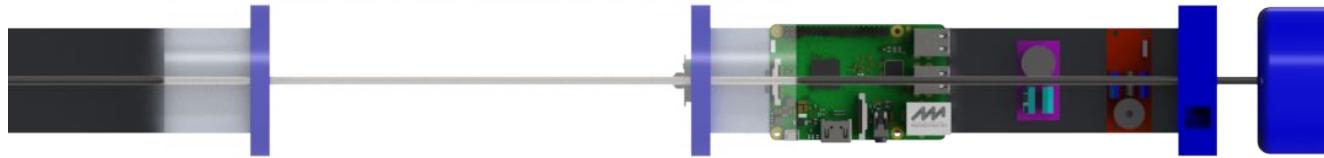


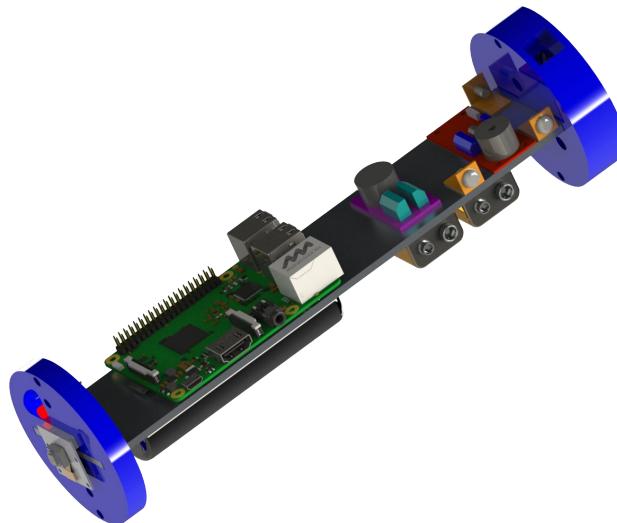
Effective -1

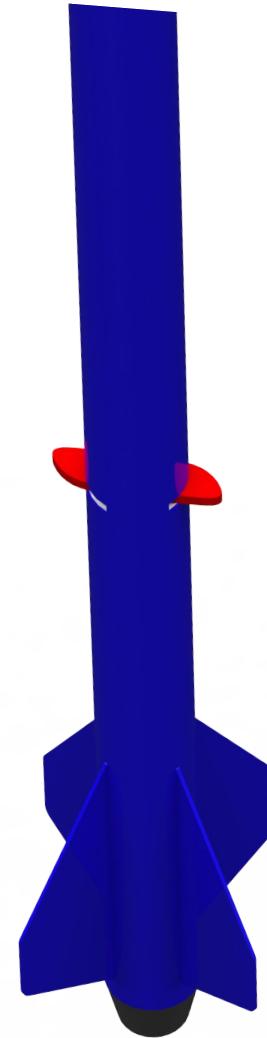
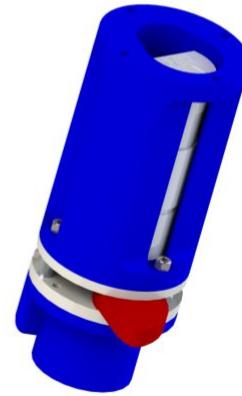
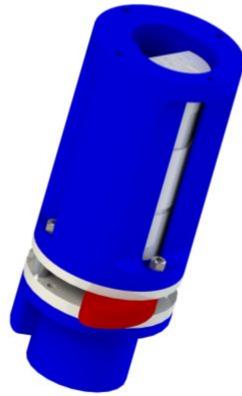
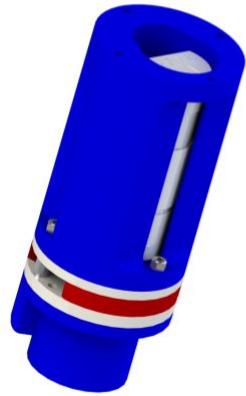
Length	Outer Diameter	Rocket Mass	Rocket Mass with Wet Motor	Final Motor Selection	Recovery System	Rail Size
2.44 m [8ft]	78.7mm [3.1 in]	4.51 kg [9.94 lb]	5.77 kg [12.72 lb]	AeroTech K535	24 in drogue chute (at apogee) via StratoLoggerCF Altimeter 48 in main chute (at 600ft) via Jolly Logic Chute Release	8 ft. 1010 rail



