

Milestone Review Flysheet 2017-2018

Institution	Citrus College	Milestone	CDR
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Vehicle Properties	
Total Length (in)	124
Diameter (in)	6.08
Gross Lift Off Weigh (lb.)	41.54
Airframe Material(s)	Blue Tube 2.0
Fin Material and Thickness (in)	Aircraft Plywood (0.25)
Coupler Length/Shoulder Length(s) (in)	30.5

Motor Properties	
Motor Brand/Designation	Aerotech L1170-FJ
Max/Average Thrust (lb.)	331.1/271.3
Total Impulse (lbf-s)	946.8
Mass Before/After Burn (lb.)	41.54/35.38
Liftoff Thrust (lb.)	331.1
Motor Retention Method	Screw-On Motor Retainer

Stability Analysis	
Center of Pressure (in from nose)	86.45
Center of Gravity (in from nose)	73.29
Static Stability Margin (on pad)	2.11
Static Stability Margin (at rail exit)	2.11
Thrust-to-Weight Ratio	6.5
Rail Size/Type and Length (in)	1212, 120
Rail Exit Velocity (ft/s)	64.6

Ascent Analysis	
Maximum Velocity (ft/s)	681
Maximum Mach Number	0.61
Maximum Acceleration (ft/s ²)	239
Predicted Apogee (From Sim.) (ft)	5421

Recovery System Properties	
Drogue Parachute	
Manufacturer/Model	Fruity Chutes
Size/Diameter (in or ft)	30
Altitude at Deployment (ft)	5420
Velocity at Deployment (ft/s)	37.6
Terminal Velocity (ft/s)	62
Recovery Harness Material	Tubular Nylon
Recovery Harness Size/Thickness (in)	1
Recovery Harness Length (ft)	30
Harness/Airframe Interfaces	Tubular Nylon recovery harness will be attached to a steel quick-link. The quick-link will latch onto a U-bolt that is attached to a bulkplate inside the airframe.

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Fruity Chutes			
Size/Diameter (in or ft)	140			
Altitude at Deployment (ft)	800			
Velocity at Deployment (ft/s)	64.3			
Terminal Velocity (ft/s)	10.2			
Recovery Harness Material	Tubular Nylon			
Recovery Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	40			
Harness/Airframe Interfaces	Tubular Nylon recovery harness will be attached to a steel quick-link. The quick-link will latch onto a U-bolt that is attached to a bulkplate inside the airframe.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	30.2	1.6	10.8	25.3

Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4				
	1121.5	60.5	403.6	940.8				
Recovery Electronics					Recovery Electronics			
Altimeter(s)/Timer(s) (Make/Model)		Missile Works RRC2+ Altimeter			Rocket Locators (Make/Model)	Altus Metrum		
Redundancy Plan and Backup Deployment Settings		Two RRC2+ altimeters, each with their own power supply, will be connected to two separate black powder containers.			Transmitting Frequencies (all - vehicle and payload)	Vehicle GPS: 434.55 MHz		
Pad Stay Time (Launch Configuration)		5 hours			Ejection System Energetics (ex. Black Powder)		Black Powder	
				Energetics Mass - Drogue Chute (grams)	Primary	3.24		
					Backup	4		
				Energetics Mass - Main Chute (grams)	Primary	4.21		
					Backup	4.75		
				Energetics Masses - Other (grams) - If Applicable	Primary			
					Backup			
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Payload								
Payload 1 (official payload)	Overview							
	<p>The objective of the payload is to safely transport and deploy an autonomous rover capable of traversing multiple varieties of terrain. When recharging is necessary, the rover will deploy a set of solar panels. The payload bay will have to withstand a high amount of force caused by the motor ignition. The rover must have the ability to be deployed without becoming trapped in the deployment system. Upon deployment, the rover will navigate through any terrain the vehicle lands upon.</p>							
Payload 2 (non-scored payload)	Overview							

Test Plans, Status, and Results

Ejection Charge Tests	<p>The sub-scale ejection charge tests were conducted on January 6, 2018 at Friends of Amateur Rocketry launch site in Randsburg, CA. The masses of the ejection charges tested are listed in the "Recovery Electronics" section of this document. Equipped two RRC2+ altimeters, the launch vehicle was secured the ground with cinderblocks and 1 in. threaded nylon straps. Each ejection canister was connected to 30 ft long cables connected to an activation switch, which would complete the circuit and activation the charge. Each charge activated successfully on the first attempt.</p>
Sub-scale Test Flights	<p>The first subscale launch performed on January 6, 2018 was not successful due to failing to turn the arming switch ON at the launch pad. As a result no flight data was collected and neither parachute deployed, causing immediate, unplanned disassembly of the launch vehicle. A second subscale launch will be conducted on January 20, 2018 at Lucerne VALley, CA.</p>
Full-scale Test Flights	<p align="center">Full scale test flights are scheduled for February 10 and March 10, 2018.</p>

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Additional Comments

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