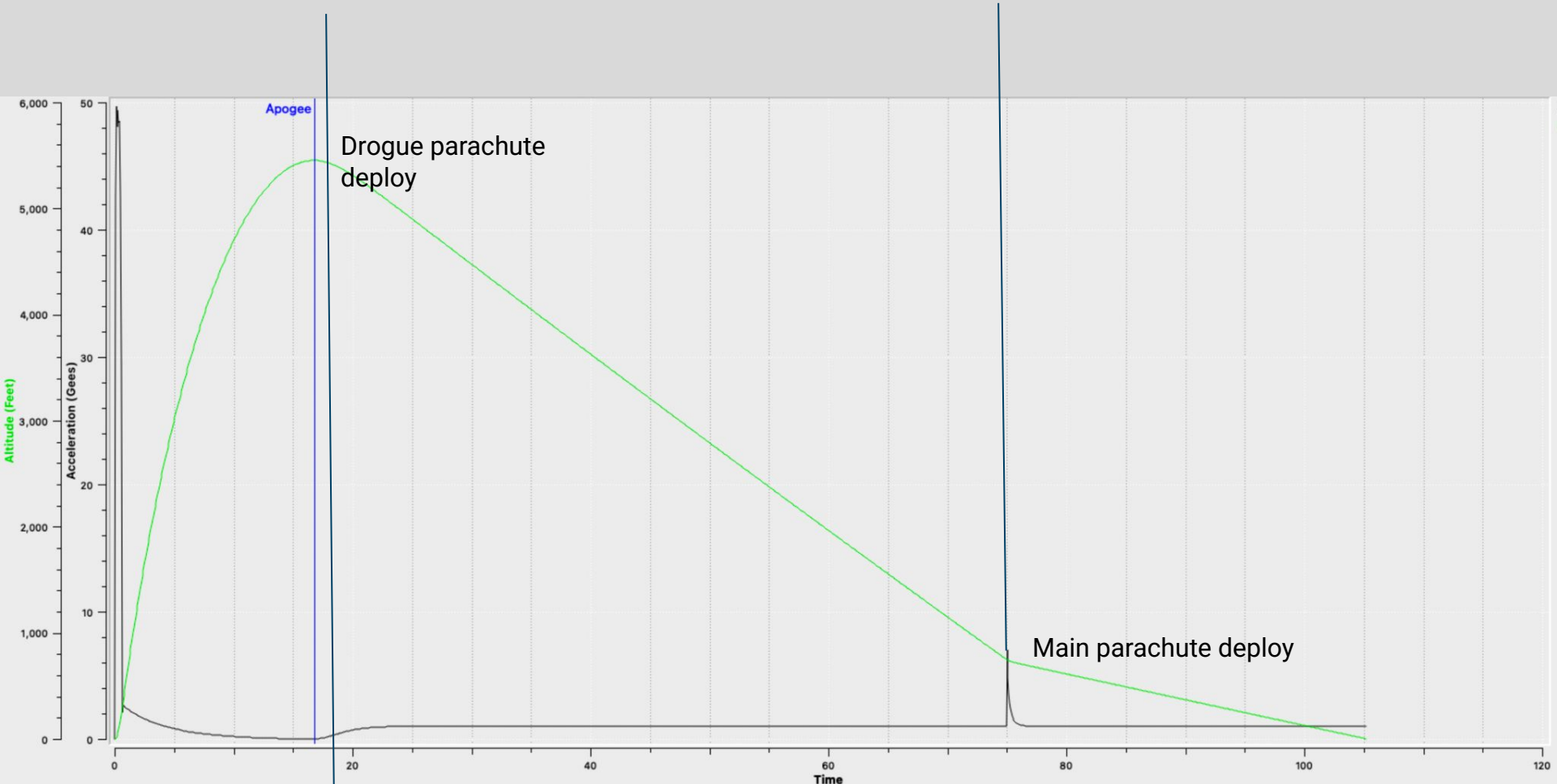
Apogee
Drogue parachute deploy
Main parachute deploy
Altitude (Feet)
Acceleration (Gees)
Time
6,000
5,000
4,000
3,000
2,000
1,000
0
50
40
30
20
10
0
0
20
40
60
80
100
120

Alternatives

Our alternative for this rocket design is a 3.5-inch body tube rocket and a longer body tube. This would make the plane harder to release but would decrease black powder amount, engine size, and body tube cost.

