

Milestone Review Flysheet

Institution Rensselaer Polytechnic Institute

Milestone Critical Design Review

Vehicle Properties

Total Length (in)	102
Diameter (in)	6
Gross Lift Off Weigh (lb)	25.15
Airframe Material	Phenolic Resin
Fin Material	G 10 Fiberglass
Coupler Length	12 in

Motor Properties

Motor Designation	2856-L910-CS-P
Max/Average Thrust (lb)	235.6/203.6
Total Impulse (lbf-s)	645
Mass Before/After Burn	92.3 oz / 44.1 oz
Liftoff Thrust (lb)	208
Motor Retention	Non-flanged Aluminum Retainer

Stability Analysis

Center of Pressure (in from nose)	74.3
Center of Gravity (in from nose)	59.2
Static Stability Margin	2.46
Static Stability Margin (off launch rail)	2.03
Thrust-to-Weight Ratio	9.37 max/ 8.10 avg
Rail Size and Length (in)	15-15 144in
Rail Exit Velocity	79.2 ft / s

Ascent Analysis

Maximum Velocity (ft/s)	720
Maximum Mach Number	0.66
Maximum Acceleration (ft/s^2)	284
Target Apogee (From Simulations)	5363 ft
Stable Velocity (ft/s)	79.2
Distance to Stable Velocity (ft)	12

Recovery System Properties

Dogue Parachute

Manufacturer/Model	Rocketman Ballistic Mach II			
Size	4 sq. ft			
Altitude at Deployment (ft)	Apogee			
Velocity at Deployment (ft/s)	0			
Terminal Velocity (ft/s)	91			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	22			
Harness/Airframe Interfaces	1500 lb size 12/0 Nickel plated swivel joint, 1.5 in eyebot fixed to forward centering ring and rear airframe bulkhead.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	297	720	691	N/A

Recovery System Properties

Main Parachute

Manufacturer/Model	Skyangle Classic-II 60			
Size	39 sq. ft			
Altitude at Deployment (ft)	700			
Velocity at Deployment (ft/s)	91			
Terminal Velocity (ft/s)	23			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	22			
Harness/Airframe Interfaces	1500 lb size 12/0 Nickel plated swivel joint, 1.5 in eyebot fixed to forwardmost bulkhead in upper airframe.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	29	70	67	N/A

Recovery Electronics

Altimeter(s)/Timer(s) (Make/Model)	Featherweight Raven3
Redundancy Plan	Perfectflite Stratologger SL100
Pad Stay Time (Launch Configuration)	1 hour

Recovery Electronics

Rocket Locators (Make/Model)	GPS Transmission
Transmitting Frequencies	Xbee Channel 45
Black Powder Mass Drogue Chute (grams)	1.7
Black Powder Mass Main Chute (grams)	1.7

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Autonomous Ground Support Equipment (MAV Teams Only)

Capture Mechanism	Overview
Container Mechanism	Overview
Launch Rail Mechanism	Overview
	Include Description of rail locking mechanism
Igniter Installation Mechanism	Overview

Payload

Payload 1	Overview
	Induction of roll and counter roll is achieved by the actuation of opposing blades protruding from the rocket body. The two sets of blades are controlled by independent motors driving independent slotted cam plates. The protrusion of the blades will be dynamically controlled based upon the rocket's angular velocity. Following the completion of the payload objective, the blades will deploy to act as an active drag control system.
Payload 2	Overview
	N/A

Test Plans, Status, and Results

Ejection Charge Tests	Ejection charge tests will be conducted prior to any dual deploy launch.
Sub-scale Test Flights	A dual deploy 2:1 scale rocket was flown on 1/6/17
Full-scale Test Flights	Full scale test flights will be conducted in late February / early March.

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Additional Comments