Milestone Review Flysheet 2018-2019

Institution	University of California, Santa Cruz

Milestone	CDR

Vehicle Properties	
Total Length (in)	104
Diameter (in)	5.46
Gross Lift Off Weigh (lb)	22.6
Airframe Material(s)	Carbon Fiber
Fin Material and Thickness (in)	Fiberglass .25
Coupler Length(s)/Shoulder Length(s) (in)	2.26

Motor Properties	
Motor Brand/Designation	AeroTech L1000
Max/Average Thrust (lb)	224.81
Total Impulse (lbf-s)	2714 Ns
Mass Before/After Burn (lb)	22.6/19.51
Liftoff Thrust (lb)	22.6
Motor Retention Method	Bolted plate

Stability Analysis	
Center of Pressure (in. from nose)	80.305
Center of Gravity (in. from nose)	62.992
Static Stability Margin (on pad)	3.14
Static Stability Margin (at rail exit)	3.2
Thrust-to-Weight Ratio	12.8
Rail Size/Type and Length (in)	96
Rail Exit Velocity (ft/s)	80.1

Ascent Analysis	
Maximum Velocity (ft/s)	748
Maximum Mach Number	0.673
Maximum Acceleration (ft/s^2)	391
Target Apogee (ft)	5280
Predicted Apogee (From Sim.) (ft)	5727

Recovery System Properties - Overall	
Total Descent Time (s)	71.7
Total Drift in 20 mph winds (ft)	800 max

Recovery System Properties - Energetics		
Ejection System Energetics (ex. Black Powder)		Black Powder
Energetics Mass - Drogue Chute (grams)	Primary	2
	Backup	2
Energetics Mass - Main Chute (grams)	Primary	N/A
	Backup	N/A
Energetics Mass - Other (grams) - If Applicable	Primary	2
	Backup	2

Recovery System Properties - Recovery Electronics	
Primary Altimeter Make/Model	Strattologger CF/PerfectFlite
Secondary Altimeter Make/Model	Easy Mini/Altus Metrum
Other Altimeters (if applicable)	-
Rocket Locator (Make/Model)	Eggfinder TX
Additional Locators (if applicable)	-
Transmitting Frequencies (all - vehicle and payload)	***Required by CDR*** (Complete on pages 3 and 4)
Describe Redundancy Plan (batteries, switches, etc.)	Each altimeter system is powered seperately and connected to independent charges
Pad Stay Time (Launch Configuration)	>1hr

Recovery System Properties - Drogue Parachute				
Manufacturer/Model			Fruity Chutes	
Size or Diameter (in or ft)			15 in	
Main Altimeter Deployment Setting			Apogee	
Backup Altimeter Deployment Setting			Apogee + 2 sec	
Velocity at Deployment (ft/s)			0	
Terminal Velocity (ft/s)			113.189	
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)			1/2 in. tubular Nylon	
Recovery Harness Length (ft)			10	
Harness/Airframe Interfaces		1/4-20 I Bolts		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	2262.3	1617.06		

Recovery System Properties - Main Parachute				
Manufacturer/Model			Fruity Chutes	
Size or Diameter (in or ft)			60 in	
Main Altimeter Deployment Setting (ft)			500	
Backup Altimeter Deployment Setting (ft)			500	
Velocity at Deployment (ft/s)			113.189	
Terminal Velocity (ft/s)			19.1601	
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)			1/2 in. tubular Nylon	
Recovery Harness Length (ft)			10	
Harness/Airframe Interfaces		1/4-20 I Bolts		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	64.82	46.34		

Milestone Review Flysheet 2018-2019

Institution	University of California, Santa Cruz	Milestone	CDR

Payload	
Payload 1 (official payload)	Overview Slim Sammy is the team's answer to the soil sample collection payload challenge. The rover has been designed to be safely and securely housed within the rocket's air frame during flight, deploy upon landing with the proper orientation correction, drive a minimum of 10ft from the landing sight taking into account the vast range of possible terrains, collect at least 10mL of soil, and seal the sample. The rover features a 3D printed unibody chassis driven by two independently driven silicone tracks. This enables the rover to traverse a majority of the expected terrains and perform obstacle avoidance maneuvers. Once the rover has reached a minimum of 10ft from the landed rocket airframe, the bull-dozer like soil sample collection scoop will deploy. The rover will then drive forward (further away from the rocket) and collect the soil sample. The scoop will then be returned to the closed position, pressed up against the sealing lid to complete the collection task.
Payload 2 (non-scored payload)	Overview

Test Plans, Status, and Results	
Ejection Charge Tests	Ejection charge tests will be completed before any flight of the the vehicle
Sub-scale Test Flights	Sub-scale was flown on Decmber 8th at the LUNAR launch site at 4:01pm.
Vehicle Demon-stration Flights	Full-Scale will be flown on Febuary 2nd or 9th
Payload Demon-stration Flights	Payload will be demonstrated on Febuary 2nd or 9th

Milestone Review Flysheet 2018-2019

Institution	University of California, Santa Cruz	Milestone	CDR

Transmitter #1			
Location of transmitter:	Nosecone		
Purpose of transmitter:	Location		
Brand	Eggfinder	RF Output Power (mW)	-
Model	Eggfinder TX	Specific Frequency used by team (MHz)	-
Handshake or frequency hopping? (explain)	None		
Distance to closest e-match or altimeter (in)			
Description of shielding plan:	Rover payload will shield all incoming transmissions from other electronic systems		

Transmitter #2			
Location of transmitter:	Recovery Section		
Purpose of transmitter:	Reciver for payload activation		
Brand	Digi International	RF Output Power (mW)	250
Model	XBee-PRO	Specific Frequency used by team (MHz)	900
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)	6 in for altimeter, 3in for black-powder charge.		
Description of shielding plan:	No shielding, module is a reciver.		

Transmitter #3			
Location of transmitter:	N/A		
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

Transmitter #4			
Location of transmitter:	N/A		
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

Milestone Review Flysheet 2018-2019

Institution	University of California, Santa Cruz	Milestone	CDR

Transmitter #5			
Location of transmitter:	N/A		
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

Transmitter #6			
Location of transmitter:	N/A		
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

Additional Comments

The additional energetics are for payload section seperation once landed. These have their own arming circuit and remote triggering. Using a Digi International XBee-PRO reciver using a 900Mhz frequency and 250Mw of power.