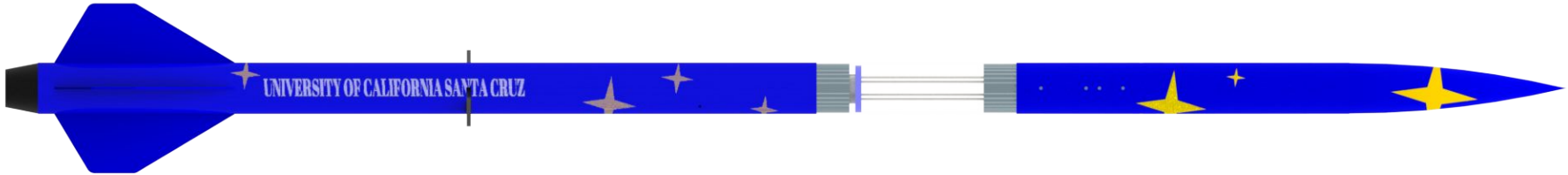
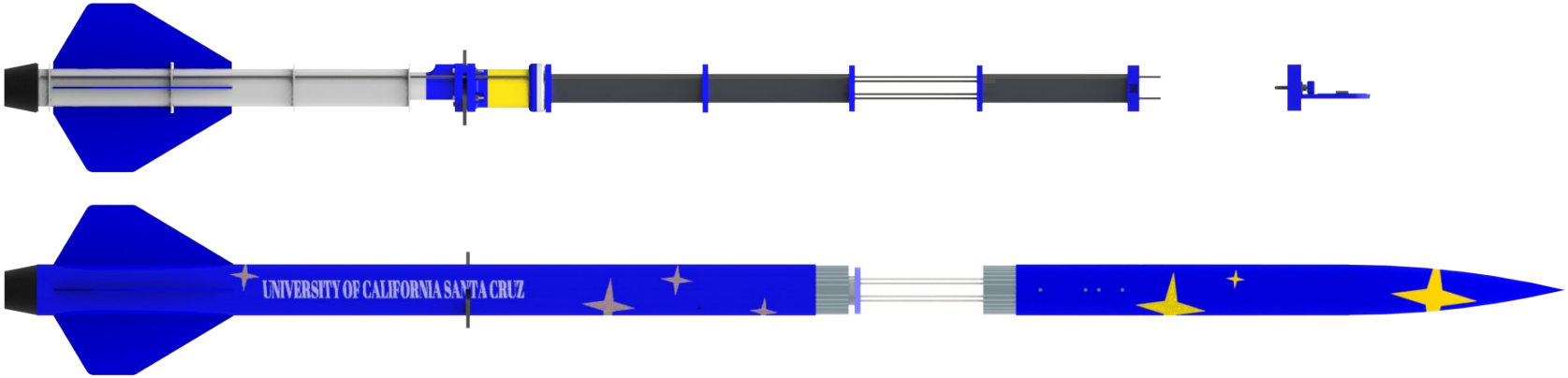
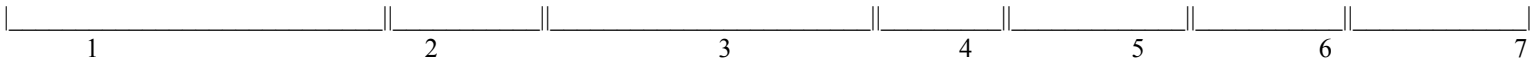

ROCKET TEAM
UNIVERSITY OF CALIFORNIA SANTA CRUZ



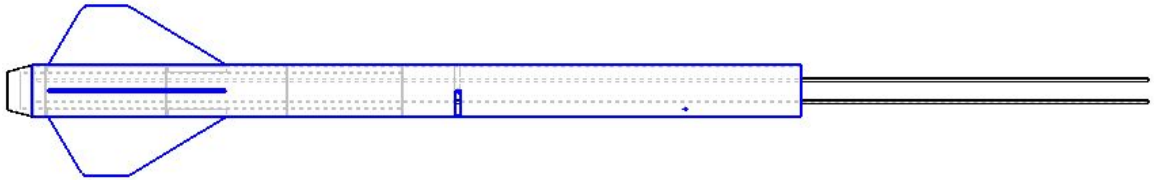
Length	Outer Diameter	Rocket Mass	Rocket Mass with Wet Motor	Final Motor Selection	Recovery System	Rail Size
2.4 m [7.9 ft] [94.75 in]	78.7mm [3.1 in]	5.14 kg [11.3 lb]	6.41 kg [14.1 lb]	AeroTech K535	24 in drogue chute (at apogee) via StratoLoggerCF Altimeter 48 in main chute (at 500ft) via Jolly Logic Chute Release	8 ft. 1010 rail



