Milestone Review Flysheet 2017-2018

Institution	University of California, Santa Cruz

Milestone	FRR

Vehicle Properties	
Total Length (in)	94.75
Diameter (in)	3.1
Gross Lift Off Weigh (lb.)	14.1
Airframe Material(s)	Blue Tube 2.0
Fin Material and Thickness (in)	Fiberglass
Coupler Length/Shoulder Length(s) (in)	8 and 10

Motor Properties	
Motor Brand/Designation	Aerotech K535
Max/Average Thrust (lb.)	147.25/120.27
Total Impulse (lbf-s)	1057
Mass Before/After Burn (lb.)	2.79/1.14
Liftoff Thrust (lb.)	141.6
Motor Retention Method	Threaded Tailcone Retainer

Stability Analysis	
Center of Pressure (in from nose)	74.4
Center of Gravity (in from nose)	59.8
Static Stability Margin (on pad)	4.65 cal
Static Stability Margin (at rail exit)	4.65 cal
Thrust-to-Weight Ratio	10.4
Rail Size/Type and Length (in)	1010 rail 96in
Rail Exit Velocity (ft/s)	55.7

Ascent Analysis	
Maximum Velocity (ft/s)	613
Maximum Mach Number	0.54
Maximum Acceleration (ft/s^2)	335
Predicted Apogee (From Sim.) (ft)	5312

Recovery System Properties Drogue Parachute				
Manufacturer/Model		Apogee/Nylon Parachute		
Size/Diameter (in or ft)		24		
Altitude at Deployment (ft)		apogee (5280)		
Velocity at Deployment (ft/s)		0		
Terminal Velocity (ft/s)		67.8		
Recovery Harness Material		Kevlar Braided Line		
Recovery Harness Size/Thickness (in)		1/4"		
Recovery Harness Length (ft)		20.5		
Harness/Airframe Interfaces		1in diameter U bolt fastened to nosecone		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	46.9	688.6		

Recovery System Properties Main Parachute				
Manufacturer/Model		Apogee/Fruit Iris Ultra		
Size/Diameter (in or ft)		48		
Altitude at Deployment (ft)		500		
Velocity at Deployment (ft/s)		67.8		
Terminal Velocity (ft/s)		20.2		
Recovery Harness Material		Kevlar Braided Line		
Recovery Harness Size/Thickness (in)		1/4"		
Recovery Harness Length (ft)		20.5		
Harness/Airframe Interfaces		1in diameter U bolt fastened to avioncs sled and all-thread sub structure		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	4.1	61.4		

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	PerfectFlite/StratoLogger CF Apogee/EasyMini
Redundancy Plan and Backup Deployment Settings	A PerfectFlite StratoLogger CF altimeters serves as the main with the EasyMini as backup. Also two Jolly Logic Chute releases shall be connected in series for main chute redundancy
Pad Stay Time (Launch Configuration)	1.5hr

Recovery Electronics		
Rocket Locators (Make/Model)	Eggfinder GPS	
Transmitting Frequencies (all vehicle and payload)	900 MHz	
Ejection System Energetics (ex. Black Powder)		Black Powder
Energetics Mass - Drogue Chute (grams)	Primary	1
	Backup	1.5
Energetics Mass - Main Chute (grams)	Primary	NA
	Backup	NA
Energetics Masses - Other (grams) - If Applicable	Primary	NA
	Backup	Na

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Payload

	Overview
Payload 1 (official payload)	The team has elected to participate in the target tracking challenge using TARS, the TArget Recognition System. TARS is housed in a clear payload bay and relies on a wide-angle video camera pointed downward to track the positions of the competition tarps in real time. Tracking will be performed with a custom software package run on a Raspberry Pi 3b. The camera system was selected to maximize the camera's viewing time of the targets and medium- and high-altitudes.
Payload 2 (non-scored payload)	NA

Test Plans, Status, and Results

Ejection Charge Tests	Under the guidance and supervision of both the Safety Officer and the NAR certified mentor, the rocket shall be configured for flight. Once the area is clear and both the mentor and safety officer give their approval, a member will count down and the ejection charge shall be detinated, ejecting the nosecone and parachutes.
Sub-scale Test Flights	The modular design of the rocket allows for a unique structure for the team's subscale rocket manufacture and testing. The plan is for the subscale rocket to be nearly identical to the full scale Effective-1 rocket in all aspects except the diameter of the motor housing. A 38mm motor housing on the subscale rocket will allow for a greater number of test flights at a lower cost per flight. Once the project has progressed to the point of manufacturing the full scale rocket, nearly all of the rocket's internal components will be directly transferable with the ease of sliding the avionics sled out of the subscale rocket and into the full scale rocket.
Full-scale Test Flights	The Full-scale test flight shall demonstate all of the functionality of the competition launch vehicle. The same model of motor is intended to be used for the full-scale test as would be used for the competition launch. If sucessful, the modification made to the rocket between that flight and the competition flight shall be kept to an absolute minimum. The full scale flight will give the team a clear indication of how the rocket will preform during the competition.

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Additional Comments