

Milestone Review Flysheet

Institution	Spring Grove Area High School (Team Darwin)	Milestone	FRR
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Vehicle Properties		Motor Properties	
Total Length (in)	88.125	Motor Manufacturer	Cesaroni
Diameter (in)	3.9	Motor Designation	K650
Gross Lift Off Weigh (lb)	18.4	Max/Average Thrust (lb)	163.96/147.60
Airframe Material	Fiberglass	Total Impulse (lbf-s)	393.64
Fin Material	G10 Fiberglass	Mass Before/After Burn	69.65/23.04 (oz)
Drag	0.95	Liftoff Thrust (lb)	163.96

Stability Analysis		Ascent Analysis	
Center of Pressure (in from nose)	64.24	Maximum Velocity (ft/s)	635.3
Center of Gravity (in from nose)	52.25	Maximum Mach Number	0.565
Static Stability Margin	3	Maximum Acceleration (ft/s^2)	363
Static Stability Margin (off launch rail)		Target Apogee (From Simulations)	5444.32
Thrust-to-Weight Ratio	8.6	Stable Velocity (ft/s)	44
Rail Size and Length (in)	1.0 96	Distance to Stable Velocity (ft)	27
Rail Exit Velocity(ft/s)	60.6		

Recovery System Properties					Recovery System Properties				
Drogue Parachute					Main Parachute				
Manufacturer/Model		Fruitychutes/IFC			Manufacturer/Model		Fruitychutes		
Size		24 in			Size		72 in		
Altitude at Deployment (ft)		5444.32			Altitude at Deployment (ft)		600		
Velocity at Deployment (ft/s)		1.08			Velocity at Deployment (ft/s)		56.86		
Terminal Velocity (ft/s)		58.86			Terminal Velocity (ft/s)		12.56		
Recovery Harness Material		Tubular Nylon			Recovery Harness Material		Tubular Nylon		
Harness Size/Thickness (in)		1			Harness Size/Thickness (in)		1		
Recovery Harness Length (ft)		15			Recovery Harness Length (ft)		25		
Harness/Airframe Interfaces		The harness will be attached to key structural components via quick links to safely secure the harness to the rocket			Harness/Airframe Interfaces		The harness will be attached to key structural components via quick links to safely secure the harness to the rocket		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4	Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	315	876	1510			24	67	116	

Recovery Electronics					Recovery Electronics				
Altimeter(s)/Timer(s) (Make/Model)		PerfectFlite CF Altimeters			Rocket Locators (Make/Model)		Communications Specialists Inc. R-300 R/C ELT Receiver		
Redundancy Plan		The E-Bay will have 2 altimeters, each altimeter will have 2 charges, one for drogue and the other main. 2 altimeters will give it a redundant system.			Transmitting Frequencies		***Required by CDR***		
Pad Stay Time (Launch		Each altimeter will have a			Black Powder Mass Drogue Chute (grams)		2		
					Black Powder Mass Main		3		

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Autonomous Ground Support Equipment (MAV Teams Only)

Capture Mechanism	Overview
	N/A
Container Mechanism	Overview
	N/A
Launch Rail Mechanism	Overview
	N/A
Igniter Installation Mechanism	Overview
	N/A

Payload

Payload 1	Overview
	The payload will test the effect that the rocket's flight and acceleration have on the planaria's ability to regenerate
Payload 2	Overview
	N/A

Test Plans, Status, and Results

Ejection Charge Tests	Each ejection charge will be 3.0 g of black powder. These charges will eject both our main and drouge parachutes through the seperation of the launch vehicle. These ejections are triggered by altimeters.
Sub-scale Test Flights	Successfull subscale test flight November 21st,2015.This subscale rocket was built at a 60% scale of what the full scale will be. Two test flights were launched with the first reaching a height of 1970' and the second reaching apogee at 2104'. Each flight had a successful deployment of the main parachute at 700'.
Full-scale Test Flights	Successful full scale flights on March 12th and 13th. The launches were both successful with our first launch flying to a height of 4585 ft with a 4 grain K1200. On March 13th our rocket flew with our new chosen motor annd flew successfully and was successfully recovered and flew to a height of 4981 feet

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Additional Comments

-Section 1(Nose Cone) Section 2(E-Bay and front body tube section) -Section 3(Rear body tube section including fins and motor casing)

