inVenTs High-Power Rocketry

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Post-Flight Performance Report

The following analysis was conducted with the data available to the team in the week following the competition. Due to the faulty altimeters used, we were unable to acquire coherent data from the first flight on the J800T motor and no data was able to be retrieved for the second flight on the K535 due to complete failure of multiple electronic components. The data obtained from the J800T flight is presented below, however it was not recorded correctly during the flight so it is inaccurate.

Flight Performance Comparison

Motor	Weight	Apogee	Max. Velocity	Max. Acceleration
J800T	16.12 lbs	2,827 ft	N/A	N/A
K535	16.32 lbs	3,120 ft	N/A	N/A

The predicted apogees for both the J class motor and K class motor with the drag system were 3345 feet. The J motor reached an apogee of 2827 feet and the K motor reached 3120 feet. The J motor did not reach the intended apogee due to its positioning slightly slanted into the wind to counteract the weather conditions and the drag system deploying slightly during flight. If we had accounted for weather conditions prior to launch and taped around the drag system to ensure that it stayed secured in place, we likely would have been able to reach the intended apogee of close to 3300 feet. The K class motor fell short of apogee because of the slant into the wind as well. The altimeters on the rocket were having significant issues prior to the second launch which could have affected the deployment of the drag system as well. Since our altimeters, cameras, and other electronic sensors failed during the second launch, it is difficult to tell the exact cause of the lower apogee.

Unfortunately, we were unable to process any data. The data retrieved from the first flight is not coherent and the team determined the data from was unusable. Multiple electronic component failures during the second flight made it unfeasible to retrieve any data off of the second flight. The failure could have occurred due to exceeding the electronic G-Load limit. The data that we were able to obtain came from the Arduino logging systems in place.

