

# Milestone Review Flysheet 2018-2019

**Institution** University of South Florida

**Milestone** PDR

## Vehicle Properties

Total Length (in)	134
Diameter (in)	6
Gross Lift Off Weight (lb)	46.2
Airframe Material(s)	Carbon Fiber/Fiberglass
Fin Material and Thickness (in)	Carbon Fiber, 1/8
Coupler Length(s)/Shoulder Length(s) (in)	6

## Motor Properties

Motor Brand/Designation	Cesaroni L1410
Max/Average Thrust (lb)	375.3/316.8
Total Impulse (lbf-s)	1085.45
Mass Before/After Burn (lb)	11.3 / 5.3
Liftoff Thrust (lb)	1500
Motor Retention Method	75mm Aerotech Retaining Ring

## Stability Analysis

Center of Pressure (in. from nose)	96.7
Center of Gravity (in. from nose)	82
Static Stability Margin (on pad)	2.45
Static Stability Margin (at rail exit)	2.45
Thrust-to-Weight Ratio	8.13
Rail Size/Type and Length (in)	Type 1515, 144
Rail Exit Velocity (ft/s)	58.2

## Ascent Analysis

Maximum Velocity (ft/s)	594
Maximum Mach Number	0.528
Maximum Acceleration (ft/s <sup>2</sup> )	252
Target Apogee (ft)	5000
Predicted Apogee (From Sim.) (ft)	5144

## Recovery System Properties - Overall

Total Descent Time (s)	76.47
Total Drift in 20 mph winds (ft)	2422.66

## Recovery System Properties - Energetics

Ejection System Energetics (ex. Black Powder)	Black Powder	
Energetics Mass - Drogue Chute (grams)	Primary	TBD (with testing)
	Backup	TBD (with testing)
Energetics Mass - Main Chute (grams)	Primary	TBD (with testing)
	Backup	TBD (with testing)
Energetics Mass - Other (grams) - If Applicable	Primary	TBD (with testing)
	Backup	TBD (with testing)

## Recovery System Properties - Recovery Electronics

Primary Altimeter Make/Model	Missile Works RCC2+
Secondary Altimeter Make/Model	Missile Works RCC3
Other Altimeters (if applicable)	
Rocket Locator (Make/Model)	Audible Beacon (TBD)
Additional Locators (if applicable)	
Transmitting Frequencies (all - vehicle and payload)	***Required by CDR*** (Complete on pages 3 and 4)
Describe Redundancy Plan (batteries, switches, etc.)	All altimeters will have fully redundant backup systems, with completely isolated batteries, switches, wiring, electronic matches, and deployment charges.
Pad Stay Time (Launch Configuration)	120+ minutes

## Recovery System Properties - Drogue Parachute

Manufacturer/Model	SkyAngle			
Size or Diameter (in or ft)	20"			
Main Altimeter Deployment Setting	Apogee + 1.5s			
Backup Altimeter Deployment Setting	Apogee + 1.5s			
Velocity at Deployment (ft/s)	50			
Terminal Velocity (ft/s)	132			
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)	1/2" Tubular Kevlar			
Recovery Harness Length (ft)	25			
Harness/Airframe Interfaces	3/16" Quick Links and D-Bolts attached to carbon fiber 1/4" bulkheads.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	10800			

## Recovery System Properties - Main Parachute

Manufacturer/Model	SkyAngle Cert 3-XL			
Size or Diameter (in or ft)	89 sq ft			
Main Altimeter Deployment Setting (ft)	650			
Backup Altimeter Deployment Setting (ft)	650			
Velocity at Deployment (ft/s)	132			
Terminal Velocity (ft/s)	10.5			
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)	1/2" tubular kevlar			
Recovery Harness Length (ft)	33.5			
Harness/Airframe Interfaces	3/16" Quick Links and D-Bolts attached to carbon fiber 1/4" bulkheads.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	62.08	37.93		

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## Payload

Payload	
Payload 1 (official payload)	<p style="text-align: center;">Overview</p> <p>The Phoenix rover concept was inspired by a reversed snowmobile, with drive wheels pulling along the rest of the body. The rover will contain an Arduino, batteries, soil recovery module, and all guidance sensors. The projected diameter is 5.67"; the internal diameter of the rocket body. The rover will be seated inside a reserved section alongside the leveling system that will prevent deployment issues. The rover will roll out of the vehicle and complete the mission objective after an initiating signal has been received.</p>
Payload 2 (non-scored payload)	<p style="text-align: center;">Overview</p>

## Test Plans, Status, and Results

Ejection Charge Tests	Planned, not yet completed. Will be performed the day before launches.
Sub-scale Test Flights	First launch scheduled for November 17, 2018 and second launch for January 19, 2019.
Vehicle Demonstration Flights	Full scale initial test launch scheduled for February 16, 2019.
Payload Demonstration Flights	Full scale demonstration flight with active payload scheduled for March 16, 2019.

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## Transmitter #1

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 #2

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 #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:			

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### 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

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