

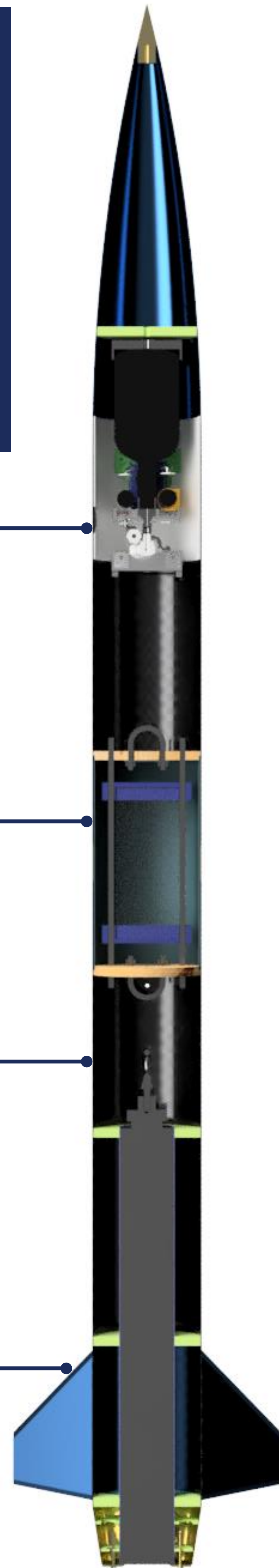
Objective
 BYU Rocketry will compete in the 2018 Intercollegiate Rocket Engineering Competition at the 2nd Annual Spaceport America Cup in Las Cruces, NM by building an 8-foot High Power rocket to send an 8.8 lb. CubeSat payload 10,000 ft. above ground level. Over 100 collegiate teams from around the world will compete.

Payload Bay
 3U CubeSat Payload: Cold-Gas Thruster Experiment (CGTE) that uses compressed gas and nozzles to demonstrate cold-gas propulsion.

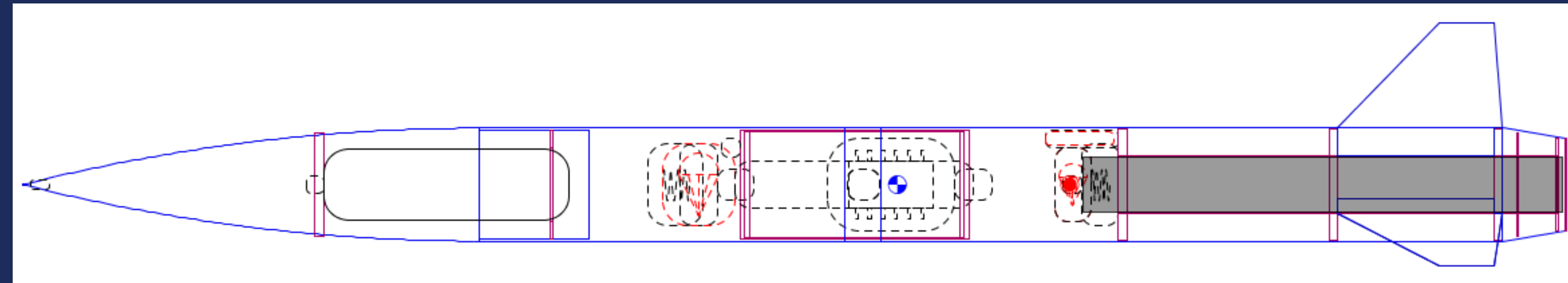
Avionics Bay
 Onboard electronics control dual parachute deployment events at specific altitudes based on barometric pressure sensors.

Main Parachute Bay
 One 72" student-made parachute, wrapped in Nomex blanket and attached to 30 ft. Kevlar shock cord, deploys 1200 ft. above the ground during descent to bring the rocket in for a safe landing at 25 ft/s.

