Milestone Review Flysheet

Institution	University of Cincinnati

Milestone	PDR

Vehicle Properties	
Total Length (in)	84.4
Diameter (in)	5.54
Gross Lift Off Weigh (lb)	19
Airframe Material	Cardboard
Fin Material	G-10 plastic
Drag	0.3 (Cd)

Motor Properties	
Motor Manufacturer	Cesaroni
Motor Designation	K570
Max/Average Thrust (lb)	200.85 / 129.15
Total Impulse (lbf-s)	465.4
Mass Before/After Burn	58.98 oz / 22.82 oz
Liftoff Thrust (lb)	200.85

Stability Analysis	
Center of Pressure (in from nose)	57.99
Center of Gravity (in from nose)	46.79 (before burnout) / 43.15 (after)
Static Stability Margin	2.04 / 2.70
Static Stability Margin (off launch rail)	2.04
Thrust-to-Weight Ratio	6.77
Rail Size and Length (in)	1.5" x 1.5" / 84 in
Rail Exit Velocity	64.22 ft/s

Ascent Analysis		
Maximum Velocity (ft/s)	659.24	
Maximum Mach Number	0.59	
Maximum Acceleration (ft/s^2)	311.7	
Target Apogee (From Simulations)	5280	
Stable Velocity (ft/s)	44	
Distance to Stable Velocity (ft)	3.3	

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model		LOC		
Size		7.1 ft^2		
Altitude at Deployment (ft)			5280	
Velocity at Deployment (ft/s)			0.0249	
Terminal Velocity (ft/s)			44.97	
Recovery Harness Material			nylon	
Harness Size/Thickness (in)			1/4"	
Recovery Harness Length (ft)			5.5	
Harness/Airframe Interfaces		Swivel eye hook / eye bolt		
Kinetic Energy of Each Section (Ft-lbs)	Rocket			
	370			

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	PerfectFlite StratoLogger SL 100
Redundancy Plan	Multiple altimeter, backup ejection charges
Pad Stay Time (Launch Configuration)	250 Hours

Recovery System Properties				
Main Parachute				
Manufacturer/Model		SkyAngle		
Size		57 ft^2		
Altitude at Deployment (ft)			600	
Velocity at Deployment (ft/s)			44.97	
Terminal Velocity (ft/s)			14.2	
Recovery Harness Material			nylon	
Harness Size/Thickness (in)			5/8" in	
Recovery Harness Length (ft)			6.6	
Harness/Airframe Interfaces		Swivel eye hook / eye bolt		
Kinetic Energy of Each Section (Ft-lbs)	Rocket	Payload		
	35.3	44.6		

Recovery Electronics	
Rocket Locators (Make/Model)	Custom GPS
Transmitting Frequencies	902-928 MHz
Black Powder Mass Drogue Chute (grams)	1.5 g (2g backup)
Black Powder Mass Main Chute (grams)	1.5 g (2g backup)

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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 main task of the Payload is to record atmospheric measurements of earth's atmosphere from an altitude of 5,280 feet. The PIL is designed to record data including, but not limited to, Pressure, Temperature, Relative Humidity, UV Radiation and Solar irradiance. The PIL will also capture at least 2 images in the air, as well as 3 images on the ground. In order to accomplish all of these tasks, multiple sub-systems have been integrated into the PIL. Among these systems, includes a landing module for the PIL to remain upright for photos.
Payload 2	Overview
	The fairing shall also successfully deploy in-order for complete mission success. The fairing is designed to split in half with a powder charge ignited at apogee, with the 2 fairing sections attached to the PIL itself with shock cord.

Test Plans, Status, and Results	
Ejection Charge Tests	The team will conduct multiple ground ejection "pop" tests to see gauge the amount of black powder to use in our charges. We will be testing the fairing separation charge, the drogue charge and main charge individually. We will start with a small amount of black powder and gradually increase the amount from there if needed.
Sub-scale Test Flights	Our scale rocket will be constructed from the Iris rocket kit from LOC Precision. The outer diameter of the rocket is 3.10" and has a 38mm motor tube. This model is a 0.56 scale of our full scale launch vehicle. This rocket model was chosen as our scale rocket because it was the kit that most closely resembled our full scale vehicle and would minimize any customization needed. Our first scheduled subscale test will take place on November 21st of 2015. The subscale will be loaded with ballast as needed in order to most closely match mass placement of the full scale. We will also be using this subscale model in the wind tunnel in our university's Aerospace laboratory. The rocket will be loaded on a sting mount and connected to a force balance. The values obtained from our wind tunnel tests will help to give us a more accurate estimation for the coefficient of drag for our full scale vehicle.
Full-scale Test Flights	Once the team has proven with the subscale model that our design works, we will do full scale testing of the launch vehicle using a simulated mass as our payload. Our full scale tests will also test our fairing separation system.

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Additional Comments