Milestone Review Flysheet 2021-2022

Institution	Explorer Post 1010

Milestone	PDR Submittal

Vehicle Properties	
Total Length (in)	64.56 in
Diameter (in)	4 in
Gross Lift Off Weigh (lb)	5.32
Airframe Material(s)	Thick walled paper tubes
Fin Material and Thickness (in)	1/4 in Plywood
Coupler Length(s)/Shoulder Length(s) (in)	Upper section shoulder length

Motor Properties	
Motor Brand/Designation	Cesaroni J357-14A
Max/Average Thrust (lb)	115.3 Lbf / 80.3 Lbf
Total Impulse (lbf-s)	441.9 Lbfs
Mass Before/After Burn (oz)	21.2oz / 9.3oz
Liftoff Thrust (N)	422.6 N (95.0 Lbf)
Motor Retention Method	Retention ring and screw

Stability Analysis	
Center of Pressure (in. from nose)	46.063 in
Center of Gravity (in. from nose)	35.472 in
Static Stability Margin (on pad)	2.65
Static Stability Margin (at rail exit)	2.698
Thrust-to-Weight Ratio	18.26:1
Rail Size/Type and Length (in)	1010, 96 in
Rail Exit Velocity (ft/s)	98.02 ft/s

Ascent Analysis	
Maximum Velocity (ft/s)	757.87
Maximum Mach Number	0.68
Maximum Acceleration (ft/s^2)	659.45
Target Apogee (ft)	3750
Predicted Apogee (From Sim.) (ft)	3677.82

Recovery System Properties - Overall	
Total Descent Time (s)	87.33
Total Drift in 20 mph winds (ft)	1560.03

Recovery System Properties - Energetics		
Ejection System Energetics (ex. Black Powder)		Black powder
Energetics Mass - Drogue Chute (grams)	Primary	1.5
	Backup	2.1
Energetics Mass - Main Chute (grams)	Primary	1.5
	Backup	2.1
Energetics Mass - Other (grams) - If Applicable	Primary	N/A
	Backup	

Recovery System Properties - Recovery Electronics	
Primary Altimeter Make/Model	RRC3 “Sport” Altimeter
Secondary Altimeter Make/Model	RRC3 “Sport” Altimeter
Other Altimeters (if applicable)	N/A
Rocket Locator (Make/Model)	Featherweight Tracker
Additional Locators (if applicable)	N/A
Transmitting Frequencies (all - vehicle and payload)	915 MHz, 921 MHz
Describe Redundancy Plan (batteries, switches, etc.)	Two redundant altimeters with completely separate systems and batteries, backup altimeter set to deploy 1 second after apogee; Two redundant ejection charge wells for drogue and primary parachutes
Pad Stay Time (Launch Configuration)	2 Hours

Recovery System Properties - Drogue Parachute				
Manufacturer/Model			Fruity Chutes	
Size or Diameter (in or ft)			12"	
Main Altimeter Deployment Setting			At apogee	
Backup Altimeter Deployment Setting			1 second after apogee	
Velocity at Deployment (ft/s)			0 ft/s	
Terminal Velocity (ft/s)			66.27 ft/s	
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)			1000 lb rated kevlar line	
Recovery Harness Length (ft)			20 ft	
Harness/Airframe Interfaces		Eye bolt on ebay		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	98.22	192.08	N/A	N/A

Recovery System Properties - Main Parachute				
Manufacturer/Model			Fruity chutes	
Size or Diameter (in or ft)			36 "	
Main Altimeter Deployment Setting (ft)			800 ft	
Backup Altimeter Deployment Setting (ft)			700 ft	
Velocity at Deployment (ft/s)			64.30 ft/s	
Terminal Velocity (ft/s)			18.4 ft/s	
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)			1000 lb rated kevlar line	
Recovery Harness Length (ft)			15 ft	
Harness/Airframe Interfaces		Eye bolt on ebay		
Kinetic Energy of Each Section (Ft-lbs)	ction 1 (Payloa	Section 2	Section 3	Section 4
	12.86	9.65	18.88	N/A

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Payload	
Payload 1 (official payload)	Overview Autonomous Guided Recovery System
Payload 2 (non-scored payload)	Overview N/A

Test Plans, Status, and Results (WILL BE UPDATED WITH STATUS AND RESULTS)	
Ejection Charge Tests	Plan to test ejection charges by carrying out separation tests on the ground.
Sub-scale Test Flights	Sub-scale rocket test flight planned for late December.
Vehicle Demonstration Flights	Vehicle demonstration flight planned for Februrary, with the payload recovered via unguided parachute.
Payload Demonstration Flights	Plan to launch in March. This test launch's conditions will be as close as possible to the competition launch.

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Transmitter #1			
Location of transmitter:	Nosecone		
Purpose of transmitter:	GPS tracking to aid in recovery		
Brand	Featherweight	RF Output Power (mW)	
Model	GPS Tracker	Specific Frequency used by team (MHz)	921
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)	3 in		
Description of shielding plan:	Separated by plywood bulkhead		

Transmitter #2			
Location of transmitter:	Electronics bay		
Purpose of transmitter:	GPS tracking transmission to aid in recovery		
Brand	Adafruit	RF Output Power (mW)	
Model	Adafruit LoRa Featherweight RFM95W	Specific Frequency used by team (MHz)	915
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)	2.5 in		
Description of shielding plan:	Separated by plywood bulkhead		

Transmitter #3			
Location of transmitter:	N/A		
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

Transmitter #4			
Location of transmitter:	N/A		
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

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Transmitter #5			
Location of transmitter:	N/A		
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

Transmitter #6			
Location of transmitter:	N/A		
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

Additional Comments