Lab 2 - Satellite Positioning

Due: 9/30/2013

Part I: Geocaching Data

This first part correlates with the results of the first lab (Lab 1 - Geocaching).

a) ***Get Ephemerides Online***. Using the RINEX files described in class, determine the navigation message file that will contain the appropriate parameters to calculate the satellite positions. Describe the parts of the filename that indicate this is the correct file.

b) ***Sky View Plot***. In terms of GPS week and seconds of week, when are the positions to be calculated? Generate the polar sky plot shown in Lab 1 - Geocaching.

c) ***Satellite Motion Plot***. Show the satellite motion over an hour for one of the satellites in the polar sky plot. This is most clearly shown in another polar plot. Plot the satellite speed during this time frame.

Part II: Class Data

Download the data from the website (there are m-files to parse the data). This data includes two Novatel receivers (each receiving signals from separate antennas) and a IF data file for one of the antennas. We will only be using one of the Novatel antenna data for this assignment.

a) Calculate the observed satellite positions using the recorded ephemeris from the Novatel Receiver. Plot the sky plot of available satellites

b) Convert the ECEF positions from the Novatel to LLA. Plot in Google Earth or GPS visualizer (where was the data taken)?

c) Convert the ECEF positions from the Novatel to ENU (use Toomers Corner as the reference location). Plot the E,N,U positions vs. time and characterize their errors