TARS Payload

TArget Recognition System





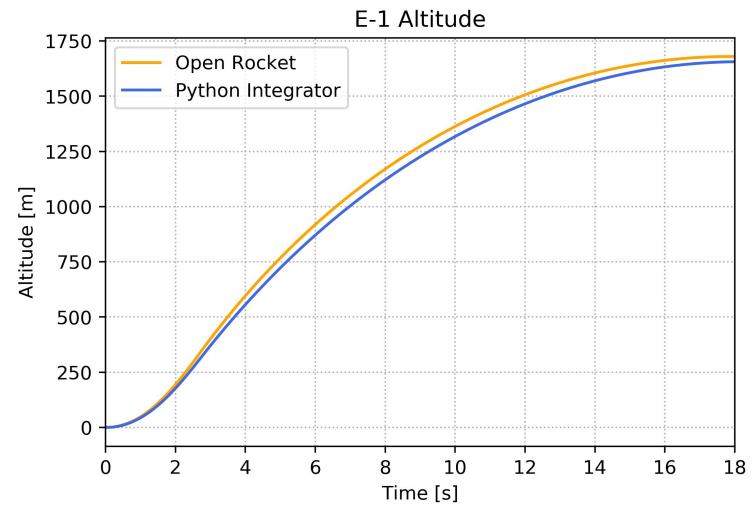
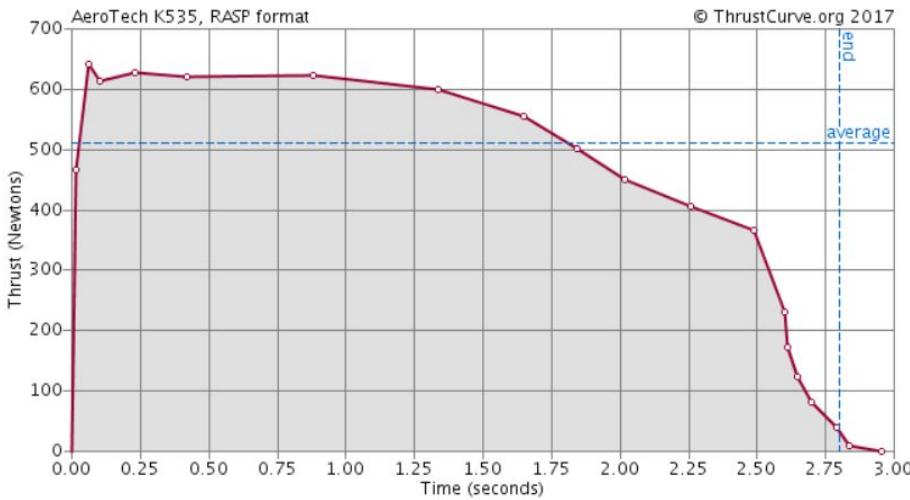
ADAS

Adaptive Drag Aerobraking System

Motor Selection

Aerotech K535

Apogee with ballast: 1656m



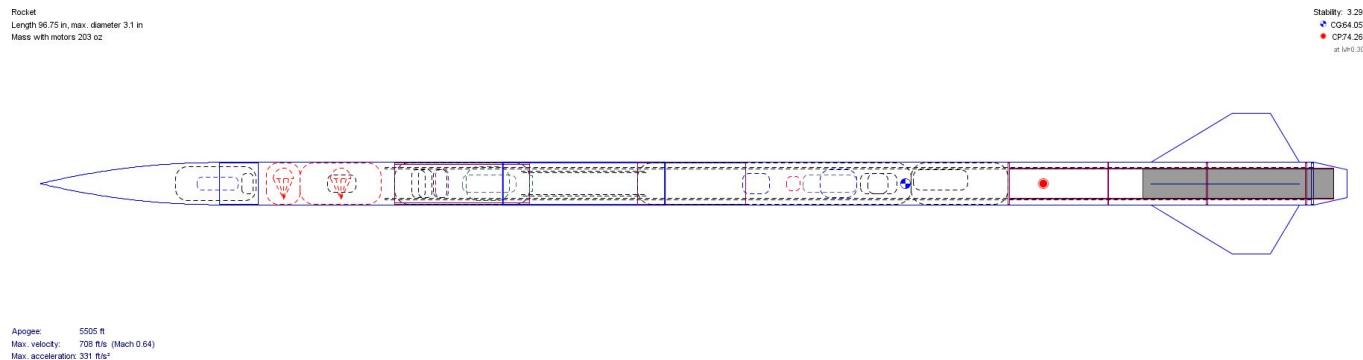
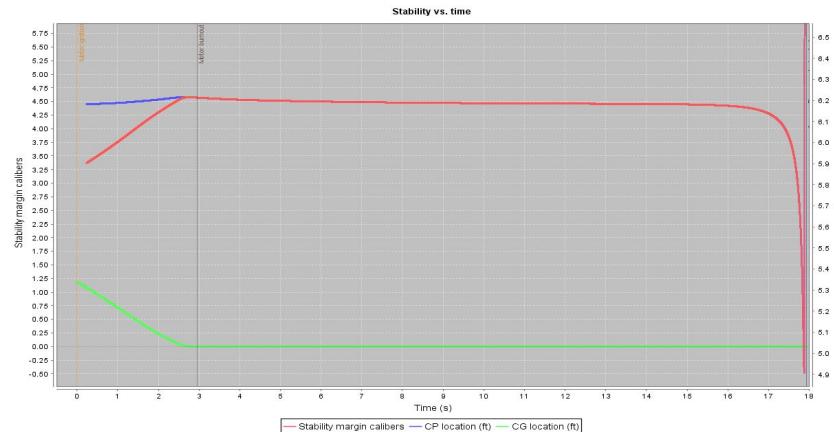
Rocket Characteristics