First Flight

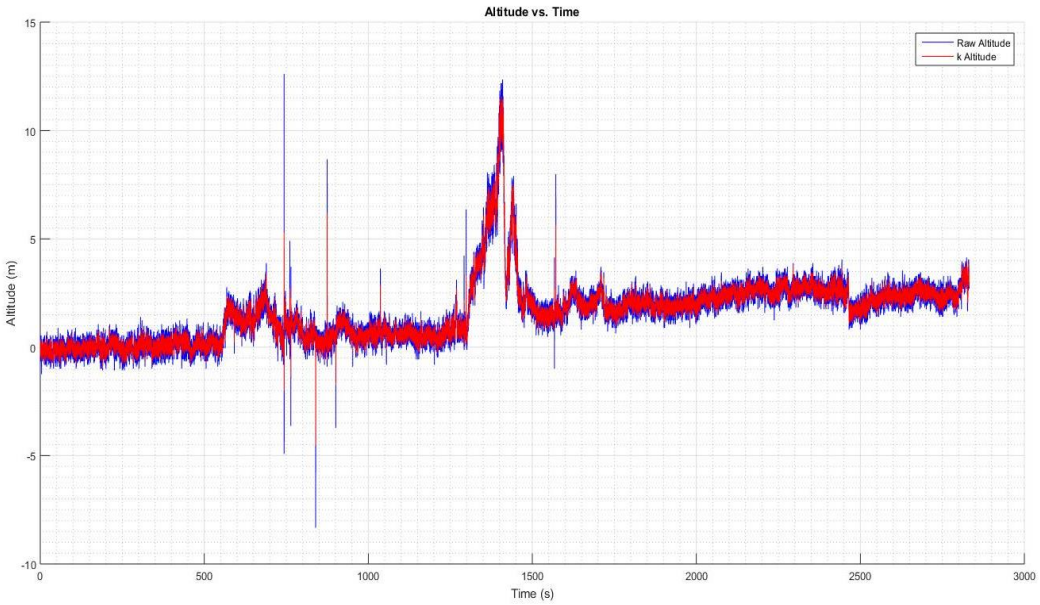

Figure 1: Altitude vs. Time

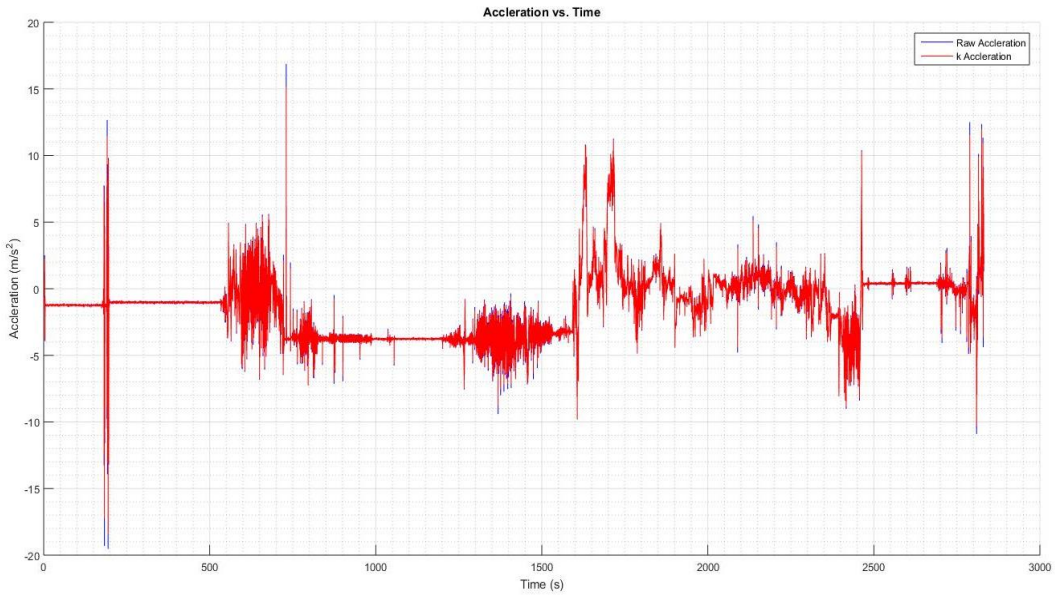

Figure 2: Acceleration vs. Time

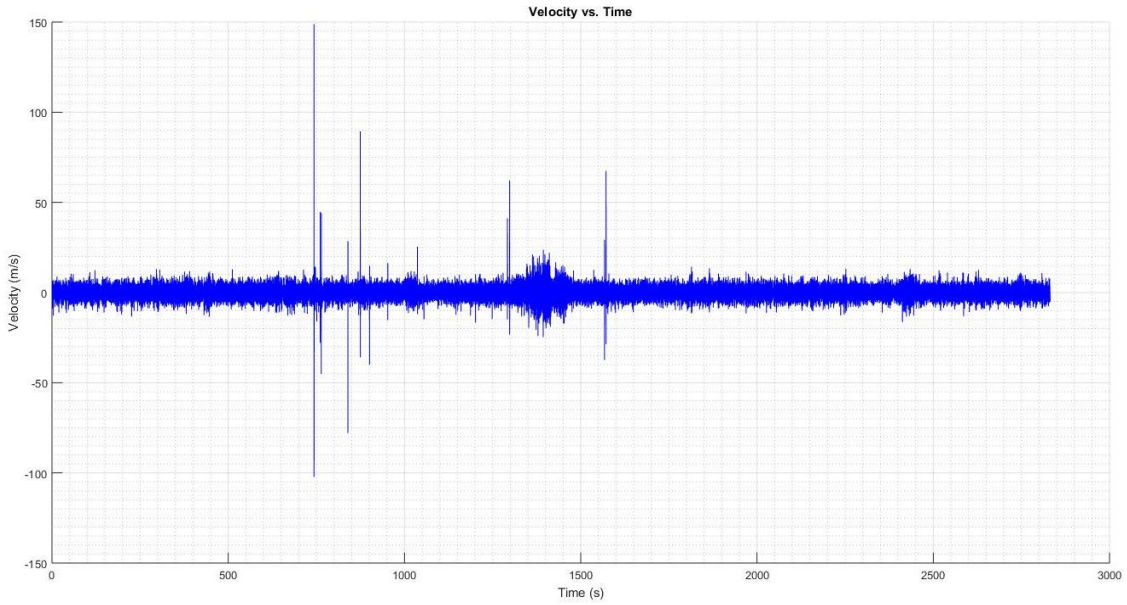

Figure 3: Velocity vs. Time

Second Flight

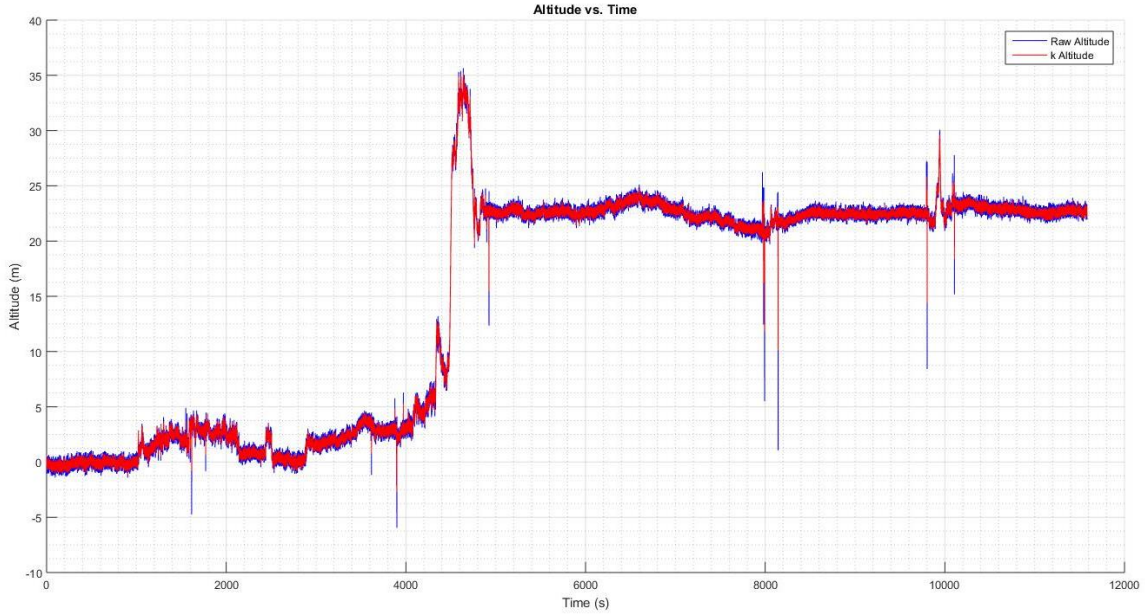

