# Preliminary Design Review

November 3, 2025

# Presentation Overview

- Leading Launch Vehicle Design
- Leading Recovery Design
- Mission Performance Predictions
- Leading Payload Design
- Air Brakes Design
- Requirement Compliance
- Project Plan
- Questions

# Team Introductions

Elizabeth
Team Lead

Donald
Structures Lead

Aditya
Aerodynamics Lead

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Recovery Lead

Aidan
Safety Officer

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Payload Software Lead

Emily
Payload Structures Lead

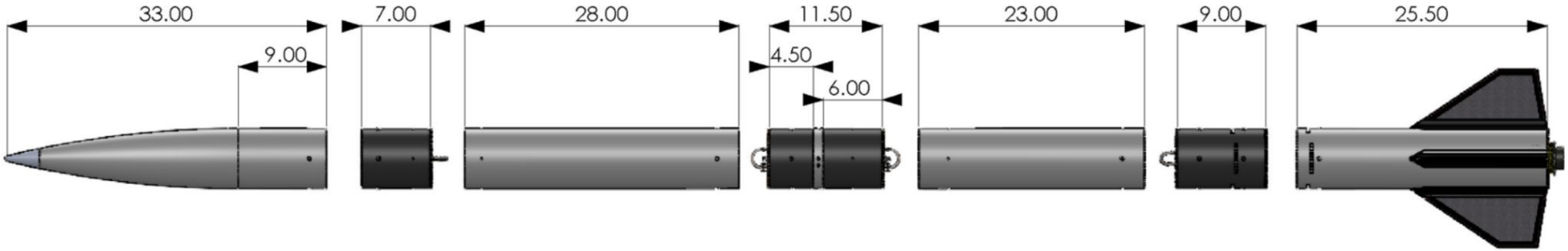
Ben
Payload Electronics Lead

James
Integration Lead

# Leading Launch Vehicle Design

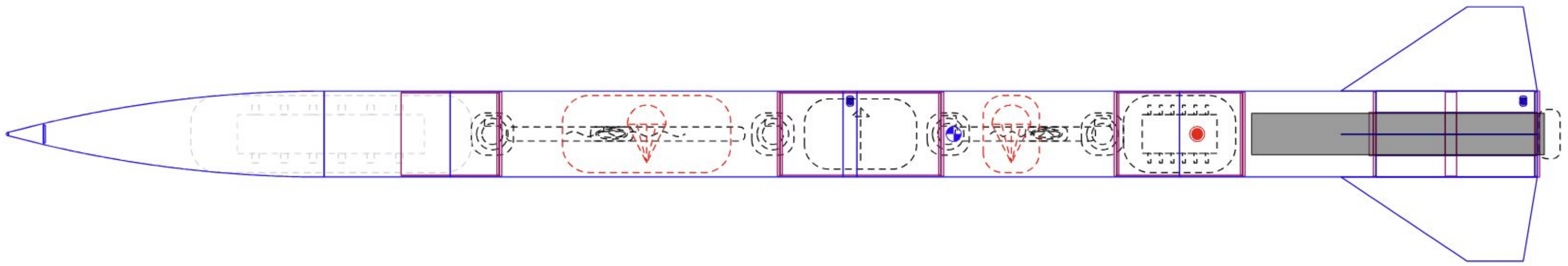
# Vehicle Dimensions

- 111.00-inch Vehicle length
- 6.12-inch Body outer diameter
- .058-inch Body wall thickness
- .068-inch Coupler wall thickness
- 36 lbf loaded



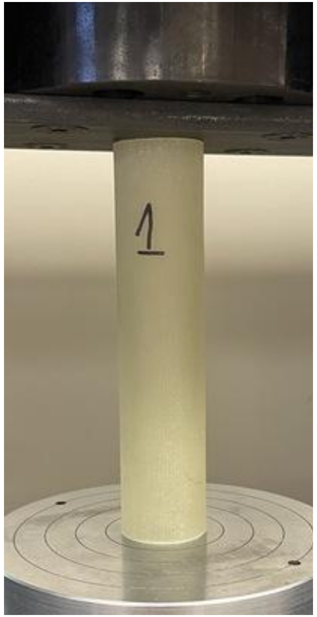
# Vehicle Stability

| Software | Center of Pressure | Center of Gravity | Stability Margin |
|---|---|---|---|
| OpenRocket | 84.901 in. | 67.54 in. | 2.84 Calibers |
| RocketPy | 84.803 in. | 66.693 in. | 2.934 Calibers |



# Vehicle Body Material

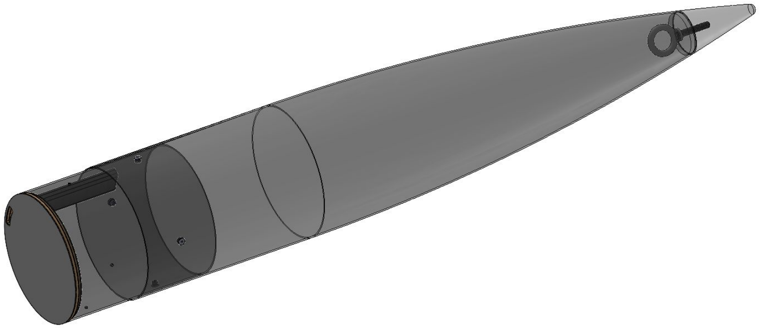
- Roll-wrapped S2 fiberglass cloth impregnated with US Composites 635 laminating epoxy
- High-strength, climate resistant, and RF transparent
- 16,500 psi experimental compressive strength

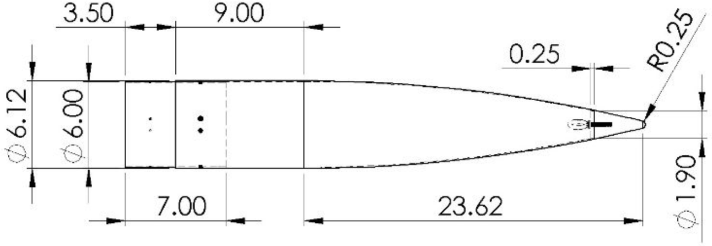


# Nosecone / Payload Bay

Multiple layers of fiberglass sleeve with US Composites epoxy

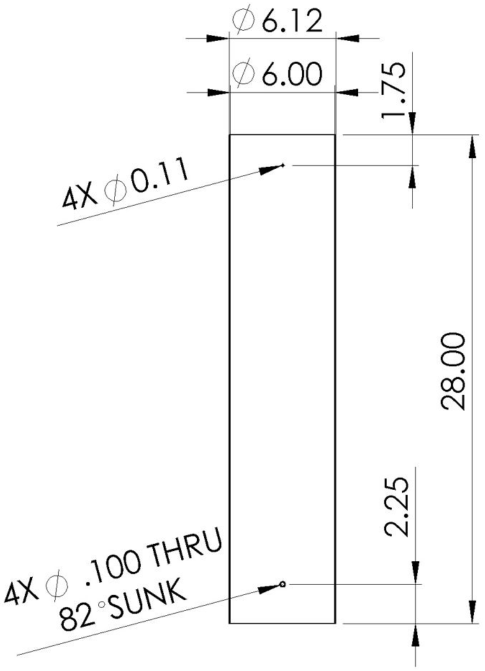
- Extended length full diameter for ample payload volume with 4:1 ratio nosecone
- Recovery attachment at nose cone tip with epoxied carbon fiber tube for shock cord guidance
- 3.5-inches of coupler engagement





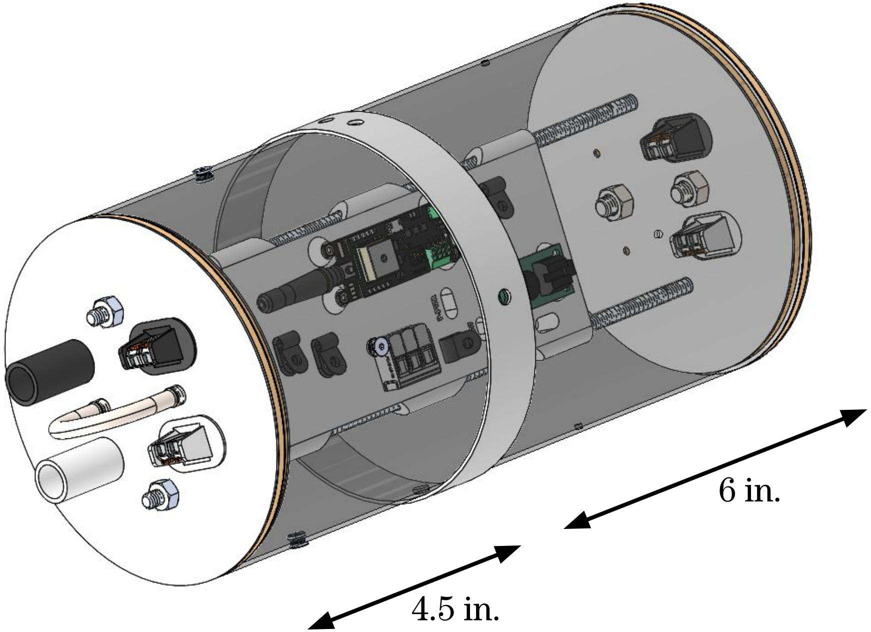
# Main Parachute Bay

- Single section of roll-wrapped fiberglass
- Houses the main recovery assembly
- Connects to the aft end of the nose cone coupler
  - 4X 4-40 Nylon shear pins
- Connects to the forward end of the avionics bay
  - 4X 6-32 Stainless steel countersunk screws



