Milestone Review Flysheet

Institution	The University of Alabama		Milestone	Flight Readiness Review

Vehicle Properties

Total Length (in)	93
Diameter (in)	5.5
Gross Lift Off Weigh (lb)	38.4
Airframe Material	Fiberglass
Fin Material	Fiberglass
Drag Coefficient	0.453

Motor Properties

Motor Manufacturer	Cesaroni Technology Inc.
Motor Designation	L851
Max/Average Thrust (lb)	222.5 / 190.9
Total Impulse (lbf-s)	828
Motor Mass Before/After Burn(kg)	3.79 / 1.59
Liftoff Thrust (lb)	129.5

Stability Analysis

Center of Pressure (in from nose)	68.27
Center of Gravity (in from nose)	56.4
Static Stability Margin	2.14 calibers
Static Stability Margin (off launch rail)	2.02 calibers
Thrust-to-Weight Ratio	4.97
Rail Size and Length (in)	144
Rail Exit Velocity (ft/s)	55.8

Ascent Analysis

Maximum Veloxity (ft/s)	562
Maximum Mach Number	0.5
Maximum Acceleration (ft/s^2)	158
Target Apogee (From Simulations)	4874
Stable Velocity (ft/s)	37.9
Distance to Stable Velocity (ft)	5.53

Recovery System Properties
Dogue Parachute

Manufacturer/Model	Giant Leap Rocketry/TAC-1			
Size (in)	26			
Altitude at Deployment (ft)	Apogee			
Velocity at Deployment (ft/s)	2.77			
Terminal Velocity (ft/s)	73.05			
Recovery Harness Material	Nylon			
Harness Size/Thickness (in)	0.625			
Recovery Harness Length (ft)	50			
Harness/Airframe Interfaces	Parachute harness will be secured to an eye bolt on the electronics bay bulk plate			
	Nose Cone	Forward	Aft	Total
Kinetic Energy of Each Section (Ft-lbs)	336.32	952.65	901.08	1863.9

Recovery System Properties
Main Parachute

Manufacturer/Model	Giant Leap Rocketry/TAC-1			
Size (in)	120			
Altitude at Deployment (ft)	700			
Velocity at Deployment (ft/s)	73.05			
Terminal Velocity (ft/s)	14.49			
Recovery Harness Material	Nylon			
Harness Size/Thickness (in)	0.625			
Recovery Harness Length (ft)	50			
Harness/Airframe Interfaces	Parachute harness will be secured to eye bolts on the electronics bay bulk plate and aft section bulk plate			
	Nose Cone	Forward	Aft	Total
Kinetic Energy of Each Section (Ft-lbs)	13.23	37.49	35.69	73.36

Recovery Electonics

Altimeter(s)/Timer(s) (Make/Model)	Perfectflite Stratologger
Redundancy Plan	Team will use two altimeters to ensure ignition of black powder charges
Pad Stay Time (Launch Configuration)	1 hour and 30 minutes

Recovery Electonics

Rocket Locators (Make/Model)	Adafruit Ultimate GPS Breakout
Transmitting Frequencies	900 Hz
Black Powder Mass Drogue Chute (grams)	4
Black Powder Mass Main Chute (grams)	4

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Payload

	Overview
Payload 1	Payload 1 will be a landing hazards detection system. This system will use a camera to take images of the ground during descent and analyze these images to detect landing hazards.
	Overview
Payload 2	Payload 2 will be a guided descent system. This system will use the data from the landing hazards detection system and the Raspberry Pi to control servo motors, which will in turn control the payload's parafoil.

Test Plans, Status, and Results

Ejection Charge Tests	The team plans to use ground testing of the black powder charges to ensure the charge will produce the correct pressure to eject the parachutes. The test will be a static ignition of full scale charges at the Pheonix Missile Works launch area.
Sub-scale Test Flights	The team built and tested a sub-scale launch vehicle with a scaled payload, weight, and motor. The sub-scale model was designed as close as possible to the full scale.
Full-scale Test Flights	The team will test all sub-systems and components of the full scale rocket, and at least one full scale mission will be flown. Full scale flights will provide the team with data on altitude, stability, and performance of the recovery system of the rocket.

Additional Comments