

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

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

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 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

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

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

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

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 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	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 Status: Testing will occur between 12/8/17 and 1/8/18 Results: N/A
Sub-scale Test Flights	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 Status: Testing will occur between 12/8/17 1/9/18 Results: N/A
Full-scale Test Flights	Test Plan: The full-scale rocket will be representative of final design; final recovery and ejection system will be onboard full-scale Status: Preliminary design completed, will be amended as rocket design changes Results: N/A

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Additional Comments