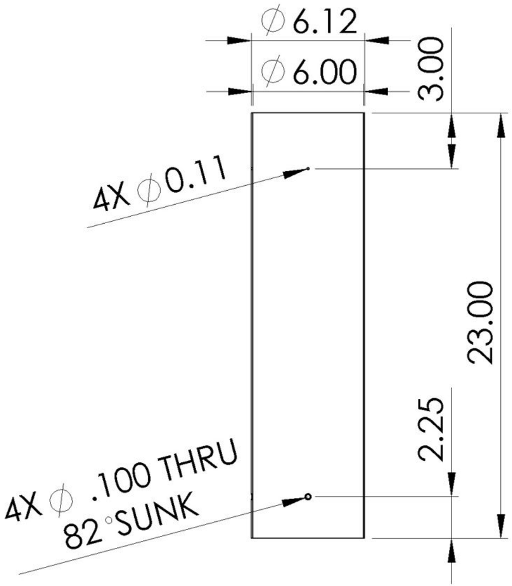
# Avionics Bay

- Contains all recovery electronics and energetics
- Extends 4.5 in. into main parachute bay
- Extends 6 in. into drogue parachute bay
- Stepped bulkheads



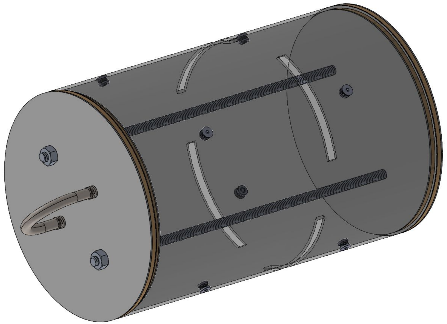
# Drogue Parachute Bay

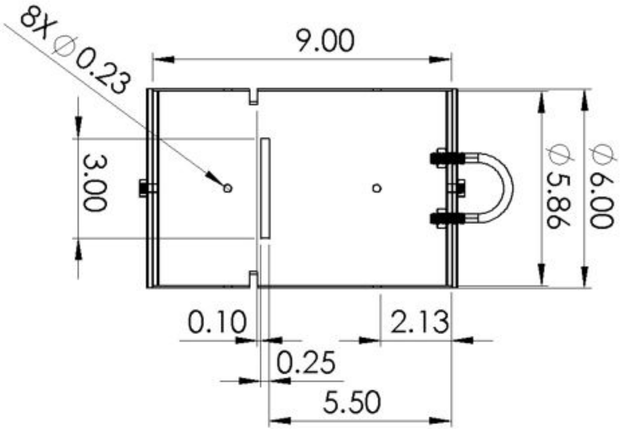
- Single section of roll-wrapped fiberglass
- Houses the drogue recovery assembly
- Connects to the aft end of the avionics bay
  - 4X 4-40 Nylon shear pins
- Connects to the forward end of the air brakes bay
  - 4X 6-32 Stainless steel countersunk screws



# Air Brakes Bay

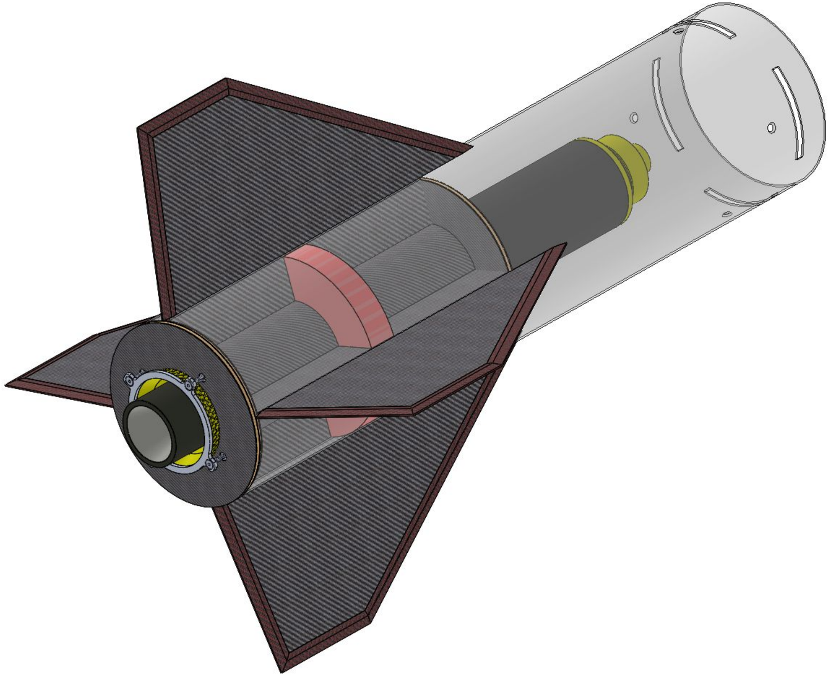
- Contains the air brakes assembly and aft drogue recovery attachment point
- Extends 4.5 in. into drogue parachute bay
- Extends 4.5 in. into fin can
- Slots cut for air brakes fins





# Fin Can

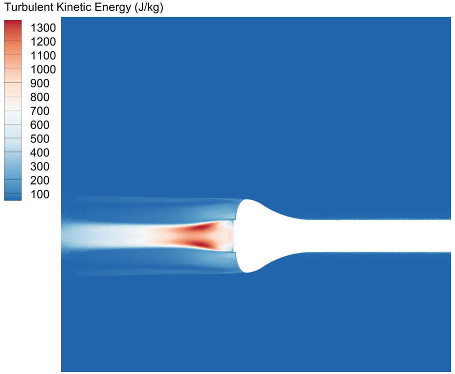
- Single section of roll-wrapped fiberglass
- Slots cut for the air brakes fins
- Epoxied in motor mount, fins, centering rings, and thrust plate assembly
- 3D Printed PLA centering ring with slots matching fins

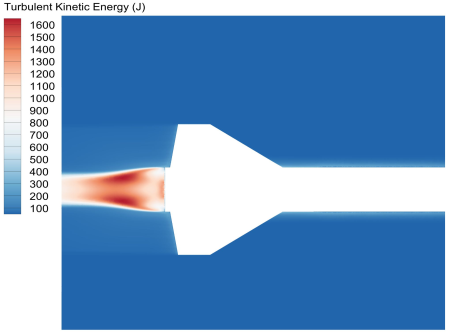


HIGH-POWERED ROCKETRY CLUB
TACHO LYCOS

# Fin design

- Preliminary design- Elliptical trailing edge, Curved delta leading edge
  - Superior Drag Reduction
  - Drag per fin = 2.248  lbf at 619 ft/s
  - Little velocity loss across the trailing edge
  - Overall Lower turbulence
  - Complex manufacturing
- Leading design - Swept Trapezoidal
  - Drag per fin = 5.845 lbf at 619 ft/s
  - Similar velocity loss across trailing edge
  - Higher turbulence induced
  - Simple manufacturing

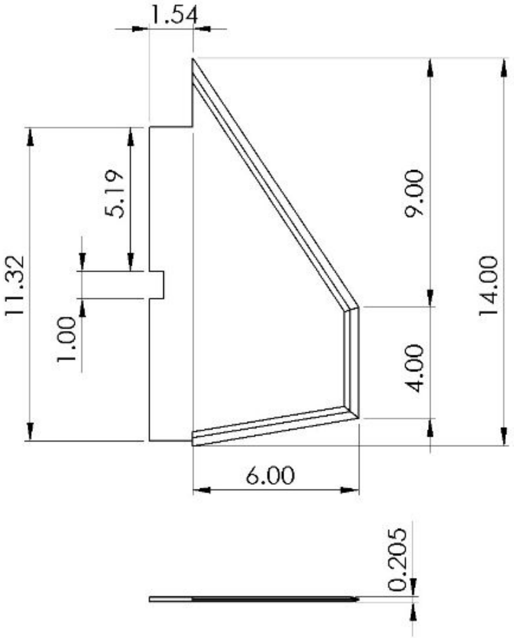


# Fin Geometry

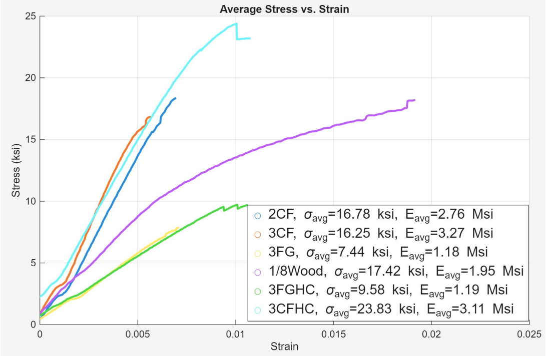
Aft-Swept Trapezoidal Shape

- Tip Chord: 4.00 in
- Root Chord: 14.00 in
- Height: 6.00 in
- Sweep Length: 2.50 in
- Fin Tab Depth: 1.54 in
- Fin Tab Length: 11.32 in
- Fin Thickness: 0.205 in



# Vehicle Plate Material

- 0.125-inch Honeycomb Nomex core material
- Multiple layers of S2 8.9 oz/yd$^2$ or 3K 5.7 oz/yd$^2$ carbon fiber cloth with US Composites laminating epoxy
- Wet layup with vacuum bag compression
- 50-55% fiber volume fraction experimentally



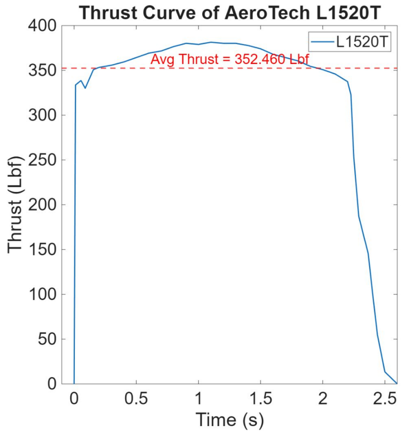
# Vehicle Plate Material (contd.)

