

Milestone Review Flysheet

Please see Milestone Review Flysheet Instructions.

Institution	The Pennsylvania State University
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Milestone	PDR
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Vehicle Properties	
Total Length (in)	99
Diameter (in)	5.15
Gross Lift Off Weight (lb)	19.88
Airframe Material	Profusion fiberglass composite
Fin Material	G10 fiberglass
Drag	0.48

Motor Properties	
Motor Manufacturer(s)	Cesaroni
Motor Designation(s)	K500-RL-8
Max/Average Thrust (lb)	133.7/112.4
Total Impulse (lbf-sec)	359
Mass (before, after burn)	19.88, 16.44
Liftoff Thrust (lb)	580

Stability Analysis	
Center of Pressure (in from nose)	62.3
Center of Gravity (in from nose)	68.9
Static Stability Margin	1.28
Thrust-to-Weight Ratio	5.6
Rail Size (in)/ Length (in)	1.5/156
Rail Exit Velocity (ft/s)	60.6

Ascent Analysis		
Maximum Velocity (ft/s)	475	
Maximum Mach Number	0.42	
Maximum Acceleration (ft/s^2)	190	
Target Apogee (1st Stage if Multiple Stages)	3000 ft	
Stable Velocity (ft/s)		
Distance to Stable Velocity (ft)		

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model		Giant Leap TAC-1		
Size		24 inch		
Altitude at Deployment (ft)				
Velocity at Deployment (ft/s)		~0 (some lateral velocity)		
Terminal Velocity (ft/s)		59.5		
Recovery Harness Material		Kevlar		
Harness Size/Thickness (in)		0.25		
Recovery Harness Length (ft)		27		
Harness/Airframe Interfaces		Metal quicklinks secured to a tender-descender connected to a 1" diameter eyebolt attached to dual bulkhead plates		
Kinetic Energy of Each Section (ft-lbs)	Body/Motor	Nosecone	Section 3	Section 4
	724	225.7		

Recovery System Properties				
Main Parachute				
Manufacturer/Model		Fruitychutes Iris Ultra Compact		
Size		72 inch		
Altitude at Deployment (ft)		1100		
Velocity at Deployment (ft/s)		59.5		
Terminal Velocity (ft/s)		13.68		
Recovery Harness Material		Kevlar		
Harness Size/Thickness (in)		0-Jan		
Recovery Harness Length (ft)		20		
Harness/Airframe Interfaces		Metal quicklinks secured to a 1" diameter eyebolt attached to dual bulkhead plates		
Kinetic Energy of Each Section (ft-lbs)	Motor/Body	Nosecone/Payload (landing under drogue)		
	38.3	60.1		

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	2 x PerfectFlite SL100 Stratologger
Redundancy Plan	Dual Altimeter setup, two ejection charges for the single separation at apogee, and dual tender-descenders in series
Pad Stay Time (Launch Configuration)	>2hr

Recovery Electronics	
Rocket Locators (Make/Model)	BigRedBee BeeLine transmitter
Transmitting Frequencies	***Required by CDR***
Black Powder Mass Drogue Chute (grams)	2 and 12g CO2
Black Powder Mass Main Chute (grams)	.2g for tender-descenders

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Autonomous Ground Support Equipment (AGSE)	
Capture Mechanism	Overview
	The capture mechanism is a autonomous robotic arm that rotates about a fixed point to transport a payload to the containment feature in the rocket.
Container Mechanism	Overview
	The container mechanism is located directly behind the nose cone and is fully extended when the rocket is placed on the rail. The mechanism is a spring loaded feature that closes when unobstructed.
Launch Rail Mechanism	Overview
	The Launch Rail Mechanism is a motor that moves a cable pulley system to raise the launch platform. The rail stays in place with the tension of the cable and a redundant locking mechanism for added safety.
Igniter Installation Mechanism	Overview
	The igniter installing mechanism sits below the erected launch platform. When instructed to do so the launch platform inserts the wadding plus ignition charges into the motor.
CG Location of Launch Pad (in inches) When Rail is Horizontal (Use Base of Rail as the Reference Point)	
78	
Moment Analysis	

Payload	
Payload 1	Overview
Payload 2	Overview

Test Plans, Status, and Results	
Ejection Charge Tests	Ground testing of the ejection charges will be conducted in late November, prior to the Subscale test launch.
Sub-scale Test Flights	The subscale test flight will be conducted in early December.
Full-scale Test Flights	

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Additional Comments