Thrust-to-Weight ratio: 14.2

Rail Exit Velocity: 22m/s (72 ft/s)

Mass: 4.51 + 0.45kg

Stability Margin: 3.29



Mass Statement and Margin

Minimum mass: (to stay below the max altitude without aerobrake deployment)

Minimum mass: 4.95 kg

Predicted mass: 4.51 kg + ~0.45 kg ballast

Maximum mass: 7.2 kg to meet the maximum KE requirement

Recovery

24" Drogue ($v_{term} = 16 \text{ m/s}$)

48" High-C_d Main Parachute ($v_{term} = 5.3 \text{ m/s}$)

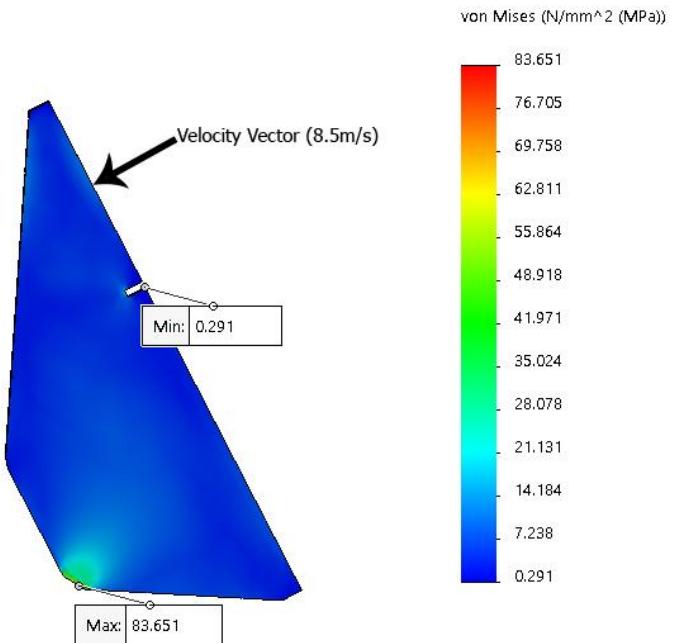
Main deployment at 183 m

Predicted ground impact energy: 57 J

Kevlar Recovery Harness

Landing Energy

Effective - 1 has a predicted landing energy of 57.4 Joules (42.336 ft-lbf), well below the maximum energy of 101.686 Joules (75 ft-lbf), and a rail exit velocity of 22 m/s.



