Institution	AIAA OC Section

Milestone	CDR

Vehicle Properties	
Total Length (in)	149.325
Diameter (in)	4"
Gross Lift Off Weigh (lb)	23.21943178
Airframe Material(s)	G12 Fiberglass
Fin Material and Thickness (in)	Fiberglass (0.375 in)
Coupler Length(s)/Shoulder Length(s) (in)	Minimum 4"

Motor Properties	
Motor Brand/Designation	Cesaroni K1085WT
Max/Average Thrust (lb)	2.654/2.454
Total Impulse (lbf-s)	5.32
Mass Before/After Burn (lb)	5.357/2.714
Liftoff Thrust (lb)	450.5
Motor Retention Method	Aeropack 75mm Retainer

Stability Analysis	
Center of Pressure (in. from nose)	111.4604
Center of Gravity (in. from nose)	94.7272
Static Stability Margin (on pad)	4.16
Static Stability Margin (at rail exit)	6.28159
Thrust-to-Weight Ratio	1:10.74
Rail Size/Type and Length (in)	96"
Rail Exit Velocity (ft/s)	65.851

Ascent Analysis	
Maximum Velocity (ft/s)	642.67
Maximum Mach Number	0.5865
Maximum Acceleration (ft/s^2)	694.01
Target Apogee (ft)	4700
Predicted Apogee (From Sim.) (ft)	4993.67

Recovery System Properties - Overall	
Total Descent Time (s)	72.38
Total Drift in 20 mph winds (ft)	2462.39102

Recovery System Properties - Energetics		
Ejection System Energetics (ex. Black Powder)		F4 Black Powder
Energetics Mass - Drogue Chute (grams)	Primary	1.99
	Backup	2.79
Energetics Mass - Main Chute (grams)	Primary	4.21
	Backup	5.9
Energetics Mass - Other (grams) - If Applicable	Primary	
	Backup	

Recovery System Properties - Recovery Electronics	
Primary Altimeter Make/Model	Stratologger CF Flight Computer
Secondary Altimeter Make/Model	RRC3 Flight Computer
Other Altimeters (if applicable)	
Rocket Locator (Make/Model)	Big Red Bee
Additional Locators (if applicable)	APRSDroid
Transmitting Frequencies (all - vehicle and payload)	***Required by CDR*** (Complete on pages 3 and 4)
Describe Redundancy Plan (batteries, switches, etc.)	The rocket has a dual redundancy system where the two altimeters are on two completely different circuits and are not connected in any way. They are also two different flight computers so if one has a bug, the other will be able to execute the commands still.
Pad Stay Time (Launch Configuration)	The rocket will be able to sit on the launch pad for at least 2 hour minimum

Recovery System Properties - Drogue Parachute				
Manufacturer/Model			Fruity Chutes	
Size or Diameter (in or ft)			18"	
Main Altimeter Deployment Setting			Apogee	
Backup Altimeter Deployment Setting			1 seconds after Apogee	
Velocity at Deployment (ft/s)			) ft/s (main) 75.582 ft/s (Backup)	
Terminal Velocity (ft/s)			95.244	
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)			25 ft	
Harness/Airframe Interfaces		Machine-closed stainless steel eye bolts, tubular nylon shock cord		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	819.86	323.57	1027.93	

Recovery System Properties - Main Parachute				
Manufacturer/Model			Fruity Chutes	
Size or Diameter (in or ft)			72"	
Main Altimeter Deployment Setting (ft)			600	
Backup Altimeter Deployment Setting (ft)			500	
Velocity at Deployment (ft/s)			95.244	
Terminal Velocity (ft/s)			21.388	
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)			25 ft	
Harness/Airframe Interfaces		Machine-closed stainless steel eye bolts, tubular nylon shock cord		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	34.63	13.67	43.4	

Milestone Review Flysheet 2018-2019

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Payload	
Payload 1 (official payload)	Overview: The payload is a rover that has a camera attached to the top. The rover is cylindrical in shape with two wheels and a tail to stabilize the rover while it is moving. The task of the rover after being released is to find a colored band on the rocket and move towards the rocket. Once it has located and moved to the band, the rover will then take a picture with the camera and store it on an SD card inside the rover. The program will then stop and the rover will have completed its task.
Payload 2 (non-scored payload)	Overview:

Test Plans, Status, and Results	
Ejection Charge Tests	Build up the rocket as though it were flight ready. Then, the charge will be ignited via wires out to a 9V battery at a safe distance (25 ft). A successful test is defined by the rocket separating at the designed point and the parachutes fully being ejected from the body tube. There should be no damage to the rocket body, parachute, or surrounding area. Both drogue and main chute ejections will be tested for both subscale and full scale vehicles. These tests will be performed as soon as the vehicle is ready.
Sub-scale Test Flights	The subscale will be flown at an organized launch on a CTI J295. It will be launched twice, the first time without the air brakes live to test the altitude without the air brakes. The air brake electonics will still be inside the rocket for this flight, but it won't be powered. The second test flight will test the air brakes and how close it can get the vehicle to our desired altitude. The air brakes will be ground tested before flying on the rocket. The launch has been rescheduled to January 5th, 2019 due to safety concerns on previous launch attempts. The payload will NOT be flown on the subscale and instead replaced with ballast.
Vehicle Demonstration Flights	The full scale will be flown twice before the Huntsville launch. The first will be without the air brakes active to test the altitude of the rocket. After ground testing the rover release system, it will be flown on the first flight to test it in flight conditions. A second flight will include live air brakes to test how close the air brakes can get the vehicle to the desired altitude. The fullscale launch is currently set for January 19, 2019. Alternate dates for the launch are February 2nd and 9th.
Payload Demonstration Flights	The payload will be ground tested as soon as it has been completed. In addition to the rover being ground tested, we will test the entire release system from start to finish while grounded. After there is proof that the system has been designed correctly, the system will be launched with the fullscale launch on January 19th. It will be flown during both flights. Batteries will be switched as necessary.

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Transmitter #1			
Location of transmitter:	Big Red Bee		
Purpose of transmitter:	GPS on the Payload		
Brand		RF Output Power (mW)	16 mW
Model		Specific Frequency used by team (MHz)	433MHz **can be moved easily
Handshake or frequency hopping? (explain)	No		
Distance to closest e-match or altimeter (in)	33.5 inches		
Description of shielding plan:	Will add Super Shield from MG Chemicals around sensitive electonics (eg Avionics Bay)		

Transmitter #2			
Location of transmitter:	Big Red Bee		
Purpose of transmitter:	GPS on the rocket vehicle		
Brand		RF Output Power (mW)	16 mW
Model		Specific Frequency used by team (MHz)	433MHz **can be moved easily
Handshake or frequency hopping? (explain)	No		
Distance to closest e-match or altimeter (in)	33.5 inches		
Description of shielding plan:	Will add Super Shield from MG Chemicals around sensitive electonics (eg Avionics Bay)		

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