Milestone Review Flysheet

PDR, CDR, FRR

Institution Name	Massachussets Institute of Technology

Milestone	CDR

Vehicle Properties	
Diameter (in)	6
Length (in)	108
Gross Liftoff Weight (lb)	43.1
Launch Lug/button Size	1515 rail
Motor Retention	Front end of motor

Motor Properties	
Motor Manufacturer	CTI
Motor Designation	L1395
Max/Average Thrust (N/lb)	1779.9N, 400.48lb/1395.7N, 314.07lb
Total Impulse (N-sec/lb-sec)	4895.4Ns/1101.46lb-s
Mass pre/post Burn (lb)	9.4568, 4.0425

Stability Analysis	
Center of Pressure (in from nose)	91.25
Center of Gravity (in from nose)	74
Static Stability Margin	3.00
Thrust-to-Weight Ratio	8.1:1
Rail Size (in) / Length (in)	1.5"/96"

Ascent Analysis	
Rail Exit Velocity (ft/s)	60.3
Max Velocity (ft/s)	680
Max Mach Number	0.61
Max Acceleration (ft/s^2)	300
Peak Altitude (ft)	5,340

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model	Surplus Military Pilot			
Size	60"			
Altitude at Deployment (ft)	5,340			
Velocity at Deployment (ft/s)	~20ft/s depending on wind			
Terminal Velocity (ft/s)	55			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1"			
Recovery Harness Length (ft)	16'			
Harness/Airframe Interfaces	Attached to 3/8" forged eye bolt in top of high school science payload unit. Eye bolt is also attached to webbing that goes down to tender descender			
Kinetic Energy During Descent (ft-lb)	Section 1	Section 2	Section 3	Section 4
	1782		1.4 (fin 1)	8.4 (fin 2)

Recovery System Properties				
Main Parachute				
Manufacturer/Model	RocketMan			
Size	R16 Classic			
Altitude at Deployment (ft)	300'			
Velocity at Deployment (ft/s)	55			
Landing Velocity (ft/s)	13			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1"			
Recovery Harness Length (ft)	3.25'			
Harness/Airframe Interfaces	3/8" Forged Eye nut into top of avionics bay, connected to threaded rod into top of motor			
Kinetic Energy Upon Landing (ft-lb)	Section 1	Section 2	Section 3	Section 4
	65 (body)	72 (nose)	1.4 (fin 1)	8.4 (fin 2)

Recovery System Properties	
Electronics/Ejection	
Altimeter(s) Make/Model	Featherweight Raven2
Redundancy Plan	Perfectflite Stratologger, redundant drogue ejection charges. Redundant igniters in Tender Descender on main
Pad Stay Time (Launch Configuration)	Upwards of 8 hours

Recovery System Properties	
Electronics/Ejection	
Rocket Locators (Make, Model)	Big Red Bee 70cm Transmitter/2m GPS. Possibly custom built
Transmitting Frequencies	436.620, 436.650, 436.710, 144.310 mhz. If more than 4 are used, the 5th
Black Power Mass Drogue Parachute (gram)	4.5
Black Power Mass Main Parachute (gram)	.2 (in Tender Descender release device)

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Payload/Science	
Succinct Overview of Payload/Science Experiment	The scientific payload for the 2011-2012 year will be a system for quantitatively measuring flutter on secondary set of fins. This system will include a set of high-speed video cameras and strain-gauges built into test fins. The data and video from the flight will be analyzed and compared to computer models developed prior to flight.
Identify Major Components	The main payload of the rocket will be a fin flutter measurement system to analyze the fin flutter induced modes in the three extra test fins made of G -10. This measurement system will consist of high speed cameras, mirrors, strain gauges, a micro-controller, solid state memory, and an
Mass of Payload/Science	The mass of all the payload electric components is about 700 grams. Including the avionics and camera bay bulk heads the entire payload mass inside the rocket is approximately 3 kiligrams.

Test Plan Schedule/Status	
Ejection Charge Test(s)	Completed January 15
Sub-scale Test Flights	Completed December 28
Full-scale Test Flights	1st Completed January 15, plans for February 18, and March 17. Additional options on March 10 and April 10.

Additional Comments
Secondary Payload: A secondary payload will be flown as part of ongoing educational outreach programs. The secondary payload will be a science experiment developed and built by a local high-school team. The payload will be selected as part of a mini-design competition. We plan to invite these younger rocket teams to submit ideas for a small scientific payload that can also be flown aboard our USLI rocket. These proposed payloads will need to fit within certain constraints (i.e., 4lbs, 5.5" diameter by 21" long).