Milestone Review Flysheet 2017-2018

Institution	Cal Poly Pomona	Milestone	CDR

Vehicle Properties

Total Length (in)	101
Diameter (in)	6
Gross Lift Off Weight (lb.)	43.7
Airframe Material(s)	Blue Tube (vulcanized fiber)
Fin Material and Thickness (in)	PLA (max thickness = 0.96 in)
Coupler Length/Shoulder Length(s) (in)	12/6

Motor Properties

Motor Brand/Designation	Aerotech L1420R
Max/Average Thrust (lb.)	408/319
Total Impulse (lbf-s)	1127
Mass Before/After Burn (lb.)	43.69/38.04
Liftoff Thrust (lb.)	319.23
Motor Retention Method	Screw on retainer

Stability Analysis

Center of Pressure (in from nose)	78.01
Center of Gravity (in from nose)	62.7
Static Stability Margin (on pad)	2.62
Static Stability Margin (at rail exit)	2.62
Thrust-to-Weight Ratio	7.3
Rail Size/Type and Length (in)	144
Rail Exit Velocity (ft/s)	60.5

Ascent Analysis

Maximum Velocity (ft/s)	664
Maximum Mach Number	0.6
Maximum Acceleration (ft/s^2)	251
Predicted Apogee (From Sim.) (ft)	5507

Recovery System Properties
Drogue Parachute

Manufacturer/Model	Cal Poly Pomona
Size (ft^2)	4
Altitude at Deployment (ft)	5528
Velocity at Deployment (ft/s)	0
Terminal Velocity (ft/s)	120.0
Recovery Harness Material	Kevlar
Recovery Harness Size/Thickness (in)	1/4
Recovery Harness Length (ft)	30
Harness/Airframe Interfaces	U bolt, quicklink, and ball bearing swivel

Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	1779	2097	3661	n/a

Recovery System Properties
Main Parachute

Manufacturer/Model	Fruity Chutes - Toroidal
Size/Diameter (ft)	10
Altitude at Deployment (ft)	600
Velocity at Deployment (ft/s)	120
Terminal Velocity (ft/s)	14.00
Recovery Harness Material	Kevlar
Recovery Harness Size/Thickness (in)	1/2
Recovery Harness Length (ft)	30
Harness/Airframe Interfaces	U bolt, quicklink, and ball bearing swivel

Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	24.2	28.5	49.8	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 and Trackimo GPS
Transmitting Frequencies (all - vehicle and payload)		900 MHz for Eggfinder / Quadband (850/900/1800/1900 MHz) for Trackimo
Ejection System Energetics		4F Black Powder
Energetics Mass - Drogue Chute (grams)	Primary	2.17
	Backup	2.17
Energetics Mass - Main Chute (grams)	Primary	3.25
	Backup	3.25
Energetics Masses - Other (grams) - If Applicable	Primary	n/a
	Backup	n/a

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Payload

	Overview
Payload 1 (official payload)	The payload experiment is a custom rover that will be deployed from the launch vehicle after landing. It will be equipped to travel a distance of 5 ft from the landing site of the launch vehicle regardless of its orientation. Once the payload has reached its destination, it shall deploy solar panels.
Payload 2 (non-scored payload)	

Test Plans, Status, and Results

Ejection Charge Tests	All ejection charges will be ground tested prior to any test flight to ensure proper seperation takes place, the black powder charges are sized correctly, and that the parachutes fully deploy from their sections. Sub-scale ejection charge tests were completed on 12/30/17 and 1/3/18. The initial results revealed that the ejection charges were not adequate enough to completely deploy the drogue and main parachutes. The charges were re-sized for the second test, which confirmed proper seperation of the drogue and main parachutes. The subscale launch vehicle test also confirmed that both sections were fully seperated during its flight. Ejection charge tests for the full-scale launch vehicle have been scheduled in the project plan for 1/27/2018.
Sub-scale Test Flights	The sub-scale model was launched on 1/6/18 and was considered successful. The launch vehicle was recovered in reusable condition and demonstrated an excellent flight, which confirmed a favorable stability of 2.59 caliber. Flight data was successfully recovered and revealed an apogee altitude of 4,313 ft.
Full-scale Test Flights	Test flights have been scheduled in the project plan: 2/03/2018 2/10/2018 2/17/2018 (backup) 2/24/2018 (backup)

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Additional Comments