Each sub system has individual alternatives that will be used before we switch rocket designs. These are in later slides and for more unusual ones they are located on our PDR.

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Payload

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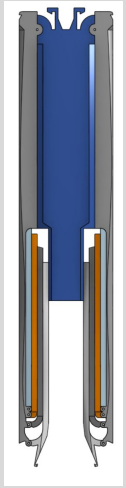

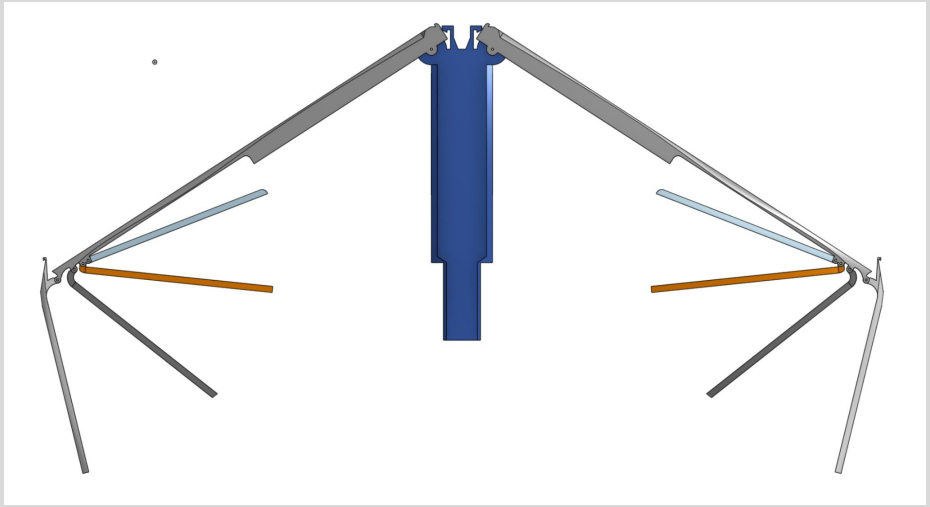

