Last week not a lot was accomplished because we felt that the accelerometers were too noisy and velocity and position could not be adequately resolved in our program. We also were preoccupied with our presentation. Furthur reasearch over spring break allowed us to discover that the IMU needed a significantly longer warm up period that we were giving it. The instruction manual gave a figure of 10 minutes. Using this a a guide we allowed the IMU to warm for about 15 minutes and collected a new set of data moving the IMU 1 meter forward and the back to the original starting position. We also accelerated the IMU at a greater rate to allow for greater distinction as to which way it is moving.
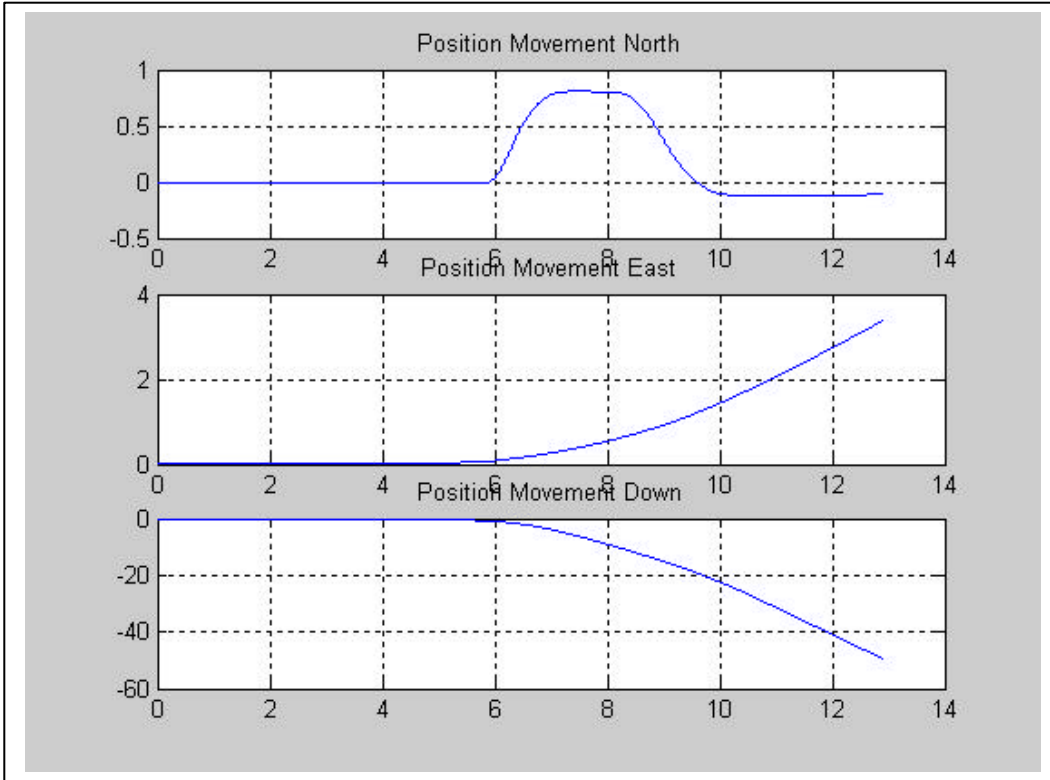

Figure   - 1 Meter Movement in the X-direction

Although the movement in the North direction is significantly better we are seeing a bad reaction in the east and down directions. This comes from the removal of the all the filtering done previously except the averaging filter.   We inspected the velocity of the north direction during the first 200 data points when the IMU is not moving. We are hoping that because the data found and shown below is a straight line that we can subtract the slope of this line from the accleration and resolve the quadratic behavior of the east and down directions.
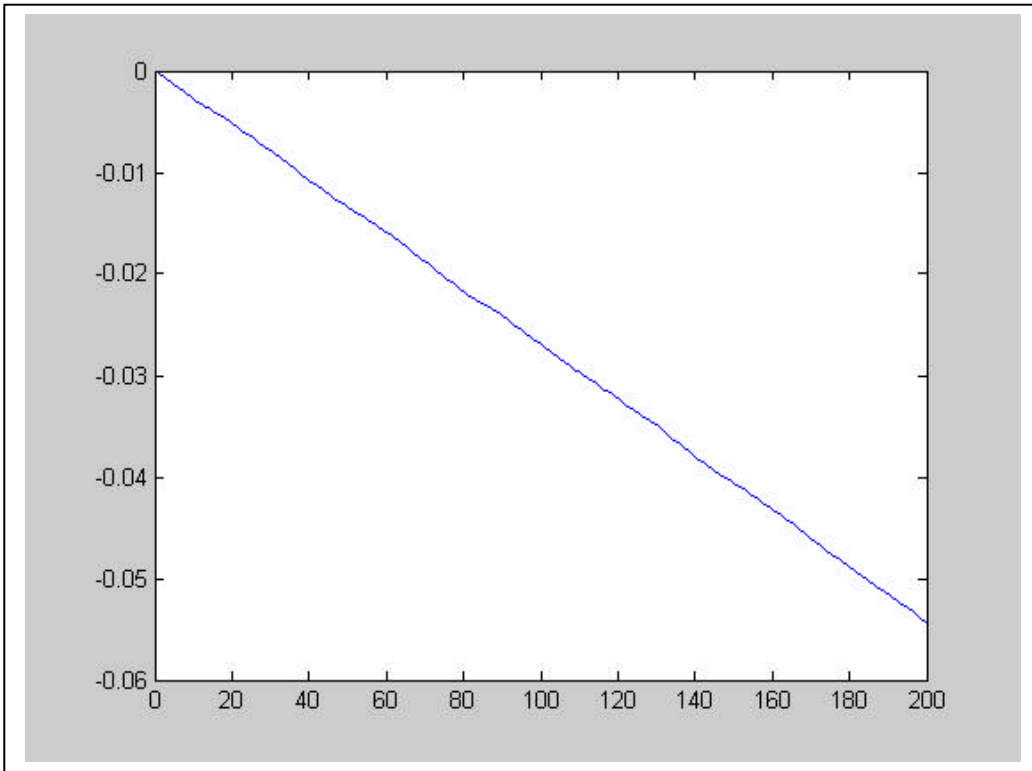

