# Milestone Review Flysheet 2017-2018

| Institution | Lenoir-Rhyne University |
|---|---|

| Milestone | PDR |
|---|---|

## Vehicle Properties

| | |
|---|---|
| Total Length (in) | 77" |
| Diameter (in) | 4" to 5" |
| Gross Lift Off Weigh (lb.) | 23.6 |
| Airframe Material(s) | Fiber Glass |
| Fin Material and Thickness (in) | Fiber Glass, 1/4" |
| Coupler Length/Shoulder Length(s) (in) | 3 1/2" 1/4" |

## Motor Properties

| | |
|---|---|
| Motor Brand/Designation | K660-17 |
| Max/Average Thrust (lb.) | 242/148 |
| Total Impulse (lbf-s) | 536 |
| Mass Before/After Burn (lb.) | 4.3/1.70 |
| Liftoff Thrust (lb.) | 243 |
| Motor Retention Method | Aero Pack retaine |

## Stability Analysis

| | |
|---|---|
| Center of Pressure (in from nose) | 56.3" |
| Center of Gravity (in from nose) | 39.1” |
| Static Stability Margin (on pad) | 3.4 |
| Static Stability Margin (at rail exit) | 3.4 |
| Thrust-to-Weight Ratio | 6.3 |
| Rail Size/Type and Length (in) | 1/4", 8' |
| Rail Exit Velocity (ft/s) | 70 |

## Ascent Analysis

| | |
|---|---|
| Maximum Velocity (ft/s) | 63 |
| Maximum Mach Number | 0.5 |
| Maximum Acceleration (ft/s^2) | 29 |
| Predicted Apogee (From Sim.) (ft) | 5,5 |

## Recovery System Properties

### Drogue Parachute

| | |
|---|---|
| Manufacturer/Model | Fruity chutes/Elliptical |
| Size/Diameter (in or ft) | 36" |
| Altitude at Deployment (ft) | 5,530 |
| Velocity at Deployment (ft/s) | 15 |
| Terminal Velocity (ft/s) | 42 |
| Recovery Harness Material | Tubular Nylon |
| Recovery Harness Size/Thickness (in) | 7 /16" |
| Recovery Harness Length (ft) | 240" |
| Harness/Airframe Interfaces | U-Bolts and Quick Links |

| Kinetic Energy of Each Section (Ft-lbs) | Section 1 | Section 2 | Section 3 | Section 4 |
|---|---|---|---|---|
| | 562 | N/A | N/A | N/A |

## Recovery System Properties

### Main Parachute

| | |
|---|---|
| Manufacturer/Model | Fruity ch |
| Size/Diameter (in or ft) | 72 |
| Altitude at Deployment (ft) | 100 |
| Velocity at Deployment (ft/s) | 42 |
| Terminal Velocity (ft/s) | 15 |
| Recovery Harness Material | Tubular |
| Recovery Harness Size/Thickness (in) | 7/1 |
| Recovery Harness Length (ft) | 10 |
| Harness/Airframe Interfaces | U-Bolts and Quick Lir |

| Kinetic Energy of Each Section (Ft-lbs) | Section 1 | Section 2 | Section 3 |
|---|---|---|---|
| | 56.9 | N/A | N/A |

## Recovery Electronics

| | |
|---|---|
| Altimeter(s)/Timer(s) (Make/Model) | Perfectflite StartologgerCF and Marsa 54 |
| Redundancy Plan and Backup Deployment Settings | apogee. StratologgerCF at 1000ft. Marsa 54 at 800ft |
| Pad Stay Time (Launch Configuration) | An hour |

## Recovery Electronics

| | | |
|---|---|---|
| Rocket Locators (Make/Model) | | Big Red Bee/ BeeLi |
| Transmitting Frequencies (all - vehicle and payload) | | ***Required by CDR |
| Ejection System Energetics (ex. Black Powder) | | 4F Black |
| Energetics Mass - Drogue Chute (grams) | Primary | 2 |
| | Backup | 2. |
| Energetics Masses - Other (grams) - If Applicable | Primary | Mair |
| | Backup | Mair |

Milestone Review Flysheet 2017-2018

| Institution | Lenoir-Rhyne University | Milestone | PDR |
|---|---|---|---|

| Payload | |
|---|---|
| Payload 1 (official payload) | Overview<br>have a spring-loaded mechanism that is activated by a Xbee communication system. We are also enhousing a spherical rover to move five feet and de |
| Payload 2 (non-scored payload) | Overview<br>N/A |

| Test Plans, Status, and Results | |
|---|---|
| Ejection Charge Tests | We will staticly ground test all ejection charges. The team will also test how to implement ejection charges with altimeters on sub scale test |
| Sub-scale Test Flights | The BEAR Team had two succesful test launches of its sub-scale rocket, which was launched on October 20th, 2017. The objectives of the flight were stability test of rocket, the recovery system, the altituide test, the flight safety. The launch also provided experience for new members. Additional flights will be attempted to further test quality of rocket design, altimeter usage with ejection charges and tracking/communication with the |
| Full-scale Test Flights | We will fly at least full scale rocket with altimeters and ballast weight to prove stability of rocket design and workmanship. We will fly at least on fi with a lower impulse motor and full payload electronics. We will fly at least one full scale rocket with the competition motor and full payload electro may fly part of the full scale rocket (the payload/rover section) on a smaller rocket for testing of spring burn wire system and rover deployment, performed, this will most likely be a minimum of two flights and a maximum of five flights. This rocket would most likely use motors of I imp |

| Institution | Lenoir-Rhyne University |
|---|---|

| Milestone | PDR |
|---|---|

| Additional Comments |
|---|
| N/A |

| |
|---|
| |

| |
|---|
| |
| |
| |
| |
| |
| r |

| |
|---|
| 1 |
| 7 |
| 9 |
| 30 |

| |
|---|
| |
| utes/IFC |
| " |
| 00 |
| 2 |
| 5 |
| Nylon |
| 6" |
| 0 |
| |
| nks |

| Section 4 |
|---|
| N/A |

| |
|---|
| |
| ne MP |
| *** |
| |
| Powder |
| |
| 5 |
| 1.5 |
| |
| 2.0 |

| |
|---|
| |

eploy solar pane

flights.

to conduct a
sub scale test
rocket.

ull scale rocket
nics. The team
/motion. If
pulse.