Milestone Review Flysheet

Institution	Citrus College

Milestone	FRR

Vehicle Properties	
Total Length (in)	119.125
Diameter (in)	6.08
Gross Lift Off Weight (lb)	45.61
Airframe Material	Blue Tube 2.0
Fin Material	Fiber glassed 10--ply aircraft plywood
Coupler Length (in)	12

Motor Properties	
Motor Designation	L1420R
Max/Average Thrust (lb)	373.63/ 320.31
Total Impulse (lbf---s)	1037.72
Mass Before/After Burn	10.06/4.41
Liftoff Thrust (lb)	320.31
Motor Retention	AP 75, flanged retainer

Stability Analysis	
Center of Pressure (in from nose)	93.84
Center of Gravity (in from nose)	73.87
Static Stability Margin	3.33
Static Stability Margin (off launch rail)	5.37
Thrust---to---Weight Ratio	7.97
Rail Size and Length (in)	1515/ 144
Rail Exit Velocity (fps)	77.29

Ascent Analysis	
Maximum Velocity (ft/s)	705.92
Maximum Mach Number	0.63
Maximum Acceleration (ft/s^2)	1168.72
Target Apogee from Simulations (ft)	5280
Stable Velocity (ft/s)	43.99
Distance to Stable Velocity (ft)	4.01

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model	Fruity Chutes/Elliptical Compact Parachute			
Size (in)	24			
Altitude at Deployment (ft)	5266.53			
Velocity at Deployment (ft/s)	35.36			
Terminal Velocity (ft/s)	78.18			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	45			
Harness/Airframe Interfaces	Harnesses will be attached to a U---Bolt that is secured into a bulkhead epoxied into the airframe.			
Kinetic Energy of Each Section (Ft---lbs)	Section 1	Section 2	Section 3	Section 4
	1350.75	643.75	1260.71	N/A

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Fruity Chutes/Iris Ultra Compact Parachute			
Size (in)	120			
Altitude at Deployment (ft)	499.94			
Velocity at Deployment (ft/s)	93.11			
Terminal Velocity (ft/s)	12.92			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	35			
Harness/Airframe Interfaces	Harnesses will be attached to a u-bolt that is secured into a bulkhead and epoxied into the airframe.			
Kinetic Energy of Each Section (Ft---lbs)	Section 1	Section 2	Section 3	Section 4
	36.92	17.6	34.46	N/A

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	Missile Work RRC2+
Redundancy Plan	The main and drogue parachutes will both have redundant black powder charges. The redundant charge for the drogue parachute is programmed to go off 1 second after the primary charge. The redundant charge for the main parachute is programmed to go off at 500'. The redundancy system includes Missile Work RRC2+ altimeters, batteries, ignitors and black powder charges for the main and drogue parachutes.
Pad Stay Time (Launch Configuration)	Upward of 2 hours

Locating Trackers	
Rocket Locators (Make/Model)	TeleGPS
Transmitting Frequencies	434.55MHz
Black Powder Mass Drogue Chute (grams)	2.86
Black Powder Mass Main Chute (grams)	5.37

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Payload	
	Overview
Payload 1	The team has designed and constructed a container intended to protect one or more fragile samples before, during, and after flight. The container will be able to safely hold a maximum amount of eight separate samples. The main container components are: radiation shielding, temperature shielding, a polycarbonate outer shell and inner chamber, a liquid sample container, and an inner sample rack with compartments covered in silicone sponges. The main role of the container is to protect the sample(s) from impact, shock, contamination, temperature change, and radiation. The container was designed considering the conditions a sample from Mars would experience during a sample retrieval mission.
Payload 2	N/A

Test Plans, Status, and Results	
Ejection Charge Tests	January 27, 2017 (Completed) The full---scale ejection charge tests was conducted to ensure that the calculated amount of shear pins will shears as ejection gases separate the compartments.
Sub---scale Test Flights	December 3, 2016 (Completed) The sub---scale test launch was performed to inspect the overall functionality of the scaled launch vehicle, including the structural design, motor selection, payload design, recovery subsystem, and the overall safety.
Full---scale Test Flights	Feburary 5, 2017 (Completed) The full---scale test launch was performed to inspect the overall functionality of the launch vehicle, including the structural design, motor selection, payload design, recovery subsystem, and the overall safety.

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Additional Comments
N/A