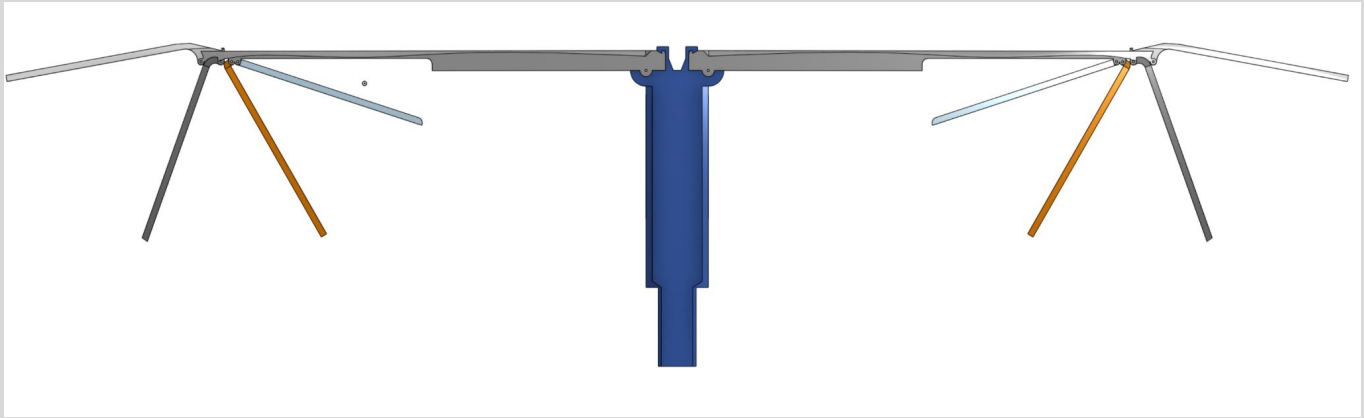

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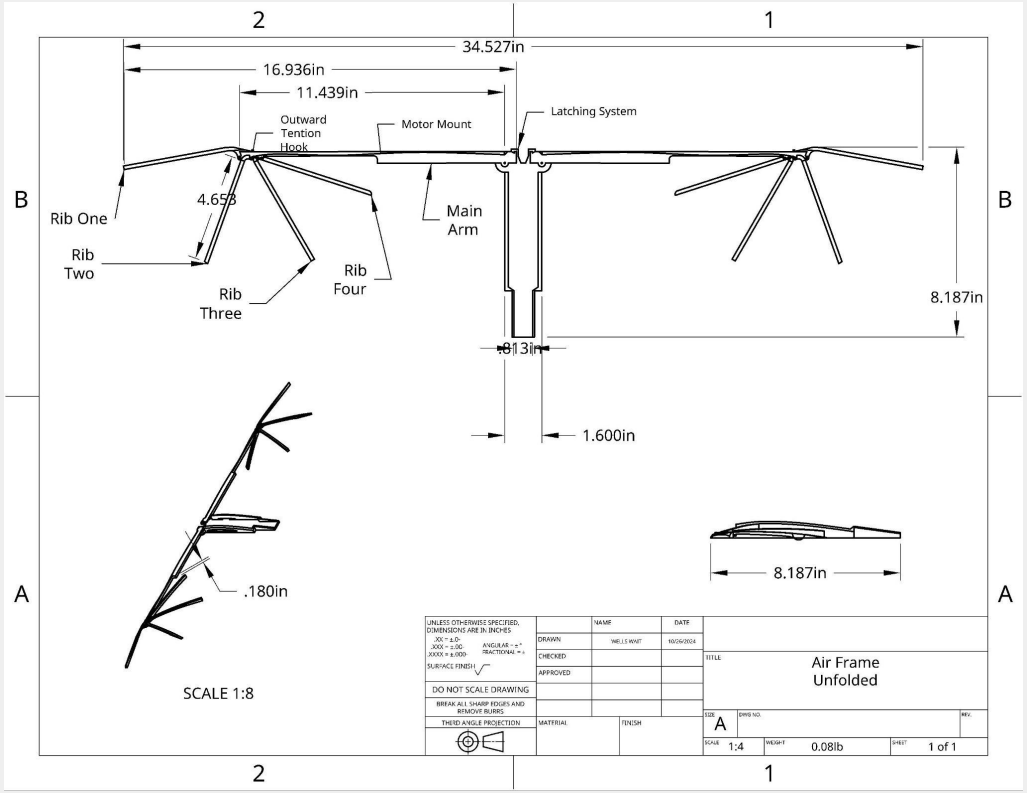
Payload Dimensions - Unfolded

Wing Span: 34.5in

Length: 8in

The size of the fuselage: Unknown
(Estimate .75 in thick)



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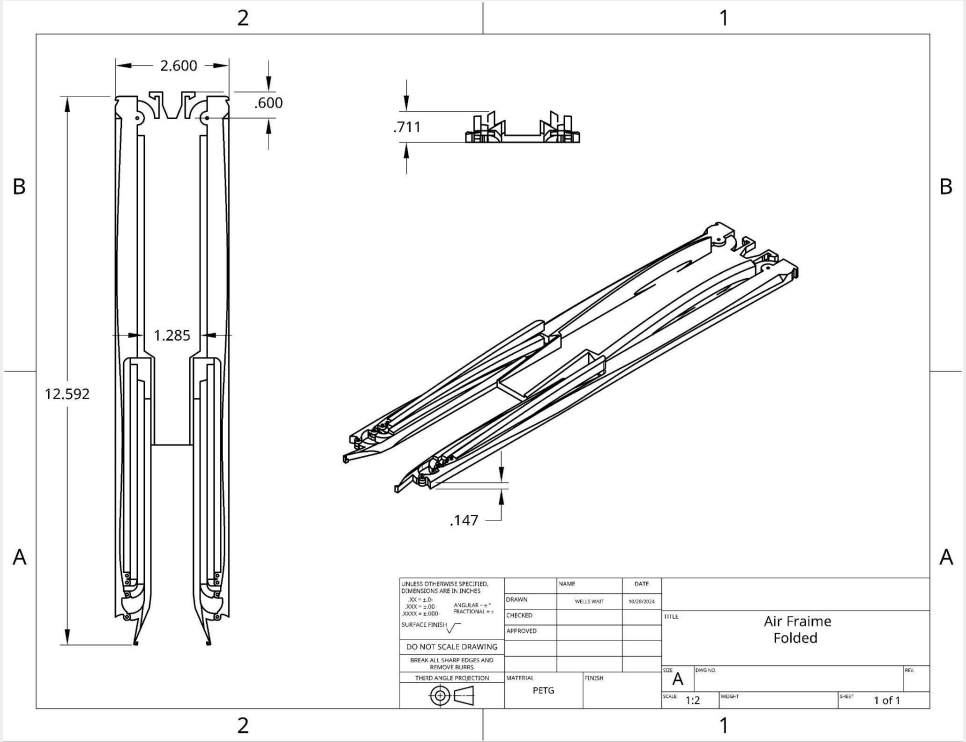
Payload Dimensions - Folded

