

Milestone Review Flysheet 2019-2020

Institution Texas Tech

Milestone PDR

Vehicle Properties	
Total Length (in)	106.63
Diameter (in)	6.155
Gross Lift Off Weigh (lb)	51.3125
Airframe Material(s)	Carbon Fiber
Fin Material and Thickness (in)	Fiberglass and Carbon Fiber composite
Coupler Length(s)/Shoulder Length(s) (in)	12

Motor Properties	
Motor Brand/Designation	Cessaroni L1395-BS
Max/Average Thrust (lb)	313.77/400.137
Total Impulse (lbf-s)	1395
Mass Before/After Burn (lb)	9.53/4.32
Liftoff Thrust (lb)	400.137
Motor Retention Method	Aeropack Screw-in Retention

Stability Analysis	
Center of Pressure (in. from nose)	64.253
Center of Gravity (in. from nose)	51.334
Static Stability Margin (on pad)	
Static Stability Margin (at rail exit)	
Thrust-to-Weight Ratio	7.8:1
Rail Size/Type and Length (in)	1515/12ft
Rail Exit Velocity (ft/s)	62.5

Ascent Analysis	
Maximum Velocity (ft/s)	594
Maximum Mach Number	0.57
Maximum Acceleration (ft/s ²)	220
Target Apogee (ft)	5280
Predicted Apogee (From Sim.) (ft)	5222

Recovery System Properties - Overall	
Total Descent Time (s)	78.4
Total Drift in 20 mph winds (ft)	2299.9

Recovery System Properties - Energetics		
Ejection System Energetics (ex. Black Powder)	Black Powder	
Energetics Mass - Drogue Chute (grams)	Primary	12.25
	Backup	15.3125
Energetics Mass - Main Chute (grams)	Primary	28.5
	Backup	35.625
Energetics Mass - Other (grams) - If Applicable	Primary	N/A
	Backup	N/A

Payload Deployment	
Location: Air or Ground (if applicable)	Ground
Altitude of Deployment (if applicable)	Ground

Recovery System Properties - Recovery Electronics	
Primary Altimeter Make/Model	StratoLogger CF
Secondary Altimeter Make/Model	StratoLogger CF
Other Altimeters (if applicable)	N/A
Rocket Locator (Make/Model)	Missile Works T3
Additional Locators (if applicable)	N/A
Transmitting Frequencies (all - vehicle and payload)	***Required by CDR*** (Complete on pages 3 and 4)
Pad Stay Time (Launch Configuration)	2 H min 5 H max
Describe Redundancy Plan (batteries, switches, etc.)	1 Battery for each component and 1 switch per component

Recovery System Properties - Drogue Parachute				
Manufacturer/Model	Top Flight Recovery			
Size or Diameter (in or ft)	18 in			
Main Altimeter Deployment Setting	Apogee			
Backup Altimeter Deployment Setting	Apogee +1			
Velocity at Deployment (ft/s)	0			
Terminal Velocity (ft/s)	168.27			
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)	1" Tubular Nylon Webbing			
Recovery Harness Length (ft)	12.7			
Harness/Airframe Interfaces	Eye-bolts on Bulkheads			
Kinetic Energy (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	2890.07	4167.55		

Recovery System Properties - Main Parachute				
Manufacturer/Model	Fruity Chutes/ Iris			
Size or Diameter (in or ft)	14			
Main Altimeter Deployment Setting (ft)	500			
Backup Altimeter Deployment Setting (ft)	490			
Velocity at Deployment (ft/s)	168.27			
Terminal Velocity (ft/s)	168.27			
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)	1" Tubular Nylon Webbing			
Recovery Harness Length (ft)	18			
Harness/Airframe Interfaces	Eye-bolts on Bulkheads			
Kinetic Energy (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	10.56	5.29	42.55	

Milestone Review Flysheet 2019-2020

Institution Texas Tech

Milestone PDR

Payload

	Overview
Payload 1 (official payload)	The payload is a tank tread rover design and it will guide it self to the ice collection site, at which point the rover will be guided to pick up an ice sample it uses a ramp to pick up the ice sample and carry it away from the site
	Overview
Payload 2 (non-scored payload)	N/A

Test Plans, Status, and Results

Ejection Charge Tests	<p style="text-align: center;">Test Plans: Ground testing will take place to calculate the black powder charge size so we can determine what we need for full scale.</p> <p style="text-align: center;">Status: Incomplete Results: N/A</p>
Sub-scale Test Flights	<p style="text-align: center;">Test Plans: Construct a sub scale version of proposed rocket to determine the performance.</p> <p style="text-align: center;">Status: Incomplete Results: N/A</p>
Vehicle Demonstration Flights	<p style="text-align: center;">Test Plans: Construct full scale rocket to test motor, ejection, and strength testing for fins and sections to the body tubes connected which is where the couplers are. Also test aerodynamic performance, EBAY, GPS, and black powder charges connected to altimeters to make sure it will perform properly.</p> <p style="text-align: center;">Status: Incomplete Results: N/A</p>
Payload Demonstration Flights	<p style="text-align: center;">Test Plans: Test maneuverability, ground protection circuits, battery performance as well as motors, microcontrollers, and ramp collection to confirm the performance of our payload.</p> <p style="text-align: center;">Status: Incomplete Results: N/A</p>

Institution Milestone

Transmitter #1

Location of transmitter:	Payload section/ Rover		
Purpose of transmitter:	Communication between controller and payload for ground use		
Brand	Raspberry Pi	RF Output Power (mW)	0.25
Model	4 B 4gb	Specific Frequency used by team (MHz)	2.402-2.480 Ghz
Handshake or frequency hopping? (explain)	Bluetooth pairing protocol		
Distance to closest e-match or altimeter (in)	19in to drouge charge		
Description of shielding plan:	Rasberry Pi will not transmit while in flight.		

Transmitter #2

Location of transmitter:	Ebay		
Purpose of transmitter:	Airframe tracking via GPS		
Brand	Missile Works	RF Output Power (mW)	0.25
Model	T3 System	Specific Frequency used by team (MHz)	902-928 Mhz
Handshake or frequency hopping? (explain)	Bluetooth pairing protocol		
Distance to closest e-match or altimeter (in)	~.25		
Description of shielding plan:	Indivually isolated Altimeters		

Transmitter #3

Location of transmitter:			
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:			
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:			

Milestone Review Flysheet 2019-2020

Institution Texas Tech

Milestone PDR

Transmitter #5

Location of transmitter:			
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:			
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

.....