Figure   -Velocity in the North Direction of the Stationary IMU

We compared the slope and the average for this set of data and found that the slope of the velocity is significantly less than the average of the acceleration. We find that this may be part of the cause of our significant error in position.

ave = -0.0562
slope = -2.7168e-004

The velocity of the movement in the x-direction after warmup is shown on the next page. After the current filtering schemes we are able to see where the IMU stands still in the begining and how it is moving based on the velocity however as it ends up the velocity does not return to 0 like it is supposed to. This causes the behavior shown in the position of the IMU in the North direction.
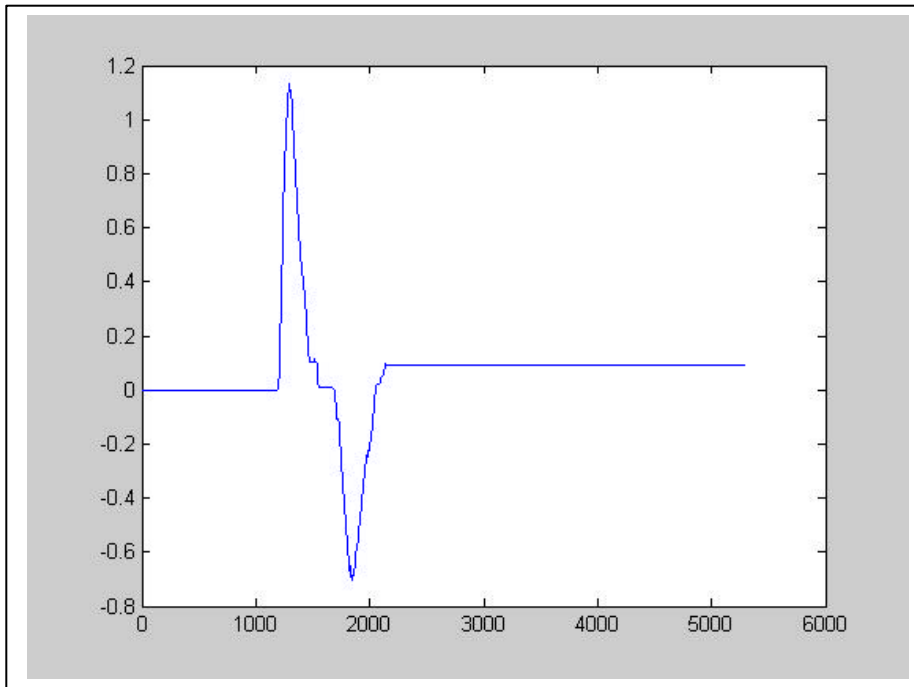
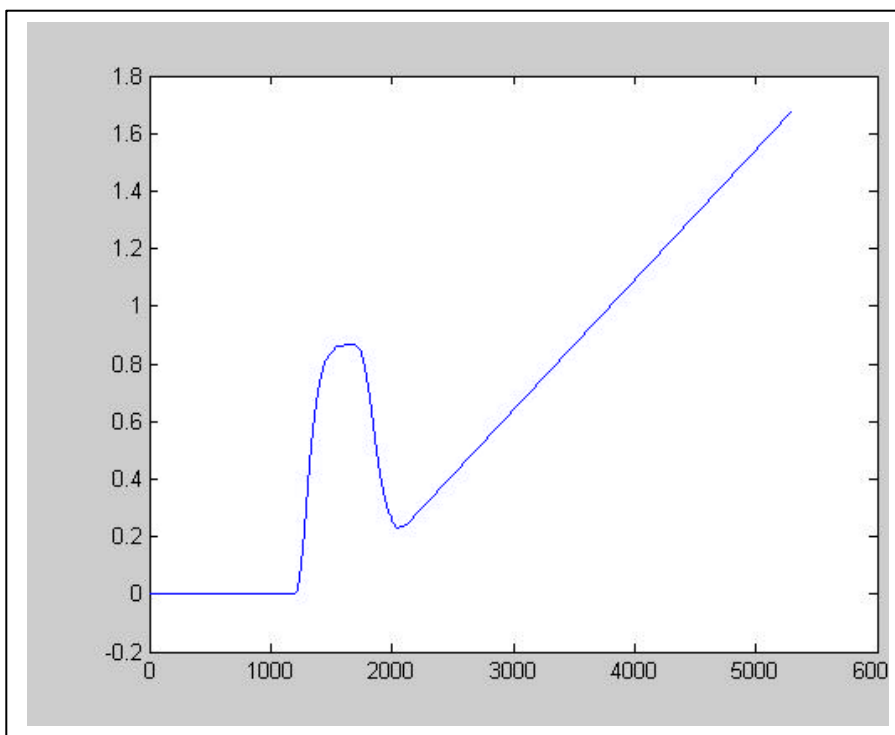Figure   - Velocity in the north direction

Figure   -Position in the north direction

We need to create an adaptive filter to signify the end of movement and eliminate the drift after that point. However we are more confident now that we are coming closer to a solution to the problem.