

Milestone Review Flysheet 2017-2018

Institution Oregon State University

Milestone PDR

Vehicle Properties	
Total Length (in)	116
Diameter (in)	5
Gross Lift Off Weight (lb.)	48.2
Airframe Material(s)	Carbon Fiber/ Fiberglass
Fin Material and Thickness (in)	Carbon Fiber/ 0.25
Coupler Length/Shoulder Length(s) (in)	8

Motor Properties	
Motor Brand/Designation	Aerotech L1420R-P
Max/Average Thrust (lb.)	373.6 lb./ 320.1 lb.
Total Impulse (lbf-s)	1037.7 lbf-s
Mass Before/After Burn (lb.)	10.05 lb / 4.414 lb
Liftoff Thrust (lb.)	348 lb
Motor Retention Method	Threaded Retainer

Stability Analysis	
Center of Pressure (in from nose)	86
Center of Gravity (in from nose)	71
Static Stability Margin (on pad)	2.96
Static Stability Margin (at rail exit)	3.25
Thrust-to-Weight Ratio	6.74
Rail Size/Type and Length (in)	1515 / 12ft
Rail Exit Velocity (ft/s)	68

Ascent Analysis	
Maximum Velocity (ft/s)	609
Maximum Mach Number	0.55
Maximum Acceleration (ft/s ²)	226
Predicted Apogee (From Sim.) (ft)	5397

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model	Fruity Chutes Classic Elliptical			
Size/Diameter (in or ft)	1.0 ft			
Altitude at Deployment (ft)	5680 ft AGL (apogee)			
Velocity at Deployment (ft/s)	0 ft/s			
Terminal Velocity (ft/s)	128.6 ft/s, 127.3 ft/s			
Recovery Harness Material	Tubular Nylon			
Recovery Harness Size/Thickness (in)	1/2 in			
Recovery Harness Length (ft)	36 ft, 12 ft			
Harness/Airframe Interfaces	Closed Welded Eyebolts; Sewn Loops in Bridle Harness; 3000lb rated swivels between bridle and suspension lines			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	5218.7	5015	N/A	N/A

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Fruity Chutes Iris			
Size/Diameter (in or ft)	8.0 ft			
Altitude at Deployment (ft)	750 ft AGL			
Velocity at Deployment (ft/s)	134.8 ft/s, 127.3 ft/s			
Terminal Velocity (ft/s)	12.97 ft/s, 12.82 ft/s			
Recovery Harness Material	Tubular Nylon			
Recovery Harness Size/Thickness (in)	1/2 in			
Recovery Harness Length (ft)	36 ft, 12 ft			
Harness/Airframe Interfaces	Closed Welded Eyebolts; Sewn Loops in Bridle Harness; 3000lb rated swivels between bridle and suspension lines			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	64.11	51.05	N/A	N/A

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	Missile Works RRC3; Jolly Logic Chute Release
Redundancy Plan and Backup Deployment Settings	2 Altimeters for each section; separate batteries for each altimeter; separate charges for each altimeter; 2 Chute Releases per section
Pad Stay Time (Launch Configuration)	Altimeters: 8+ hours; Telemetry Unit: ~3 hours

Recovery Electronics		
Rocket Locators (Make/Model)	X-Bee Pro SX Tranceiver; Sparkfun Venus GPS	
Transmitting Frequencies (all - vehicle and payload)	***Required by CDR***	
Ejection System Energetics		
Black Powder		
Energetics Mass - Drogue Chute (grams)	Primary	0.125 g
	Backup	0.1875 g
Energetics Mass - Main Chute (grams)	Primary	N/A
	Backup	N/A
Energetics Masses - Other (grams) - If Applicable	Primary	6.0 g
	Backup	10.0 g

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Payload

Payload	
Payload 1 (official payload)	Overview
	The payload will be a deployable, autonomous rover. A servo-actuated solar array will be mounted on the top surface of the rover. The rover will be housed in the payload bay of the launch vehicle, fully enclosed, during launch and descent. After landing the rover will exit the open end of the payload bay. The rover will drive at least five feet away from all parts of the airframe, navigating away from the launch vehicle and around other obstacles by using data from its sensors. Once the rover has reached a sufficiently clear location, the solar array will open, completing the mission.
Payload 2 (non- scored payload)	Overview

Test Plans, Status, and Results

Ejection Charge Tests	<p>Test Plan: Create a test mock-up with the same outer diameter, coupler tube material, and number/construction of shear pins will match the final assembly</p> <p>Status: Testing will occur between 12/8/17 and 1/8/18</p> <p>Results: N/A</p>
Sub-scale Test Flights	<p>Test Plan: Construct sub-scale rocket with same stability margin as final launch vehicle; sub-scale will contain the same ejection controllers as the final assembly</p> <p>Status: Testing will occur between 12/8/17 1/9/18</p> <p>Results: N/A</p>
Full-scale Test Flights	<p>Test Plan: The full-scale rocket will be representative of final design; final recovery and ejection system will be onboard full-scale</p> <p>Status: Preliminary design completed, will be amended as rocket design changes</p> <p>Results: N/A</p>

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Additional Comments