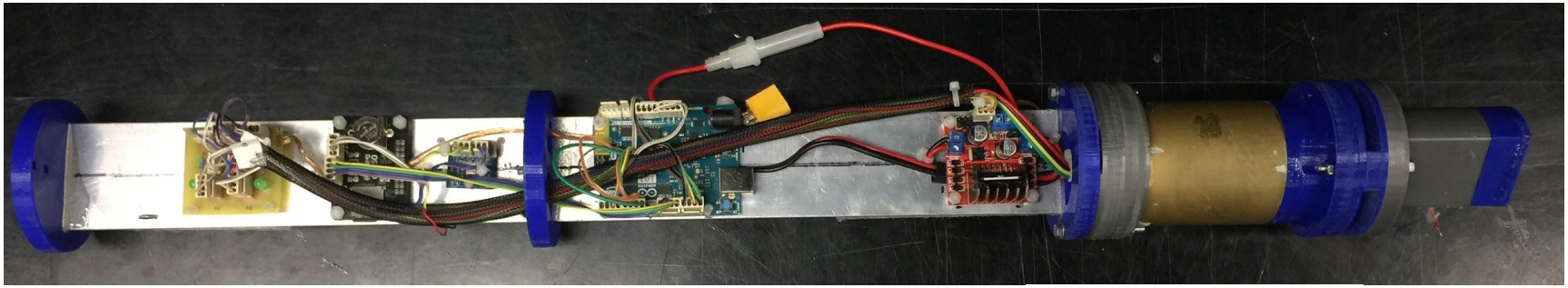


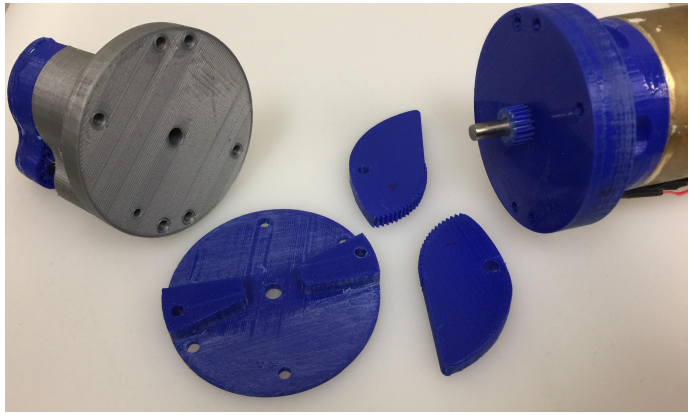
1. Thrust Section [24.4 in]
2. Adaptive Drag Aerobraking System (ADAS) [8.3 in]
3. Lower Avionics Bay [19.0 in]
4. TArget Recognition System (TARS) Window [7.4 in]
5. Upper Avionics Bay [10.0 in]
6. Recovery Section [9.0 in]
7. Nose Cone/GPS [16.5 in]

