

# Milestone Review Flysheet 2018-2019

**Institution** U. of Hawaii - CC

**Milestone** FRR

Vehicle Properties	
Total Length (in)	116.25 in
Diameter (in)	4 in
Gross Lift Off Weigh (lb)	32.2 lb
Airframe Material(s)	G-10 Fiberglass
Fin Material and Thickness (in)	Machined Aluminum
Coupler Length(s)/Shoulder Length(s) (in)	11 in/4.5 in

Motor Properties	
Motor Brand/Designation	Aerotech K1050W
Max/Average Thrust (lb)	487 lb/254 lb
Total Impulse (lbf-s)	545 lbf-s
Mass Before/After Burn (lb)	4.85 lb/2.1 lb
Liftoff Thrust (lb)	487 lb
Motor Retention Method	Aeropac (RB54) Universal

Stability Analysis	
Center of Pressure (in. from nose)	96.3 in
Center of Gravity (in. from nose)	69.75 in
Static Stability Margin (on pad)	6.64
Static Stability Margin (at rail exit)	5.11
Thrust-to-Weight Ratio	7.9
Rail Size/Type and Length (in)	15-15/144 inches
Rail Exit Velocity (ft/s)	55.77 ft/s

Ascent Analysis	
Maximum Velocity (ft/s)	577.6 ft/s
Maximum Mach Number	0.513
Maximum Acceleration (ft/s <sup>2</sup> )	382 ft/s <sup>2</sup>
Target Apogee (ft)	4700
Predicted Apogee (From Sim.) (ft)	4820

Recovery System Properties - Overall	
Total Descent Time (s)	90 s
Total Drift in 20 mph winds (ft)	2637 ft

Recovery System Properties - Energetics		
Ejection System Energetics (ex. Black Powder)	Black Powder	
Energetics Mass - Drogue Chute (grams)	Primary	3.0 g
	Backup	3.5 g
Energetics Mass - Main Chute (grams)	Primary	5.0 g
	Backup	6.0 g
Energetics Mass - Other (grams) - If Applicable	Primary	
	Backup	

Recovery System Properties - Recovery Electronics	
Primary Altimeter Make/Model	TeleMega V3.0
Secondary Altimeter Make/Model	PerfectFlight
Other Altimeters (if applicable)	
Rocket Locator (Make/Model)	TeleMega V3.0
Additional Locators (if applicable)	
Transmitting Frequencies (all - vehicle and payload)	***Required by CDR*** (Complete on pages 3 and 4)
Describe Redundancy Plan (batteries, switches, etc.)	Seperated power sources and switches. Completely independent systems
Pad Stay Time (Launch Configuration)	2 hr

Recovery System Properties - Drogue Parachute				
Manufacturer/Model	RocketMan			
Size or Diameter (in or ft)	3 ft			
Main Altimeter Deployment Setting	Apogee			
Backup Altimeter Deployment Setting	Apogee			
Velocity at Deployment (ft/s)	0 ft/s			
Terminal Velocity (ft/s)	75 ft/s			
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)	1 in Nylon (2 ton)			
Recovery Harness Length (ft)	40 ft			
Harness/Airframe Interfaces	Eyebolt 1/2 in thick, closed loop			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	2812 Ft-lbs			

Recovery System Properties - Main Parachute				
Manufacturer/Model	RocketMan			
Size or Diameter (in or ft)	10 ft			
Main Altimeter Deployment Setting (ft)	500 ft			
Backup Altimeter Deployment Setting (ft)				
Velocity at Deployment (ft/s)	75 ft/s			
Terminal Velocity (ft/s)	24 ft/s			
Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap)	1 in Nylon (2 ton)			
Recovery Harness Length (ft)	20 ft			
Harness/Airframe Interfaces	two point U-bolt (5/8 in thick)			
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	61.8 ft-lb	48.7 ft-lb		

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Payload	
Payload 1 (official payload)	Overview
	A four wheeled rover to be deployed from the payload section of the rocket using an internal drive thread/stepper motor assembly. The rover will then travel a distance >10 ft and collect a soil sample.
Payload 2 (non-scored payload)	Overview
	None scheduled at this time

Test Plans, Status, and Results	
Ejection Charge Tests	Deployment tests for both Drogue and Main were successful. A full scale flight test was performed on Feb 16 at the FRR site in California.
Sub-scale Test Flights	On-going to test the drag brakes and over-all rocket stability.
Vehicle Demonstration Flights	A full-scale test was performed on Feb 16 at the FRR launch site in Mojave California
Payload Demonstration Flights	A Payload demonstration test is scheduled for March 23.

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Transmitter #1			
Location of transmitter:	Avionics section of the Rocket		
Purpose of transmitter:	location of descending rocket		
Brand	Altus Metrum	RF Output Power (mW)	40 mW
Model	TeleMega V3.0	Specific Frequency used by team (MHz)	434.55MHz
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)	4 in seperated by 1/2" plywood bulkhead		
Description of shielding plan:	Seperated unit; Two 1/2 in thick Ply bulheads within a coupler unit		

Transmitter #2			
Location of transmitter:	Payload section (nosecone)		
Purpose of transmitter:	Location of descending payload		
Brand	BigRedBee	RF Output Power (mW)	100 mW
Model	Bee Line TX	Specific Frequency used by team (MHz)	433.92MHz
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)	48 in		
Description of shielding plan:			

Transmitter #3			
Location of transmitter:	Payload section		
Purpose of transmitter:	Payload Deployment		
Brand	Digi International	RF Output Power (mW)	250 mW
Model	Xbee 900HP	Specific Frequency used by team (MHz)	915 MHz (CP)
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)	48 in		
Description of shielding plan:			

Transmitter #4			
Location of transmitter:			
Purpose of transmitter:			
Brand		RF Output Power (mW)	
Model		Specific Frequency used by team (MHz)	
Handshake or frequency hopping? (explain)			
Distance to closest e-match or altimeter (in)			
Description of shielding plan:			