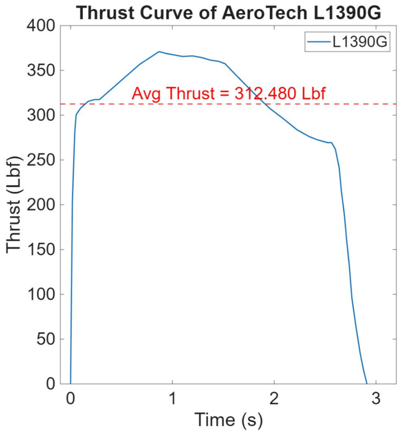
| Component | Layup Sequence | | | | |
|---|---|---|---|---|---|
| Avionics & Nose Cone Bulkheads | 4 x [0/90] FG | Honeycomb Nomex Core | 1 x [0/90] FG | Honeycomb Nomex Core | 4 x [0/90] FG |
| Air Brakes Bulkheads | 3 x [0/90] CF | Honeycomb Nomex Core | 1 x [0/90] CF | Honeycomb Nomex Core | 3 x [0/90] CF |
| Forward Centering Ring | 3 x [0/90] CF | Honeycomb Nomex Core | 3 x [0/90] CF | NA | |
| Thrust Plate | 3 x [0/90] CF | Honeycomb Nomex Core | 1 x [0/90] CF | Honeycomb Nomex Core | 3 x [0/90] CF |
| Fins (symmetric) | 1 x [0/90] CF | 1 x [-45/+45] CF | 1 x [0/90] CF | 1 x [-45/+45] CF | Honeycomb Nomex Core |

# Motor Selection

- The chosen motor is the AeroTech L1390G
- Its burn time, altitude, and thrust curve were driving factors
- For a given target Apogee of 4600 ft, the motor will carry the vehicle to 5435 ft.

| Motor | Rail Exit Velocity | Maximum Acceleration | Thrust to Weight |
|---|---|---|---|
| L1390G | 78.5 ft/s | 9.56 G | 8.58:1 Lbs |
| L1520T | 83.4 ft/s | 10 G | 9.59:1 Lbs |



# Leading Recovery Design

# Recovery Events

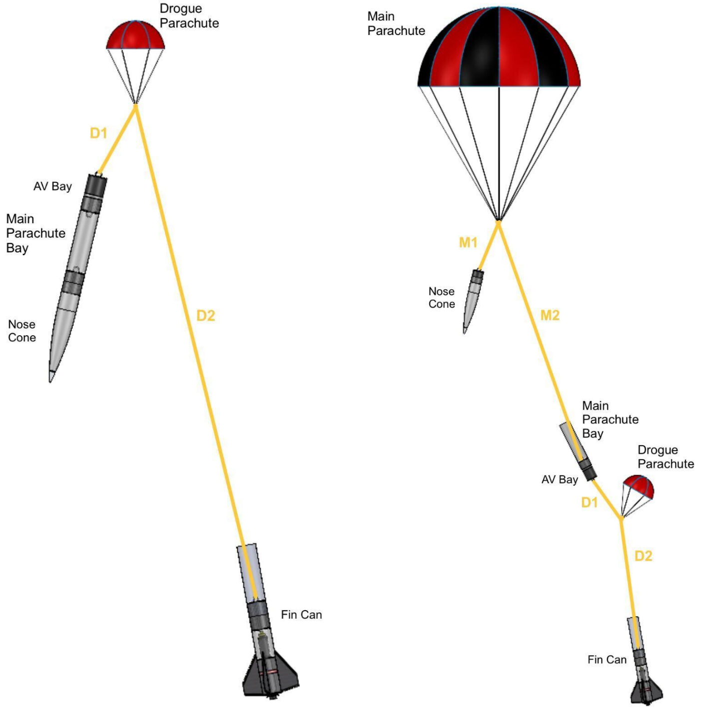
Drogue Deployment

- Apogee
- Secondary 1 second after primary

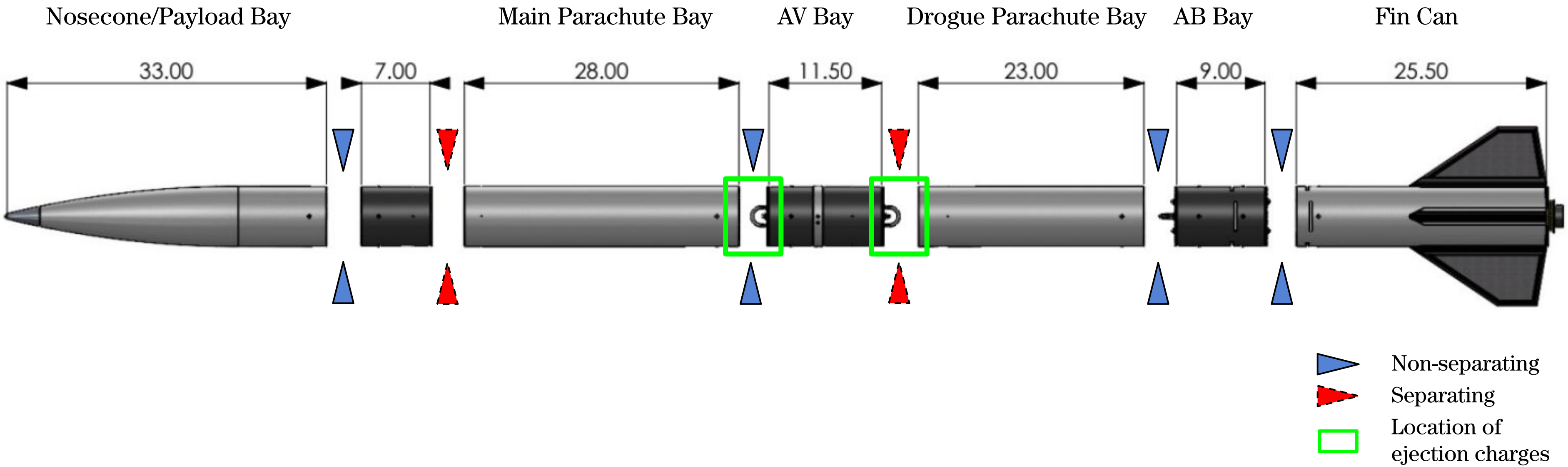
Main Deployment

- 550 ft.
- Secondary at 500 ft.

All sections connected via shock cord with a minimum of 10ft. of separation between sections



# Separation Points



# Altimeters

| Altimeter | Size | | Power | Cost | Owned | Sensors | | Features | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Length | Width | | | | Barometer | Accelerometer | GPS | Tele | Radio |
| Silicdyne Fluctus | 4.30” | 1.00” | 3.7V - 10V | $400 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Eggtimer Quasar | 5.50” | 1.09” | 7.4V | $100 | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Altus Metrum EasyMini | 1.50” | 0.80” | 3.7V - 12V | $80 | ✓ | ✓ | | | | |
| PerfectFlite StratologgerCF | 2.00” | 0.84” | 4V - 16V<br>9V Nominal | $70 | ✓ | ✓ | | | | |

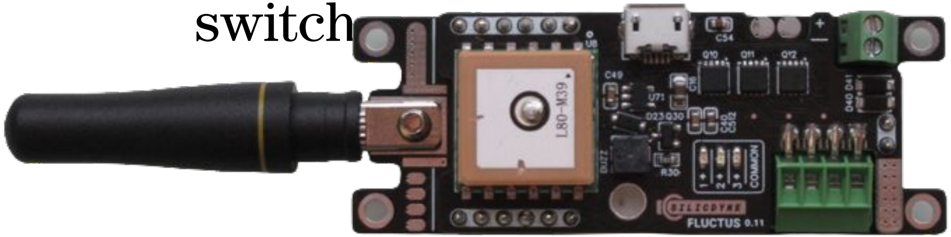
# Trackers

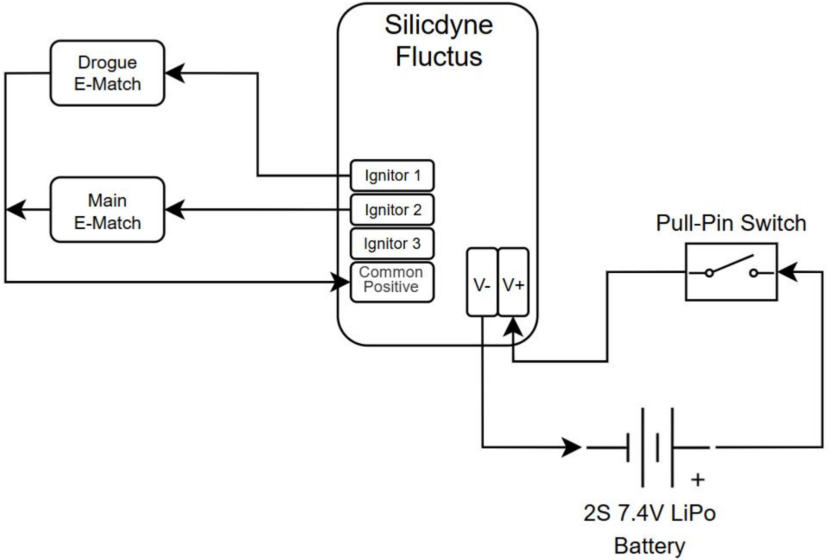
| Tracker | Size | | Transmitter Frequency | Range | Cost | Owned |
|---|---|---|---|---|---|---|
| | Length | Width | | | | |
| Silicdyne Fluctus | 4.30” | 1.00” | 900 MHz | 6.00 miles | $400 | ✓ |
| Eggtimer Quasar | 5.50” | 1.09” | 900 MHz | 6.00 miles | $100 | ✓ |
| Eggfinder Mini | 7.00” | 3.25” | 900 MHz | 1.50 miles | $75 | ✓ |

# Leading Avionics

## Primary Altimeter + GPS Tracker

- Silicdyne Fluctus
- Powered by a 7.4V 800 mAh LiPo battery
- Controlled using pull-pin switch