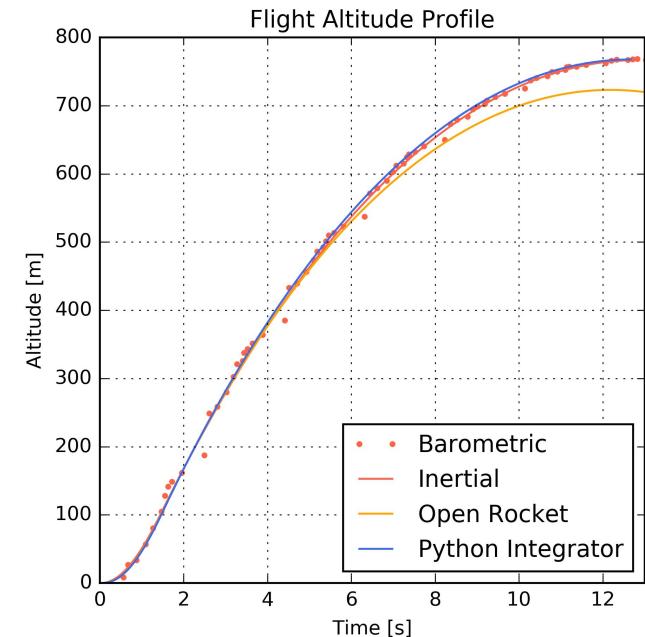
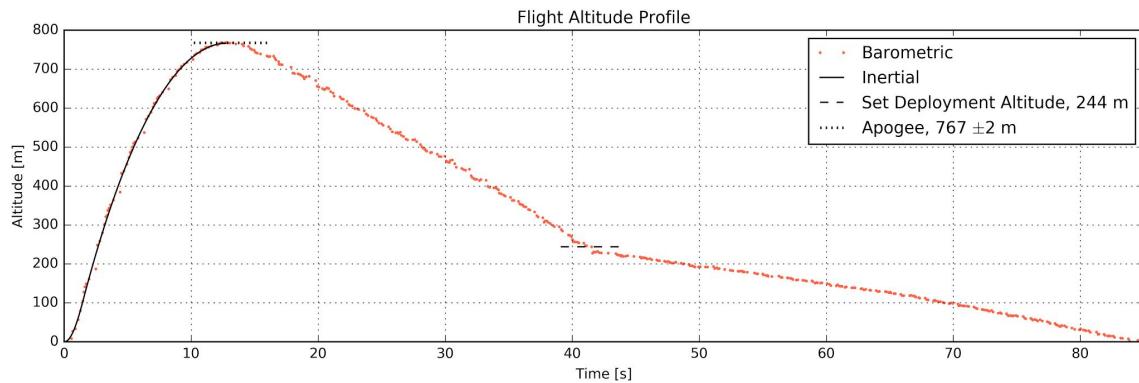
Drift Calculations

Wind Speed (mph)	0	5	10	15	20
Drift (ft) (OpenRocket)	7	701	1461	1504	2169
Drift (ft) (Wind Speed * Flight Time)	0	735	1460	1680	2220

