Milestone Review Flysheet 2017-2018

Institution	Piedmont Virginia Community College

Milestone	FRR

Vehicle Properties	
Total Length (in)	105.5
Diameter (in)	6
Gross Lift Off Weigh (lb.)	52.75
Airframe Material(s)	G12 Fiberglass
Fin Material and Thickness (in)	G10 Fiberglass, 0.25 in. thick
Coupler Length/Shoulder Length(s) (in)	6, 4 for nosecone

Motor Properties	
Motor Brand/Designation	AeroTech L1420R
Max/Average Thrust (lb.)	407.8 / 319.2
Total Impulse (lbf-s)	1034.8
Mass Before/After Burn (lb.)	10.06 / 4.41
Liftoff Thrust (lb.)	349
Motor Retention Method	AeroPack Screw-On Retainer

Stability Analysis	
Center of Pressure (in from nose)	86.4
Center of Gravity (in from nose)	67
Static Stability Margin (on pad)	3.23
Static Stability Margin (at rail exit)	2
Thrust-to-Weight Ratio	6.05
Rail Size/Type and Length (in)	1515, 12 ft
Rail Exit Velocity (ft/s)	65.7

Ascent Analysis	
Maximum Velocity (ft/s)	532
Maximum Mach Number	0.48
Maximum Acceleration (ft/s^2)	200
Predicted Apogee (From Sim.) (ft)	3955

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model		Jolly Logic / Chute Release		
Size/Diameter (in or ft)		24 in. (effective)		
Altitude at Deployment (ft)		3955		
Velocity at Deployment (ft/s)		0		
Terminal Velocity (ft/s)		129		
Recovery Harness Material		Tubular Kevlar		
Recovery Harness Size/Thickness (in)		0.5		
Recovery Harness Length (ft)		40		
Harness/Airframe Interfaces		One swivel tied to each end of recovery harness. Two quick links connecting each swivel to two U-bolts.		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	5237	6918	N/A	N/A

Recovery System Properties				
Main Parachute				
Manufacturer/Model		Rocketman / Standard Parachute		
Size/Diameter (in or ft)		16 ft		
Altitude at Deployment (ft)		700		
Velocity at Deployment (ft/s)		129		
Terminal Velocity (ft/s)		15.2		
Recovery Harness Material		Tubular Kevlar		
Recovery Harness Size/Thickness (in)		0.5		
Recovery Harness Length (ft)		40		
Harness/Airframe Interfaces		One swivel tied to each end of recovery harness. Two quick links connecting each swivel to two U-bolts.		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	68.1	73.1	N/A	N/A

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	MissileWorks / RRC3
Redundancy Plan and Backup Deployment Settings	Two RRC3s with separate batteries, switches, ejection cups, and igniters. Primary charge fires at apogee, with backups at apogee
Pad Stay Time (Launch Configuration)	83 hours

Recovery Electronics		
Rocket Locators (Make/Model)		Adafruit / Ultimate GPS
Transmitting Frequencies (all - vehicle and payload)		Data: 900 MHz band (902 - 928 MHz) Video: 5740 MHz
Ejection System Energetics (ex. Black Powder)		Black Powder
Energetics Mass - Drogue Chute (grams)	Primary	8
	Backup	10
Energetics Mass - Main Chute (grams)	Primary	10
	Backup	10
Energetics Masses - Other (grams) - If Applicable	Primary	1
	Backup	

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Payload	
Payload 1 (official payload)	Overview Deployable rover. Six-wheeled rover with a movable solar panel that can be used to right the rover if it ends up on its side or upside down.
Payload 2 (non-scored payload)	Overview N/A

Test Plans, Status, and Results	
Ejection Charge Tests	Initial tests succeeded in separating the rocket, but weren't energetic enough. The charge size was increased until a sufficiently energetic separation occurred with 8 grams.
Sub-scale Test Flights	Failed. The parachute and blast protector got tangled on threaded rods inside the parachute tube, preventing separation.
Full-scale Test Flights	Successful. The full-scale rocket was flown and recovered successfully. However, due to high wind speeds it was not flown with the full-scale motor; instead it was flown with a K1200 motor. Because of this, the Altitude Control System was not used during the flight.

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Additional Comments