



Rocket-Launched Autonomous Quadcopter

2018 Argonia Cup Senior Design Project



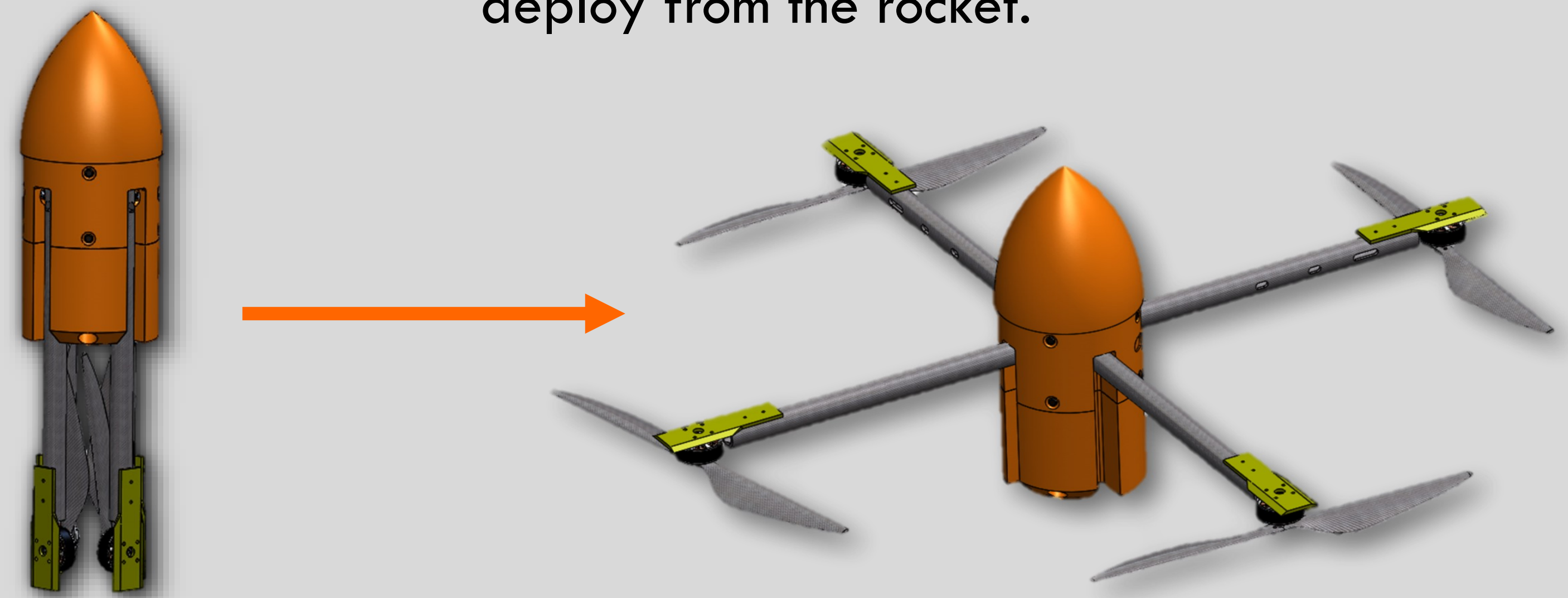
Oklahoma State University, College of Engineering, Architecture and Technology