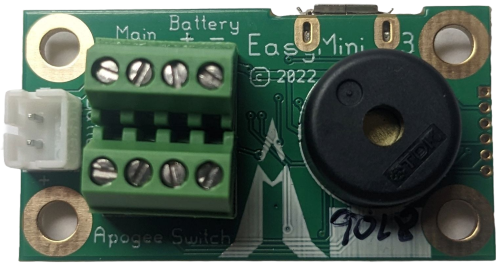


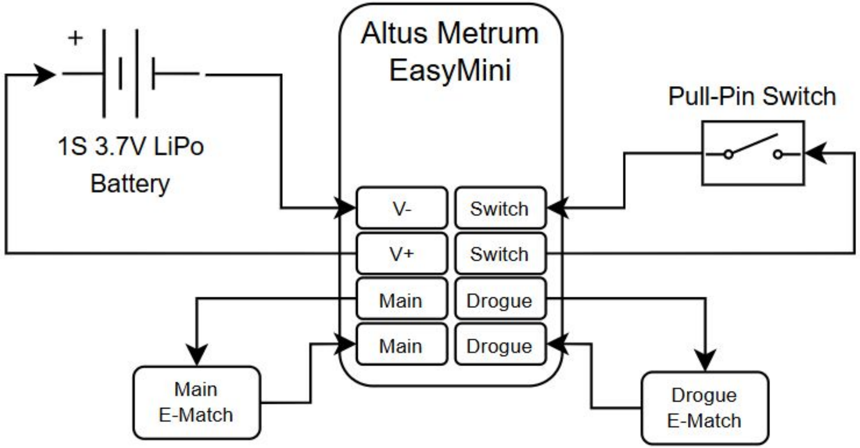



# Leading Avionics

## Secondary Altimeter

- Altus Metrum EasyMini
- Powered by a 3.7V 500 mAh LiPo battery
- Controlled using pull-pin switch



# Drogue Parachute

| Parachute | Drag Coefficient | Descent Velocity | Descent Time: Apogee to Main Deployment | Max Drift Distance: Apogee to Main Deployment | Owned |
|---|---|---|---|---|---|
| 15” Elliptical | 1.5 | 120.27 fps | 33.67 s | 987.75 ft | ✓ |
| 18” Elliptical | 1.5 | 100.23 fps | 40.41 s | 1185.30 ft | ✓ |
| 24” Elliptical | 1.5 | 75.17 fps | 53.88 s | 1580.40 ft | ✓ |
| 30” Elliptical | 1.5 | 60.14 fps | 67.35 s | 1975.50 ft | |

# Main Parachute

| Parachute | Drag Coefficient | Descent Velocity | Descent Time: from Main Deployment | Kinetic Energy | Max Drift Distance: Apogee to Main Deployment | Owned |
|---|---|---|---|---|---|---|
| Fruity Chutes Iris Ultra 72" Compact | 2.2 | 21.02 fps | 26.17 s | 99.53 ft-lbf | 767.59 ft | |
| Fruity Chutes Iris Ultra 84" Compact | 2.2 | 17.73 fps | 31.01 s | 70.86 ft-lbf | 909.72 ft | ✓ |
| Fruity Chutes Iris Ultra 96" Compact | 2.2 | 15.76 fps | 34.89 s | 55.99 ft-lbf | 1023.45 ft | ✓ |
| Fruity Chutes Iris Ultra 120" Compact | 2.2 | 12.61 fps | 43.61 s | 35.83 ft-lbf | 1279.32 ft | ✓ |

# Parachute Materials

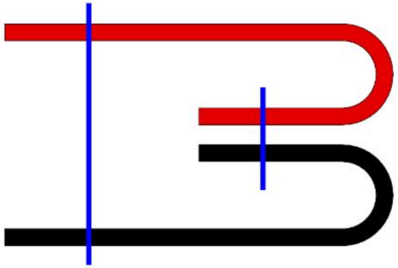
## Parachute Material: Ripstop Nylon

| Uncalendered | Calendered |
|---|---|
| Softer, more flexible | Increases stiffness, maintains flexibility |
| More porous, breathable | Reduced porosity |
| Less resistant to abrasion | High resistance to abrasion |
| Tensile strength: 14.7 lbf/in | Tensile strength: 24.7 lbf/in |

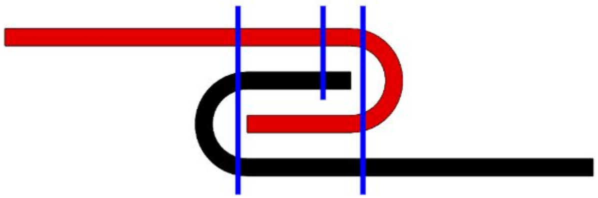
## Thread Material

| Cotton | Bonded Nylon |
|---|---|
| Easy to handle | Higher tensile strength |
| Inelastic | Elasticity |
| Degrades quickly | Durable |

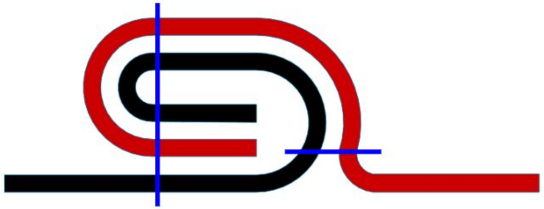
# Parachute Fabrication



French Seam



Flat-Fell Seam



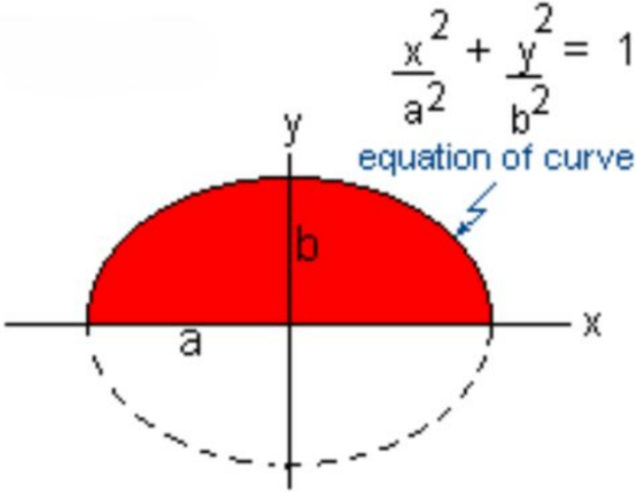
Flat-Fell Seam Variation

# Shroud Lines

| UHMWPE | Kevlar |
|---|---|
| High strength-to-weight ratio | Abrasion and heat resistant |
| High tensile strength | Lower tensile strength |
| Tangles easily | Greater durability |
| Can twist/distort under loading | Easier to handle, doesn't tangle as easily |

# Parachute Design

- Elliptical shape
- b/a = 0.7
- Reduces required material while maintaining performance
  - Weight and packing volume



# Leading Parachute Configuration

Drogue Parachute

- 18 in. custom elliptical parachute
- Protected by Nomex blanket

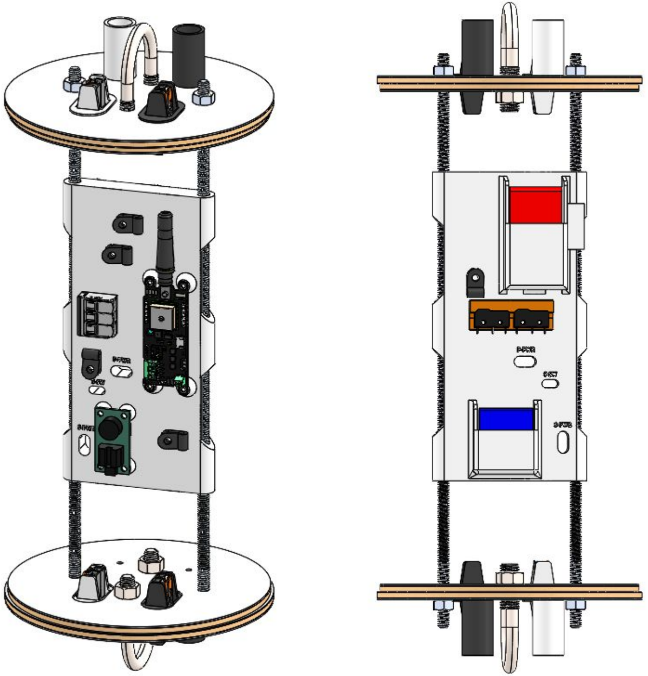
Main Parachute

- Fruity Chutes Iris Ultra 96 in. Compact
- Protected by Fruity Chutes deployment bag

| Parameter | Value |
|---|---|
| Drogue Descent Velocity | 100.15 fps |
| Main Descent Velocity | 15.76 fps |
| Max Kinetic Energy | 55.99 ft-lbf |
| Descent Time | 75.33 s |
| Max Drift Distance | 2209.71 ft |

# AV Sled Design

- 3D printed PLA sled
- All electronics mounted directly to sled
- Built-in slots for batteries, in addition to Velcro
- Wire clamps for cable management
- In-line WAGO connectors on each bulkhead
- Color-coded wires and charge wells



# Shock Cord Selection

Parachute opening force

- Parachute inflation time: $t = \frac{nD}{v_d} = \frac{4 \cdot 8\, ft.}{100.15\, fps} = 0.3195\, sec$

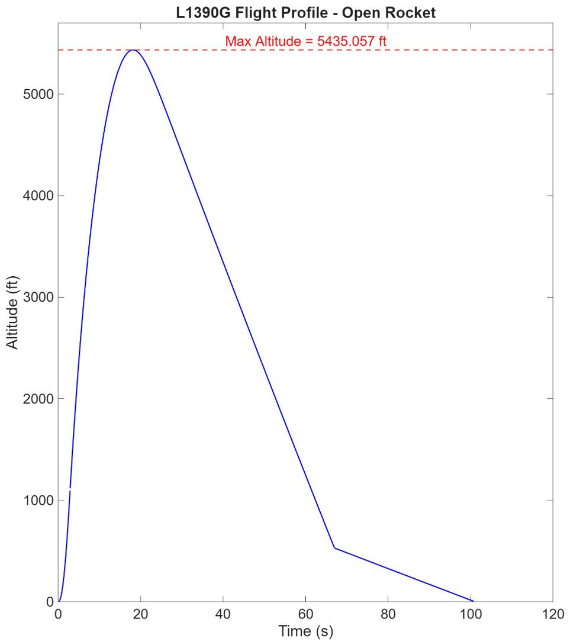
- Opening shock force: $F_{shock} = \frac{m\Delta v}{t} = \frac{31.63\, lbm \cdot 84.39\, fps}{32.2\, ft/s^2 \cdot 0.3195\, sec} = 259.42\, lbf$

