

Milestone Review Flysheet

Institution University of South Florida

Milestone Preliminary Design Report

Vehicle Properties	
Total Length (in)	102
Diameter (in)	4
Gross Lift Off Weigh (lb)	33
Airframe Material	G12 Fiberglass
Fin Material	G10 Fiberglass
Drag	57 lbf

Motor Properties	
Motor Manufacturer	Gorilla Motors
Motor Designation	L1112BT
Max/Average Thrust (lb)	291.577/252.91
Total Impulse (lbf-s)	833.816
Mass Before/After Burn	529/451 oz
Liftoff Thrust (lb)	267.522

Stability Analysis	
Center of Pressure (in from nose)	76.506 in
Center of Gravity (in from nose)	68.224 in
Static Stability Margin	2.82
Static Stability Margin (off launch rail)	2.06
Thrust-to-Weight Ratio	8.823
Rail Size and Length (in)	121
Rail Exit Velocity	77.9 ft/s

Ascent Analysis	
Maximum Velocity (ft/s)	678
Maximum Mach Number	0.61
Maximum Acceleration (ft/s^2)	252
Target Apogee (From Simulations)	5280
Stable Velocity (ft/s)	105
Distance to Stable Velocity (ft)	25

Recovery System Properties				
Dogue Parachute				
Manufacturer/Model		SkyAngle		
Size		6.3 sq. ft		
Altitude at Deployment (ft)		Apogee		
Velocity at Deployment (ft/s)		0		
Terminal Velocity (ft/s)		90.4		
Recovery Harness Material		Tubular Nylon		
Harness Size/Thickness (in)		1		
Recovery Harness Length (ft)		10.5		
Harness/Airframe Interfaces		Connection between U bolts on Nosecone/Payload Bay Bulkhead and Fore Altimeter Bay fastened to the Fore Airframe.		
Kinetic Enerfy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	82.258	94.909	366.15	N/A

Recovery System Properties				
Main Parachute				
Manufacturer/Model		SkyAngle		
Size		89 sq. ft		
Altitude at Deployment (ft)		500		
Velocity at Deployment (ft/s)		90.4		
Terminal Velocity (ft/s)		15.9		
Recovery Harness Material		Tubular Nylon		
Harness Size/Thickness (in)		1		
Recovery Harness Length (ft)		10.5		
Harness/Airframe Interfaces		Connection between Ubolts on Aft Altimter Bay and U bolts on top centering ring of the motor mount.		
Kinetic Enerfy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	14.468	16.693	64.4	N/A

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	RRC3/Missile Works
Redundancy Plan	2 Altimeters wired to redundant seperation charges
Pad Stay Time (Launch Configuration)	3 Hours

Recovery Electronics	
Rocket Locators (Make/Model)	TeleGPS/Apogee
Transmitting Frequencies	***Required by CDR***
Black Powder Mass Drogue Chute (grams)	0.5 g
Black Powder Mass Main Chute (grams)	0.5 g

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Autonomous Ground Support Equipment (MAV Teams Only)

	Overview
Capture Mechanism	The robotic arm will be attached to the base of a rover mechanism. After the payload has been approached a camera on the end of the robotic gripper will determine the payload location and orient itself for capture. Upon capture the rover will return to a predefined base and confirm payload location and orientation at a static camera attached to the base of the rail.
	Overview
Container Mechanism	The container mechanism is being tested and decided between three separate concepts right now. We will either be working with a simple padded enclosure and hatch mechanism, a bistable compliant mechanism constructed from laser cut acrylic, or a closed circuit pneumatic "airbag" design.
	Overview
Launch Rail Mechanism	The launch rail will be lifted by a worm and gear mechanism. A locking rod will move from groove to groove in order to safely support the rod from slippage. The ratcheting mechanism will also serve to increment the number of degrees raised using discrete units that will allow us to definitively raise the rail to 15 degrees from vertical.
	Overview
Igniter Installation Mechanism	The igniter will be installed in a linear actuator attached to the baseplate of the AGSE rail. The igniter will be kept straight by a guide hole in the blast plate and directed upwards by the linear actuator after the launch rail is in position.

Payload

	Overview
Payload 1	The AGSE payload will be a sealed PVC pipe 3" in length and 3/4" in diameter filled with sand in order to weigh 4 oz.
	Overview
Payload 2	

Test Plans, Status, and Results

Ejection Charge Tests	The ejection charge tests precede each launch.
Sub-scale Test Flights	The subscale test flight is scheduled for 12/12
Full-scale Test Flights	The full scale test flight is scheduled for 2/20

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Additional Comments