Milestone Review Flysheet 2017-2018

Institution	Georgia Institute of Technology

Milestone	CDR

Vehicle Properties	
Total Length (in)	107
Diameter (in)	5.562
Gross Lift Off Weigh (lb.)	37.38
Airframe Material(s)	G12 Fiberglass
Fin Material and Thickness (in)	G10 Fiberglass (0.25")
Coupler Length/Shoulder Length(s) (in)	6-Dec

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)	82.64 (at rail exit)
Center of Gravity (in from nose)	71.33 (at launch)
Static Stability Margin (on pad)	2.08
Static Stability Margin (at rail exit)	2.09
Thrust-to-Weight Ratio	8.26 (at launch)
Rail Size/Type and Length (in)	1010 / 120 in
Rail Exit Velocity (ft/s)	71.7

Ascent Analysis	
Maximum Velocity (ft/s)	669
Maximum Mach Number	0.6
Maximum Acceleration (ft/s^2)	294
Predicted Apogee (From Sim.) (ft)	5434

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)			72.5	
Recovery Harness Material			Tubular Nylon	
Recovery Harness Size/Thickness (in)			9/16in dia	
Recovery Harness Length (ft)			20	
Harness/Airframe Interfaces		Quicklink to Eyebolt		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	671.56	1360.5	326.64	/

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)			70.6	
Terminal Velocity (ft/s)			15.5	
Recovery Harness Material			Tubular Nylon	
Recovery Harness Size/Thickness (in)			9/16in dia	
Recovery Harness Length (ft)			20	
Harness/Airframe Interfaces		Quicklink to Eyebolt		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	30.68	62.18	14.92	/

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	PerflectFlight Stratologger CF Altimeters
Redundancy Plan and Backup Deployment Settings	Two 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)	2.5 GHz, 900 MHz, 433 MHz	
jection System Energetics (ex. Black Powder		FFFF BlackPowder
Energetics Mass - Drogue Chute (grams)	Primary	1.5
	Backup	1.5
Energetics Mass - Main Chute (grams)	Primary	2.25
	Backup	2.25
Energetics Masses - Other (grams) - If Applicable	Primary	N/A
	Backup	N/A

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Payload	
	Overview
Payload 1 (official payload)	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.
	Overview
Payload 2 (non-scored payload)	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 equppied with LED mock charges. The black powder charges were 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 cerficiation 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 will be launched tentatively in late January. It will be conducted at an approved event and area in most likely Alabama, with our mentor with level 2 NRA certification and our safety officer both present. Full functionality will be present on all systems, and a thoroughly tested recovery system with dual redundancy will be employed.

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Additional Comments