Width: 2.6

Length: 12.5 in
(Will be shortened to 12in)

The size of the fuselage: Unknown
(Estimate .75 in thick)



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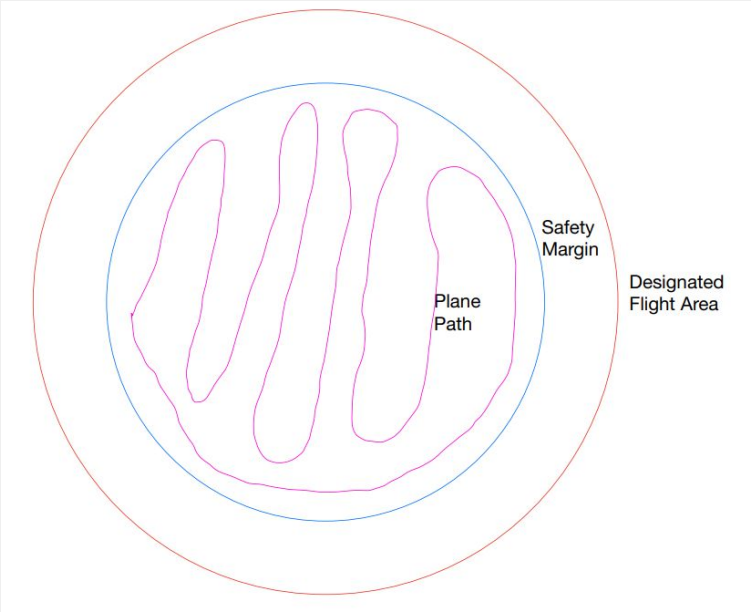
Flight Software - Path Option 1

Grid based systematic flight path with perimeter loop to connect the start of the grid flight path. This would allow the plane to start anywhere on the path and complete the entirety.



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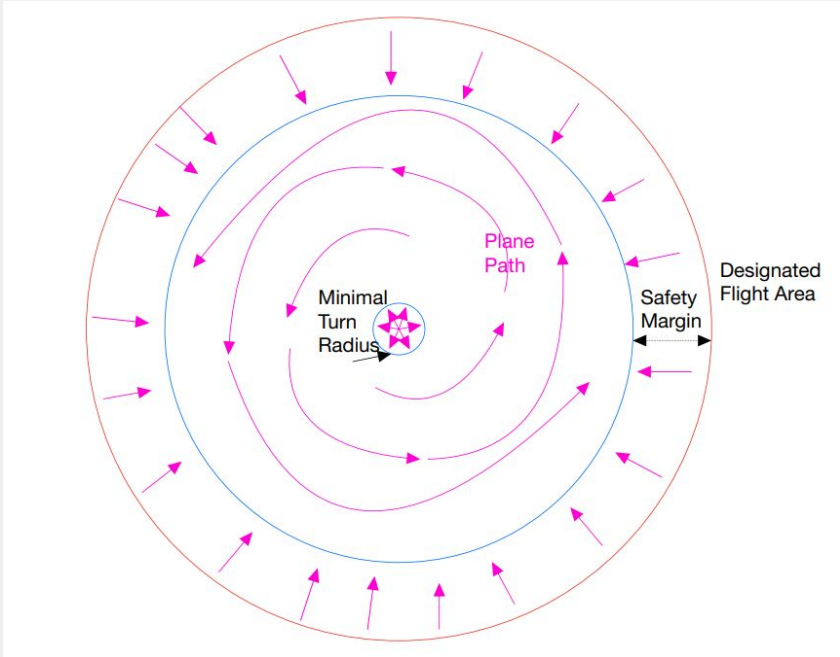
Flight Software - Path Option 2

This path is a simple spiral going out to the outside of the flight radius. This will keep the plane away from other rockets launching while still covering a large aria. If the rocket is near the boarder when the plane is released this path would not be optimal.



