

Milestone Review Flysheet 2017-2018

Institution Georgia Institute of Technology

Milestone FRR

Vehicle Properties	
Total Length (in)	108
Diameter (in)	5.562
Gross Lift Off Weigh (lb.)	39.734
Airframe Material(s)	G12 Fiberglass
Fin Material and Thickness (in)	G10 Fiberglass (0.25")
Coupler Length/Shoulder Length(s) (in)	12"

Motor Properties	
Motor Brand/Designation	Aerotech L1390G
Max/Average Thrust (lb.)	370.89 / 305.63
Total Impulse (lbf-s)	887
Mass Before/After Burn (lb.)	8.54 / 4.2
Liftoff Thrust (lb.)	300
Motor Retention Method	Threaded Retainer

Stability Analysis	
Center of Pressure (in from nose)	83.764 in
Center of Gravity (in from nose)	71.817 in
Static Stability Margin (on pad)	2.13
Static Stability Margin (at rail exit)	2.15
Thrust-to-Weight Ratio	7.78 : 1
Rail Size/Type and Length (in)	1515 / 12 ft
Rail Exit Velocity (ft/s)	73.8

Ascent Analysis	
Maximum Velocity (ft/s)	628
Maximum Mach Number	0.564
Maximum Acceleration (ft/s ²)	275
Predicted Apogee (From Sim.) (ft)	5081

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model	Apogee 29095			
Size/Diameter (in or ft)	36 in			
Altitude at Deployment (ft)	At Apogee			
Velocity at Deployment (ft/s)	17.375			
Terminal Velocity (ft/s)	76			
Recovery Harness Material	Tubular Nylon			
Recovery Harness Size/Thickness (in)	9/16in dia			
Recovery Harness Length (ft)	24			
Harness/Airframe Interfaces	Quicklink to Eyebolt			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	817.97	401.09	1650.38	

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Fruity Chutes/IFC-96			
Size/Diameter (in or ft)	96 in			
Altitude at Deployment (ft)	500			
Velocity at Deployment (ft/s)	75.5			
Terminal Velocity (ft/s)	15.4			
Recovery Harness Material	Tubular Nylon			
Recovery Harness Size/Thickness (in)	9/16in dia			
Recovery Harness Length (ft)	30			
Harness/Airframe Interfaces	Quicklink to Eyebolt			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	36.3	17.8	73.25	

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	PerfectFlight Stratologger CF Altimeters
Redundancy Plan and Backup Deployment Settings	Two, independently powered altimeters will be used
Pad Stay Time (Launch Configuration)	2 hours minimum

Recovery Electronics		
Rocket Locators (Make/Model)	Eggfinder TX and RX	
Transmitting Frequencies (all - vehicle and payload)	900 MHz, 433 MHz	
Reaction System Energetics (ex. Black Powder)	FFFF Black Powder	
Energetics Mass - Drogue Chute (grams)	Primary	1.5
	Backup	1.5
Energetics Mass - Main Chute (grams)	Primary	2.5
	Backup	2.5
Energetics Masses - Other (grams) - If Applicable	Primary	N/A
	Backup	N/A

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Payload	
Payload 1 (official payload)	Overview
	The Rover Payload comprises of a Rover vehicle that is capable of autonomous movement and unfolding solar panels, as well as a deployment mechanism to remove the vehicle from the rocket body. During flight, the rover is housed within the body of the rocket. After landing, it is the function of the deployment system to get the rover out of the rocket and onto the ground so it can complete its mission.
Payload 2 (non-scored payload)	Overview
	The purpose of the Apogee Target System (ATS) is to adjust the apogee of a rocket by providing additional drag force after the burnout. Considering the unpredictability of external factors such as wind gust that cannot be simulated, it is crucial to a system that can adjust any deviation from ideal flight. Variable drag force is provided by adjusting surface areas by actuating flaps, which are controlled by motors and integrated board.

Test Plans, Status, and Results	
Ejection Charge Tests	The ejection system of the rocket is controlled by the StratologgerCF altimeters that output a high current to an electric match. A black powder charge that blows out the chutes is ignited by this process. The altimeters will be tested through a barometric pressure chamber equipped with LED mock charges. The black powder tested and recorded at the subscale launch, which was on Saturday November 18th.
Sub-scale Test Flights	A subscale rocket was launched November 18th with fully functioning sensors and recovery system, and a prototype design of our Apogee Targeting System. The launch was conducted in an approved event and area in Taledega, Alabama. Our mentor with level 2 certification and our safety officer were both present. The launch was successful, but the Apogee Targeting System did not deploy properly, due to an error in the software. In addition, ground testing of the Rover Deployment System was successfully completed.
Full-scale Test Flights	The full scale rocket was launched on February 24, 2018. The launch was conducted in an approved event and area in Samson, Alabama. Our mentor with level 2 certification and our safety officer were both present. The launch and recovery were successful, but the Apogee Targeting System and Rover Deployment system were not active. Therefore, these systems will not be active for the competition flight.

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Additional Comments