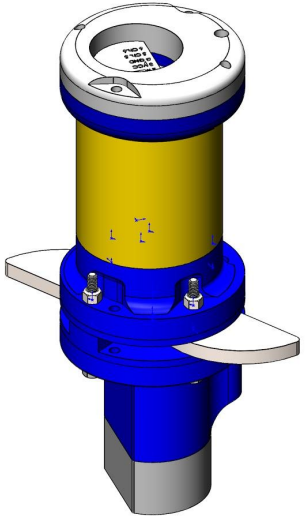
Thrust Section



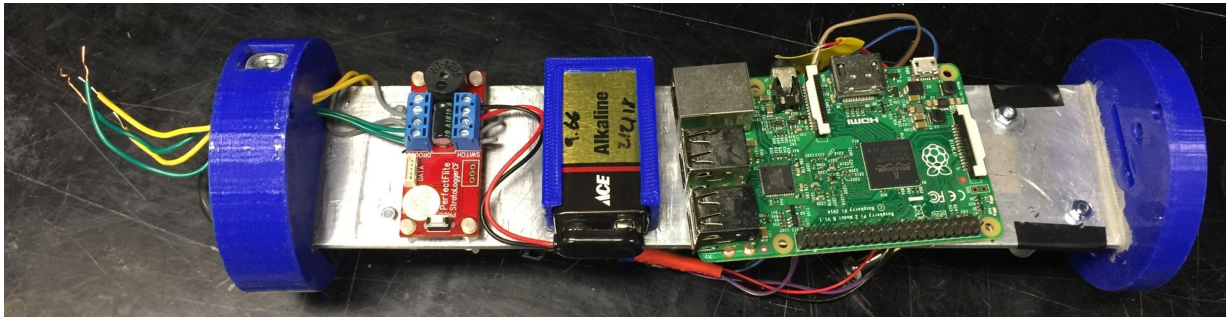
Lower Avionic Sled / ADAS



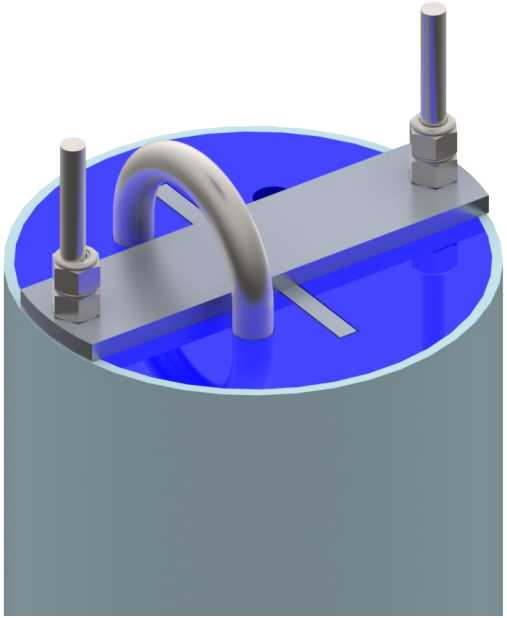


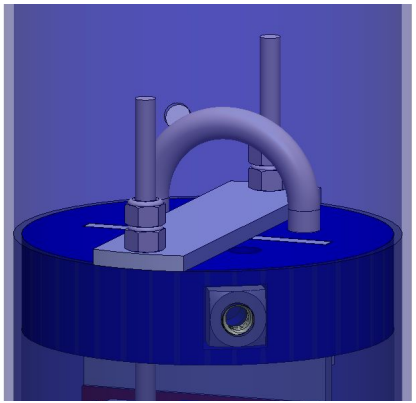


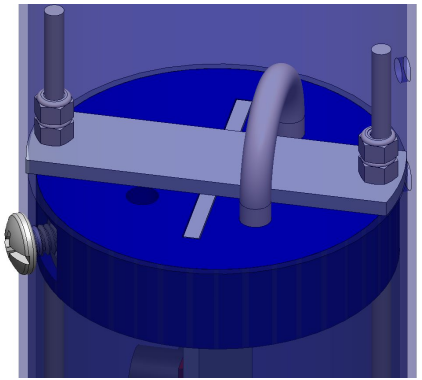
Upper Avionics / TARS



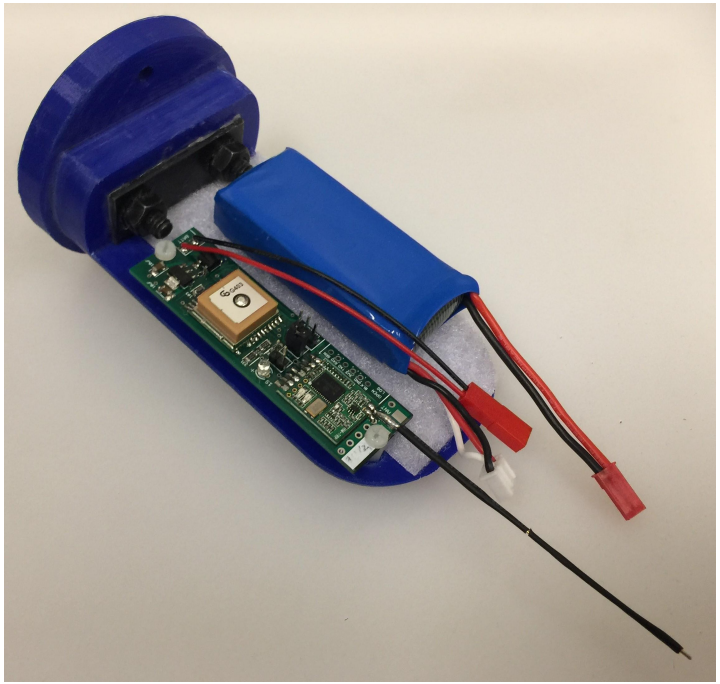
Avionic Sled Securement