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Flight Software - Path Option 3

This would be an algorithm to avoid locations that have already been flown. This is more computationally strenuous as it has to constantly refer to all the GPS data collected.

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Alternatives

Design	Pro	Con
Rotating Solid folding Wing	Simple and reliable	Wings will take up more room in the rocket possibly requiring a larger body tube.
Non-differential thrust	More standard and would be able to steer without forward thrust	This would involve adding more rotating parts and servos. These are fragile during deployment.
Delta wing high speed descent with flap contra	No motors and minimal wings with a parachute for safe landing	This will be moving too fast to get good images and if a failed parachute released occurs it is a dart-like object.

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Payload Release

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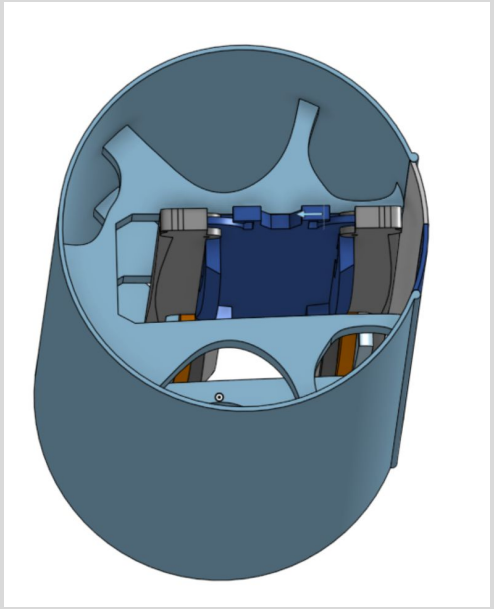
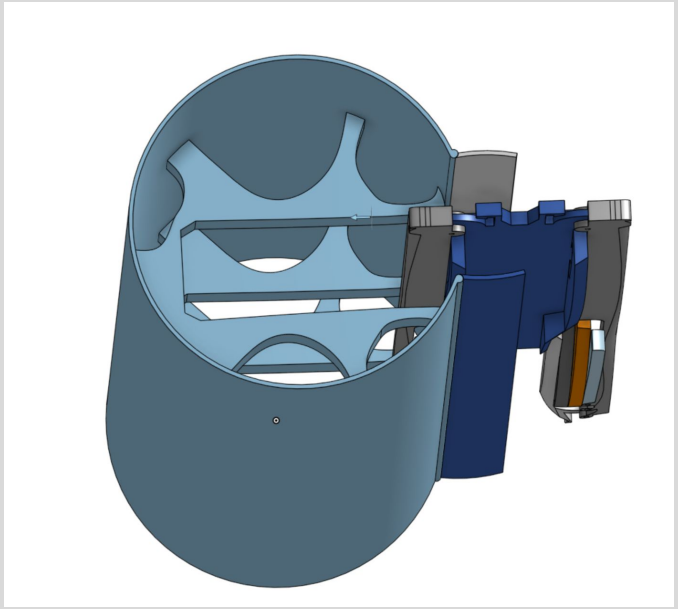
Double Door Hatch system





