

Milestone Review Flysheet 2017-2018

Institution Texas Tech University

Milestone FRR

Vehicle Properties	
Total Length (in)	10.3675
Diameter (in)	6
Gross Lift Off Weigh (lb.)	44
Airframe Material(s)	Blue Tube, G10
Fin Material and Thickness (in)	G10 3/16in
Coupler Length/Shoulder Length(s) (in)	(12,10)/(6,5)

Motor Properties	
Motor Brand/Designation	Cesaroni L1395_BS
Max/Average Thrust (lb.)	400.14/313.77
Total Impulse (lbf-s)	1100.5
Mass Before/After Burn (lb.)	Before: 9.5; After: 5.2
Liftoff Thrust (lb.)	400
Motor Retention Method	Thrust Plate/Retainer Ring

Stability Analysis	
Center of Pressure (in from nose)	93.7
Center of Gravity (in from nose)	77.6
Static Stability Margin (on pad)	2.39
Static Stability Margin (at rail exit)	2.7
Thrust-to-Weight Ratio	7.12
Rail Size/Type and Length (in)	1515:12:00
Rail Exit Velocity (ft/s)	74.8

Ascent Analysis	
Maximum Velocity (ft/s)	692
Maximum Mach Number	0.62
Maximum Acceleration (ft/s^2)	261.8
Predicted Apogee (From Sim.) (ft)	5925.2

Recovery System Properties	
Drogue Parachute	
Manufacturer/Model	Rocket Man Standard 1.9
Size/Diameter (in or ft)	2 ft
Altitude at Deployment (ft)	Apogee
Velocity at Deployment (ft/s)	0
Terminal Velocity (ft/s)	105
Recovery Harness Material	Tubular Nylon with Kevlar
Recovery Harness Size/Thickness (in)	1
Recovery Harness Length (ft)	15
Harness/Airframe Interfaces	G10 bulkhead from payload section to composite E-Bay bulkhead
Kinetic Energy of Each Section (Ft-lbs)	Section 1
	Section 2
	Section 3
	Section 4
	2376.2
	6669.4

Recovery System Properties				
Main Parachute				
Manufacturer/Model	Rocket Man Standard 1.1			
Size/Diameter (in or ft)	16			
Altitude at Deployment (ft)	1000			
Velocity at Deployment (ft/s)	105			
Terminal Velocity (ft/s)	15			
Recovery Harness Material	Tubular Nylon with Kevlar			
Recovery Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	40			
Harness/Airframe Interfaces	Aluminum bulkhead from aft to composite to E-Bay			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	27.8	13.8	56.9	

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	Perfect Flight StratologgerCF
Redundancy Plan and Backup Deployment Settings	We will have 2 altimeters which are connected to 2 charges for each seperation
Pad Stay Time (Launch Configuration)	2 Hours

Recovery Electronics		
Rocket Locators (Make/Model)	Missile works tracker	
Transmitting Frequencies (all - vehicle and payload)	902-928 MHz	
Ejection System Energetics (ex. Black Powder)	4F Black Powder	
Energetics Mass - Drogue Chute (grams)	Primary	1.00
	Backup	1.50
Energetics Mass - Main Chute (grams)	Primary	1.50
	Backup	2.00
Energetics Masses - Other (grams) - If Applicable	Primary	1.75
	Backup	2.25

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Payload

	Overview
Payload 1 (official payload)	<p>After landing, the nosecone of the rocket will separate with black powder charges, allowing the rover to exit from its location near the nosecone. The rover will be located on a rotating housing, which utilizes two roller element bearings and an offset center of mass to rotate the rover to an upright position. After attaining an upright position, the rover will be released from its payload housing and will be ejected from the rocket via a compressed spring. The rover will demonstrate the ability to stow, decreasing its effective volume in order to fit a larger rover into the size constraints of the rocket. The rover will rotate its wheels downward, lifting the chassis of the rover. It will also extend its wheel base by pushing the wheels outward after exiting the rocket.</p>
	Overview
Payload 2 (non-scored payload)	<p>Incorporating a dynamic apogee control system (DACS) into the launch vehicle.</p>

Test Plans, Status, and Results

Ejection Charge Tests	<p>For sub scale testing we built a sub scale model where we scaled down our ejection charges as a result of the scaled down pressure chambers. For ground testing we will fabricate the bulkheads and body tube then test both the 3-4 shear pin options to see which fulfills the safety standards we previously set in place</p>
Sub-scale Test Flights	<p>Sub-Scale launch was held on January 8th. The flight went successfully and confirmed processes and verified methods that will be applied to the build and launch of the full-scale.</p>
Full-scale Test Flights	<p>Full scale testing will be held in between the months of February - March. Parts are ordered, and construction has begun.</p>

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Additional Comments

Use two Tripoli level 3 mentos/advisors. Maximum altitude cap was being tested during this launch to determine amount of ballast