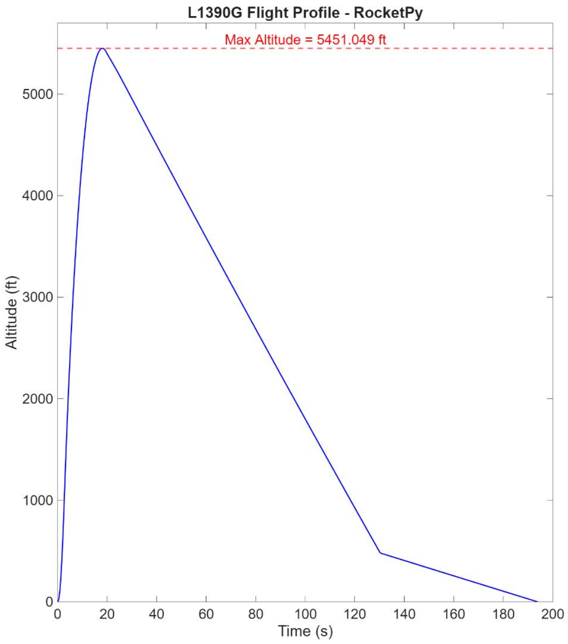
- 5/8 in. Kevlar shock cord strength: 6600 lbf
- Shock cord factor of safety: 25.44

# Mission Performance Predictions

# Trajectory - Chosen Motor

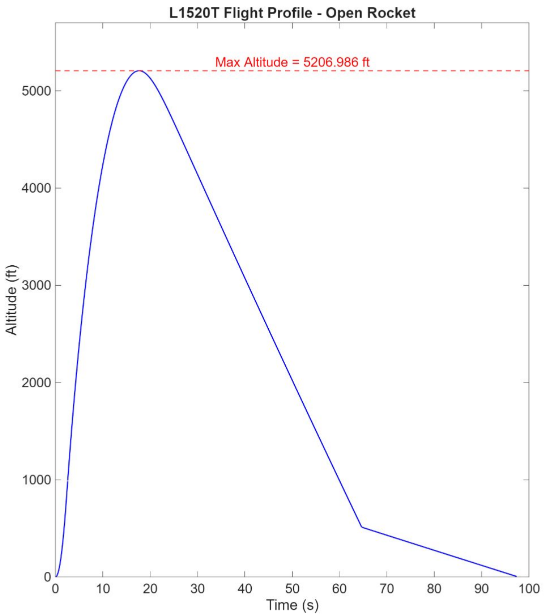
- Flight profiles between OpenRocket and RocketPy show an Apogee of 5435 ± 20 ft.
- Declared Apogee is 4600 ft. with Air Brakes deployment

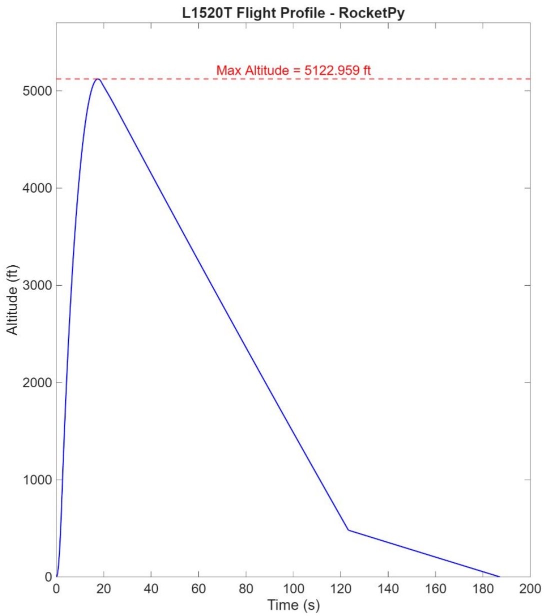


# Trajectory - Backup Motor

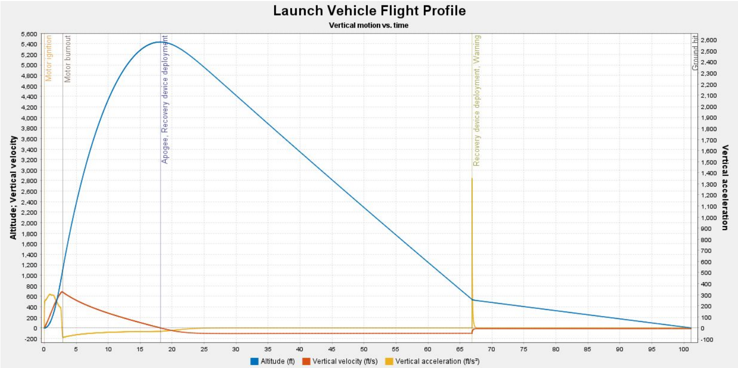
- An Apogee of 5206 ± 100 ft. is projected
- The vehicle will be able to reach the declared apogee with Air Brakes deployment

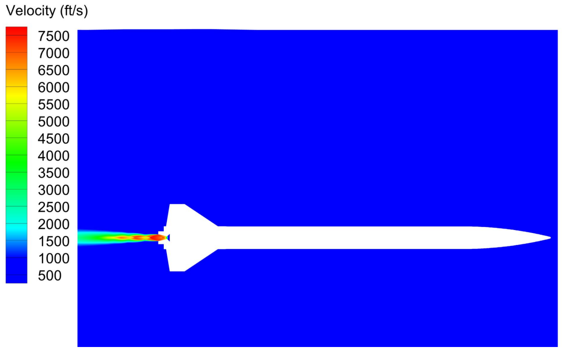


# Performance - Chosen Motor

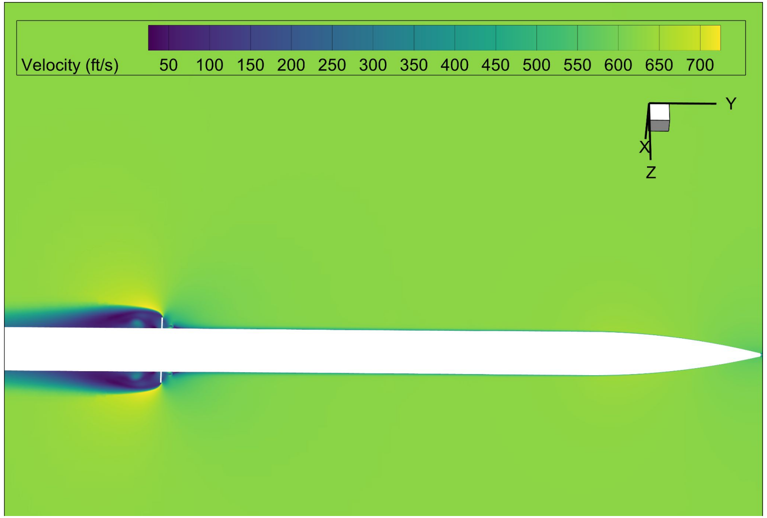
- All simulations were conducted with
  - 144 in Launch Rail
  - 5 mph average wind speed
  - 5 deg, cant