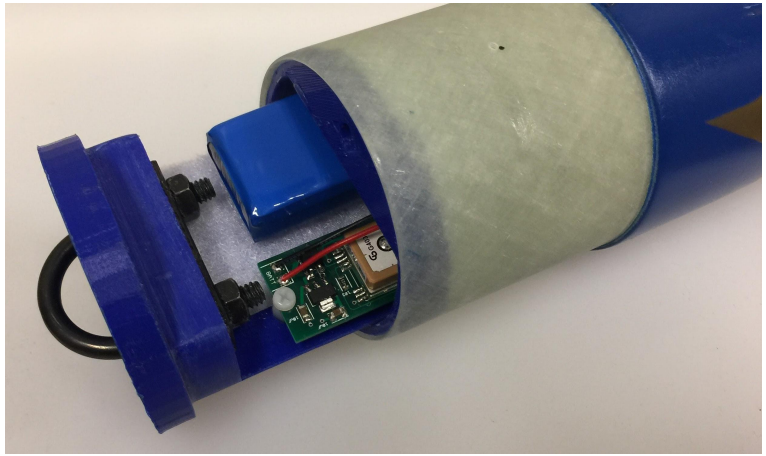


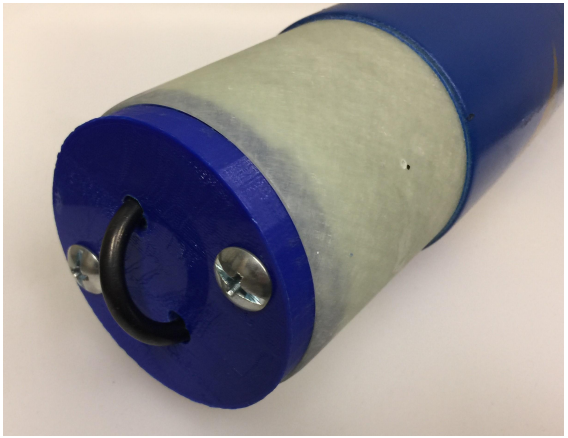




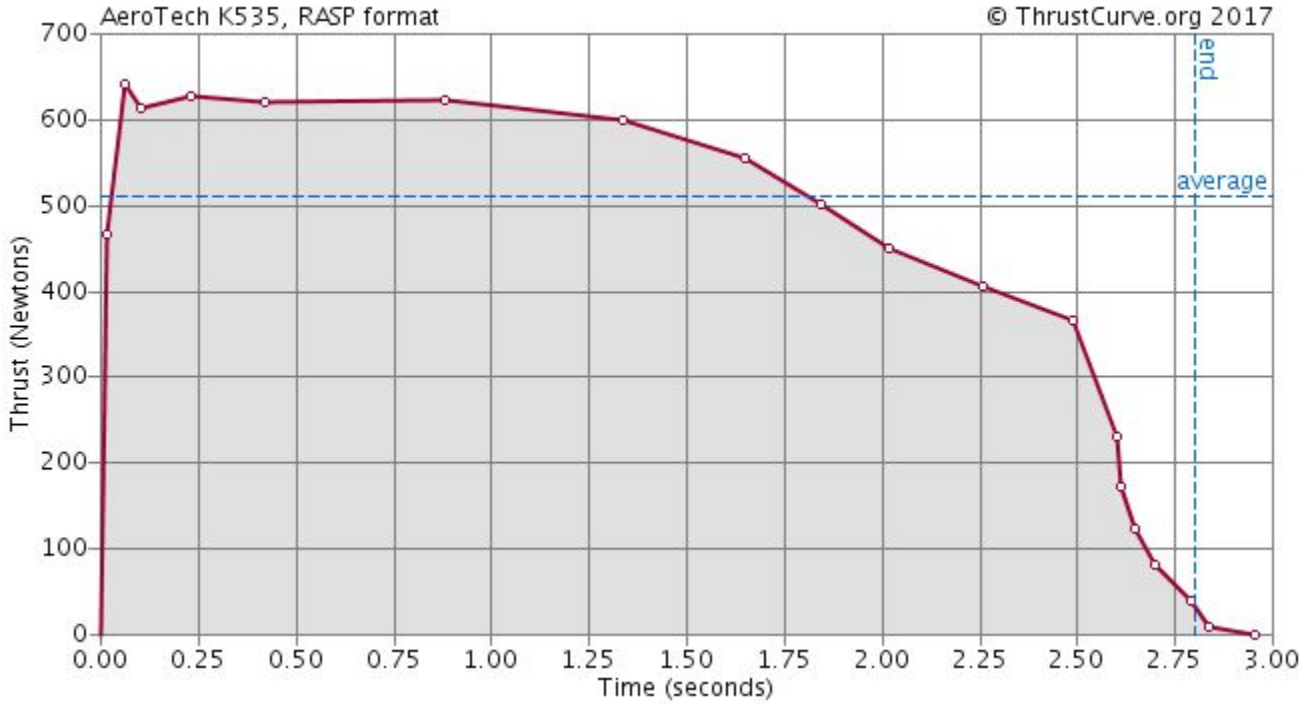
GPS Recovery





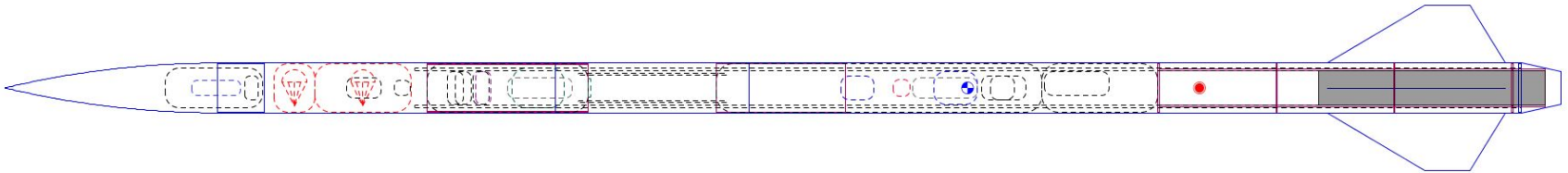


Motor


AeroTech K535, RASP format
© ThrustCurve.org 2017
Thrust (Newtons)
700
600
500
400
300
200
100
0
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
2.75
3.00
Time (seconds)
end
average