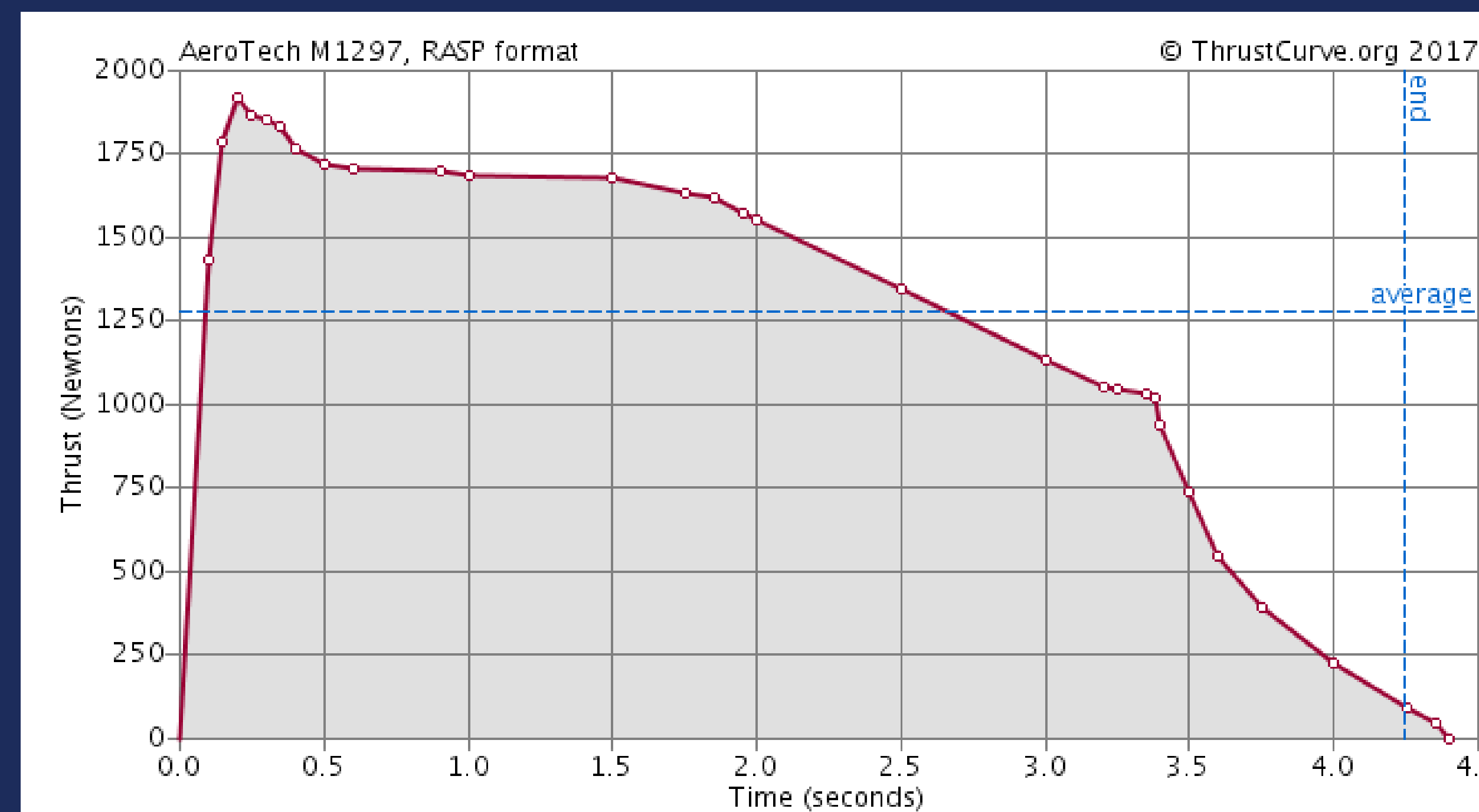
Motor Mount
 Fiberglass motor retention assembly, through-the-wall fiberglass fins, inner tube and plywood and fiberglass centering rings for concentric thrust.



Modeling and Testing
 Flight simulations were conducted using open-source software to fine tune the mass of the rocket so the target altitude of 10,000 feet could be reached.



The rocket is powered by a commercial Aerotech M1297W solid fuel motor.



Two test launches to 10,000 ft. were performed in April and May of 2018 on M1297W commercial Aerotech motors.



CONOPS
 The mission is comprised of 10 phases

- Preparation: All flight systems are checked
- Ignition: Launch command is sent to the motor
- Liftoff: Rocket begins to move off the launch pad
- Main Stage Flight: Rocket clears the rail and is powered upward by the motor
- Coasting Flight: Rocket motor no longer produces thrust
- Apogee: Vertical velocity of rocket is zero
- Drogue Descent: Drogue chute is deployed and rocket begins a controlled descent
- Main Parachute Descent: Main chute is deployed at 1100 feet
- Landing: Rocket touches back to ground
- Recovery: Rocket is transported back to staging area

