

# Milestone Review Flysheet

**Institution**

The University of Toledo

**Milestone**

Preliminary Design Review

## Vehicle Properties

Total Length (in)	84.88
Diameter (in)	4.00
Gross Lift Off Weigh (lb)	16.60
Airframe Material	Fiberglass
Fin Material	Fiberglass
Coupler Length	9"

## Motor Properties

Motor Designation	AeroTech K480W-P
Max/Average Thrust (lb)	228.81/118.83
Total Impulse (lbf-s)	1676.700032
Mass Before/After Burn	4.58/1.73
Liftoff Thrust (lb)	204.57
Motor Retention	RMS 54/2560

## Stability Analysis

Center of Pressure (in from nose)	66.781 in
Center of Gravity (in from nose)	53.896 in
Static Stability Margin	1.86
Static Stability Margin (off launch rail)	1.86
Thrust-to-Weight Ratio	12.4
Rail Size and Length (in)	72
Rail Exit Velocity	65.6

## Ascent Analysis

Maximum Velocity (ft/s)	745
Maximum Mach Number	0.67
Maximum Acceleration (ft/s <sup>2</sup> )	363.56
Target Apogee (From Simulations)	5615
Stable Velocity (ft/s)	65
Distance to Stable Velocity (ft)	6.4

## Recovery System Properties

### Dogue Parachute

Manufacturer/Model	LOC Precision			
Size	12"			
Altitude at Deployment (ft)	5638			
Velocity at Deployment (ft/s)	32.96			
Terminal Velocity (ft/s)	139			
Recovery Harness Material	Nylon			
Harness Size/Thickness (in)	1/8 in x 1/2 in			
Recovery Harness Length (ft)	10 ft			
Harness/Airframe Interfaces	Eyebolt attached to top of Payload Bay and to the bottom of the recovery bay.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	746.14	2160.11	N/A	N/A

## Recovery System Properties

### Main Parachute

Manufacturer/Model	LOC Precision			
Size	72"			
Altitude at Deployment (ft)	700			
Velocity at Deployment (ft/s)	139			
Terminal Velocity (ft/s)	22.4			
Recovery Harness Material	Nylon Shock Cord			
Harness Size/Thickness (in)	1/8"x1/2"			
Recovery Harness Length (ft)	10			
Harness/Airframe Interfaces	Eye bolt attached to top of recovery bay and bulkhead of in the nosecone.			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	19.98	9.12	65.76	N/A

## Recovery Electronics

Altimeter(s)/Timer(s) (Make/Model)	StrattologgerCF
Redundancy Plan	Second StratologgerCF and backup blackpowder charges
Pad Stay Time (Launch Configuration)	Up to 8 hours

## Recovery Electronics

Rocket Locators (Make/Model)	TeleGPS
Transmitting Frequencies	434.550 MHz
Black Powder Mass Drogue Chute (grams)	2 g
Black Powder Mass Main Chute (grams)	2 g

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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
	Our payload will use a single servo and gear set to roll the vehicle in a controlled manner. After a controlled rotation, a counter roll will be administered to the vehicle to stop the rotation and control the vehicle.
Payload 2	Overview
	N/A

**Test Plans, Status, and Results**

Ejection Charge Tests	Ejection charge tests will be ran multiple times, once shortly after construction and again shortly before full-scale test flight. An ejection charge test will also be ran before any full-scale launch.
Sub-scale Test Flights	Subscale model will be built, tested, and flown by team members new to rocketry. They will be overseen by veteran members. Launch date pending. Expected mid to late November.
Full-scale Test Flights	Full scale test flight will be flown in early to mid February. Flight will be done with smaller motor (K185-W) so we can stay within the flight ceiling of 3000 ft. Flight will be done with fully operational payload.

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Critical Design Review

**Additional Comments**

Completed by Andrew Loch