Objective

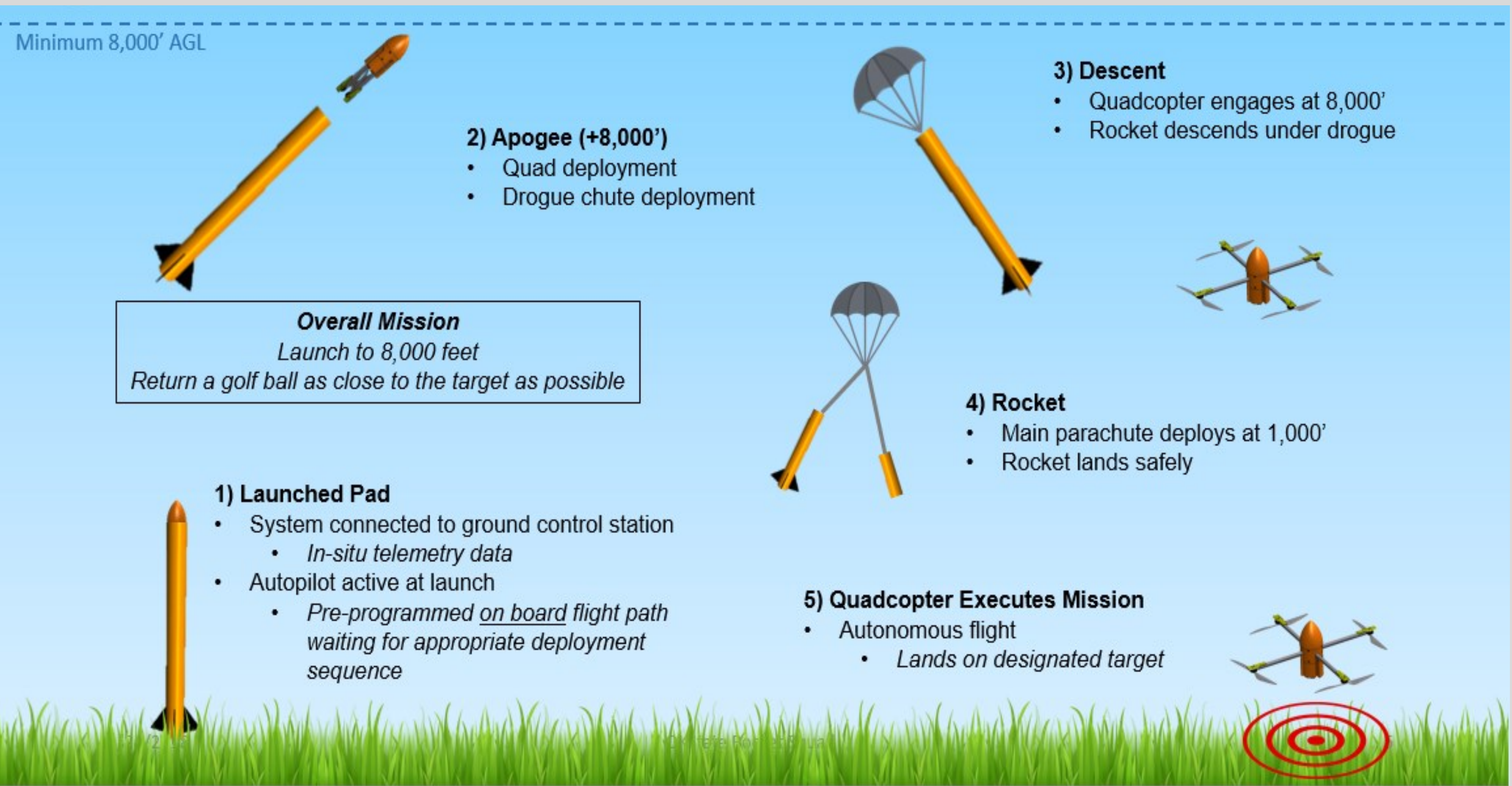
Compete in the 2018 Argonia Cup Rocketry Competition by launching a rocket to at least 8000' AGL and returning a golf ball payload as close to the target as possible on a max of an L motor.

Design Approach

Autonomous nose cone quad copter that can easily fold into and deploy from the rocket.