Rocket flight stability

CG AS BUILT	CP AS BUILT	Stability margin AS BUILT	Thrust to weight ratio	Rail Exit velocity
152 cm from nose cone tip	189 cm from the nose cone tip	4.65	10.4	17 m/s (55.7 ft/s)



Mass

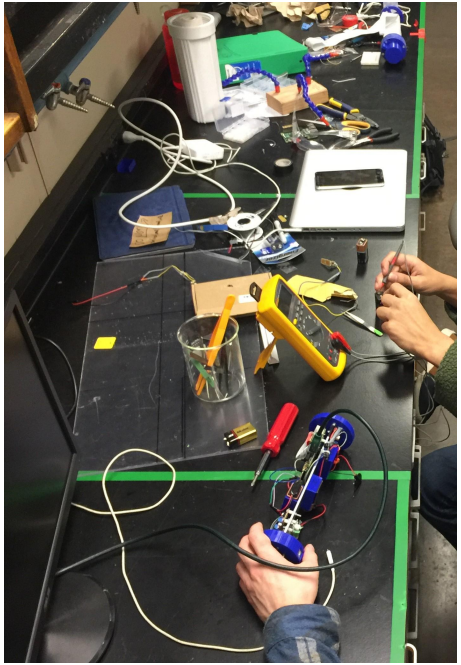
Rocket Mass	Rocket Mass with Wet Motor
5.14 kg [11.3 lb]	6.41 kg [14.1 lb]

Parachutes

Parachute	Size	Descent Rate [Predicted]	Descent Rate [Actual]
Drogue	18” Nylon with a 6” radius vent	26.5 m/s (87.04 ft/s)	20.67 m/s (67.8 ft/s)
Main	48" Fruity Chutes: Iris Ultra Parachute	5.46 m/s (17.94 ft/s)	6.15 m/s (20.2 ft/s)

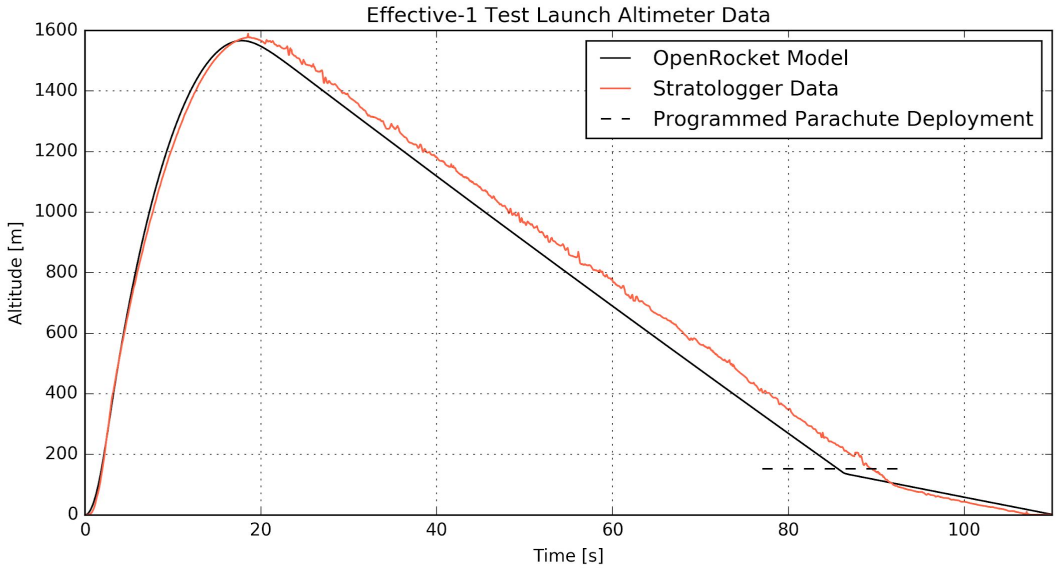
Wind Speed	**Predicted drift from launch pad**	**Predicted drift calculated from full scale flight data**
No wind	0 ft	0 ft
5 mph (7.33 ft/s)	598.7 ft	698.5 ft
10 mph (14.66 ft/s)	1197 ft	1397 ft
15 mph (22 ft/s)	1796 ft	2095.6 ft
17.9 mph (26.4 ft/s)	-	2500 ft
20 mph (29.33 ft/s)	2394 ft	2794.1 ft (see condition below)

