

# Milestone Review Flysheet 2017-2018

**Institution** California State Polytechnic University, Pomona

**Milestone** PDR

Vehicle Properties	
Total Length (in)	93
Diameter (in)	6
Gross Lift Off Weight (lb.)	46
Airframe Material(s)	Vulcanized fiber
Fin Material and Thickness (in)	PLA with Fiberglass layer
Coupler Length/Shoulder Length(s) (in)	12/6

Motor Properties	
Motor Brand/Designation	Cesaroni L1115
Max/Average Thrust (lb.)	303/252
Total Impulse (lbf-s)	1127
Mass Before/After Burn (lb.)	9.709/4.251
Liftoff Thrust (lb.)	302.6
Motor Retention Method	Screw on retainer

Stability Analysis	
Center of Pressure (in from nose)	71.73
Center of Gravity (in from nose)	59.16
Static Stability Margin (on pad)	2.04
Static Stability Margin (at rail exit)	2.04
Thrust-to-Weight Ratio	6.58
Rail Size/Type and Length (in)	96
Rail Exit Velocity (ft/s)	57.2

Ascent Analysis	
Maximum Velocity (ft/s)	264
Maximum Mach Number	0.56
Maximum Acceleration (ft/s^2)	237
Predicted Apogee (From Sim.) (ft)	5761.2

Recovery System Properties									
Drogue Parachute									
Manufacturer/Model	Cal Poly Pomona								
Size (ft^2)	8.25								
Altitude at Deployment (ft)	5528								
Velocity at Deployment (ft/s)	0								
Terminal Velocity (ft/s)	90.0								
Recovery Harness Material	Kevlar								
Recovery Harness Size/Thickness (in)	1/4								
Recovery Harness Length (ft)	20								
Harness/Airframe Interfaces	Eyebolt, quicklink, and ball bearing swivel								
Kinetic Energy of Each Section (Ft-lbs)	<table border="1" style="width: 100%; text-align: center;"> <tr> <th>Section 1</th> <th>Section 2</th> <th>Section 3</th> <th>Section 4</th> </tr> <tr> <td>1227</td> <td>1113</td> <td>2762</td> <td>n/a</td> </tr> </table>	Section 1	Section 2	Section 3	Section 4	1227	1113	2762	n/a
Section 1	Section 2	Section 3	Section 4						
1227	1113	2762	n/a						

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Fruity Chutes - Toroidal			
Size/Diameter (ft)	10			
Altitude at Deployment (ft)	400			
Velocity at Deployment (ft/s)	90			
Terminal Velocity (ft/s)	13.00			
Recovery Harness Material	Kevlar			
Recovery Harness Size/Thickness (in)	1/2			
Recovery Harness Length (ft)	40			
Harness/Airframe Interfaces	Eyebolt, quicklink, and ball bearing swivel			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	25.6	23.2	57.6	n/a

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	Perfectflite Stratologger CF
Redundancy Plan and Backup Deployment Settings	Redundant Perfectflite Stratologger CF with redundant black powder charges
Pad Stay Time (Launch Configuration)	1+ hours

Recovery Electronics		
Rocket Locators (Make/Model)	Eggfinder GPS	
Transmitting Frequencies (all - vehicle and payload)	909/5 Mhz	
Ejection System Energetics	4F Black Powder	
Energetics Mass - Drogue Chute (grams)	Primary	1.624
	Backup	1.624
Energetics Mass - Main Chute (grams)	Primary	2.26
	Backup	2.26
Energetics Masses - Other (grams) - If Applicable	Primary	n/a
	Backup	n/a

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### Payload

Payload 1 (official payload)	Overview
	The payload experiment will be a deployable rover. It will be custom-made, autonomous, and remotely-triggered to eject from the launch vehicle by team members once the launch vehicle has landed. The payload will be equipped to travel a straight-line distance of 5 ft from the landing site of the launch vehicle regardless of its orientation. It will be equipped with a track and wheel system capable of navigating across the terrain field at the launch site and will then deploy foldable solar panels once it has reached its destination. The solar panels shall be released by the use of a spring-locking mechanism.
Payload 2 (non-scored payload)	Overview

### Test Plans, Status, and Results

Ejection Charge Tests	<p style="text-align: center;">Ground tests will be conducted for the sub-scale and full-scale launch vehicle recovery systems prior to test flights. Analysis will be conducted to verify black powder charges have been sized correctly.</p> <p style="text-align: center;">Recovery system tests have been scheduled in the project plan:                  Sub-scale recovery system: 11/25/2017                  Full-scale recovery system: 1/27/2018</p>
Sub-scale Test Flights	<p style="text-align: center;">Flight dates have been scheduled in the project plan:                  12/09/2017                  12/16/2017                  12/23/2017</p> <p style="text-align: center;">An additional test flight may be scheduled if further test analysis is needed.</p>
Full-scale Test Flights	<p style="text-align: center;">Flight dates have been scheduled in the project plan:                  2/03/2018                  2/10/2018                  2/17/2018                  2/24/2018</p>

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### Additional Comments

The sub-scale launch vehicle dimensions and additional information are currently being refined and shall be provided by CDR.