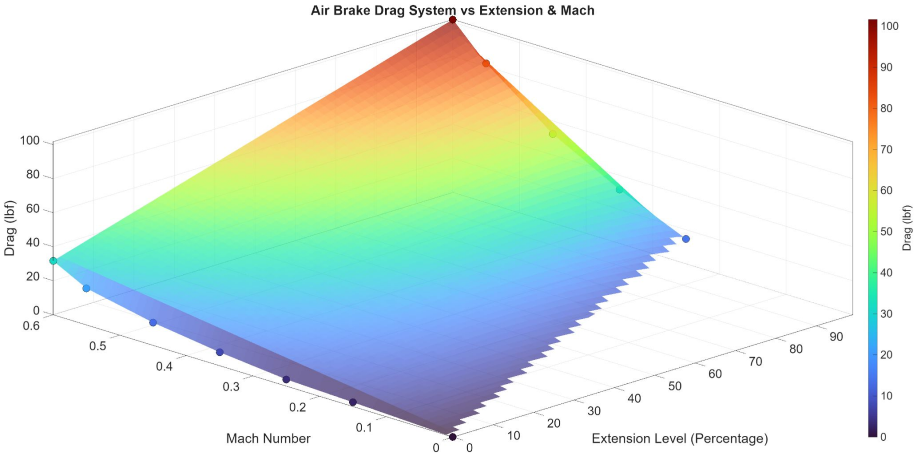



# Declared Apogee

- Declared Apogee is 4600 ft with Air Brakes deployment

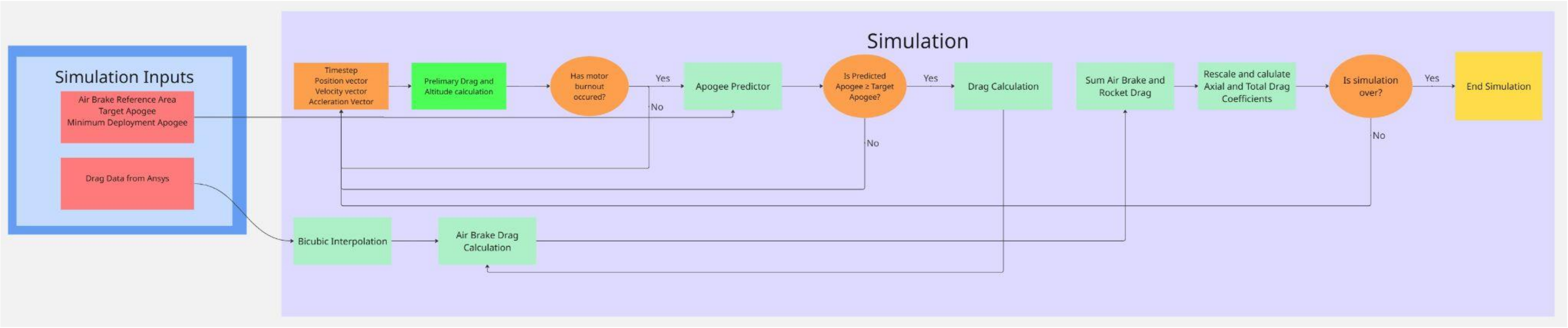



- Drag force per Mach vs Deployment level was simulated for a drag profile



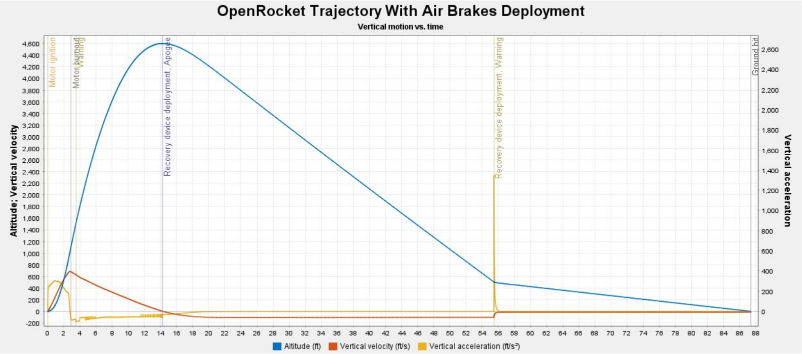
# OpenRocket Plugin

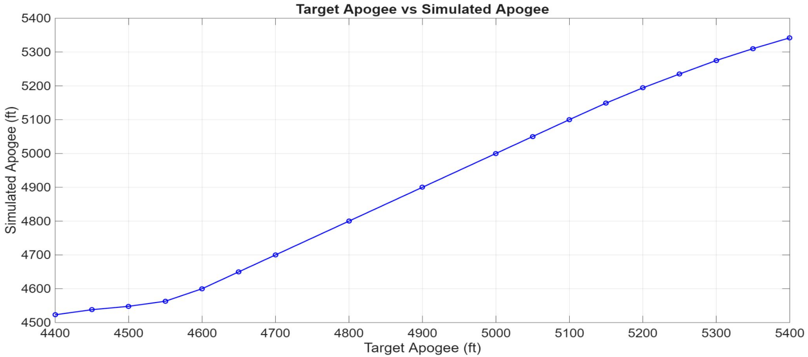
- OpenRocket supports external augmentation software
- Drag profile is used in conjunction with custom software to influence OpenRocket
- Air Brakes control system is translated to OpenRocket for trajectory analysis



# Target Apogee

- Trajectory for the declared apogee is generated
  - Target Apogee set is 4600 ft.
  - Simulated Apogee is 4600 ft.
- With the use of the plugin, Target Apogee equals Simulated Apogee from 4600 ft to 5200 ft
- Further refinement will be employed for accuracy



# Leading Payload Design

# Payload Objective and Requirements

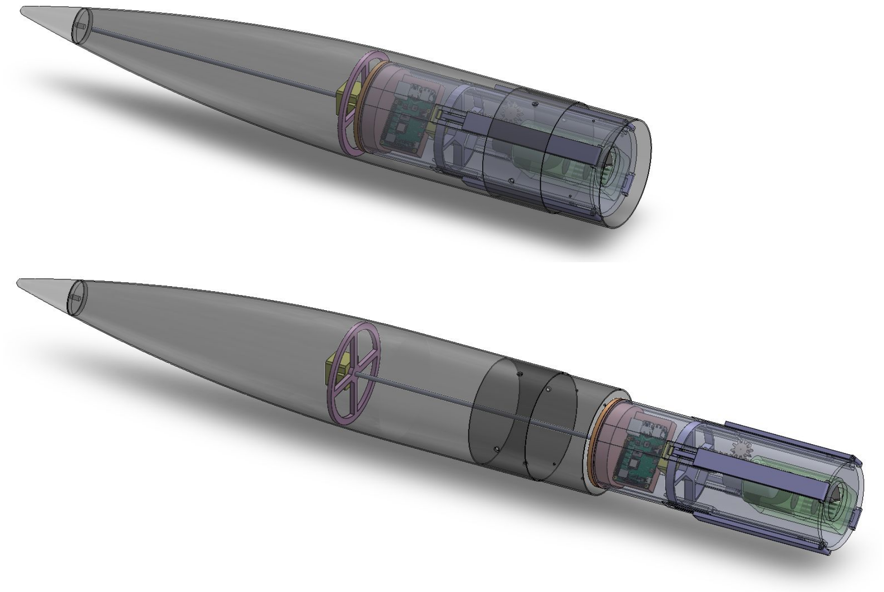
- Collect 50 milliliters of soil within 15 minutes of the rocket landing
- Test the collected soil for pH, electrical conductivity, and Nitrate-Nitrogen content
- Save this data with timestamps to be presented to NASA
- Create an atmosphere-isolated housing for four STEMnauts

# Payload Design Objectives

- Create a self-righting ground-deploying lander
- Use an auger to drill into and collect soil
- Test soil with an integrated sensor

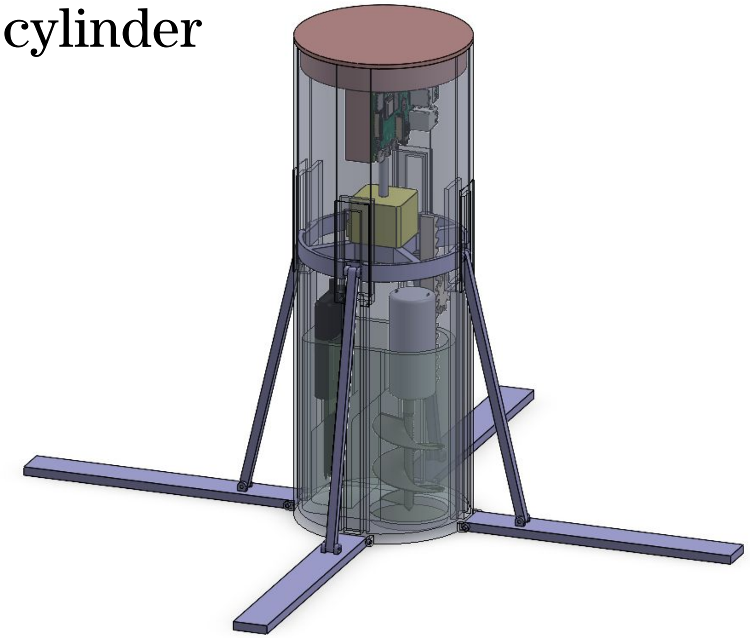
# Payload Design: Deployment

- Housed in the nosecone
- Use a lead screw to push the lander out
- Guide lander with rails
- Use an electronic latch to release the lander when it is fully deployed



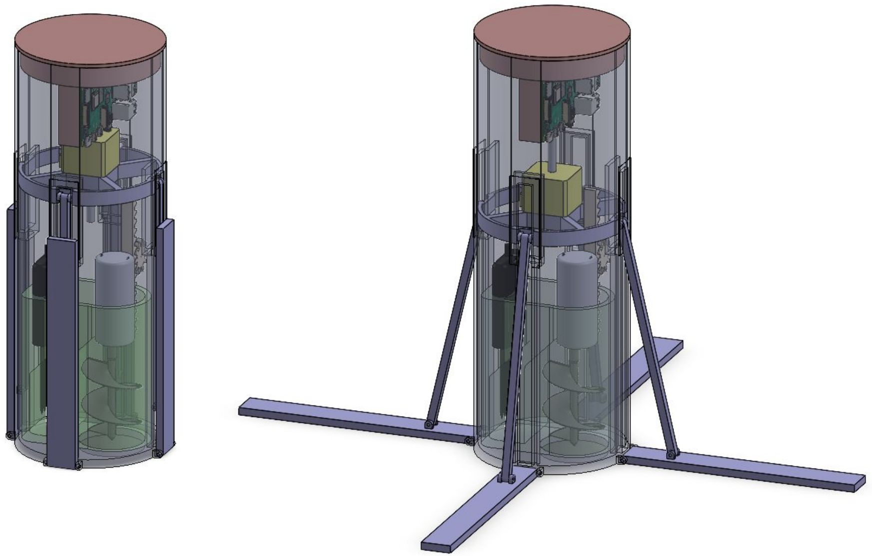
# Payload Design: Lander

- 5-inch diameter, 14-inch long cylinder
- Housed in the nosecone
- Deployed after landing



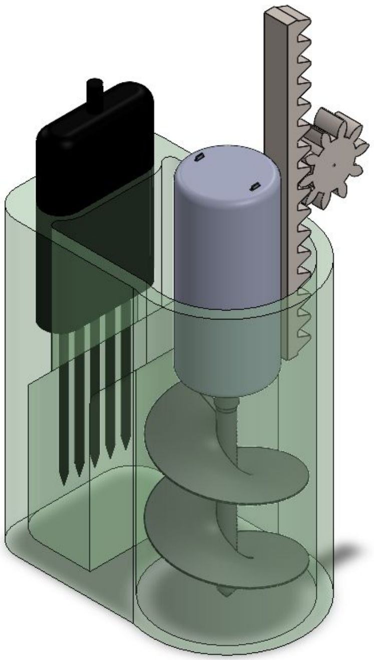
# Payload Design: Legs

- Four deployable legs
- Start folded, extend using struts to a moving collar
- This will cause the payload to self-right



