Milestone Review Flysheet 2018-2019

Institution: University of Alabama in Huntsville

Milestone: CDR

Vehicle Properties

Total Length (in)	124
Diameter (in)	6
Gross Lift Off Weigh (lb)	43.11
Airframe Material(s)	Fiberglass
Fin Material and Thickness (in)	Fiberglass/0.125
Coupler Length(s)/Shoulder Length(s) (in)	13/6

Motor Properties

Motor Brand/Designation	Aerotech L1420R
Max/Average Thrust (lb)	374/326
Total Impulse (lbf-s)	1038
Mass Before/After Burn (lb)	10.1/4.41
Liftoff Thrust (lb)	38.75
Motor Retention Method	Aft Retention

Stability Analysis

Center of Pressure (in. from nose)	91.1
Center of Gravity (in. from nose)	76.1
Static Stability Margin (on pad)	2.43
Static Stability Margin (at rail exit)	2.5
Thrust-to-Weight Ratio	7.01
Rail Size/Type and Length (in)	1515/ X/ 144
Rail Exit Velocity (ft/s)	55.5

Ascent Analysis

Maximum Velocity (ft/s)	592
Maximum Mach Number	0.533
Maximum Acceleration (ft/s^2)	222
Target Apogee (ft)	4800
Predicted Apogee (From Sim.) (ft)	4806

Recovery System Properties - Overall

Total Descent Time (s)	81.7
Total Drift in 20 mph winds (ft)	2387

Recovery System Properties - Energetics

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

Recovery System Properties - Recovery Electronics

Primary Altimeter Make/Model	PerfectFlite Stratologger CF
Secondary Altimeter Make/Model	PerfectFlite Stratologger CF
Other Altimeters (if applicable)	Featherweight Raven3
Rocket Locator (Make/Model)	Xbee Pro Transmitter
Additional Locators (if applicable)	
Transmitting Frequencies (all - vehicle and payload)	900 MHz
Describe Redundancy Plan (batteries, switches, etc.)	Dual, Independent System
Pad Stay Time (Launch Configuration)	

Recovery System Properties - Drogue Parachute

Manufacturer/Model		FruityChutes CFC-18		
Size or Diameter (in or ft)		18 in		
Main Altimeter Deployment Setting		Apogee		
Backup Altimeter Deployment Setting		Apogee + 1 sec		
Velocity at Deployment (ft/s)		0		
Terminal Velocity (ft/s)		119		
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)		1" Tubular Nylon		
Recovery Harness Length (ft)		30		
Harness/Airframe Interfaces		Upper Airframe Bulkhead/Coupler Bulkhead		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	4353.85	5031.11	-	-

Recovery System Properties - Main Parachute

Manufacturer/Model		FruityChutes IFC-144		
Size or Diameter (in or ft)		144 in		
Main Altimeter Deployment Setting (ft)		600		
Backup Altimeter Deployment Setting (ft)		550		
Velocity at Deployment (ft/s)		119		
Terminal Velocity (ft/s)		12.92		
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)		1" Tubular Nylon		
Recovery Harness Length (ft)		50		
Harness/Airframe Interfaces		Lower Airframe Bulkhead/ Coupler Bulkhead		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	46.21	11.04	40.82	-

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Payload

Payload 1 (official payload)	Overview
	The payload selected is the deployable Unmanned Aerial Vehicle. Its dimensions have been contrained by the available space within the internal structure of the rocket. The UAV will fit within a 6 in diameter and a 4 longitudinal space within the rocket. The UAV will be encased within a protective sheath that, upon ejection from the rocket body tube, will unfold and passively self-orient itself such that the UAV will deploy upright. Once the sheath unfolds, the UAV will mechanical open its arms and close the circuity of the vehicle. The UAV pilot will activate the motors, take-off, and fly to the NASA specified target zone, where it will release a simulated navigational beacon above the target area.
Payload 2 (non-scored payload)	Overview
	No Secondary Payload

Test Plans, Status, and Results

Ejection Charge Tests	Ejection charge testing for the full scale rocket will be conducted according to a similar SOP developed for the subscale charge tests, which was successful. The tests will be conducted in a dedicated area at the UAH Propulsion Research Center before the first flight of the full scale rocket.
Sub-scale Test Flights	A subscale flight test was conducted on 17 November, 2018. The system worked as expected and there were no failures in flight. The apogee was lower than initially predicted and the causes of these discrepencies are being investigated and a Drag Coefficient is in the process of being tabulated. There are no plans to relaunch the subscale
Vehicle Demon-stration Flights	There are open launch windows on 2 February, two fields on 9 February, 16 February and 2 March. The full scale vehicle flight will be conducted on one of these available dates depending on fabrication schedule and weather.
Payload Demon-stration Flights	Once all prerequisite payload testing has been completed, the full system will fly on one of the dates listed in the vehicle demonstration flight section.

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Transmitter #1

Location of transmitter:	Nosecone		
Purpose of transmitter:	Rocket Recovery Tracking		
Brand	Xbee	RF Output Power (mW)	250
Model	Pro 900 S3B	Specific Frequency used by team (MHz)	900
Handshake or frequency hopping? (explain)	Frequency Hopping		
Distance to closest e-match or altimeter (in)	52		
Description of shielding plan:			

Transmitter #2

Location of transmitter:	Rear of Upper Airframe		
Purpose of transmitter:	Payload Deployment		
Brand	Xbee	RF Output Power (mW)	0
Model	Pro 900 S3B	Specific Frequency used by team (MHz)	900
Handshake or frequency hopping? (explain)	Frequecy Hopping		
Distance to closest e-match or altimeter (in)	16		
Description of shielding plan:	Device is only used as reciever, no transmitting.		

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