Team 32

LIBERTY ROCKETRY

North Georgia Truss · SOLIDWORKS · BWXT BWX Technologies, Inc. · NICK RAYNE'S Garage · 3Dconnexion · Ansys · DeepEarth LOGIC

PROJECT OMEGA

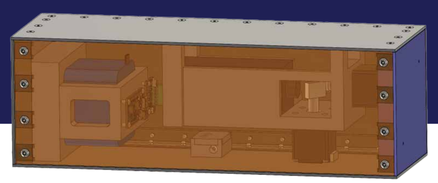
- Liftoff Weight: 25kg
- Max velocity: 280 m/s (mach 0.806)
- Max acceleration: 9.34 G's
- Motor Type: M1845NT
- Flight time: 170 seconds
- Thrust (avg) to weight ratio: 7.5:1

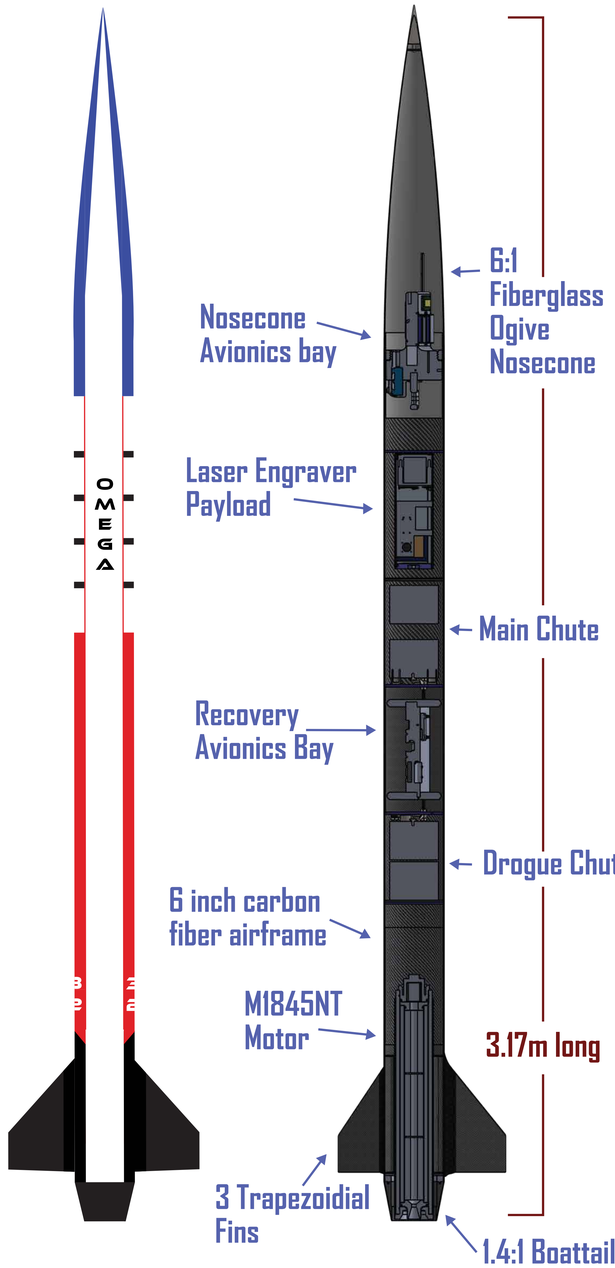
Avionics

- Dual redundant altimeters with independent power for failsafe deployment
- SRAD flight hardware, TeleGPS tracking, and custom ground station integration
- Split between nosecone and recovery bay to prevent RF interference from carbon fiber

Payload

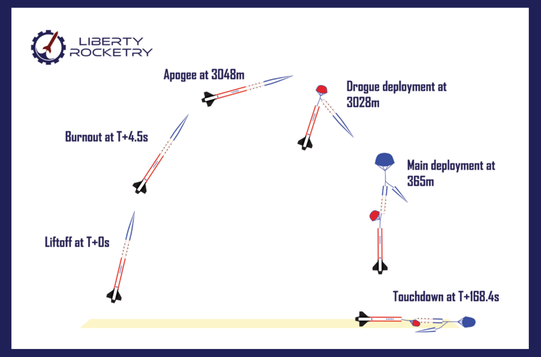
- 4.4 lb galvanometric laser engraver operating during ascent
- 4 W laser with servo-driven mirror system for precise beam control
- Custom PCB, Li-ion battery, and temperature-based safety shutdown