# Payload Design: Drill

- Comprehensive mechanism to collect, store, and test soil
- Use a rotating and extending auger to collect soil
- Use passive mechanisms to funnel the dirt into a desired container
- Position sensor to be covered by soil

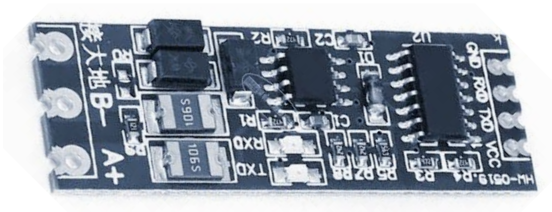


# Payload Design: Soil Sensor

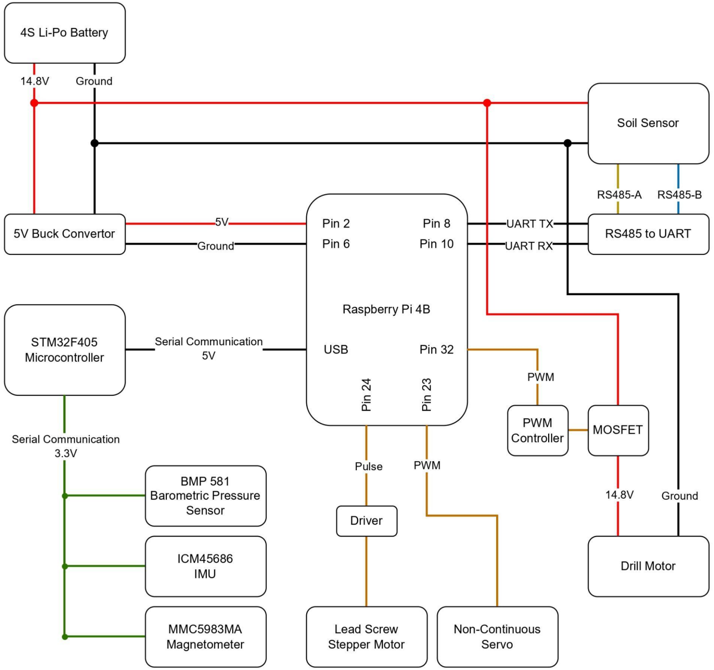
- Soil Probe
    - Temperature
    - Moisture Content
    - **pH**
    - **Electrical Conductivity**
    - **Nitrogen Levels**
    - Phosphorus Levels
    - Potassium Levels

# Payload Design: Soil Sensor

- 7-in-1 Sensor
  - Requires 12-24V of power
  - Modbus RTU communication protocol
  - RS485 communication standard
- RS-485 to UART converter

# Payload Electrical Schematics



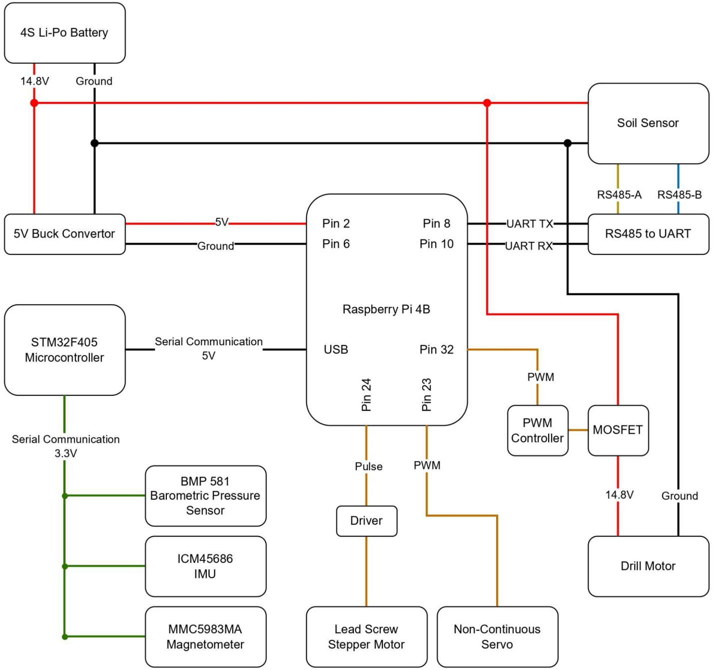

## Sensor Array

- BMP 581
  - Pressure Sensor
- ICM45686
  - Inertial Measurement Unit (IMU)
- MMC5983MA
  - Magnetometer
- STM32F405
  - Microcontroller

## On-Board Computer

- Raspberry Pi 4b

# Payload Electrical Schematics



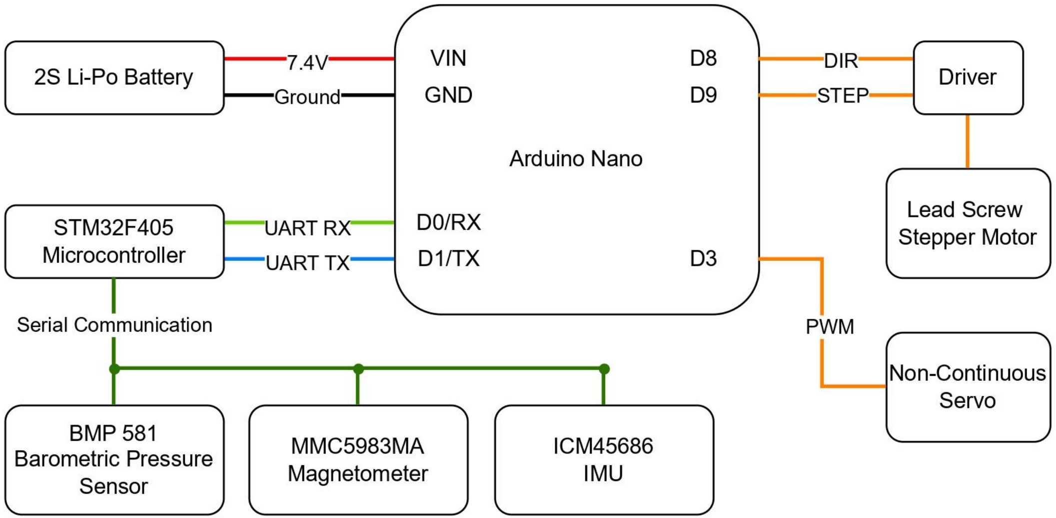

## Motors

- Planetary gear motor
  - PWM controller connected to MOSFET
- Non-continuous servo
  - Rack and Pinion
- Stepper motor
  - Pulse signal to motor driver

## Power

- 4S LiPo Battery

# Payload Electrical Schematics

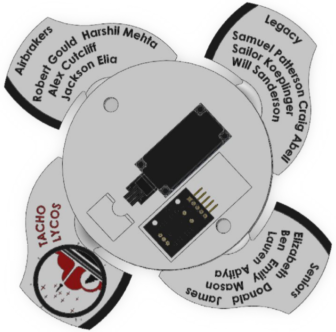


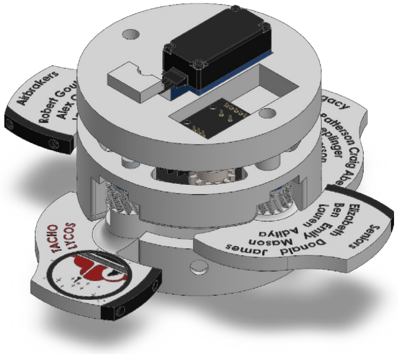

- On-Board Computer
  - Arduino Nano
- Similar sensor array
  - UART (Communication)
- Motors
  - Stepper motor
  - Non-continuous servo
- Power
  - 2S LiPo (7.4V)

# Air Brakes Design

# Leading Design

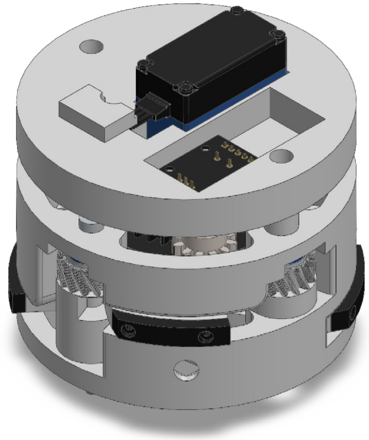
- Planetary gear design
  - Central gear actuates 4 gears simultaneously
  - Helical gears for reduced friction
- 4 fins to maximize area
  - 23.06 in^2 max area



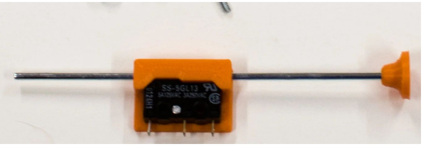
# Manufacturing

- All structural parts to be 3D printed
  - Material Choice - PETG
- Electronics
  - Soldered for direct connections
  - Wiring and connectors for ease of assembly

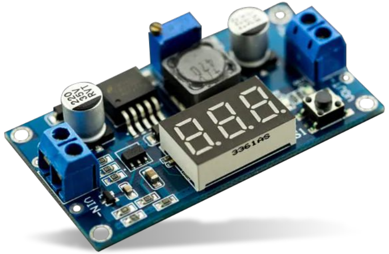


# Hardware

- Raspberry Pi 5
- IMU
- Barometric pressure sensor
- Servo
- Buck Converter
- Pullpin
- 4S Li-Po Battery





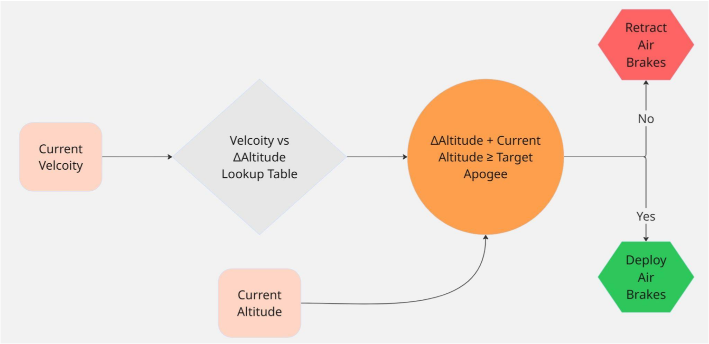



# Software

- All programming is done in Python
  - Object Oriented Programming
  - Access to reliable libraries
- Supports multi-threading
  - Raspberry Pi 5 has 4 cores
  - Faster compute
- Programmed as a Finite State Machine

