

Milestone Review Flysheet 2018-2019

Institution Piedmont Virginia Community College

Milestone PDR

Vehicle Properties	
Total Length (in)	113.2
Diameter (in)	4 in. to 8 in.
Gross Lift Off Weigh (lb)	44.6
Airframe Material(s)	Fiberglass, Basswood, ABS
Fin Material and Thickness (in)	Fiberglass, 1/4 in.
Coupler Length(s)/Shoulder Length(s) (in)	4 in. , 5 in.

Motor Properties	
Motor Brand/Designation	Aerotech L1420R
Max/Average Thrust (lb)	319.2
Total Impulse (lbf-s)	1034.8
Mass Before/After Burn (lb)	10.1 / 4.41
Liftoff Thrust (lb)	349
Motor Retention Method	AeroPack Tailcone Retainer

Stability Analysis	
Center of Pressure (in. from nose)	83.3
Center of Gravity (in. from nose)	63.24
Static Stability Margin (on pad)	2.84
Static Stability Margin (at rail exit)	2.5
Thrust-to-Weight Ratio	7.2:1
Rail Size/Type and Length (in)	1515 / 144 in.
Rail Exit Velocity (ft/s)	74.6

Ascent Analysis	
Maximum Velocity (ft/s)	642.1
Maximum Mach Number	0.57
Maximum Acceleration (ft/s ²)	243.55
Target Apogee (ft)	5,050
Predicted Apogee (From Sim.) (ft)	5,082

Recovery System Properties - Overall	
Total Descent Time (s)	40
Total Drift in 20 mph winds (ft)	887.8

Recovery System Properties - Energetics		
Ejection System Energetics (ex. Black Powder)	Black Powder	
Energetics Mass - Drogue Chute (grams)	Primary	3.7
	Backup	3.7
Energetics Mass - Main Chute (grams)	Primary	3.7
	Backup	3.7
Energetics Mass - Other (grams) - If Applicable	Primary	
	Backup	

Recovery System Properties - Recovery Electronics	
Primary Altimeter Make/Model	Missile Works/RRC3
Secondary Altimeter Make/Model	Missile Works/RRC3
Other Altimeters (if applicable)	N/A
Rocket Locator (Make/Model)	Adafruit Ultimate GPS
Additional Locators (if applicable)	N/A
Transmitting Frequencies (all - vehicle and payload)	***Required by CDR*** (Complete on pages 3 and 4)
Describe Redundancy Plan (batteries, switches, etc.)	Fully redundant altimeters and ejection charges. Backup charges at apogee + 2 seconds, apogee + 4 seconds, and 500 ft. Two redundant chute releases connected in series per parachute
Pad Stay Time (Launch Configuration)	15+ hours

Recovery System Properties - Drogue Parachute				
Manufacturer/Model		Jolly Logic/Chute Release		
Size or Diameter (in or ft)		18 in (effective)		
Main Altimeter Deployment Setting		Apogee		
Backup Altimeter Deployment Setting		Apogee +2 seconds, Apogee +4 seconds		
Velocity at Deployment (ft/s)		0		
Terminal Velocity (ft/s)		78 (Payload) 105(Booster)		
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)		12 ft (booster) 6 ft (payload)		
Harness/Airframe Interfaces		Two quick links on each end of the recovery harness attached to U-bolts		
Kinetic Energy of Each Section (Ft-lbs)	Payload	Booster	Section 3	Section 4
	970	3191		

Recovery System Properties - Main Parachute				
Manufacturer/Model		The Rocketman/ Standard (Booster Parachute)		
Size or Diameter (in or ft)		12 ft (Booster), 5 ft (Payload)		
Main Altimeter Deployment Setting (ft)		600(booster) 700(payload)		
Backup Altimeter Deployment Setting (ft)		Apogee +2 seconds, Apogee + 4 seconds		
Velocity at Deployment (ft/s)		78(Payload) 105 (Booster)		
Terminal Velocity (ft/s)		13.2 (Booster) 23.6(Payload)		
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)		12 ft (Booster), 6 ft (Payload)		
Harness/Airframe Interfaces		Two quick links on each end of the recovery harness attached to U-bolts		
Kinetic Energy of Each Section (Ft-lbs)	Booster	Payload	Section 3	Section 4
	64.9	50.1		

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Payload

Payload	
Payload 1 (official payload)	<p style="text-align: center;">Overview</p> <p style="text-align: center;">Quadcopter style UAV, housed in a capsule to protect it during deployment.</p>
Payload 2 (non-scored payload)	<p style="text-align: center;">Overview</p>

Test Plans, Status, and Results

Ejection Charge Tests	Recovery System charge tests will occur after the launch vehicle is fully constructed, but before any flights. This applies to the subscale launch vehicle as well.
Sub-scale Test Flights	Scheduled for November 10th and backup flight for December 8th at the Battle Park launch site near Culpepper, VA.
Vehicle Demonstration Flights	Planned for mid-January
Payload Demonstration Flights	

Milestone Review Flysheet 2018-2019

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Milestone PDR

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:			

Milestone Review Flysheet 2018-2019

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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