

Milestone Review Flysheet

Institution The University of Akron

Milestone CDR

Vehicle Properties

Total Length (in)	144
Diameter (in)	5.125
Gross Lift Off Weigh (lb)	53.7
Airframe Material	Carbon Fiber/Fiberglass
Fin Material	Fiberglass
Coupler Length	8 inches

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)	99.499
Center of Gravity (in from nose)	85.797
Static Stability Margin	2.65
Static Stability Margin (off launch rail)	2.78
Thrust-to-Weight Ratio	9.39
Rail Size and Length (in)	144
Rail Exit Velocity	88.28 ft/s

Ascent Analysis

Maximum Velocity (ft/s)	630
Maximum Mach Number	0.57
Maximum Acceleration (ft/s^2)	401
Target Apogee (From Simulations)	5574
Stable Velocity (ft/s)	50
Distance to Stable Velocity (ft)	4

Recovery System Properties

Dogue Parachute

Manufacturer/Model	Student Designed - Elliptical			
Size	17 in diameter			
Altitude at Deployment (ft)	Apogee			
Velocity at Deployment (ft/s)	0			
Terminal Velocity (ft/s)	143.44			
Recovery Harness Material	Flat Webbed Nylon			
Harness Size/Thickness (in)	3/4"			
Recovery Harness Length (ft)	18			
Harness/Airframe Interfaces	2500 lb swivel hoist ring. Quick link of shock cord to hoist ring through carabiner.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	6549	5751		

Recovery System Properties

Main Parachute

Manufacturer/Model	Student Designed - Annular			
Size	130 in diameter			
Altitude at Deployment (ft)	850			
Velocity at Deployment (ft/s)	143.44			
Terminal Velocity (ft/s)	11.35			
Recovery Harness Material	Flat Webbed Nylon			
Harness Size/Thickness (in)	3/4"			
Recovery Harness Length (ft)	16			
Harness/Airframe Interfaces	2500 lb swivel hoist ring. Quick link of shock cord to hoist ring through carabiner.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	74.2	72.2	8	

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 its 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 900: 900 MHz
Black Powder Mass Drogue Chute (grams)	CO2 23g
Black Powder Mass Main Chute (grams)	CO2 45g

Milestone Review Flysheet

Institution The University of Akron

Milestone CDR

Payload

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	A ground test will be done prior to sub-scale flight tests to ensure the selected CO2 amount is appropriate to fully and reliably eject the main and drogue parachutes.
Sub-scale Test Flights	A test flight was performed with a successful ascent, but an unsuccessful recovery. It was concluded that the black powder charge that is used to puncture the CO2 canister vented out the wrong end of the ejection system. It is further discussed in section 4.
Full-scale Test Flights	A full-scale flight is planned to happen before the end of February

Milestone Review Flysheet

Institution

Milestone

Additional Comments

