Milestone Review Flysheet 2017-2018

Institution	University of North Dakota	Milestone	CDR

Vehicle Properties

Total Length (in)	107
Diameter (in)	6
Gross Lift Off Weigh (lb.)	32.94
Airframe Material(s)	Carbon Fibre
Fin Material and Thickness (in)	Fiberglass - 1/8
Coupler Length/Shoulder Length(s) (in)	4

Motor Properties

Motor Brand/Designation	AeroTech L1150
Max/Average Thrust (lb.)	294/258
Total Impulse (lbf-s)	784.36
Mass Before/After Burn (lb.)	8.125/3.54
Liftoff Thrust (lb.)	83.9
Motor Retention Method	Nozzle Thrust Ring

Stability Analysis

Center of Pressure (in from nose)	77.612
Center of Gravity (in from nose)	64.70
Static Stability Margin (on pad)	2.15
Static Stability Margin (at rail exit)	2.1
Thrust-to-Weight Ratio	7.84
Rail Size/Type and Length (in)	0.25/144
Rail Exit Velocity (ft/s)	78.6

Ascent Analysis

Maximum Velocity (ft/s)	673
Maximum Mach Number	0.61
Maximum Acceleration (ft/s^2)	264
Predicted Apogee (From Sim.) (ft)	5566

Recovery System Properties

Drogue Parachute

Manufacturer/Model	Public Missiles Limited
Size/Diameter (in or ft)	48 in
Altitude at Deployment (ft)	5566
Velocity at Deployment (ft/s)	0
Terminal Velocity (ft/s)	41.32
Recovery Harness Material	Tubular Nylon
Recovery Harness Size/Thickness (in)	1
Recovery Harness Length (ft)	12
Harness/Airframe Interfaces	Stainless steel u-bolt connected to bulkhead

Kinetic Energy of Each Section (Ft-lbs)	Nosecone	Altimeter	Fin Can	N/A
	309.81	60.79	261.88	

Recovery System Properties

Main Parachute

Manufacturer/Model	Public Missiles Limited
Size/Diameter (in or ft)	108 in
Altitude at Deployment (ft)	1500
Velocity at Deployment (ft/s)	65.9
Terminal Velocity (ft/s)	20.2
Recovery Harness Material	Tubular Nylon
Recovery Harness Size/Thickness (in)	1
Recovery Harness Length (ft)	12
Harness/Airframe Interfaces	Stainless steel u-bolt connected to bulkhead

Kinetic Energy of Each Section (Ft-lbs)	Nosecone	Altimeter	Fin Can	N/A
	73.76	14.45	62.48	

Recovery Electronics

Altimeter(s)/Timer(s) (Make/Model)	Perfect Flight
Redundancy Plan and Backup Deployment Settings	Altimeter, Arduino, tube separation and parachute ejection, Redundant parachutes deploy if descent velocity is above critical
Pad Stay Time (Launch Configuration)	1 to 2 hours

Recovery Electronics

Rocket Locators (Make/Model)	Com-Spec at-2b Transmitter/ PR-100A	
Transmitting Frequencies (all - vehicle and payload)	***Required by CDR***	
jection System Energetics (ex. Black Powder		
Energetics Mass - Drogue Chute (grams)	Primary	5
	Backup	5
Energetics Mass - Main Chute (grams)	Primary	5
	Backup	5
Energetics Masses - Other (grams) - If Applicable	Primary	N/A
	Backup	N/A

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Payload

	Overview
Payload 1 (official payload)	Rover payload will be secured underneath the nose cone by a lockable bearing. Upon landing, and the deployment process is initiated, the rover will be orientated right side up. Actuators will begin to push the nose cone forward. As the actuators extend the plate the rover resides on will extrude out with the actuators. Once the actuators have deployed fully the rover will rotate on the plate and proceed to drive 5 feet, stop and deploy a set of solar panels
Payload 2 (non-scored payload)	Overview

Test Plans, Status, and Results

Ejection Charge Tests	Second charge test for the scale rocket was successful. No charge tests have been conducted for the full scale rocket.
Sub-scale Test Flights	Sub-Scale launch results: Successful. Launch vehicle reached an apogee of 1250 feet according to altimeter data
Full-scale Test Flights	No full-scale test flight has been conducted. There is no set date for the full-scale launch. It is planned to be constructed by Feb 20th, and launched by March 1 - 15th.

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Additional Comments