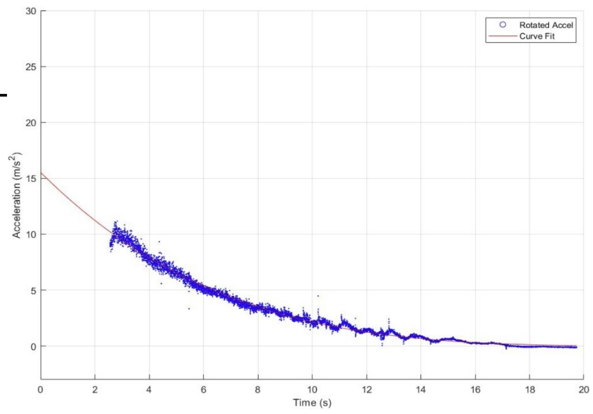
# Control system

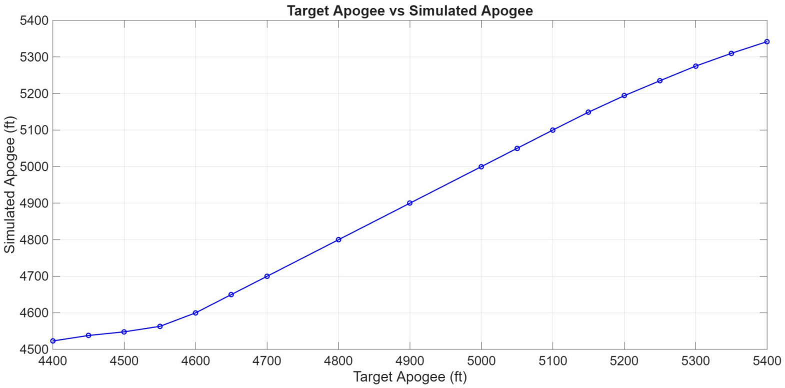
- Bang-bang control scheme
  - Binary decisions
- Takes in and keeps track of
  - Position Vector
  - Velocity Vector
  - Acceleration Vector



# Apogee Prediction

- Takes in Z-axis acceleration and altitude from IMU
- Acceleration data fits to a curve
  - A(1-B*t)^4
- Double integration yields current altitude
- Back Tested from prior flights
- Quick and accurate within ~4%.
  - ~2 seconds - 32 ft deviation
  - ~3.5 seconds - 16.4 ft deviation



# Requirement Compliance

# Requirements Compliance

Covers both NASA and Team-Derived requirements

Tool Used: Requirement Verification Matrices (RVMs)

Purpose:

- Ensure all project requirements are satisfied
- Maintain traceability between owners, design elements, and verification activities

Lifecycle: RVMs are maintained throughout the project timeline

| Verification Level | Description | Key |
|---|---|---|
| Verified | All verification success criteria has been met. | V |
| Partially Verified | Some verification success criteria has been met, some criteria may still be in progress. | PV |
| In Progress | None of the verification success criteria has been met, but the verification process has begun. | IP |
| Not Verified | None of the verification success criteria has been met and not meaningful progress has been made towards verification yet. | NV |

# Requirement Verification Matrices (RVMs)

| ID | SHALL Statement | Justification | Planned Action | Verification Method | Verification Success Criteria | Status | Performing Subsystem | Results |
|---|---|---|---|---|---|---|---|---|

Inspired Heavily by NASA System Engineering Handbook (2016)


Key Columns:

- ID / SHALL Statement: Identifies and describes each requirement
- Planned Action: Outlines approach for verification
- Verification Method: Defines how verification is performed
- Success Criteria: Conditions for requirement verification
- Status: Current verification state
- Performing Subsystem: Responsible subsystem(s)
- Results: Links to objective evidence of verification
- Justification: Explains rationale and necessity (for Team Derived Requirements)

# Team Derived Requirements

Capture project-specific needs beyond NASA requirements

Created collaboratively by subsystem leads and integration lead

Justification Column:

- Documents rationale and necessity of each requirement

Follows same RVM structure and process as NASA requirements

Features Functional, Design, Environmental, and Safety

| Requirement Type | Verified | Partially Verified | In Progress | Not Verified |
|---|---|---|---|---|
| NASA Requirements | 32.86 % (24) | 6.85 % (5) | 45.21 % (33) | 15.07 % (11) |
| Team Derived Requirements | 8.86 % (7) | 6.33 % (5) | 32.91 % (26) | 51.90 % (41) |

# Project Plan

# Competition Development Timeline

## 2025-26 Student Launch Development Gantt Chart

| Task Name | Task Number | Start Week | End Week | Aug | | | | Sep | | | | Oct | | | | | Nov | | | | Dec | | | | | Jan | | | | Feb | | | | Mar | | | | Apr | | | | | May | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | W01 | W02 | W03 | W04 | W05 | W06 | W07 | W08 | W09 | W10 | W11 | W12 | W13 | W14 | W15 | W16 | W17 | W18 | W19 | W20 | W21 | W22 | W23 | W24 | W25 | W26 | W27 | W28 | W29 | W30 | W31 | W32 | W33 | W34 | W35 | W36 | W37 | W38 | W39 | W40 | W41 | W41 | W42 |
| Brainstorming | 1 | W01 | W06 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vehicle Design | 2 | W01 | W08 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Payload Design | 3 | W01 | W08 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Airbrakes Design | 4 | W01 | W08 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subscale Parts Ordering | 5 | W07 | W07 | | | | | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subscale Vehicle Manufacturing | 6 | W07 | W11 | | | | | | | 6 | 6 | 6 | 6 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subscale Parachute Manufacturing | 7 | W09 | W10 | | | | | | | | | 7 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subscale Recovery System Testing | 8 | W12 | W12 | | | | | | | | | | | | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subscale Painting | 9 | W14 | W15 | | | | | | | | | | | | | | 9 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Subscale Launch | 10 | W13 | W13 | | | | | | | | | | | | | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full-scale Parts Ordering | 11 | W14 | W15 | | | | | | | | | | | | | | 11 | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Payload Parts Ordering | 12 | W10 | W15 | | | | | | | | | | 12 | 12 | 12 | 12 | 12 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Full-Scale Vehicle Manufacturing | 13 | W15 | W25 | | | | | | | | | | | | | | | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | | | | | | | | | | | | | | | | | | |
| Payload Manufacturing | 14 | W12 | W25 | | | | | | | | | | | | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 | | | | | | | | | | | | | | | | | | |
| Full-scale Parachute Manufacturing | 15 | W24 | W25 | | | | | | | | | | | | | | | | | | | | | | | | 15 | 15 | | | | | | | | | | | | | | | | | | |
| Full-scale Component Testing | 16 | W23 | W25 | | | | | | | | | | | | | | | | | | | | | | | 16 | 16 | 16 | | | | | | | | | | | | | | | | | | |
| Payload Testing | 17 | W26 | W27 | | | | | | | | | | | | | | | | | | | | | | | | | | 17 | 17 | | | | | | | | | | | | | | | | |
| Recovery System Testing | 18 | W27 | W27 | | | | | | | | | | | | | | | | | | | | | | | | | | | 18 | | | | | | | | | | | | | | | | |
| Full-scale Painting | 19 | W27 | W27 | | | | | | | | | | | | | | | | | | | | | | | | | | | 19 | | | | | | | | | | | | | | | | |
| Vehicle Launch Window | 20 | W28 | W28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 20 | | | | | | | | | | | | | | | |
| Payload Launch Window | 21 | W28 | W28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 21 | | | | | | | | | | | | | | | |
| Competition Launch | 22 | W39 | W39 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 22 | | | | |

# Budget Timeline

## 2025-26 Student Launch Budget Gantt Chart

TACHO LYCOS

| Task Name | Task Number | Start Week | End Week | W01 | W02 | W03 | W04 | W05 | W06 | W07 | W08 | W09 | W10 | W11 | W12 | W13 | W14 | W15 | W16 | W17 | W18 | W19 | W20 | W21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Aug | | | | Sep | | | | Oct | | | | | Nov | | | | Dec | | | |
| E Council S25-F25 | 1 | W01 | W08 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | |
| Student Government S25-F25 | 2 | W01 | W15 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | |
| E Council S25-F26 | 3 | W13 | W42 | | | | | | | | | | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Student Goverment S25-F26 | 4 | W13 | W42 | | | | | | | | | | | | | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Space Grant 2025-2026 | 5 | W15 | W42 | | | | | | | | | | | | | | | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| EYE Funding | 6 | W27 | W27 | | | | | | | | | | | | | | | | | | | | | |
| ETF Funding | 7 | W27 | W27 | | | | | | | | | | | | | | | | | | | | | |
| Sponsorships | 8 | W05 | W42 | | | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

| Task Name | W22 | W23 | W24 | W25 | W26 | W27 | W28 | W29 | W30 | W31 | W32 | W33 | W34 | W35 | W36 | W37 | W38 | W39 | W40 | W41 | W41 | W42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | | | | Feb | | | | Mar | | | | Apr | | | | | May | | | |
| E Council S25-F25 | | | | | | | | | | | | | | | | | | | | | | |
| Student Government S25-F25 | | | | | | | | | | | | | | | | | | | | | | |
| E Council S25-F26 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Student Goverment S25-F26 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Space Grant 2025-2026 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| EYE Funding | | | | | | 6 | | | | | | | | | | | | | | | | |
| ETF Funding | | | | | | 7 | | | | | | | | | | | | | | | | |
| Sponsorships | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

# Questions?