Test Plans and Procedures

- Electrical
- Stability
- ADAS
- TARS
- Recovery System

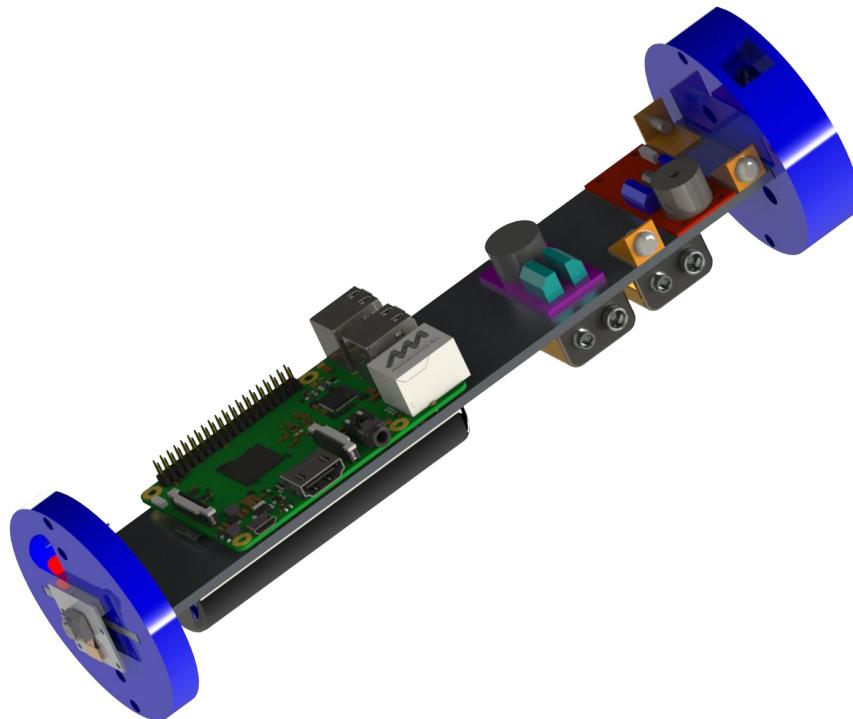
Subscale Flight Data



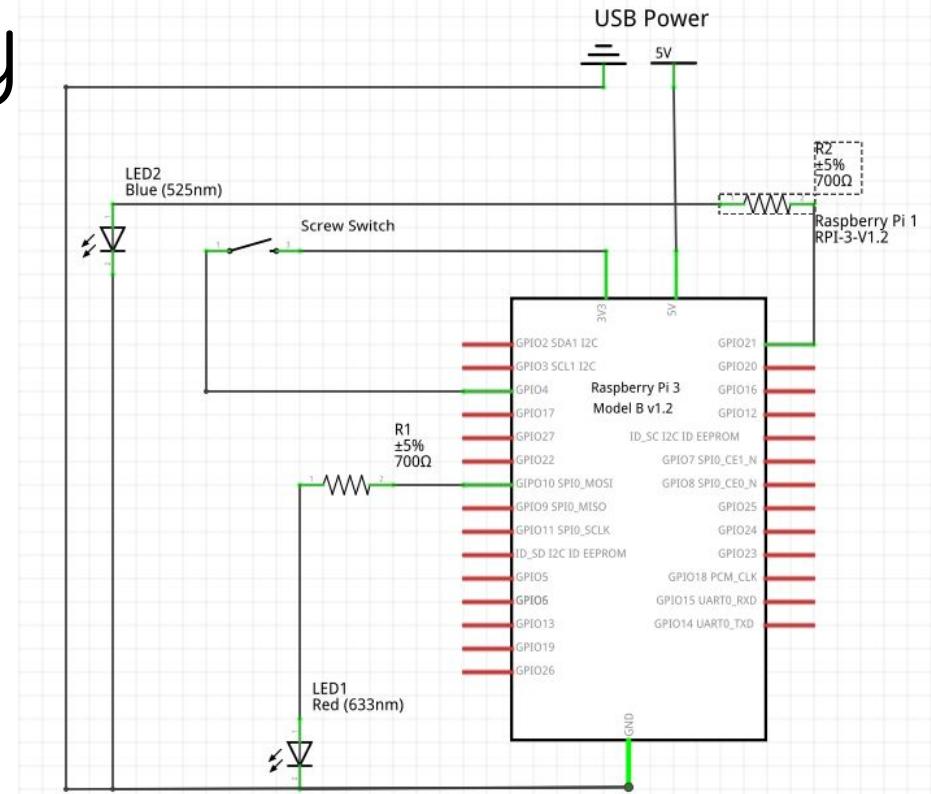
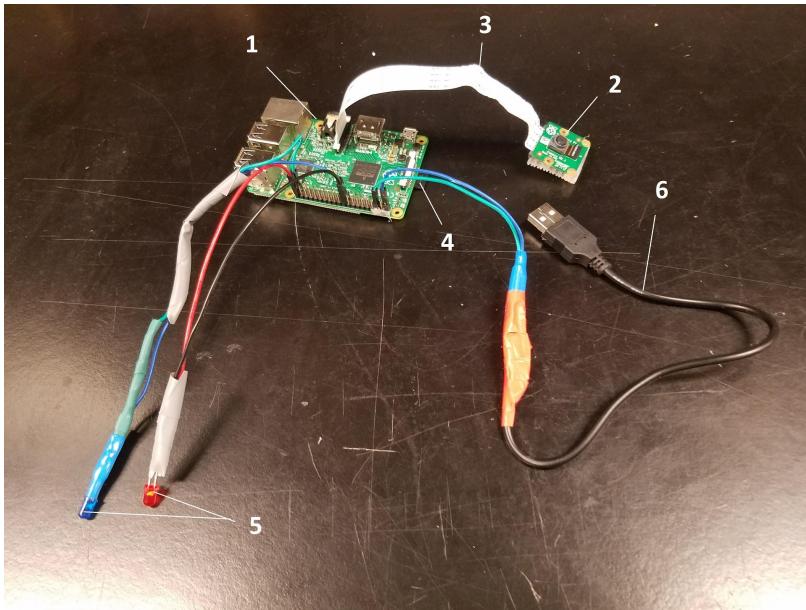
Tests of Staged Recovery Systems

On ground parachute ejection charge test, along with vacuum test of altimeters so as to make sure they are accurate and in working order.

Payload Structure and Integration



Payload Circuitry



Funding and Outreach

- Enough money has been raised to pay for both launch vehicles and their motors
- Outreach is going according to plan: we project to have interacted and built paper rockets with ~300 K-12 students by FRR



Status of Requirements Verification

All requirements are thoroughly understood and coupled with an action plan to following through with the requirement.