

Milestone Review Flysheet

Please see Milestone Review Flysheet Instructions.

Institution	Spring Grove Area High School
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Milestone	CDR
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Vehicle Properties	
Total Length (in)	105.3067 in
Diameter (in)	4 in
Gross Lift Off Weight (lb)	22.625 lbs
Airframe Material	Fiberglass
Fin Material	Ultem
Drag	88.9 N

Motor Properties	
Motor Manufacturer(s)	Cesaroni
Motor Designation(s)	K510
Max/Average Thrust (lb)	114.65
Total Impulse (lbf-sec)	559.35
Mass (before, after burn)	90.65 oz, 46.27 oz
Liftoff Thrust (lb)	667.24 lbs

Stability Analysis	
Center of Pressure (in from nose)	83.0638
Center of Gravity (in from nose)	55.3195
Static Stability Margin	6.94
Thrust-to-Weight Ratio	5.1
Rail Size (in)/ Length (in)	144 x 144
Rail Exit Velocity (ft/s)	65.95 ft/s

Ascent Analysis		
Maximum Velocity (ft/s)	607 ft/s	
Maximum Mach Number	0.539	
Maximum Acceleration (ft/s^2)	646 ft/s^2	
Target Apogee (1st Stage if Multiple Stages)	5280	
Stable Velocity (ft/s)	44.0 ft/s	
Distance to Stable Velocity (ft)	5.52 ft	

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model		Fruity Chutes		
Size		24 inch		
Altitude at Deployment (ft)		5493 ft		
Velocity at Deployment (ft/s)		0.16 ft/s		
Terminal Velocity (ft/s)		77.05		
Recovery Harness Material		Tubular Nylon		
Harness Size/Thickness (in)		1.00 in		
Recovery Harness Length (ft)		50 ft		
Harness/Airframe Interfaces		Forged steel eye bolt on the front of the motor casing, and eyebolts on the Ebay and nosecone. Chute held on with tubular nylon and quick links.		
Kinetic Energy of Each Section (ft-lbs)	Section 1	Section 2	Section 3	Section 4
	1076.61	492.96		

Recovery System Properties				
Main Parachute				
Manufacturer/Model		Fruity Chutes		
Size		72 in		
Altitude at Deployment (ft)		600 ft		
Velocity at Deployment (ft/s)		77.3 ft/s		
Terminal Velocity (ft/s)		16.6		
Recovery Harness Material		Tubular Nylon		
Harness Size/Thickness (in)		1.00 in		
Recovery Harness Length (ft)		50 ft		
Harness/Airframe Interfaces		Forged steel eye bolt on the front of the motor casing, and eyebolts on the Ebay and nosecone. Chute held on with tubular nylon and quick links.		
Kinetic Energy of Each Section (ft-lbs)	Section 1	Section 2	Section 3	Section 4
	27.42	22.9	22.59	

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	Perfectflite Stratologger CF Altimeter
Redundancy Plan	We will have a pair of altimeters, a pair of batteries, a pair of transmitters, and two ejection charges for each parachute.
Pad Stay Time (Launch Configuration)	3 hours

Recovery Electronics	
Rocket Locators (Make/Model)	PR-300 A Receiver AT2B Transmitter
Transmitting Frequencies	222.27
Black Powder Mass Drogue Chute (grams)	1.8 g
Black Powder Mass Main Chute (grams)	3.0 g

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Autonomous Ground Support Equipment (AGSE)	
Capture Mechanism	Overview
Container Mechanism	Overview
Launch Rail Mechanism	Overview
	Please include a description of how the rail will be locked in place
Igniter Installation Mechanism	Overview
CG Location of Launch Pad (in inches) When Rail is Horizontal (Use Base of Rail as the Reference Point)	
Moment Analysis	

Payload	
Payload 1	Overview
	We are testing the effects that a rocket launch will have on a colloid solution. We will see if this solution acts as a solid, or a liquid under the extreme pressures acting on it from the launch.
Payload 2	Overview

Test Plans, Status, and Results	
Ejection Charge Tests	For the ejection charge tests, everything went as planned. For the drogue chute, it was recommended that we either lower the amount of black powder, or use a longer shock cord. We lowered the ejection charge to 1.8g and the test was successful.
Sub-scale Test Flights	The flight of the sub scale rocket had a predicted height of 2403 ft. The actual height was 2303, and had a 4.2% difference. Other than the height difference, the rockets behaved the same, and made a safe decent.
Full-scale Test Flights	Not yet performed

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Additional Comments