Milestone Review Flysheet

Please see Milestone Review Flysheet Instructions.

Institution	Spring Grove Area High School

Milestone	CDR

Vehicle Properties

Total Length (in)	114.500 inches
Diameter (in)	4.0 in
Gross Lift Off Weight (lb)	23.35 lb
Airframe Material	PML Fiberglass Wrapped Phenolic
Fin Material	1/8" G10 Fiberglass
Drag	1.2 based on nose-cone and cross sectional area.

Motor Properties

Motor Manufacturer(s)	Cesaroni Technology Inc
Motor Designation(s)	K510 Classic
Max/Average Thrust (lb)	155.07 lb / 115.55 lb
Total Impulse (lbf-sec)	558.85 lb·f/s
Mass (before, after burn)	2,590g / 1,393g
Liftoff Thrust (lb)	32.60 lb at .15

4.8s burn time

Stability Analysis

Center of Pressure (in from nose)	81.97 in
Center of Gravity (in from nose)	71.09 in
Static Stability Margin	2.72
Thrust-to-Weight Ratio	4.949
Rail Size (in)/ Length (in)	1.5 in / 96 in
Rail Exit Velocity (ft/s)	53.1 ft/s

Ascent Analysis

Maximum Velocity (ft/s)	594.28	ft/s
Maximum Mach Number	0.53	
Maximum Acceleration (ft/s^2)	175.23	ft/s
Target Apogee (1st Stage if Multiple Stages)	5,481.63 ft	
Stable Velocity (ft/s)	43.99 ft	
Distance to Stable Velocity (ft)	5.77 ft	

Recovery System Properties

Drogue Parachute

Manufacturer/Model	FRUITYCHUTES / IFC
Size	24 in.
Altitude at Deployment (ft)	5,481.63 ft
Velocity at Deployment (ft/s)	8.43 ft/s
Terminal Velocity (ft/s)	52.03 ft/s
Recovery Harness Material	Tubular Nylon
Harness Size/Thickness (in)	1 inch
Recovery Harness Length (ft)	15 ft
Harness/Airframe Interfaces	The harness will be connected to a number of quick links throughout the rocket that secure to eye-bolts on bulkheads.

Kinetic Energy of Each Section (ft-lbs)	Section 1	Section 2	Section 3	Section 4
	59.63	365.1	293.2	N/A
	PAYLOAD	BACK	FRONT	

Recovery System Properties

Main Parachute

Manufacturer/Model	FRUITYCHUTES - IA
Size	72 inches
Altitude at Deployment (ft)	700 ft
Velocity at Deployment (ft/s)	52.03 ft/s
Terminal Velocity (ft/s)	17.1 ft/s
Recovery Harness Material	Tubular-Nylon
Harness Size/Thickness (in)	1 inch
Recovery Harness Length (ft)	25 feet

Kinetic Energy of Each Section (ft-lbs)	Section 1	Section 2	Section 3	Section 4
	9.07	53.65	42.3	6.53
	1	2	3	4

Recovery Electronics

Altimeter(s)/Timer(s) (Make/Model)	Perfectflite CF Altimeters
Redundancy Plan	using two altimeters, one will be a main to deploy at apogee and 700 ft. Another back up will be on a delay of two seconds for the main and drogue chute.
Pad Stay Time (Launch Configuration)	Each altimeter can last 4 hrs. on the pad.

Recovery Electronics

Rocket Locators (Make/Model)	N/A
Transmitting Frequencies	***Required by CDR***
Black Powder Mass Drogue Chute (grams)	3.5g
Black Powder Mass Main Chute (grams)	3.5g

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

Payload	
Payload 1	Overview The payload will examine the effect of single port hole sizes on the measurements taken by Perfect Flite and CF altimeters. DATA will be taken on 5/64", 3/32" and 7/64" holes.
Payload 2	Overview N/A

Test Plans, Status, and Results	
Ejection Charge Tests	We plan to use 3.5 grams of black powder to eject both the main and drogue chute sides of the rocket. Both ejections will be run off of the redundant altimeters. Ejection Testing will be done on 1/16
Sub-scale Test Flights	We launched our first sub-scale rocket in December, and unfortunately it got stuck in a tree, but maintained a stable flight. We plan to re-launch the sub-scale on January 17th.
Full-scale Test Flights	Design is fully complete. Testing is soon to be finished and construction will begin after the January 17th sub-scale launch.

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Additional Comments

No Comments