Testing

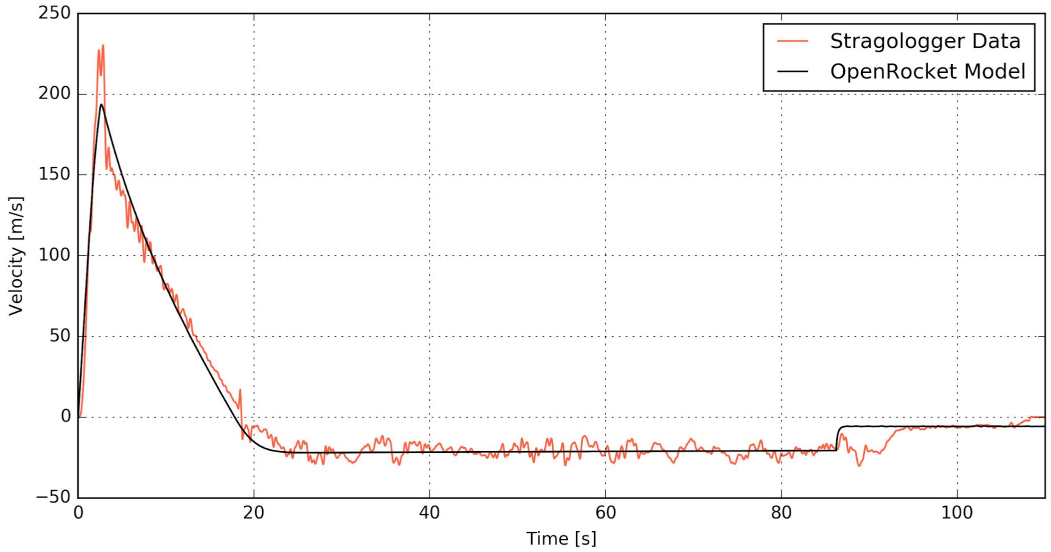


Full Scale Flight

Full Scale Flight



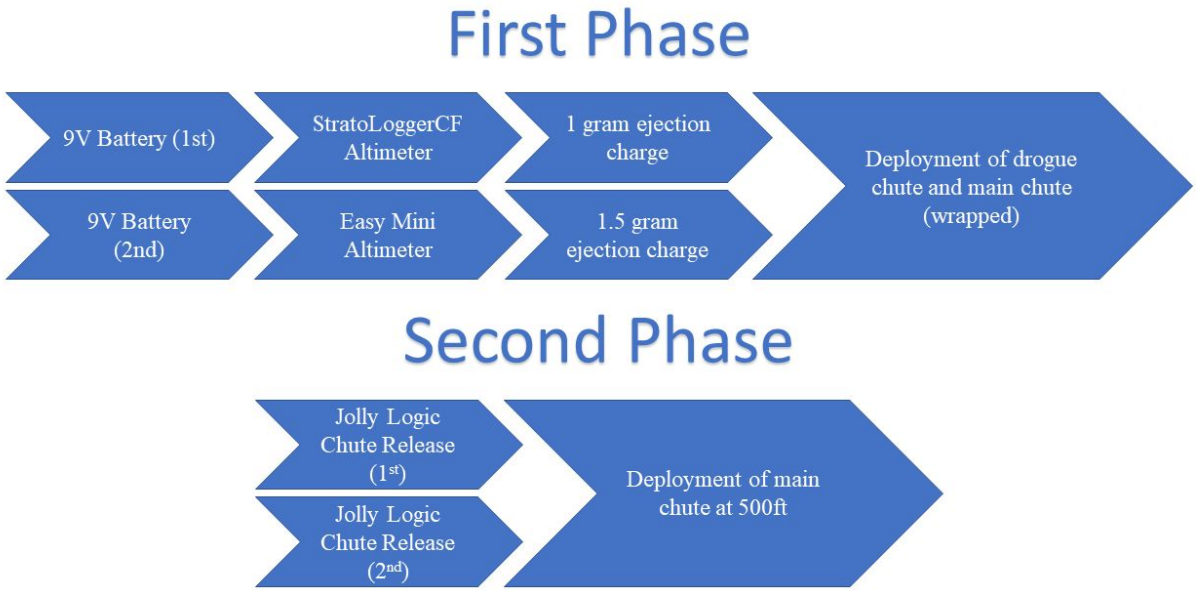
Full Scale Flight



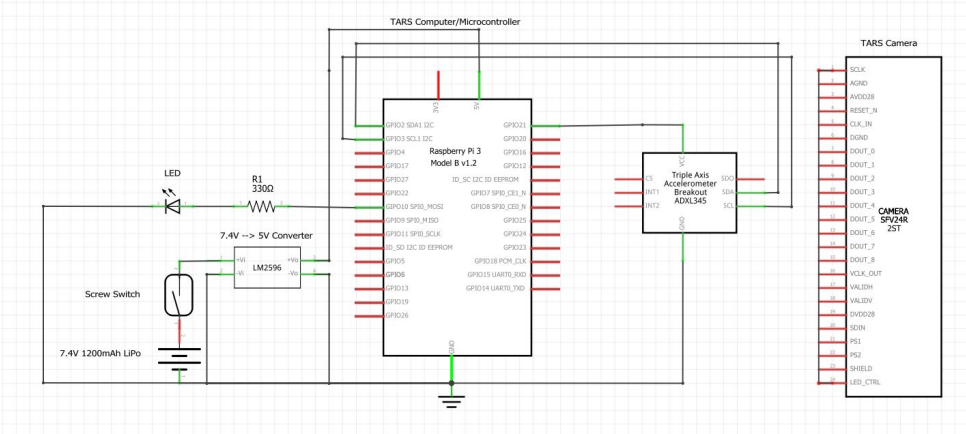
Failure	Working Rationale	Potential Solutions
Failure to engage EasyMini altimeter	Poorly attached screw-switch detached during arming process on pad	➢ Implement a different switch mechanism ➢ Reinforce screw switch attachment with epoxy
ADAS data write failure	ADAS SD card jostled during assembly; lost contact with flight computer	➢ Reinforce and guard SD card with tape ➢ Reposition and secure nearby wires ➢ Use an SD card extension cable and route it to a safer and less occupied region of the avionics sled ➢ Have a backup redundant SD card
TARS SD card write failure	Raspberry Pi SD card was bent and cracked during flight due to strong landing forces; poorly secured computer moved around during flight/landing, putting a load on the card against nearby components	➢ Better secure Raspberry Pi computer with additional mounting struts (4 rather than 2) ➢ Use an SD card extension cable and route it to a less occupied region of the payload sled ➢ Use lightweight padding to protect SD card from external forces ➢ Use a larger parachute to decrease landing loads
Airframe fracture	The blue tube airframe surrounding the ADAS slits suffered a fracture that propagated around the majority of the circumference of the body tube along its spirals.This failure occurred upon ground impact.	➢ Reinforce the existing airframe with a long interior coupler held in with epoxy (mentor’s recommendation) ➢ Use an externally-mounted piece of airframe material to reinforce the vehicle ➢ Modify the aerobrake fins to accommodate smaller slits; reduce slit size ➢ Use a larger parachute to decrease landing loads

