# Milestone Review Flysheet 2018-2019

| Institution | University of Alabama Huntsville |
|---|---|

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

| Vehicle Properties | |
|---|---|
| Total Length (in) | 119 |
| Diameter (in) | 6.17 |
| Gross Lift Off Weigh (lb) | 37.4 |
| Airframe Material(s) | Fiberglass |
| Fin Material and Thickness (in) | Fiberglass/.125 |
| Coupler Length(s)/Shoulder Length(s) (in) | 14/6 |

| Motor Properties | |
|---|---|
| Motor Brand/Designation | Aerotech L1520L |
| Max/Average Thrust (lb) | 396.9/352.5 |
| Total Impulse (lbf-s) | 887.77 |
| Mass Before/After Burn (lb) | 8.55/4.20 |
| Liftoff Thrust (lb) | 337.2 |
| Motor Retention Method | Aft Retention |

| Stability Analysis | |
|---|---|
| Center of Pressure (in. from nose) | 82.9 |
| Center of Gravity (in. from nose) | 69.5 |
| Static Stability Margin (on pad) | 2.04 |
| Static Stability Margin (at rail exit) | 2.23 |
| Thrust-to-Weight Ratio | 9.74 |
| Rail Size/Type and Length (in) | 79.5 |
| Rail Exit Velocity (ft/s) | 70.9 |

| Ascent Analysis | |
|---|---|
| Maximum Velocity (ft/s) | 654 |
| Maximum Mach Number | 0.56 |
| Maximum Acceleration (ft/s^2) | 306 |
| Target Apogee (ft) | 4800 |
| Predicted Apogee (From Sim.) (ft) | 4937 |

| Recovery System Properties - Overall |
|---|

| Recovery System Properties - Recovery Electronics | |
|---|---|
| Primary Altimeter Make/Model | PerfectFlite |
| Secondary Altimeter Make/Model | PerfectFlite |
| Other Altimeters (if applicable) | Raven3 (Telemetry |
| Rocket Locator (Make/Model) | Xbee Pro transmitter |
| Additional Locators (if applicable) | |
| Transmitting Frequencies (all - vehicle and payload) | 900 MHz |
| Describe Redundancy Plan (batteries, switches, etc.) | Dual, Independent System |
| Pad Stay Time (Launch Configuration) | Indefinite with system powered off, unknown with system powered |

| Recovery System Properties - Drogue Parachute | | | | |
|---|---|---|---|---|
| Manufacturer/Model | | Fruity Chutes CFC-18 | | |
| Size or Diameter (in or ft) | | 1.5 | | |
| Main Altimeter Deployment Setting | | Apogee | | |
| Backup Altimeter Deployment Setting | | Apogee +2 | | |
| Velocity at Deployment (ft/s) | | 0 | | |
| Terminal Velocity (ft/s) | | 103.7 | | |
| Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap) | | 1/2'' Tubular Nylon | | |
| Recovery Harness Length (ft) | | 50 | | |
| Harness/Airframe Interfaces | | U Loop' Arrangment I-bolt attached to airframe via bulkhead | | |
| Kinetic Energy of Each Section (Ft-lbs) | Section 1 | Section 2 | Section 3 | Section 4 |
| | 3941.3 | 1740.29 | | |

| Recovery System Properties - Main Parachute | |
|---|---|
| Manufacturer/Model | Fruity Chutes IFC-120 Iris Ultra |
| Size or Diameter (ft) | 10 |

| | |
|---|---|
| Total Descent Time (s) | 87.12 |
| Total Drift in 20 mph winds (ft) | 2493 |

| Recovery System Properties - Energetics | | |
|---|---|---|
| Ejection System Energetics (ex. Black Powder) | | Black Powder |
| Energetics Mass - Drogue Chute (grams) | Primary | 3 |
| | Backup | 3.5 |
| Energetics Mass - Main Chute (grams) | Primary | 2 |
| | Backup | 2.5 |
| Energetics Mass - Other (grams) - If Applicable | Primary | |
| | Backup | |

