Milestone Review Flysheet

Institution	University of Akron

Milestone	LRR

Vehicle Properties	
Total Length (in)	147
Diameter (in)	5.125
Gross Lift Off Weigh (lb)	53.1
Airframe Material	Carbon Fiber/Fiberglass
Fin Material	Fiberglass
Coupler Length	10

Motor Properties	
Motor Designation	L2200G-P
Max/Average Thrust (lb)	697/504
Total Impulse (lbf-s)	1147.4
Mass Before/After Burn	10.5/4.93
Liftoff Thrust (lb)	543
Motor Retention	Thrust Plate with center rings

Stability Analysis	
Center of Pressure (in from nose)	117.8
Center of Gravity (in from nose)	93.57
Static Stability Margin	4.7
Static Stability Margin (off launch rail)	4.4
Thrust-to-Weight Ratio	10.24
Rail Size and Length (in)	144
Rail Exit Velocity	81

Ascent Analysis		
Maximum Velocity (ft/s)	598	
Maximum Mach Number	0.54	
Maximum Acceleration (ft/s^2)	386.7	
Target Apogee (From Simulations)	4584	
Stable Velocity (ft/s)	50	
Distance to Stable Velocity (ft)	4	

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model	Student Designed - Elliptical			
Size	17in Diameter			
Altitude at Deployment (ft)	Apogee			
Velocity at Deployment (ft/s)	0			
Terminal Velocity (ft/s)	142			
Recovery Harness Material	Flat Webbed Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	4ft and 13ft			
Harness/Airframe Interfaces	Carabineer linked to U-bolt with Backplate.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	6973	4372		

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Student Designed - Toroidal			
Size	130in Diameter			
Altitude at Deployment (ft)	850			
Velocity at Deployment (ft/s)	142			
Terminal Velocity (ft/s)	15.5			
Recovery Harness Material	Flat Webbed Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	16ft and 14ft			
Harness/Airframe Interfaces	Carabineer linked to U-bolt with Backplate.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	74	52	9	

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	PerfectFlite StratologgerCF (x2)
Redundancy Plan	Each Altimeter is capable of drogue and main parachute deployment. Each altimeter will be connected to is own CO2 charge.
Pad Stay Time (Launch Configuration)	1 hour 30 minutes

Recovery Electronics	
Rocket Locators (Make/Model)	Trimble Copernicus II
Transmitting Frequencies	Xbee-PRO 900HB: 900 MHz
Black Powder Mass Drogue Chute (grams)	CO2 23g
Black Powder Mass Main Chute (grams)	CO2 45g

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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
	The payload will house a fragile material and protect it from the forces of a rocket launch and landing. It will utilize a spring/damper system, ballistic gel, and inflatable bladders. The bladders will be filled with air from the atmosphere using a pump
Payload 2	Overview
	N/A

Test Plans, Status, and Results	
Ejection Charge Tests	Ejection charge tests were conducted on both drogue and main chute bays to ensure proper separation. Both tests were successful.
Sub-scale Test Flights	A test flight was performed with an unsuccessful recovery. The sub-scale successfully launched but it was concluded that a malfunction with the rocket's electronics caused its recovery system to not deploy.
Full-scale Test Flights	A full scale test was performed with a fully successful launch and recovery. A few improvements were made with NASA's approval

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Additional Comments