

Milestone Review Flysheet

Institution University of Louisville

Milestone CDR

Vehicle Properties	
Total Length (in)	140
Diameter (in)	6.1
Gross Lift Off Weigh (lb)	43.9
Airframe Material	Carbon Fiber
Fin Material	Carbon Fiber
Coupler Length	12 in

Motor Properties	
Motor Designation	AeroTech L2200-G
Max/Average Thrust (lb)	697.31/494.58
Total Impulse (lbf-s)	1147.43
Mass Before/After Burn	43.9/38.4
Liftoff Thrust (lb)	697.31
Motor Retention	Custom machined retainer secured with 10-32 shoulder bolts.

Stability Analysis	
Center of Pressure (in from nose)	115.3
Center of Gravity (in from nose)	112.11
Static Stability Margin	3.21
Static Stability Margin (off launch rail)	2.2
Thrust-to-Weight Ratio	14.65
Rail Size and Length (in)	144
Rail Exit Velocity	96.8

Ascent Analysis		
Maximum Velocity (ft/s)	721	
Maximum Mach Number	0.65	
Maximum Acceleration (ft/s^2)	469	
Target Apogee (From Simulations)	5561 feet without VDS	5280 feet with VDS
Stable Velocity (ft/s)	52	
Distance to Stable Velocity (ft)	3.8	

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model	Custom Cruciform			
Size	1.9/1.3 ft			
Altitude at Deployment (ft)	5280/5280 +2 sec delay			
Velocity at Deployment (ft/s)	25.79 ft/s / 72.87 ft/s			
Terminal Velocity (ft/s)	93.6 ft/s / 129.0 ft/s			
Recovery Harness Material				
Harness Size/Thickness (in)				
Recovery Harness Length (ft)	12 feet / 12 feet			
Harness/Airframe Interfaces	ARRD			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	2876 ft/lb	4887 ft/lb		

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Custom Toroidal			
Size	9 ft/2.9ft			
Altitude at Deployment (ft)	590 feet / 1300 feet			
Velocity at Deployment (ft/s)	93.6 ft/s / 129.0 ft/s			
Terminal Velocity (ft/s)	14.6 ft/s 22.30 ft/s			
Recovery Harness Material				
Harness Size/Thickness (in)				
Recovery Harness Length (ft)	12 feet/ 12 feet			
Harness/Airframe Interfaces	U Bolt			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	70 ft lb	39.4 ft/lb		

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	
Redundancy Plan	
Pad Stay Time (Launch	

Recovery Electronics	
Rocket Locators (Make/Model)	
Transmitting Frequencies	***Required by CDR***
Black Powder Mass Drogue Chute (grams)	
Black Powder Mass Main	

Configuration)

Chute (grams)

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Autonomous Ground Support Equipment (MAV Teams Only)

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

Payload

Payload 1	Overview
	The Experimental Payload will deploy from the rocket and will utilize a multirotor platform as a primary recovery system.
Payload 2	Overview

Test Plans, Status, and Results

Ejection Charge Tests	All ejection charges will be ground tested prior any test flight to ensure proper separation takes place, the black powder charges are sized correctly, and that the parachutes fully deploy from their sections.
Sub-scale Test Flights	A successful launch and recovery of the subscale vehicle was completed on December 17th, 2016.
Full-scale Test Flights	

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Additional Comments