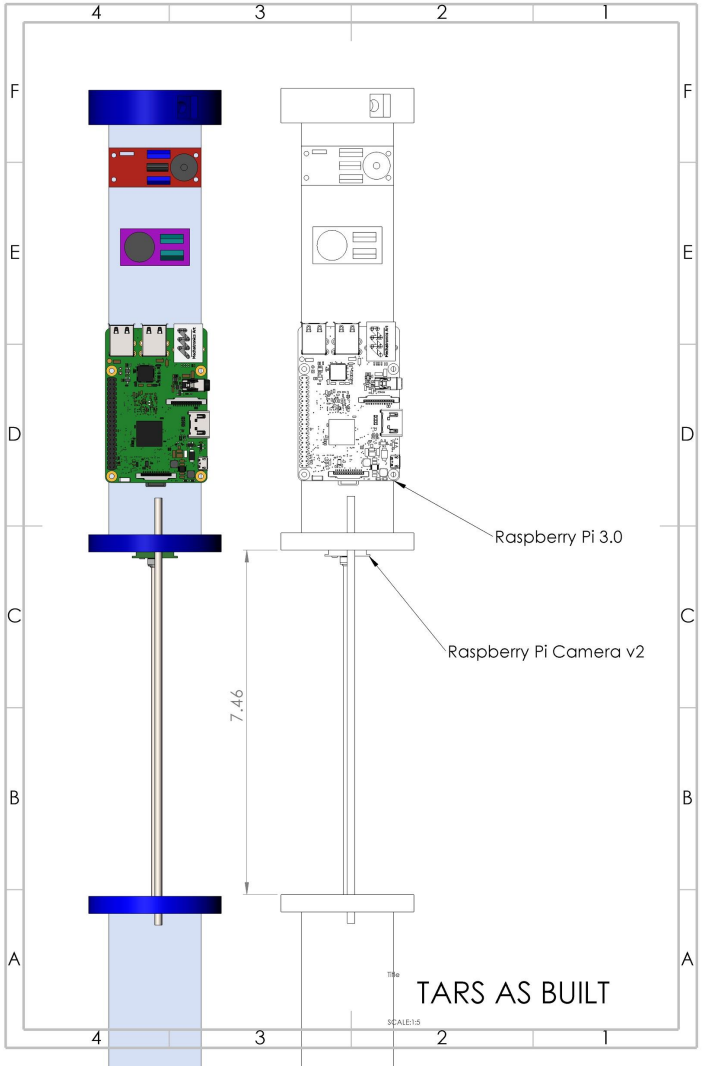
Recovery System Tests

Recovery System

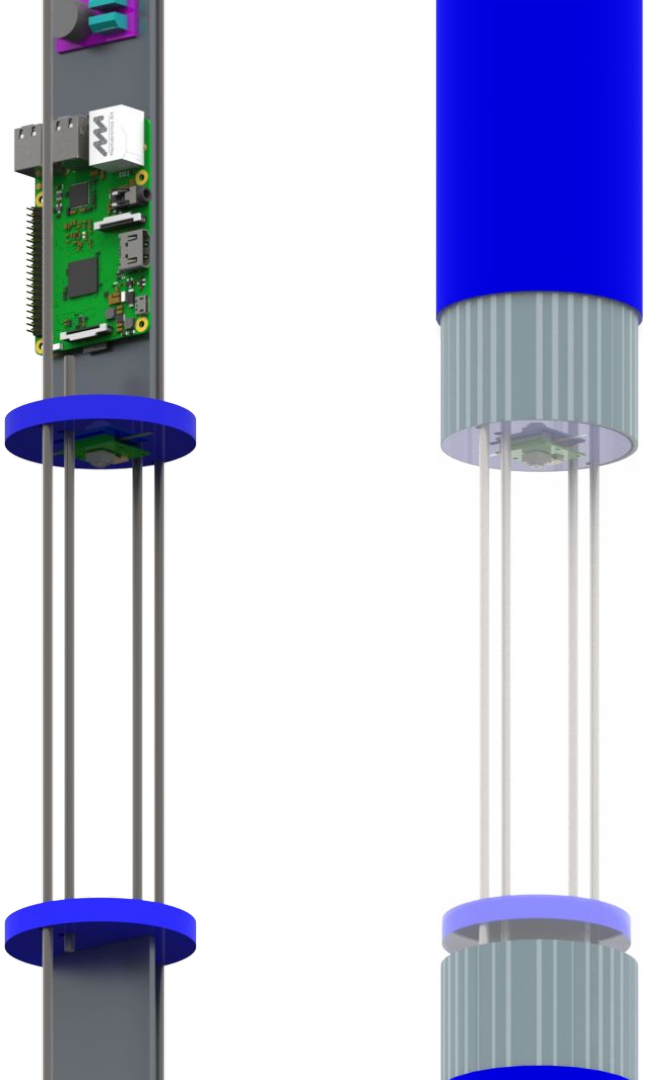


