

Milestone Review Flysheet

PDR, CDR, FRR

Institution Name Spring Grove Area High School

Milestone CDR

Vehicle Properties	
Diameter (in)	ID: 3.90 in. / OD: 4.099 in.
Length (in)	81.95 in.
Gross Liftoff Weight (lb)	10.71 lb.
Launch Lug/button Size	1.0 in for a 1010 rail
Motor Retention	54mm AeroPack Retainer-P

Motor Properties	
Motor Manufacturer	Cesaroni
Motor Designation	Pro 54 K2045 Vmax
Max/Average Thrust (N/lb)	2184 N / 1996 N
Total Impulse (N-sec/lb-sec)	1417 N-sec
Mass pre/post Burn (lb)	2.84 lb / 1.26 lb

Stability Analysis	
Center of Pressure (in from nose)	58.056 in
Center of Gravity (in from nose)	68.519 in
Static Stability Margin	2.56
Thrust-to-Weight Ratio	42.55
Rail Size (in) / Length (in)	1.0 in / 96 in.

Ascent Analysis	
Rail Exit Velocity (ft/s)	147 ft/s
Max Velocity (ft/s)	953 ft/s
Max Mach Number	0.85
Max Acceleration (ft/s ²)	1483 ft/s ²
Peak Altitude (ft)	5264 ft

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model		Fruity Chutes / CFC-15		
Size		15 in.		
Altitude at Deployment (ft)		5264 ft.		
Velocity at Deployment (ft/s)		0 ft/s		
Terminal Velocity (ft/s)		92.1 ft/s		
Recovery Harness Material		Tubular Nylon		
Harness Size / Thickness (in)		1 in		
Recovery Harness Length (ft)		20 ft.		
Harness/Airframe Interfaces		The parachute is connected to the shock cord with a swivel. The shock cord connects to a 1/4" Quicklink and a 5/16" U-bolt in a 1/2 inch bulkhead.		
Kinetic Energy During Descent (ft-lb)	Section 1	Section 2	Section 3	Section 4
	486 ft-lb	100 ft-lb	607 ft-lb	N/A

Recovery System Properties				
Main Parachute				
Manufacturer/Model		Fruity Chutes / IFC-72		
Size		72 in		
Altitude at Deployment (ft)		600 ft		
Velocity at Deployment (ft/s)		92.1 ft/s		
Landing Velocity (ft/s)		19.1 ft/s		
Recovery Harness Material		Tubular Nylon		
Harness Size / Thickness (in)		1 in		
Recovery Harness Length (ft)		25 ft.		
Harness/Airframe Interfaces		The parachute is connected to the shock cord with a swivel. The shock cord connects to a 1/4" Quicklink and a 5/16" U-bolt through a 1/2" bulkhead.		
Kinetic Energy Upon Landing (ft-lb)	Section 1	Section 2	Section 3	Section 4
	15.8 ft-lb	5.5 ft-lb	25.8 ft-lb	6.2 ft-lb

Recovery System Properties				
Electronics/Ejection				
Altimeter(s) Make/Model		Perfect Flite / Strata Logger		
Redundancy Plan		Using two altimeters with two ejection charges for each. One altimeter will have a slight delay from the other. Both will be coated in a special epoxy to prevent electronics from backing off.		
Pad Stay Time (Launch Configuration)		Altimeters will work for weeks. The payload can be powered for a little over an hour.		

Recovery System Properties				
Electronics/Ejection				
Rocket Locators (Make, Model)		Communication Specialists Inc / AT-28 Transmitter		
Transmitting Frequencies		***Required by CDR*** 222.470 MHz		
Black Power Mass Drogue Parachute (gram)		1.0 grams		
Black Power Mass Main Parachute (gram)		1.0 grams		

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Payload/Science

Succinct Overview of Payload/Science Experiment	The payload will measure the current and voltage produced at different heights during its descent, and record data so that a graph of power vs. height can be analyzed. The payload will know what height a power was produced, using a pressure sensor to calculate height.
Identify Major Components	Lucite cylinder to protect solar panel, electronics bay housing, reliable solar panel, an Arduino data logger, an analog ammeter, a digital pressure sensor, an SD card to store data, a 9 Volt battery power supply, and epoxy to prevent electronics from coming off.
Mass of Payload/Science	14.836 oz.

Test Plan Schedule/Status

Ejection Charge Test(s)	The ejection charges have been test in their entirety and it has been concluded that 1.0 grams of black powder will yield the best results.
Sub-scale Test Flights	The sub-scale rocket has been launched successfully three times without problems. Sub-scale launches were completed January 6.
Full-scale Test Flights	Parts have been ordered, some have been recieved. Waiting for more parts to arrive before construction begins. Launch dates and locations have been finalized.

Additional Comments

Because of the large acceleration of the rocket, electronic components of the recovery system will be coated in a special epoxy, along with some components of the payload electronics.