

Milestone Review Flysheet 2017-2018

Institution University Of Louisville

Milestone FRR

Vehicle Properties	
Total Length (in)	139
Diameter (in)	6.25
Gross Lift Off Weigh (lb.)	49
Airframe Material(s)	Carbon fiber
Fin Material and Thickness (in)	Carbon fiber, 0.125
Coupler Length/Shoulder Length(s) (in)	6-Dec

Motor Properties	
Motor Brand/Designation	Aerotech L2200
Max/Average Thrust (lb.)	700/434
Total Impulse (lbf-s)	1147.43
Mass Before/After Burn (lb.)	10.46/4.92
Liftoff Thrust (lb.)	697.31
Motor Retention Method	Custom aluminum retainer

Stability Analysis	
Center of Pressure (in from nose)	98.5
Center of Gravity (in from nose)	83
Static Stability Margin (on pad)	5.41
Static Stability Margin (at rail exit)	2.48
Thrust-to-Weight Ratio	14.4
Rail Size/Type and Length (in)	1515/8020/144
Rail Exit Velocity (ft/s)	91.6

Ascent Analysis	
Maximum Velocity (ft/s)	664
Maximum Mach Number	0.6
Maximum Acceleration (ft/s^2)	428
Predicted Apogee (From Sim.) (ft)	5,363

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model	In House			
Size/Diameter (in or ft)	13 in.			
Altitude at Deployment (ft)	5280			
Velocity at Deployment (ft/s)	~0			
Terminal Velocity (ft/s)	92.17/87.99			
Recovery Harness Material	tubular nylon			
Recovery Harness Size/Thickness (in)	9. / 16			
Recovery Harness Length (ft)	22. / 9			
Harness/Airframe Interfaces	U Bolt / ARRD / 660 lb zinc plated steel quick link / Bowline knot			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	359.7	N/A	394.6	N/A

Recovery System Properties				
Main Parachute				
Manufacturer/Model	In House			
Size/Diameter (in or ft)	89 / 104			
Altitude at Deployment (ft)	400			
Velocity at Deployment (ft/s)	92.17/87.99			
Terminal Velocity (ft/s)	33.26 / 15.9 / 28.4 / 14.85			
Recovery Harness Material	tubular nylon			
Recovery Harness Size/Thickness (in)	9. / 16			
Recovery Harness Length (ft)	22. / 18			
Harness/Airframe Interfaces	U Bolt / ARRD / 660 lb zinc plated steel quick link / Bowline knot			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	47.4	64.9	26.6	64.9

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	PerfectFlite StratoLoggerCF
Redundancy Plan and Backup Deployment Settings	delayed redundant BP charges in all separation events. Separate stratologgercfs activate redundant charges. ARRD contains redundant e-match
Pad Stay Time (Launch Configuration)	4 hrs.

Recovery Electronics		
Rocket Locators (Make/Model)	Skytraw, Trackimo, Eggfinder, Aim Xtra	
Transmitting Frequencies (all - vehicle and payload)	Vehicle - Skytraq (902-928MHz), Trackimo (850, 900, 1800, 1900 MHz), Eggfinder (900MHz), AIM XTRA (433 MHz) Payload -	
Ejection System Energetics (ex. Black Powder)	Black powder	
Energetics Mass - Drogue Chute (grams)	Primary	3.3, 2.7
	Backup	3.3, 2.7
Energetics Mass - Main Chute (grams)	Primary	1.9
	Backup	1.9
Energetics Masses - Other (grams) - If Applicable	Primary	N/a
	Backup	N/a

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Payload	
Payload 1 (official payload)	Overview
	<p>strength locking mechanism inside the launch vehicle for the duration of the flight and recovery. During landing, the payload's orientation correction system will ensure upright orientation of the rover prior to deployment. After gaining RSO permission, a team memebr will send a deployment signal to the on-board receiver module unlocking the rover. The rover will then autonomously drive at least five feet from the launch vehicle to a final destination. At this point, the rover will deploy a set of foldable solar cell panels. This marks the conclusion of the primary mission of the payload. The secondary mission will be using the power generated by the solar panels to take images of the rover and surrouding area for data collection. The secondary mission of the payload will have no effect on its ability to successfully complete the primary mission.</p>
Payload 2 (non- scored payload)	Overview
	N/a

Test Plans, Status, and Results	
Ejection Charge Tests	<p>Ejection charge tests will be conducted prior to every launch. Tests were conducted prior to both test launches and resulted in a pass for each test.</p>
Sub-scale Test Flights	<p>The subscleavehicle was tested twice. The first flight was ruled a failure. The second test flight was ruled a success.</p>
Full-scale Test Flights	<p>The full scale vehicle was tested twice, the first resulting in a failure due to motor CATO, the second resulted in a failure due to a separation failure at apogee. The full scale vehicle will be rebuilt and reflown successfully.</p>

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Additional Comments