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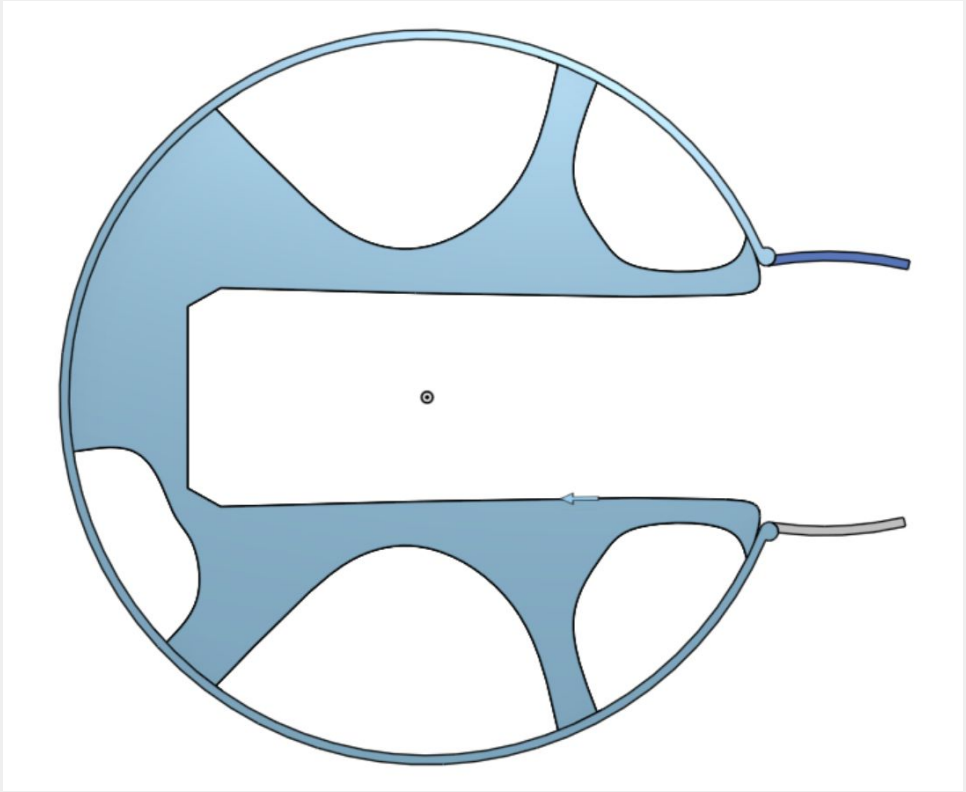
Slingshot

- Gets plane away from rocket
- Pushes plane to open door
- Ensures plane is fully out of rocket



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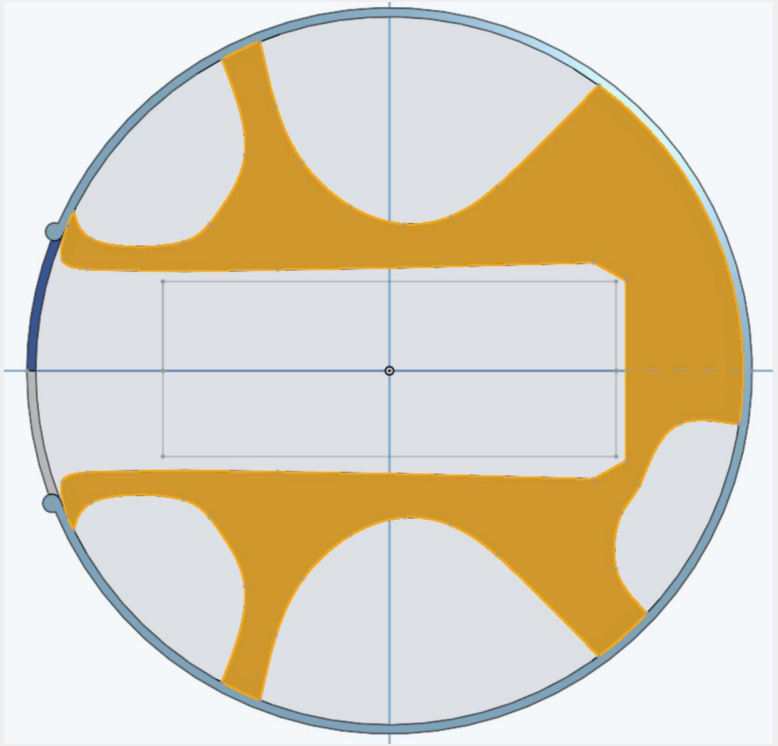
Internal Frame

- Supports body tube
- Keeps plane optimally oriented
- Ensures wings don’t open until release



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Requirements Compliance Plan

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Questions?

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