Figure 4: Altitude vs. Time

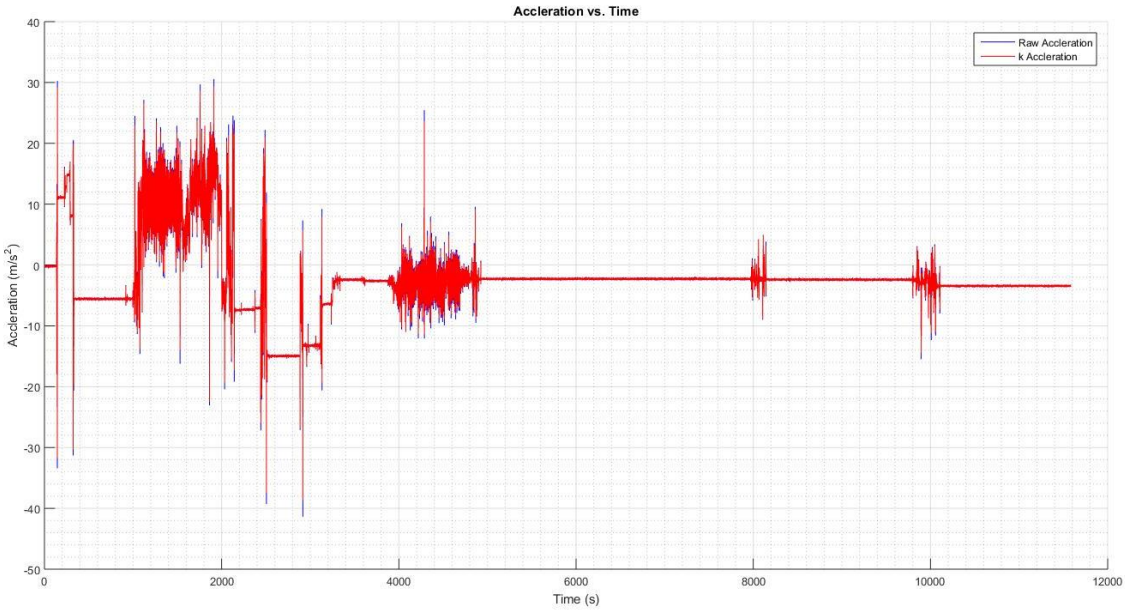

Figure 5: Acceleration vs. Time

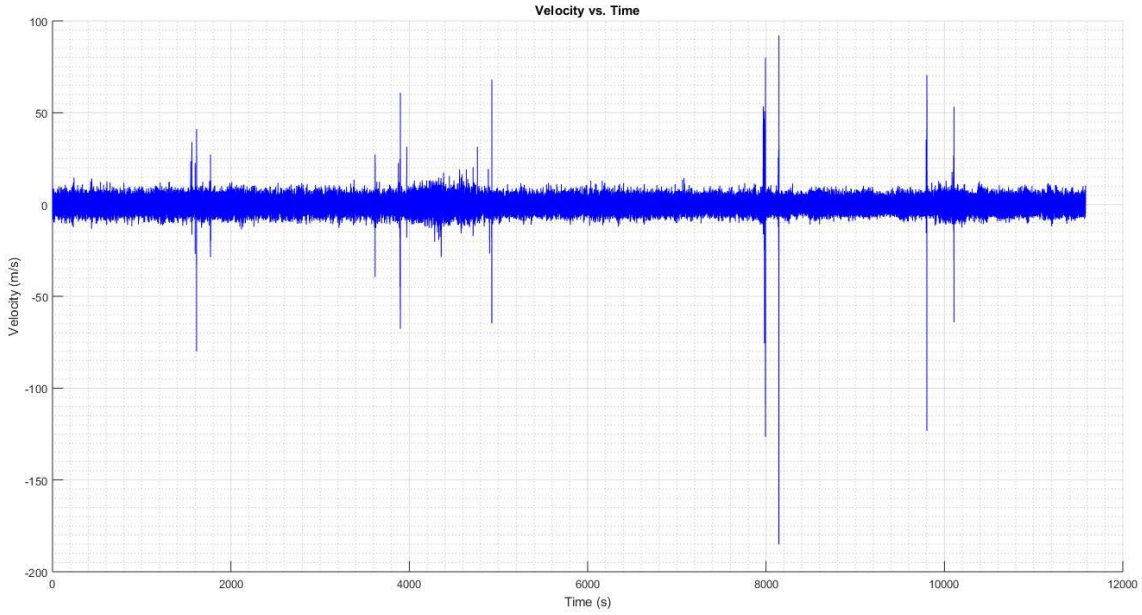

Figure 6: Velocity vs. Time

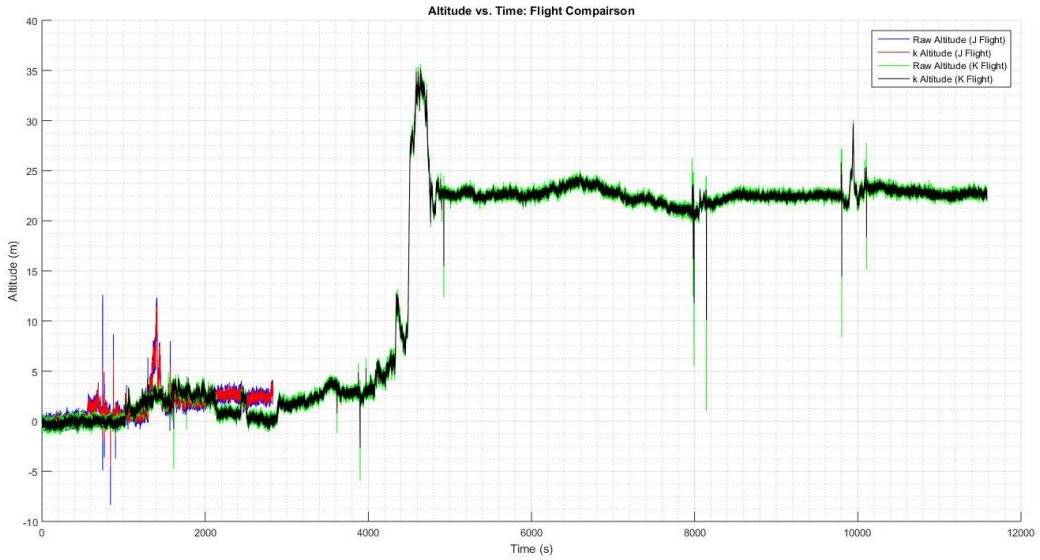

Figure 7: Altitude vs. Time: Flight Comparison