TARS Dimensions

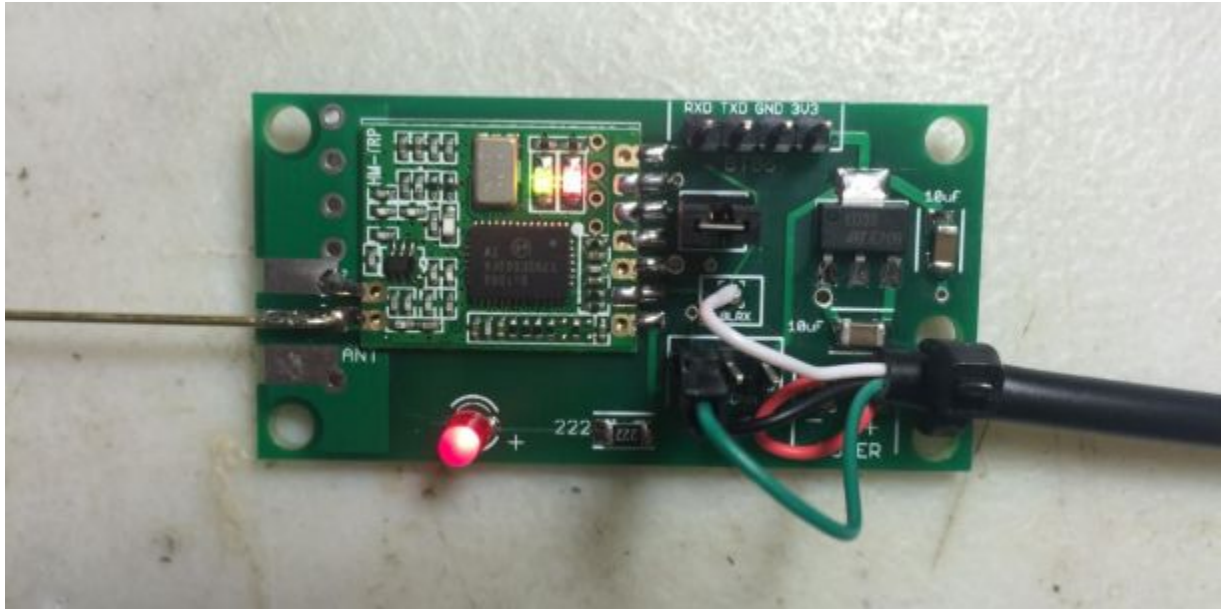




Payload Integration



Interface with ground system (GPS)



Full Scale Flight