

# Milestone Review Flysheet 2017-2018

**Institution** University of Louisville

**Milestone** PDR

Vehicle Properties	
Total Length (in)	145
Diameter (in)	6.25
Gross Lift Off Weigh (lb.)	45.88
Airframe Material(s)	Carbon Fiber
Fin Material and Thickness (in)	Carbon Fiber, 0.125
Coupler Length/Shoulder Length(s) (in)	12/6

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)	96.51
Center of Gravity (in from nose)	82.33
Static Stability Margin (on pad)	5.43
Static Stability Margin (at rail exit)	2.25
Thrust-to-Weight Ratio	15.26
Rail Size/Type and Length (in)	1515/144
Rail Exit Velocity (ft/s)	95.4

Ascent Analysis	
Maximum Velocity (ft/s)	732
Maximum Mach Number	0.65
Maximum Acceleration (ft/s <sup>2</sup> )	479
Predicted Apogee (From Sim.) (ft)	5,289

Recovery System Properties									
Drogue Parachute									
Manufacturer/Model	In House								
Size/Diameter (in or ft)	52 in. / 50 in.								
Altitude at Deployment (ft)	5280								
Velocity at Deployment (ft/s)	<32								
Terminal Velocity (ft/s)	58.8 ft/s								
Recovery Harness Material	tubular nylon shockcord								
Recovery Harness Size/Thickness (in)	9/16 in.								
Recovery Harness Length (ft)	464 ft. total								
Harness/Airframe Interfaces	U-Bolt x 2 Advanced Retention and Release Device x 1								
Kinetic Energy of Each Section (Ft-lbs)	<table border="1" style="width: 100%;"> <thead> <tr> <th>Section 1</th> <th>Section 2</th> <th>Section 3</th> <th>Section 4</th> </tr> </thead> <tbody> <tr> <td>15.0</td> <td>208.0</td> <td>6.7</td> <td>1.96.6</td> </tr> </tbody> </table>	Section 1	Section 2	Section 3	Section 4	15.0	208.0	6.7	1.96.6
Section 1	Section 2	Section 3	Section 4						
15.0	208.0	6.7	1.96.6						

Recovery System Properties				
Main Parachute				
Manufacturer/Model	In House			
Size/Diameter (in or ft)	81 in. / 80 in.			
Altitude at Deployment (ft)	500			
Velocity at Deployment (ft/s)	58.8 ft/s			
Terminal Velocity (ft/s)	21.4			
Recovery Harness Material	tubular nylon shockcord			
Recovery Harness Size/Thickness (in)	9/16 in.			
Recovery Harness Length (ft)	480 in. total			
Harness/Airframe Interfaces	U bolt x 3			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	N/A	75	N/A	75

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	Perfectflite StratoLoggerCF
Redundancy Plan and Backup Deployment Settings	Redundant Perfectflite StratoLoggerCF with +2 second delay
Pad Stay Time (Launch Configuration)	"Months" via <a href="http://www.perfectflite.com/SLCF.html">http://www.perfectflite.com/SLCF.html</a>

Recovery Electronics		
Rocket Locators (Make/Model)	Trackimo Real Time GPS Tracking Device	
Transmitting Frequencies (all vehicle and payload)	***Required by CDR***	
Ejection System Energetics	Black powder charges	
Energetics Mass - Drogue Chute (grams)	Primary	2.33 +2.99
	Backup	2.33 +2.99
Energetics Mass - Main Chute (grams)	Primary	2.19
	Backup	2.19
Energetics Masses - Other (grams) - If Applicable	Primary	0.06
	Backup	0.06

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**Payload**

Payload 1 (official payload)	<p style="text-align: center;">Overview</p> <p>The experimental payload will be a deployable rover with foldable solar cell panels. All systems of the payload will be completely enclosed and secured via a locking mechanism inside the launch vehicle for the duration of the flight and recovery. During landing, the payload's orientation correction system will ensure proper orientation of the rover prior to deployment. After gaining RSO permission, a team member will send a deployment signal to the on-board receiver module unlocking the rover. The rover will then autonomously drive five feet from the launch vehicle to a final destination. At this point, the rover will a set of foldable solar cell panels. This marks the conclusion of the primary mission of the payload. The secondary mission will be taking images of the rover and surrounding 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)	<p style="text-align: center;">Overview</p> <p>This experimental payload will be a variable drag system. All systems of this payload will be completely enclosed inside a 12" coupler. This design includes 3 slots that allow aluminum blades to actuate out of the vehicle, changing the drag coefficient of the launch vehicle and slowing the vehicle down. this results in us being able to adjust our kinetic energy and in return changing our projected altitude.</p>

**Test Plans, Status, and Results**

Ejection Charge Tests	<p>All ejection charges will be ground tested prior to any test flight to ensure proper separation takes place, the black powder charges are sized</p>
Sub-scale Test Flights	
Full-scale Test Flights	

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Additional Comments

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