Milestone Review Flysheet

PDR, CDR, FRR

Institution Name	Massachusetts Institute of Technology

Milestone	PDR

Vehicle Properties	
Diameter (in)	6.26
Length (in)	124.5
Gross Liftoff Weight (lb)	46.28
Launch Lug/button Size	16-Mar
Motor Retention	Stainless Steel Rod

Motor Properties	
Motor Manufacturer	Cesaroni
Motor Designation	L1115
Max/Average Thrust (N/lb)	1713N, 1119N
Total Impulse (N-sec/lb-sec)	5015 Ns
Mass pre/post Burn (lb)	4.4kg, 2.01kg

Stability Analysis	
Center of Pressure (in from nose)	89.95
Center of Gravity (in from nose)	77.09
Static Stability Margin	2.11
Thrust-to-Weight Ratio	8.3
Rail Size (in) / Length (in)	1.5" x 1.5", 8ft

Ascent Analysis	
Rail Exit Velocity (ft/s)	54
Max Velocity (ft/s)	594.6
Max Mach Number	0.53
Max Acceleration (ft/s^2)	503.3
Peak Altitude (ft)	5,650

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model	Surplus Military Pilot			
Size	60"			
Altitude at Deployment (ft)	5,650			
Velocity at Deployment (ft/s)	~20 ft/s depending on wind			
Terminal Velocity (ft/s)	48.4			
Recovery Harness Material	Tubuluar Nylon			
Harness Size/Thickness (in)	1"			
Recovery Harness Length (ft)	16'			
Harness/Airframe Interfaces	Attached to a 3/8" forged eye bolt in top of payload sabot unit. Eye bolt also attached to webbing that goes to tender descender			
Kinetic Energy During Descent (ft-lb)	Section 1	Section 2	Section 3	Section 4
	1331.3			

Recovery System Properties				
Main Parachute				
Manufacturer/Model	RocketMan			
Size	R16 Classic			
Altitude at Deployment (ft)	3000'			
Velocity at Deployment (ft/s)	48.4			
Landing Velocity (ft/s)	13.9			
Recovery Harness Material	Tubular Nylon			
Harness Size/Thickness (in)	1"			
Recovery Harness Length (ft)	3.25'			
Harness/Airframe Interfaces	38" 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
	70.7 (body)	.8 (Nose/Sabo	69.7 (Quadrotor)	

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.
Transmitting Frequencies	***Required by CDR***
Black Power Mass Drogue Parachute (gram)	3.5
Black Power Mass Main Parachute (gram)	0.2 (Tender Descender release device)

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Payload/Science	
Succinct Overview of Payload/Science Experiment	A Custom built composite quadrotor carrying a system of payloads to exhibit object tracking and recognition in dynamic environments and to quantitatively measure high-altitude atmospheric lightning events
Identify Major Components	The primary payload of the rocket will be the quadrotor which will be equipped with GPS, radio telecommand devices, an IMU, pressure sensors, an onboard computes, CMOS cameras, IR emitters/ detectors, and an autonomous flight stabilizer.
Mass of Payload/Science	The mass of the quadrotor is being estimated to be about 10 pounds.

Test Plan Schedule/Status	
Ejection Charge Test(s)	Early December (Likely December 8)
Sub-scale Test Flights	18-Nov
Full-scale Test Flights	Early February

Additional Comments