

Customized MATLAB-based Tools for GPS and GLONASS Data Analysis and Signal Processing

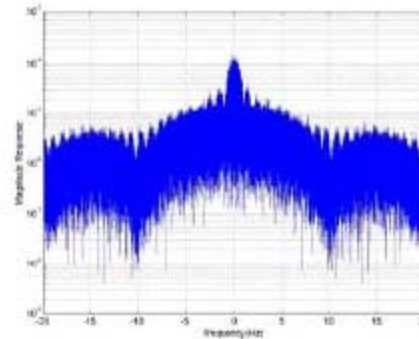
Signal Simulation Tool: The signal simulation tool simulates the effect of GPS and GLONASS satellite signals on a conventional receiver's code and carrier tracking loops. The Toolbox's signal processing simulation architecture includes a truth profile. This truth profile is used to generate the simulated signals as a function of the signal strength, pseudorange, Doppler, and Doppler-rate. The receiver profile defines the receiver being simulated and the parameters used by the receiver to process the signals. The state output from the simulated receiver models the output from an actual receiver experiencing the simulated conditions. The signal simulation tool can be used as an analysis aid to assist in test and evaluation of receivers beyond the capability of conventional RF signal simulators that do not provide low-level insight into the operation of a receiver. This insight can in turn be used to specify key parameters for receivers to optimize their performance in the presence of perturbed environments.

Geographical Tools: The Toolbox's geographic tools facilitate the transformation of data between the various coordinate systems commonly used in GPS research, such as latitude-longitude-altitude, WGS-84 and PZ-90.02 Earth-Centered, Earth-Fixed (ECEF), North East Down (NED), and body reference frames. These tools provide the user flexibility in data representation.

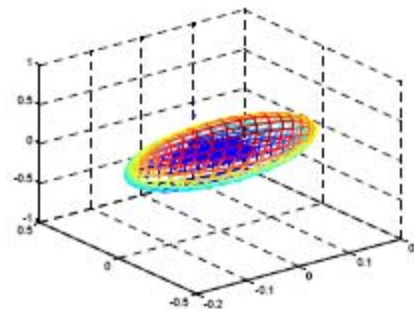
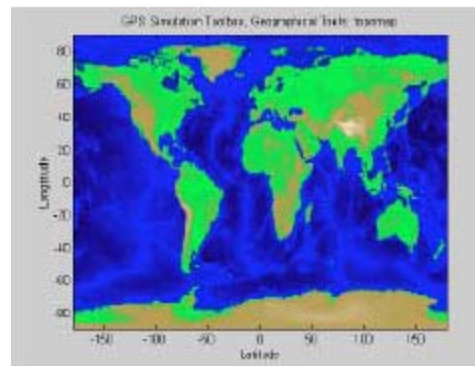
Satellite Geometry Tools: The Toolbox also provides tools to read GPS and GLONASS almanacs and ephemerides and compute ECEF and line-of-sight vectors to the GNSS satellites as a function of user position and time. The tools can also compute dilution of precision (DOP) values and determine predicted satellite visibility.

Receiver Design and Analysis Tools: The receiver design and analysis tools model different receiver architectures and simulate different error scenarios. With these tools, a simulation can predict how a receiver will react in different environments, such as urban environments, environments susceptible to multi-path effects, and high-dynamic situations.

The signal simulation flow that is executed when generating a simulation profile is illustrated below. This can be used to generate simulated data sets for playback and analysis by the built in receiver module within the MATLAB tools. The simulated GPS and GLONASS signals can also be played back into a receiver under test as live digital or RF signals using the NAVSYS Advanced GPS Hybrid Simulator (AGHS) product or the ETTUS USRP product family with the NAVSYS Signal Architect software.



Spectrum of simulated signal CA and P code



EXCELLENCE

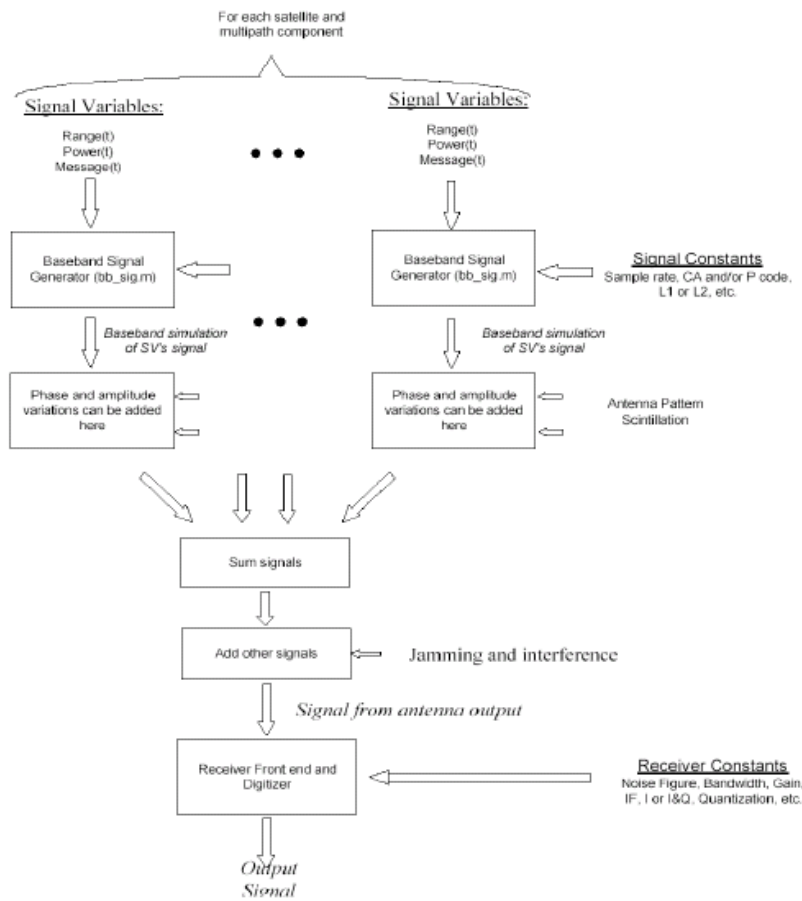
IN

GPS

PRODUCTS

&

SERVICES



GPS Signal Simulation Toolbox Flow Diagram

The signal simulation flow that is executed when generating a simulation profile is illustrated above. This can be used to generate simulated data sets for playback and analysis by the built in receiver module within the MATLAB tools. The simulated GPS signals can also be played back into a GPS receiver under test as live digital or RF signals using the NAVSYS Advanced GPS Hybrid Simulator (AGHS) product.

Platforms: Windows XP, Windows 7
MATLAB 5.0 or higher

Application Areas:

GPS/GLONASS performance analysis, research and development, and system design

Data acquisition, analysis and modeling

GPS/GLONASS precision applications

Next generation GPS/GLONASS signals in space modeling and simulation

Data recording and playback from real-time systems

For more information:
phone: (866) 462-8797
email: info@navsys.com