

Milestone Review Flysheet 2017-2018

Institution Georgia Institute of Technology

Milestone PDR

Vehicle Properties	
Total Length (in)	102
Diameter (in)	5.562
Gross Lift Off Weigh (lb.)	36.875
Airframe Material(s)	G12 Fiberglass
Fin Material and Thickness (in)	G10 Fiberglass (0.25")
Coupler Length/Shoulder Length(s) (in)	12 / 6

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)	78 (at rail exit)
Center of Gravity (in from nose)	65.7 (at launch)
Static Stability Margin (on pad)	2.2
Static Stability Margin (at rail exit)	2.25
Thrust-to-Weight Ratio	8.136 (at launch)
Rail Size/Type and Length (in)	1010 / 96in
Rail Exit Velocity (ft/s)	70.3

Ascent Analysis	
Maximum Velocity (ft/s)	678
Maximum Mach Number	0.61
Maximum Acceleration (ft/s ²)	298
Predicted Apogee (From Sim.) (ft)	5533

Recovery System Properties									
Drogue Parachute									
Manufacturer/Model	PAR-45 TFR								
Size/Diameter (in or ft)	45in								
Altitude at Deployment (ft)	At Apogee								
Velocity at Deployment (ft/s)	19.7								
Terminal Velocity (ft/s)	57								
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)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Section 1</th> <th>Section 2</th> <th>Section 3</th> <th>Section 4</th> </tr> </thead> <tbody> <tr> <td>237.5</td> <td>127.78</td> <td>280.89</td> <td>/</td> </tr> </tbody> </table>	Section 1	Section 2	Section 3	Section 4	237.5	127.78	280.89	/
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237.5	127.78	280.89	/						

Recovery System Properties									
Main Parachute									
Manufacturer/Model	Rocketman Stf 16ft								
Size/Diameter (in or ft)	16ft								
Altitude at Deployment (ft)	800								
Velocity at Deployment (ft/s)	44.7								
Terminal Velocity (ft/s)	12								
Recovery Harness Material	Tubular Nylon								
Recovery Harness Size/Thickness (in)	9/16in dia								
Recovery Harness Length (ft)	20								
Harness/Airframe Interfaces	Quicklink to Eyebolt								
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Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	PerfectFlight 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)	***Required by CDR***				
Ignition System Energetics (ex. Black Powder)	FFFF BlackPowder				
Energetics Mass - Drogue Chute (grams)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Primary</td> <td>1.5</td> </tr> <tr> <td>Backup</td> <td>1.5</td> </tr> </table>	Primary	1.5	Backup	1.5
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Backup	2.25				
Energetics Masses - Other (grams) - If Applicable	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Primary</td> <td>N/A</td> </tr> <tr> <td>Backup</td> <td>N/A</td> </tr> </table>	Primary	N/A	Backup	N/A
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Payload	
Payload 1 (official payload)	Overview
	<p>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.</p>
Payload 2 (non-scored payload)	Overview
	<p>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.</p>

Test Plans, Status, and Results	
Ejection Charge Tests	<p>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 charges will be tested and recorded at the subscale launch, scheduled for Saturday November 18th.</p>
Sub-scale Test Flights	<p>Subscale will be launched November 18th with fully functioning sensors and recovery system, and prototype designs of our Apogee Targeting System and Rover Deployment System. Construction of the subscale rocket has been completed. The launch will be conducted in an approved event and area in Taledega, Alabama. Our mentor with level 2 certification and our safety officer will both be present.</p>
Full-scale Test Flights	<p>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.</p>

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Additional Comments