

Milestone Review Flysheet 2017-2018

Institution Tarleton State University

Milestone FRR

Vehicle Properties

| | |
|----------------------------------------|----------------------|
| Total Length (in) | 120" |
| Diameter (in) | 6" |
| Gross Lift Off Weigh (lb.) | 51.677 |
| Airframe Material(s) | G12 Fiberglass |
| Fin Material and Thickness (in) | G10 Fiberglass, 1/4" |
| Coupler Length/Shoulder Length(s) (in) | 12"/ 6" |

Motor Properties

| | |
|------------------------------|---------------------------|
| Motor Brand/Designation | L2200G |
| Max/Average Thrust (lb.) | 696.94/494.58 |
| Total Impulse (lbf-s) | 1147.42 |
| Mass Before/After Burn (lb.) | 167.36/88.75 |
| Liftoff Thrust (lb.) | 562.14 |
| Motor Retention Method | Quick Change Flange Mount |

Stability Analysis

| | |
|----------------------------------------|----------------------------|
| Center of Pressure (in from nose) | 92.6292" |
| Center of Gravity (in from nose) | 78.45" |
| Static Stability Margin (on pad) | 2.3 |
| Static Stability Margin (at rail exit) | 2.57 |
| Thrust-to-Weight Ratio | 22.203:1 |
| Rail Size/Type and Length (in) | 1515/Extruded Aluminum 10' |
| Rail Exit Velocity (ft/s) | 83.183 |

Ascent Analysis

| | |
|-----------------------------------|--------|
| Maximum Velocity (ft/s) | 646.23 |
| Maximum Mach Number | 0.5742 |
| Maximum Acceleration (ft/s^2) | 450 |
| Predicted Apogee (From Sim.) (ft) | 5255 |

Recovery System Properties

Drogue Parachute

| | |
|--------------------------------------|------------------------------|
| Manufacturer/Model | b2 Rocketry/ SkyAngle Cert 3 |
| Size/Diameter (in or ft) | Drogue - 21.8' |
| Altitude at Deployment (ft) | Apogee |
| Velocity at Deployment (ft/s) | 0 |
| Terminal Velocity (ft/s) | 120 |
| Recovery Harness Material | Kevlar |
| Recovery Harness Size/Thickness (in) | 1/2" |
| Recovery Harness Length (ft) | 30' |

Recovery System Properties

Main Parachute

| | |
|--------------------------------------|------------------------------|
| Manufacturer/Model | b2 Rocketry/ SkyAngle Cert 3 |
| Size/Diameter (in or ft) | XXL - 105" |
| Altitude at Deployment (ft) | 500' |
| Velocity at Deployment (ft/s) | 120 |
| Terminal Velocity (ft/s) | 15 |
| Recovery Harness Material | Kevlar |
| Recovery Harness Size/Thickness (in) | 1/2" |
| Recovery Harness Length (ft) | 30' |

Harness/Airframe Interfaces

Parachute is tied to Kevlar shock cord. The Kevlar shock cord is tied to U-bolts which are bolted to bulkplates with backing plate. Bulkplates, with the exception of AV Bay lids, are epoxied in using Proline 4500.

| | | | | |
|-----------------------------------------|-----------|-----------|-----------|-----------|
| Kinetic Energy of Each Section (Ft-lbs) | Section 1 | Section 2 | Section 3 | Section 4 |
| | 2301.27 | 2675.12 | 3790.93 | N/A |

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| | | | | |
|-----------------------------------------|-----------|-----------|-----------|-----------|
| Kinetic Energy of Each Section (Ft-lbs) | Section 1 | Section 2 | Section 3 | Section 4 |
| | 40.55 | 47.15 | 66.8 | N/A |

Recovery Electronics

| | |
|------------------------------------------------|---------------------------|
| Altimeter(s)/Timer(s) (Make/Model) | StratoLogger CF |
| Redundancy Plan and Backup Deployment Settings | One Extra StratoLogger CF |
| Pad Stay Time (Launch Configuration) | 10 Hours |

Recovery Electronics

| | | | |
|------------------------------------------------------|-------------|--|--|
| Rocket Locators (Make/Model) | Garmin DC50 | | |
| Transmitting Frequencies (all - vehicle and payload) | 151,880 MHz | | |
| Ejection System Energetics (ex. Black Powder) | | | |
| Energetics Mass - Drogue Chute (grams) | Primary | | |
| | Backup | | |
| Energetics Mass - Main Chute (grams) | Primary | | |
| | Backup | | |
| Energetics Masses - Other (grams) - If Applicable | Primary | | |
| | Backup | | |

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Payload

| Payload | |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Payload 1 (official payload) | Overview |
| | The payload is a rover that will be autonomously deployed after landing. The weight of the rover is 41.274 ounces. The rover is stowed in a section directly behind the nose cone. After the rover deploys, it will 5 feet and deploy solar panels. |
| Payload 2 (non scored payload) | Overview |
| | |

Test Plans, Status, and Results

| | |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ejection Charge Tests | Ejection charge tests are an important part of this project and used to ensure that premature deployment does not happen during flight as well as to keep stress of the recovery system at a minimum. All tests will be scheduled the day before a test launch. |
| Sub-scale Test Flights | A minimum of two sub-scale test flights will be scheduled. All sub-scale flights will happen prior to any full-scale test flights. |
| Full-scale Test Flights | No full-scale test flights will occur until a successful sub-scale flight has been completed. The first few full-scale flights will be focused on a successful flight and recovery. Every flight afterward will be focused on achieving the target apogee. |

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Additional Comments