Milestone Review Flysheet

Institution	University of Evansville

Milestone	PDR

Vehicle Properties	
Total Length (in)	111.75
Diameter (in)	5.5
Gross Lift Off Weigh (lb)	36.5
Airframe Material	Carbon Fiber
Fin Material	G-10 Fiberglass
Coupler Length	1

Motor Properties	
Motor Designation	L850W AeroTech
Max/Average Thrust (lb)	266.4/195.1
Total Impulse (lbf-s)	830.7
Mass Before/After Burn	8.1/3.54
Liftoff Thrust (lb)	269.8
Motor Retention	Aero Pack 75mm Retainer - L

Stability Analysis	
Center of Pressure (in from nose)	90.456
Center of Gravity (in from nose)	69.935
Static Stability Margin (After Burn-out)	4.5
Static Stability Margin (off launch rail)	3.69
Thrust-to-Weight Ratio	5.61:1
Rail Size and Length (in)	144
Rail Exit Velocity	69.2

Ascent Analysis	
Maximum Velocity (ft/s)	592
Maximum Mach Number	0.53
Maximum Acceleration (ft/s^2)	208
Target Apogee (From Simulations)	5379
Stable Velocity (ft/s)	69.2
Distance to Stable Velocity (ft)	9.02

Recovery System Properties				
Dogue Parachute				
Manufacturer/Model	Fruity Chutes CFC-36			
Size	36"			
Altitude at Deployment (ft)	5280			
Velocity at Deployment (ft/s)	0			
Terminal Velocity (ft/s)	49.9			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	25			
Harness/Airframe Interfaces	5/16" steel U-bolts secured to aluminum bulkplates epoxied to airframe			
Kinetic Enerfy of Each Section (Ft-lbs)	Nose Cone	Recovery Bay	Booster	-
	275	166.7	388	

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Fruity Chutes IFC-96			
Size	96"			
Altitude at Deployment (ft)	1000 AGL			
Velocity at Deployment (ft/s)	49.9			
Terminal Velocity (ft/s)	13.75			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	35			
Harness/Airframe Interfaces	5/16" steel U-bolts secured to aluminum bulkplates epoxied to airframe			
Kinetic Enerfy of Each Section (Ft-lbs)	Nose Cone	Recovery Bay	Booster	-
	20.9	12.66	29.4	

Recovery Electonics	
Altimeter(s)/Timer(s) (Make/Model)	PerfectFlite StratoLogger CF
Redundancy Plan	Identical altimeter circuit with independent battery and arming switch; independent igniter circuits
Pad Stay Time (Launch Configuration)	

Recovery Electonics	
Rocket Locators (Make/Model)	Altus Metrum TeleMega
Transmitting Frequencies	***Required by CDR***
Black Powder Mass Drogue Chute (grams)	0.98
Black Powder Mass Main Chute (grams)	1.61

Milestone Review Flysheet

Institution	University of Evansville	Milestone	PDR

Autonomous Ground Support Equipment (MAV Teams Only)	
Capture Mechanism	Overview
	N/A
Container Mechanism	Overview
	N/A
Launch Rail Mechanism	Overview
	N/A
Igniter Installation Mechanism	Overview
	N/A

Payload	
Payload 1	Overview
	The fragile material payload consists of a concentric cylinder design with the inner cylinder housing said material. The two cylinders are connected via a parallell and series spring system. The inner cylinder is connected to the outer cylinder via wire rope isolators used to dampen small vibrations while the outer cylinder is connected to the bulkhead via larger conventional springs to absorb large impact, takeoff and parachute forces. the entire concentric cyilinder assembly oscilates within the main body tube of the rocket and will be lubricated for smooth translation.
Payload 2	Overview
	N/A

Test Plans, Status, and Results	
Ejection Charge Tests	Prior to launch, ejection charge testing will be conducted on the ground to ensure that the calculated masses of black powder can successfully shear the pins and separate the rocket sections. Black powder charge mass will be optimized for the main parachute and drogue parachute compartments to ensure extreme confidence in creating an ejection event without overpressurizing the compartments or creating excessive velocity. A test rig will be constructed to secure the rocket at various angles. It will also protect the ejected section from damage after it is free.
Sub-scale Test Flights	Subscale testing will be conducted in order to verify quantities obtained from computer simulations in OpenRocket and RockSim. The rocket will be scaled using dimensionless analysis. Sub-scale wind tunnel tests will be conducted in order to test the rocket's coefficient of friction. In addition to this, the sub-scale model will be launched in order to test various parameters on the rocket, such as parachute deployment and fragile material handing, while also testing the durability and effectiveness of the materials and motor that were selected.
Full-scale Test Flights	Full scale test will be preformed on the rocket after optimization. These tests will be used to verify that all the materials used to make the rocket are fully function and safe for launch. Additionally, full-scale tests will be conducted in order to verify data obtained from computer simulations, such as maximum height and parachute deployment at proper times. This test will also be used to ensure the rocket does not ascend beyond the allowable limit and all rules and regulations set forth by the FAA and NASA are met.

Milestone Review Flysheet

Institution	University of Evansville

Milestone	PDR

Additional Comments