Satellite Navigation Modernization

Homework #05

Due: December 19, 2017

1. We are now ready to work with multiple-epoch data files and analyze the variability in the position estimates. Download receiver (*rcvr.dat*) and ephemeris (*eph.dat*) files from course URL (hw5.zip). The column formats of these files are identical to those for the files used in HW4.

   Column 1 of the ephemeris file is the time tag corresponding to the most recent update of the ephemeris parameter values. Column 1 of the receiver file contains the measurement time tag. When solving for user position and clock bias, you must use the most recent ephemeris information for each PRN.

   a. Compute position and clock bias estimates for each epoch when 4 or more satellites are in view. Express the positions in the ENU coordinate frame centered at the position estimate from HW4. Plot east, north, and up positions versus time. Calculate the mean and standard deviation of each component.

   b. Plot the user clock bias estimates $\hat{b}$ versus time. What does this plot tell you about the time keeping ability of the receiver clock?

2. Place your SkyTraq receiver in an open area and gather data for 15 minutes. Calculate your position in Lat/long/height coordinates using the measured pseudoranges and ephemeris. Use all of the data to produce your position solution (i.e., stack the data in a single G matrix). Plot the Lat/Long in your favorite mapping program. Turn in the map with your location depicted. (Note: download SkyTraq receiver guide from course URL (SkyTraq receiver guide.zip))