CONOPS

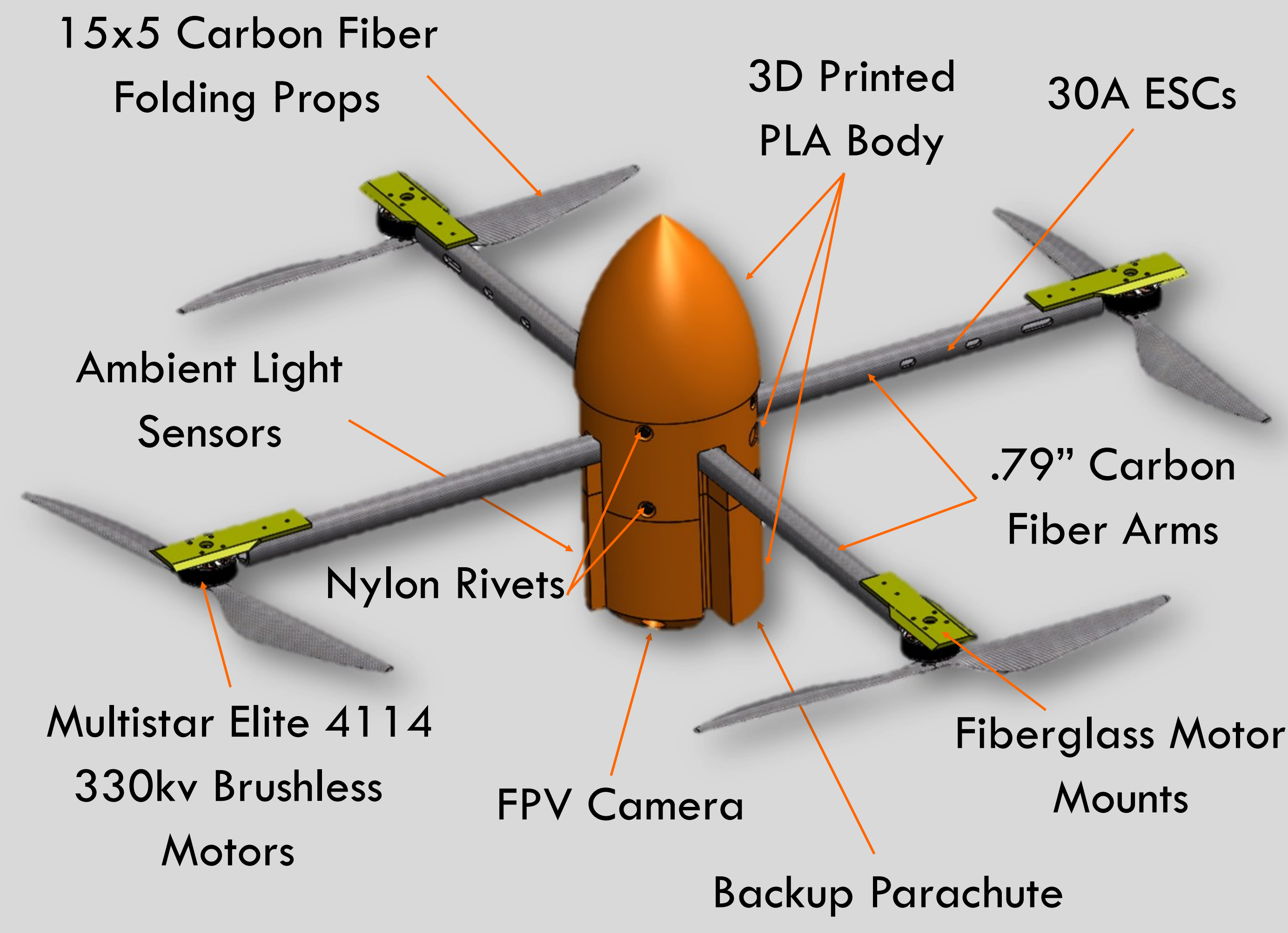


Quad Specifications

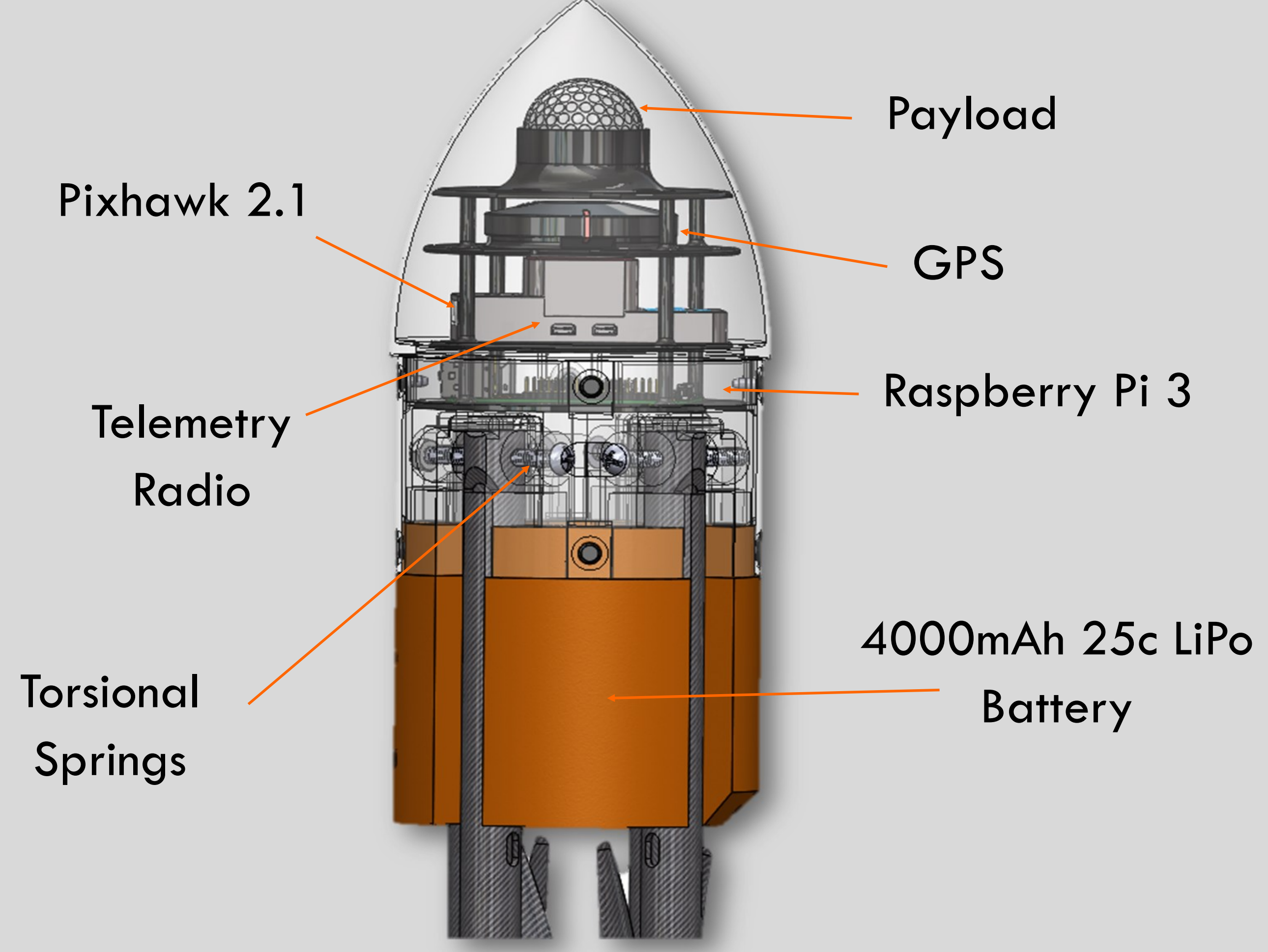
- GTOW: 2770g
- Average Hover Time: ~14 minutes
- Thrust to Weight: 2.2
- Calculated Specific Thrust: 7.63 g/W
- Calculated Max Speed: 19.3 mph
- Height: 12" (5.31" Nose Cone)



