



# BYU Rocketry

## 2018 IREC & Spaceport America Cup



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### Objective

BYU Rocketry will compete in the 2018 Intercollegiate Rocket Engineering Competition at the 2<sup>nd</sup> 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

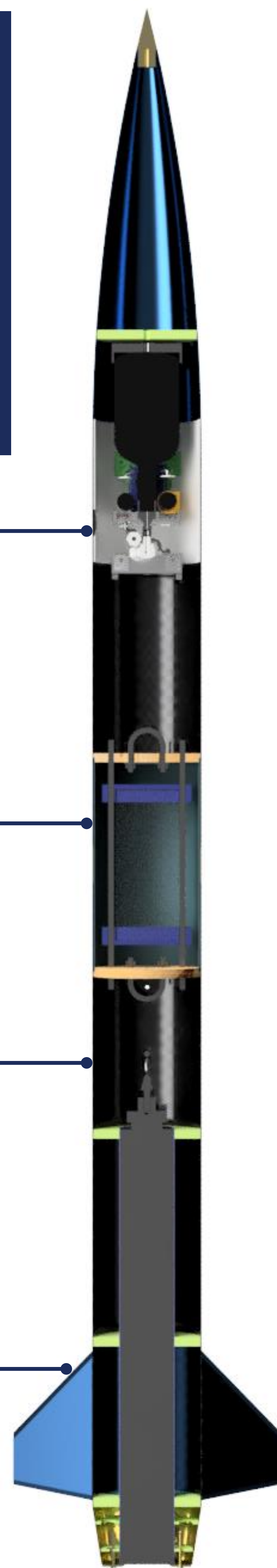
Onboard electronics control dual parachute deployment events at specific altitudes based on barometric pressure sensors.

### 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.

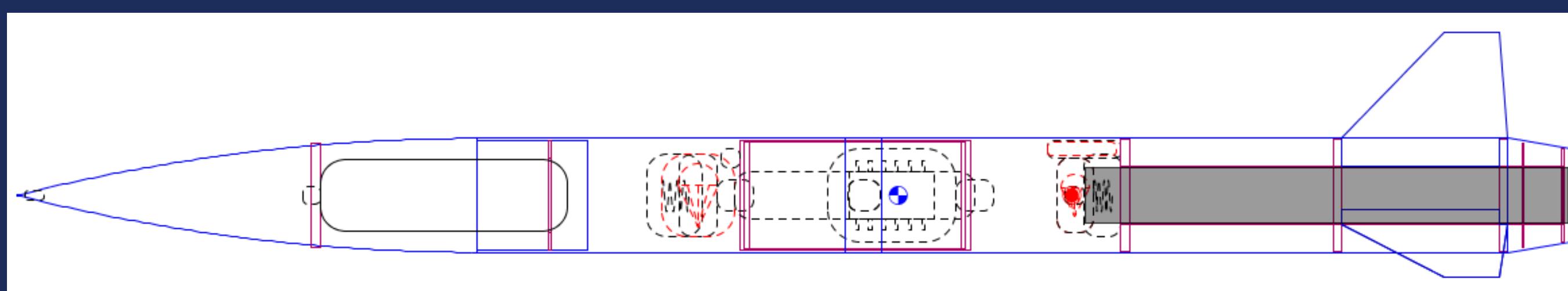
### Motor Mount

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

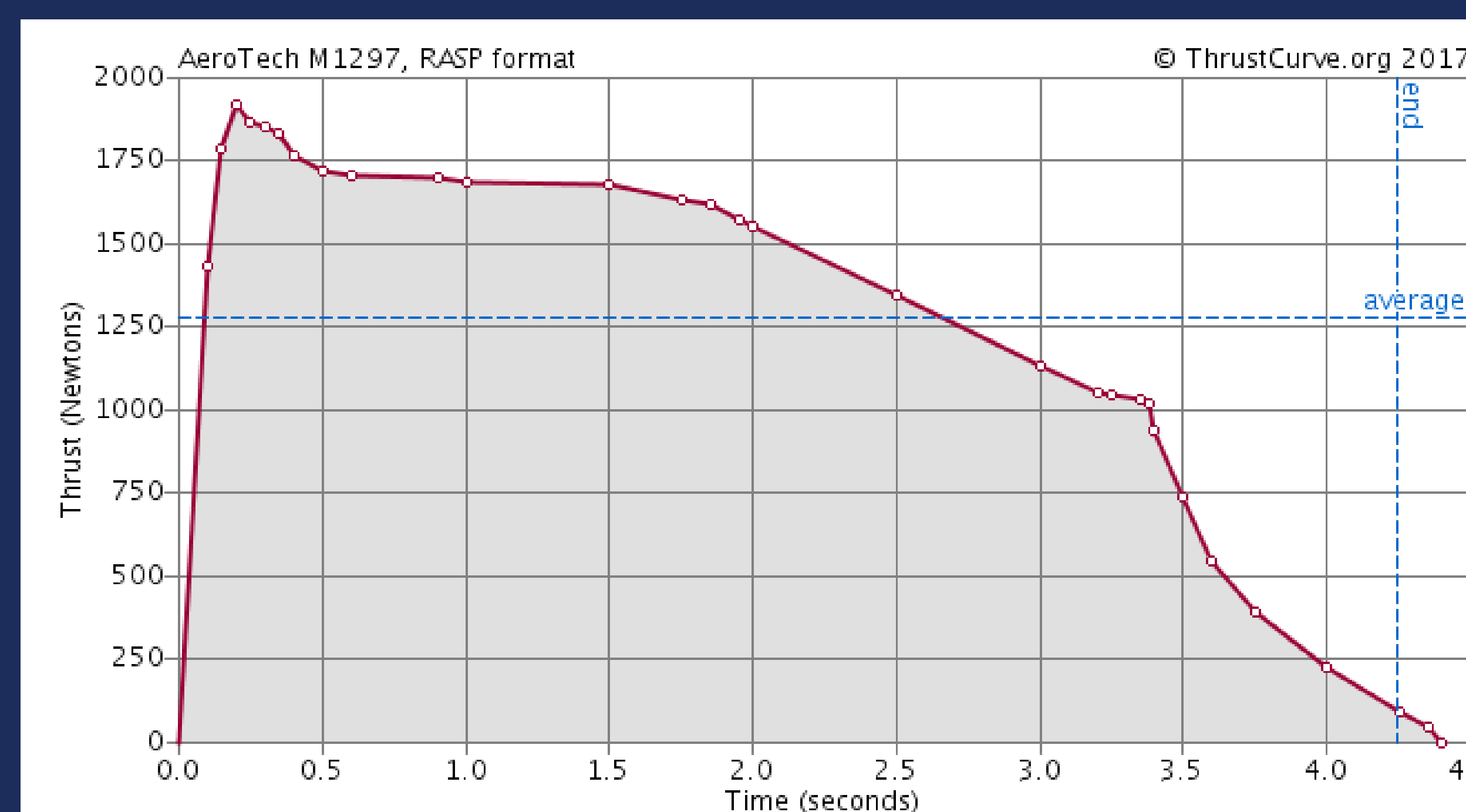


### Modeling and Testing

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



Sponsors:



A&P Technology



Team Members: Bradley Buttars, Riley Creer, Ryan Garrison, Scott Harris, Alex Laraway, Riley Meik, Mark Sweeney

Faculty Advisers: Dr. David Fullwood