

# Milestone Review Flysheet

PDR, CDR, FRR

<b>Institution Name</b>		Harvey Mudd College				<b>Milestone</b>		Full Scale Flight Test		
<b>Vehicle Properties</b>					<b>Motor Properties</b>					
Diameter (in)		3.13			Motor Manufacturer		Aerotech			
Length (in)		80.375			Motor Designation		J401FJ			
Gross Liftoff Weight (lb)		10.71			Max/Average Thrust (N/lb)		480/408.9 N			
Launch Lug/button Size		1/4" rail			Total Impulse (N-sec/lb-sec)		1115.4 Ns			
Motor Retention		PML HAMR			Mass pre/post Burn (lb)		2.01/0.883 lb			
<b>Stability Analysis</b>					<b>Ascent Analysis</b>					
Center of Pressure (in from nose)		65.2			Rail Exit Velocity (ft/s)		46			
Center of Gravity (in from nose)		47.9			Max Velocity (ft/s)		663			
Static Stability Margin		5.53			Max Mach Number		0.58			
Thrust-to-Weight Ratio		10.1			Max Acceleration (ft/s <sup>2</sup> )		422			
Rail Size (in) / Length (in)		0.50			Peak Altitude (ft)		5,495			
<b>Recovery System Properties</b>					<b>Recovery System Properties</b>					
<b>Drogue Parachute</b>					<b>Main Parachute</b>					
Manufacturer/Model		Rocketman			Manufacturer/Model		Fruity Chutes			
Size		24"			Size		60"			
Altitude at Deployment (ft)		5,495			Altitude at Deployment (ft)		1,000			
Velocity at Deployment (ft/s)		0			Velocity at Deployment (ft/s)		72.6			
Terminal Velocity (ft/s)		72.6			Landing Velocity (ft/s)		18.5			
Recovery Harness Material		Nylon			Recovery Harness Material		Nylon			
Harness Size/Thickness (in)		1/4"			Harness Size/Thickness (in)		5/8"			
Recovery Harness Length (ft)		10			Recovery Harness Length (ft)		10			
Harness/Airframe Interfaces					Harness/Airframe Interfaces					
Kinetic Energy During Descent (ft-lb)	Section 1	Section 2	Section 3	Section 4	Kinetic Energy Upon Landing (ft-lb)	Section 1	Section 2	Section 3	Section 4	
	632					162				

Recovery System Properties		Recovery System Properties	
Electronics/Ejection		Electronics/Ejection	
Altimeter(s) Make/Model	Featherweight Raven2 (2)	Rocket Locators (Make, Model)	Arduino/Xbee (sends coordinates with other telemetry)
Redundancy Plan	separate batteries for each altimeter	Transmitting Frequencies	900 MHz
		Black Powder Mass	0.75 g
Pad Stay Time (Launch Configuration)	40 hrs	Drogue Parachute (gram)	0.75 g
		Main Parachute (gram)	

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### Payload/Science

Succinct Overview of Payload/Science Experiment	We are measuring the relative intensity of incoming light within the wavelength bands of 150-400 nm, 400-1100nm, and 1100-1800nm as well as atmospheric data such as altitude, internal and external temperature, and humidity.
Identify Major Components	Honeywell HEL-705-T Platinum RTD Thermometer, Freescale MPXA6115A6T1 Absolute Pressure Sensor, Thorlabs FGAP71 GaP Photodiode 150nm-550nm effective wavelength, Thorlabs FDS100 Si Photodiode 350nm-1100nm effective wavelength, Thorlabs FGA21 InGaAs Photodiode 800nm-1800nm effective wavelength
Mass of Payload/Science	1.5 lbs estimated

### Test Plan Schedule/Status

Ejection Charge Test(s)	Nov 6, 2011: complete
Sub-scale Test Flights	Nov 12, 2011: complete and successful

Full-scale Test Flights	Feb 11, 2011: beginning assembly
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**Additional Comments**

The listed kinetic energy on landing is the sum total of the kinetic energies of each of the sections (landing velocity times total empty weight of the vehicle). For each section the kinetic energy will be less, and as each section lands, the kinetic energies of those above it will drop even more as the parachute will be holding less and less weight. The energy of each section will be less than the 75 lb-ft maximum.