# Milestone Review Flysheet 2017-2018

| Institution | University of California, Santa Cruz |
|---|---|

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

| Vehicle Properties | |
|---|---|
| Total Length (in) | 80.8 |
| Diameter (in) | 3 |
| Gross Lift Off Weigh (lb.) | 9.85 |
| Airframe Material(s) | Blue Tube 2.0 |
| Fin Material and Thickness (in) | Fiberglass |
| Coupler Length/Shoulder Length(s) (in) | 2.5 |

| Motor Properties | |
|---|---|
| Motor Brand/Designation | Aerotech J540 |
| Max/Average Thrust (lb.) | 121.4 |
| Total Impulse (lbf-s) | 261 |
| Mass Before/After Burn (lb.) | 2.39/0.89 |
| Liftoff Thrust (lb.) | 140 |
| Motor Retention Method | Threaded Tailcone Retainer |

| Stability Analysis | |
|---|---|
| Center of Pressure (in from nose) | 62.5 |
| Center of Gravity (in from nose) | 51.4 |
| Static Stability Margin (on pad) | 5.71 |
| Static Stability Margin (at rail exit) | 3.61 |
| Thrust-to-Weight Ratio | 13.3 |
| Rail Size/Type and Length (in) | 1010 rail 96in |
| Rail Exit Velocity (ft/s) | 81.2 |

| Ascent Analysis | |
|---|---|
| Maximum Velocity (ft/s) | 714 |
| Maximum Mach Number | 0.63 |
| Maximum Acceleration (ft/s^2) | 428.3 |
| Predicted Apogee (From Sim.) (ft) | 6018 |

| Recovery System Properties<br>Drogue Parachute | | | | |
|---|---|---|---|---|
| Manufacturer/Model | | | Apogee/Nylon Parachute | |
| Size/Diameter (in or ft) | | | 18 | |
| Altitude at Deployment (ft) | | | 6018 | |
| Velocity at Deployment (ft/s) | | | 0 | |
| Terminal Velocity (ft/s) | | | 61.5 | |
| Recovery Harness Material | | | Kevlar Braided Line | |
| Recovery Harness Size/Thickness (in) | | | 0.12 | |
| Recovery Harness Length (ft) | | | 10 | |
| Harness/Airframe Interfaces | | 1in diameter U bolt fastened to nosecone | | |
| Kinetic Energy of Each Section (Ft-lbs) | Section 1 | Section 2 | Section 3 | Section 4 |
| | 74.9 | 366.4 | | |

| Recovery System Properties<br>Main Parachute | | | | |
|---|---|---|---|---|
| Manufacturer/Model | | | Apogee/Nylon Parachute | |
| Size/Diameter (in or ft) | | | 48 | |
| Altitude at Deployment (ft) | | | 500 | |
| Velocity at Deployment (ft/s) | | | 61.5 | |
| Terminal Velocity (ft/s) | | | 21.6 | |
| Recovery Harness Material | | | Kevlar Braided Line | |
| Recovery Harness Size/Thickness (in) | | | 0.12 | |
| Recovery Harness Length (ft) | | | 16 | |
| Harness/Airframe Interfaces | | 1in diameter U bolt fastened to avioncs sled and all-thread sub structure | | |
| Kinetic Energy of Each Section (Ft-lbs) | Section 1 | Section 2 | Section 3 | Section 4 |
| | 9.1 | 45.2 | | |

| Recovery Electronics | |
|---|---|
| Altimeter(s)/Timer(s) (Make/Model) | PerfectFlite/StratoLogger CF |
| Redundancy Plan and Backup Deployment Settings | Two PerfectFlite StratoLogger CF altimeters shall be included in the system, with independent power sources and energetic charges |
| Pad Stay Time (Launch Configuration) | 1.5hr |

| Recovery Electronics | | |
|---|---|---|
| Rocket Locators (Make/Model) | Eggfinder GPS | |
| Transmitting Frequencies (all vehicle and payload) | ***Required by CDR*** | |
| Ejection System Energetics (ex. Black Powder) | | Black Powder |
| Energetics Mass - Drogue Chute (grams) | Primary | 0.36 |
| | Backup | 0.36 |
| Energetics Mass - Main Chute (grams) | Primary | NA |
| | Backup | NA |
| Energetics Masses - Other (grams) - If Applicable | Primary | NA |
| | Backup | Na |

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| Payload | |
|---|---|
| Payload 1 (official payload) | Overview: The team has elected to participate in the target tracking challenge using TARS, the TArget Recognition System. TARS is housed in a clear payload bay and relies on a wide-angle video camera pointed downward to track the positions of the competition tarps in real time. Tracking will be performed with a custom software package run on a Raspberry Pi 3b. The camera system was selected to maximize the camera's viewing time of the targets and medium- and high-altitudes. |
| Payload 2 (non-scored payload) | Overview: NA |

| Test Plans, Status, and Results | |
|---|---|
| Ejection Charge Tests | Under the guidance and supervision of both the Safety Officer and the NAR certified mentor, the rocket shall be configured for flight. Once the area is clear and both the mentor and safety officer give their approval, a member will count down and the ejection charge shall be detinated, ejecting the nosecone and parachutes. |
| Sub-scale Test Flights | The modular design of the rocket allows for a unique structure for the team's subscale rocket manufacture and testing. The plan is for the subscale rocket to be nearly identical to the full scale Effective-1 rocket in all aspects except the diameter of the motor housing. A 38mm motor housing on the subscale rocket will allow for a greater number of test flights at a lower cost per flight. Once the project has progressed to the point of manufacturing the full scale rocket, nearly all of the rocket's internal components will be directly transferable with the ease of sliding the avionics sled out of the subscale rocket and into the full scale rocket. |
| Full-scale Test Flights | The Full-scale test flight shall demonstate all of the functionality of the competition launch vehicle. The same model of motor is intended to be used for the full-scale test as would be used for the competition launch. If sucessful, the modification made to the rocket between that flight and the competition flight shall be kept to an absolute minimum. The full scale flight will give the team a clear indication of how the rocket will preform during the competition. |

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## Additional Comments