

# Milestone Review Flysheet

**Institution** Spring Grove Area High School (Team Darwin)

**Milestone** CDR

## Vehicle Properties

Total Length (in)	88.125
Diameter (in)	3.9
Gross Lift Off Weigh (lb)	17.3
Airframe Material	Fiberglass
Fin Material	G10 Fiberglass
Drag	0.95

## Motor Properties

Motor Manufacturer	Cesaroni
Motor Designation	K1200
Max/Average Thrust (lb)	306.5/268.3
Total Impulse (lbf-s)	452.6
Mass Before/After Burn	57.56oz/22.95oz
Liftoff Thrust (lb)	306.5

## Stability Analysis

Center of Pressure (in from nose)	64.2
Center of Gravity (in from nose)	51.1
Static Stability Margin	3.3
Static Stability Margin (off launch rail)	
Thrust-to-Weight Ratio	17.3
Rail Size and Length (in)	96
Rail Exit Velocity(ft/s)	84.8

## Ascent Analysis

Maximum Velocity (ft/s)	703.4
Maximum Mach Number	0.625
Maximum Acceleration (ft/s^2)	474.7
Target Apogee (From Simulations)	5422
Stable Velocity (ft/s)	44
Distance to Stable Velocity (ft)	27

## Recovery System Properties

### Dogue Parachute

Manufacturer/Model	Fruitychutes/IFC			
Size	24 in			
Altitude at Deployment (ft)	5184.58			
Velocity at Deployment (ft/s)	4.05			
Terminal Velocity (ft/s)	72.7			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1			
Recovery Harness Length (ft)	15			
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
	157	437.7	755.6	

## Recovery System Properties

### Main Parachute

Manufacturer/Model	Fruitychutes			
Size	72 in			
Altitude at Deployment (ft)	600			
Velocity at Deployment (ft/s)	72.7			
Terminal Velocity (ft/s)	20.1			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1			
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			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	12	33.5	57.8	

## Recovery Electronics

Altimeter(s)/Timer(s) (Make/Model)	PerfectFlite CF Altimeters
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.

## Recovery Electronics

Rocket Locators (Make/Model)	Communications Specialists Inc. R-300 R/C ELT Receiver
Transmitting Frequencies	***Required by CDR***
Black Powder Mass Drogue Chute (grams)	3

Pad Stay Time (Launch Configuration)	Each altimeter will have a battery life of 4 hrs.	Black Powder Mass Main Chute (grams)	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 drogue parachutes through the separation of the launch vehicle. These ejections are triggered by altimeters.
Sub-scale Test Flights	Successful 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

Full scale test and ground ejection charge test scheduled for the weekend of January 15-16.

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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)