| | |
|---|---|
| Main Altimeter Deployment Setting (ft) | 600 ft AGL |
| Backup Altimeter Deployment Setting (ft) | 550 ft AGL |
| Velocity at Deployment (ft/s) | 103.8 |
| Terminal Velocity (ft/s) | 12.86 |
| Recovery Harness Material, Size, and Type (examples - 1/2 in. tubular Nylon or 1 in. flat Kevlar strap) | 1/2'' Tubular Nylon |
| Recovery Harness Length (ft) | 50 ft |
| Harness/Airframe Interfaces | U Loop' Arrangment I-bolt attached to airframe via bulkhead |

| Kinetic Energy of Each Section (Ft-lbs) | Section 1 | Section 2 | Section 3 | Section 4 |
|---|---|---|---|---|
| | 54.29 | 5.91 | 26.25 | |

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## Payload

| | Overview |
|---|---|
| Payload 1 (official payload) | The payload selected is the deployable Unmanned Aerial Vehicle. Its dimensions have been contrained by the available space within the internal structure of the rocket. The UAV will fit within a 6 in diameter and a 24 in longitudinal space within the rocket. The UAV will be encased within a protective sheath that, upon ejection from the rocket body tube, will unfold and passively self-orient itself such that the UAV will deploy upright. Once the sheath unfolds, the UAV will mechanical open its arms and close the circuity of the vehicle. The UAV pilot will activate the motors, take-off, and fly to the NASA specified target zone, where it will release a simulated navigational beacon above the target area. |

| | Overview |
|---|---|
| Payload 2 (non-scored payload) | No secondary Payload |

## Test Plans, Status, and Results

| | |
|---|---|
| Ejection Charge Tests | Standard Operating Procedures will be developed to verify and refine charge sizing. Tests will take place in a designated area at the UAH Propulsion Research Center. This location properly isolates the test operaters from exposure to any energetics. |

| | |
|---|---|
| Sub-scale Test Flights | The first subscale flight is scheduled for November 10th. The secondary/backup flight is scheduled for December 8th. Both launches are in Woodville, Al and are hosted by the Huntsville Area Rocketry Association (NAR 403). The rocket will be assembled up to the point of energetic installation the night before launch and assembled according to a Standard Operation Procedure. |
| Vehicle Demon-stration Flights | The first fullscale flight is scheduled for February 9th, 2018. The launch is in Woodville, Al and are hosted by the Huntsville Area Rocketry Association (NAR 403). The rocket will be assembled up to the point of energetic installation the night before launch and assembled according to a Standard Operation Procedure. A backup launch is possible on March 9th, 2018. |
| Payload Demon-stration Flights | The payload demonstration flight will be conducted on February 9th, 2018. Additional flights can be conducted on March 9th, 2018. |

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| **Transmitter #1** | | | |
|---|---|---|---|
| Location of transmitter: | Nosecone | | |
| Purpose of transmitter: | Rocket Recovery Tracking | | |
| Brand | Xbee | RF Output Power (mW) | 250 |
| Model | Pro 900 S3B | Specific Frequency used by team (MHz) | 900 |
| Handshake or frequency hopping? (explain) | Frequency Hopping | | |
| Distance to closest e-match or altimeter (in) | 52 | | |
| Description of shielding plan: | To be assessed once thorough risk assesment conducted | | |

| Transmitter #2 | | | |
|---|---|---|---|
| Location of transmitter: | Rear of Upper Airframe | | |
| Purpose of transmitter: | Payload Deployment | | |
| Brand | Xbee | RF Output Power (mW) | 0 |
| Model | Pro 900 S3B | Specific Frequency used by team (MHz) | 900 |
| Handshake or frequency hopping? (explain) | Frequency Hopping | | |
| Distance to closest e-match or altimeter (in) | 16 | | |
| Description of shielding plan: | Device will be used as a receiver only. Transmission from the device will be disabled | | |

| Transmitter #3 | | | |
|---|---|---|---|
| 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: | | | |

| 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: | | | |

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## Transmitter #5

| | | | |
|---|---|---|---|
| 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: | | | |

## Transmitter #6

| | | | |
|---|---|---|---|
| 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: | | | |

## Additional Comments