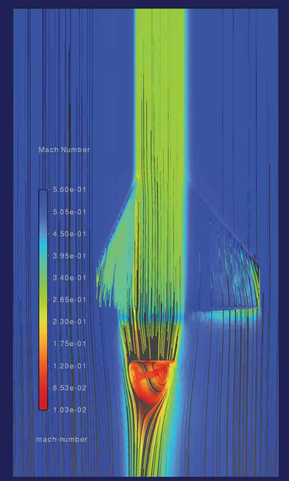


Recovery

- Dual-deployment, dual-separation system (drogue at apogee, main at ~365 m)
- Designed for stable descent at ~6.0 m/s and full vehicle reuse
- Redundant altimeters and pull-pin arming for layered safety



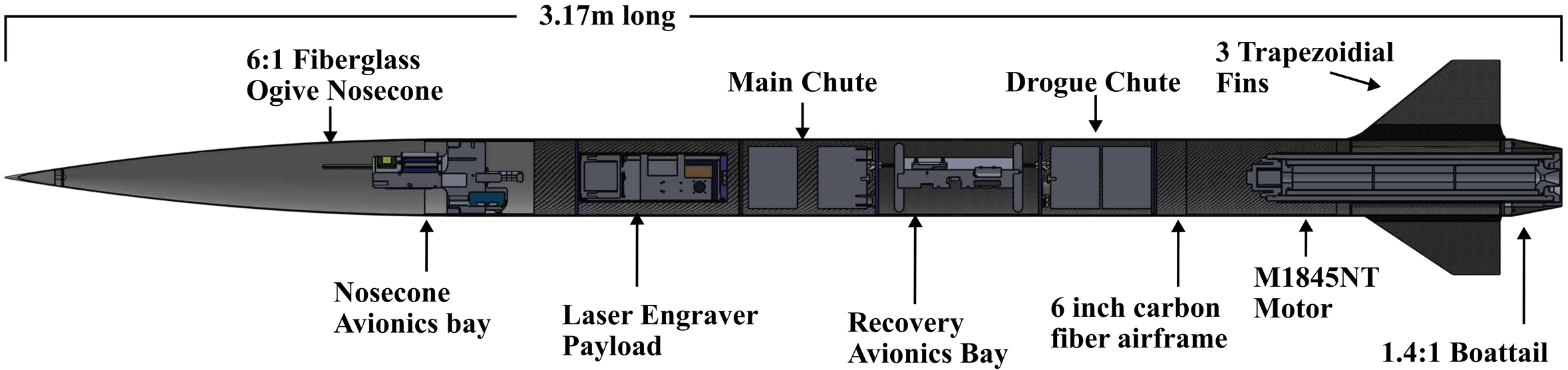
Aerodynamics (Aero-Structures)



- Carbon fiber airframe with 6:1 tangent ogive fiberglass nosecone
- Trapezoidal three-fin configuration with carbon fiber boat tail to reduce drag
- Validated through OpenRocket, CFD, and FEA to ensure stable flight, structural reliability, and accurate apogee performance

Propulsion

- Aerotech M1845 solid rocket motor (8307 Ns total impulse, M-class) selected for high-performance flight
- Thrust-to-weight ratio and burn profile optimized via simulation to reliably achieve 10,000 ft target apogee
- Motor mount and retention system validated through subscale and full-scale testing


3.17m long
6:1 Fiberglass
Ogive Nosecone
Main Chute
Drogue Chute
3 Trapezoidial
Fins
Nosecone
Avionics bay
Laser Engraver
Payload
Recovery
Avionics Bay
6 inch carbon
fiber airframe
M1845NT
Motor
1.4:1 Boattail