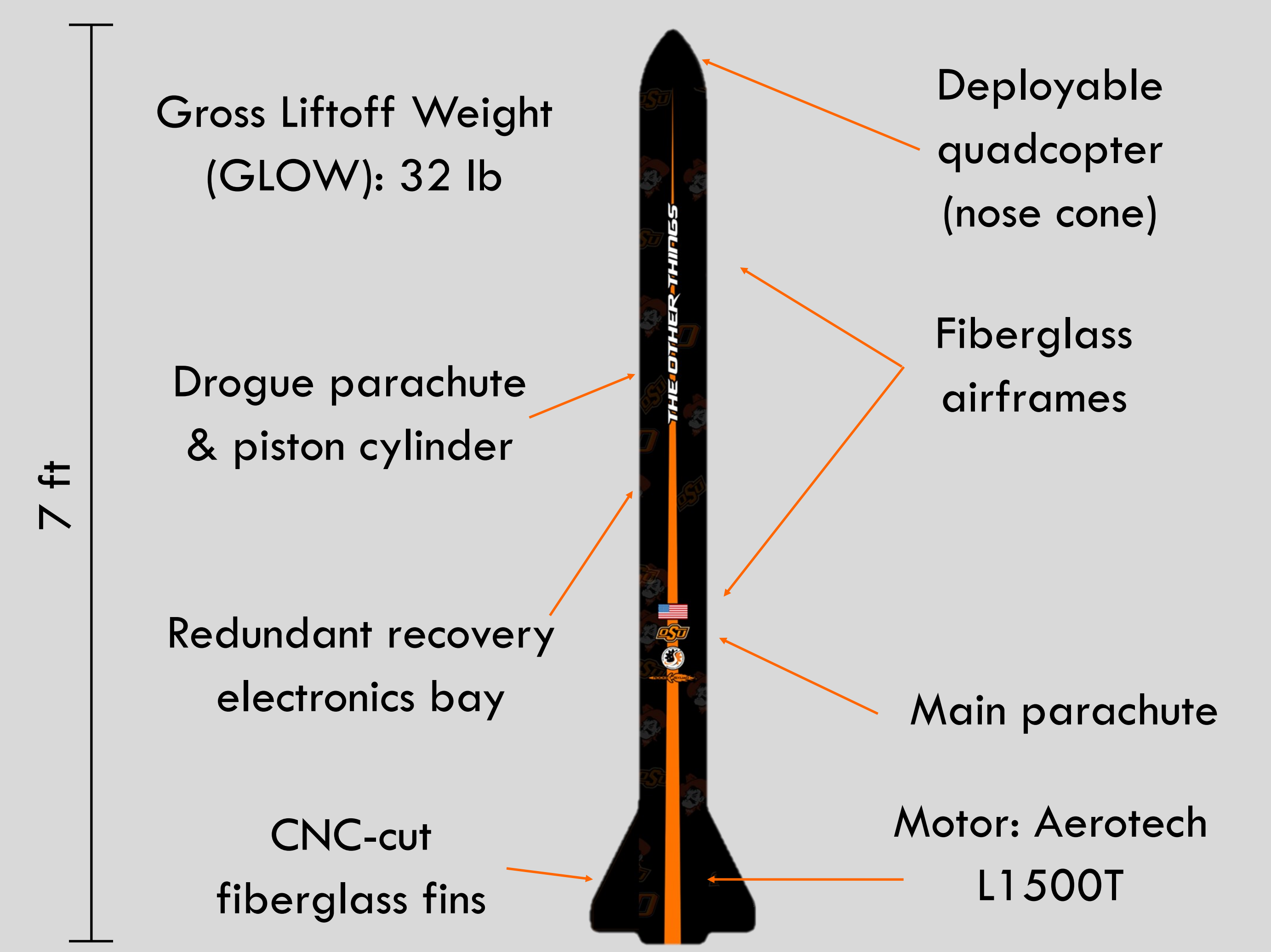
Quadcopter - The Eagle



Avionics Layout



Launch Vehicle - The Other Things



Launch



Results

- Thorough pre-launch testing
- Apogee: 8,556 feet AGL
- Max Velocity: 1,020 MPH
- Successful rocket recovery
- Successful quad deployment & autonomous mission startup
- Anomaly during quad flight
- Partial mission success

The Team: Nicholas Foster (Lead), Nicolas George, Ben Kadavy, Chad Kenkel, Logan Kunka, Gerald McCullers, Caleb Ritchie, Jake Rosario, Lucas Utley, & Andrew Walsh

Faculty Advisors: Dr. James Kidd, Dr. Jamey Jacob