

Readme File for Case Study 1

To run the simulations associated with case study 1, run the m-script (`gnss_ins_EKF_loose_integration.m`). This script plays back flight test data where a low cost IMU and GPS unit (the Corssbow Micronav) were used to sense the vehicle's state for a time duration of approximately 14 minutes. In addition, another low cost integrated GPS/INS (the MIDG II) was flown along with the Micronav and its attitude solution for the same flight test is contained in the data file. Its attitude solution can be used as an bench mark of sorts.

Executing `gnss_ins_EKF_loose_integration.m` will use the Micronav IMU data and GPS data to implement a loose GNSS/INS integration. It does this by calling four separate scripts: one to configure the Extended Kalman Filter (`gnss_ins_EKF_config.m`), one to load in relevant constants (`gnss_ins_EKF_constants.m`) and one to load the IMU data (`gnss_ins_EKF_data_loader`) and finally either one of two plotting scripts (`plot_EKF_results.m` or `plot_chapter_7_figures.m`). Ensure that the directory structure is compatible with the location of the directory `gnss_ins_functions` as it contains functions that are required by the integration algorithms.

The figures in Chapter 7 are for a 6.5 minute subset of the 14 minutes of data. This is the default subset processed by the m-files. On an average PC, it takes between 2 and 3 minutes to execute the GNSS/INS algorithm on this subset of data. Note that the m-script `plot_EKF_results.m` generates only a few graphs of states and outputs. The reader can add more lines to this m-script to examine additional variables. Also, some of the plots generated by the OCTAVE version of the m-scripts may axes labels (and other texts) that may be in Greek letters.

For a more detailed description of theoretical aspects associated with Case Study 1, refer to the detailed documentation found on the book web page.