

# ASEN 5090 Assignment 6

1. Based on the instructions from projects 4 and 5, download the Yuma almanac and RINEX observations from the NIST station for 2017 January 1. Note that 2017 January 1 00:00 UTC corresponds to GPS week 1930 and day-of-week 0, plus 18 leap seconds.  
Yuma almanac URL: [www.celestrak.com/GPS/almanac/Yuma/2017/almanac.yuma.week0906.061440.txt](http://www.celestrak.com/GPS/almanac/Yuma/2017/almanac.yuma.week0906.061440.txt)  
CDDIS FTP URL: <ftp://cddis.gsfc.nasa.gov/gnss/data/daily>
2. Use the routines for computing satellite ECEF location for PRN 24. Then use the routines for computing sky coordinates to find the satellite azimuth and elevation relative to a location near Boulder, CO. Note: routines for these calculations are provided in the project skeletons.
3. To compute the troposphere delay, we need at least three local parameters: temperature, pressure, and partial pressure of water vapor (which can be calculated using temperature and relative humidity). Choose a set of temperature, pressure, and partial pressure of water vapor values that seem reasonable for Boulder, CO in January. Briefly justify your choice of parameters. If you can't find historical data, just decide on some reasonable values.  
Note: for computing partial water vapor pressure from relative humidity, you can use the Arden Buck equation. See lecture slides or Wikipedia: [en.wikipedia.org/wiki/Relative\\_humidity](http://en.wikipedia.org/wiki/Relative_humidity)
4. Compute the **slant tropospheric delay** using either the Hopfield or Saastamoinen model and a mapping function of your choice. Say which model and mapping function you used. Plot time series of the satellite elevation, estimated tropospheric delay, and the ratio of the tropospheric delay to the L1 code pseudorange measurement.
5. Write a **short** report containing your answers to the questions above and images of your plots. Also summarize if you had any programming issues you were unable to address, including your thought process in trying to fix them.

*Please upload one .zip file containing your code and report to the D2L dropbox by the project due date.*

## Important Notes:

- Please submit one .zip file containing your code and PDF of your report to the D2L dropbox.
- Please use hours when plotting time series.

## Tips

The project skeletons include all necessary routines inside `coordinate_utilities`, `orbit_utilities`, and `rinex_utilities`.