Video Link

The video link presented below is from the J800T motor flight in its unedited form. Video for the K545 motor flight was not obtained due to a low battery and possible damage to the camera system during flight

ΔVT - J800T Launch Video

Screenshots

Figure 8: Drogue Chute Deployment at Apogee

Figure 9: Drogue Chute Deployment at Apogee. Note the drogue chute to the right of the image.

Figure 10: Main Chute Deployment at ~700 ft AGL

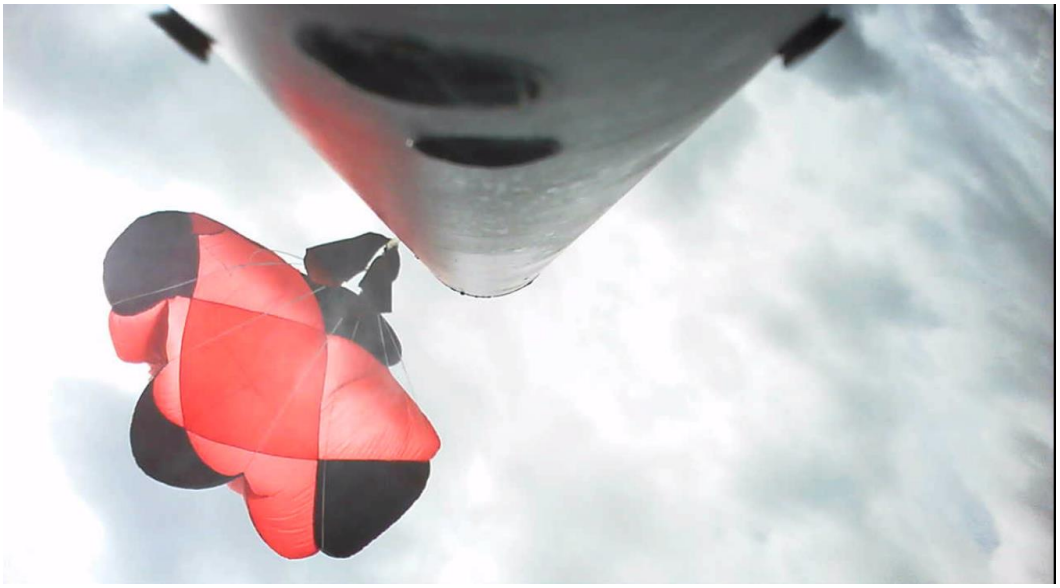

Figure 11: During Descent

Figure 12: Landing