

Software GNSS Signal Simulator

Software Simulation of all GNSS Signals (GPS, C/A, P(Y), M, L₂C, L₅; Galileo, WAAS, EGNOS) (SGSS-DF-001-01)

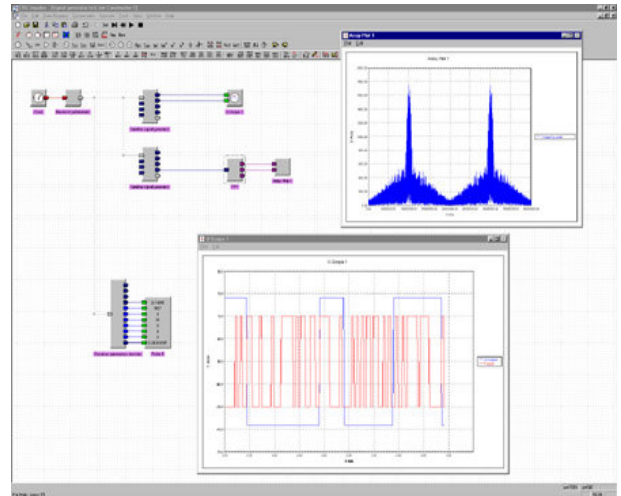
The open-architecture software GNSS simulation system allows sample by sample simulation of all navigational signals including GPS L1, L2, L5, Glonass L1, and Galileo E1, E5, E6. It is based on the IMPULSE™ framework and provides off-line generation of a data file, where all the samples generated by the software are stored. The signal samples are generated with very high fidelity and represents all the characteristics of the signal affected by satellite motion, environment, receiver platform motions, antennas, and so-on. These samples can be used for testing simulated receiver performances (see Software GPS Receiver) or can be stored in our Digital Data Recorder and Storage (DSU). When played back through the DSU, RF signals ready to be directly connected to antenna (for reception or radiation) or generated.

The software-based system allows for the insertion of various signal conditions and degradations that are not possible with conventional simulators. The schematic-based system can be used to simulate signals from multiple satellites. Receiver wavefront at multiple antennas can be modeled. It can be used to synthesize the signals at any location on Earth or in space.

The simulator can model various effects such as:

- Scintillations
- Interference and jamming; narrow-band, wide-band, directional
- High-dynamics; specified orbits
- Plasma effects; re-entry bodies
- Obscuration
- Multipath effects
- Ocean scattering
- Ionospheric Effect

The full GPS and other GNSS constellation is available. All the necessary modules for the user-defined systems are provided.



The user can configure the GPS signal simulator using a schematic-based GUI and simple menu-driven instructions. The signal simulator allows access of various intermediate test points in the GPS signal chain (this is not possible with hardwired simulators), allowing the user to introduce various specialized situations that include (but are not limited to): directional jamming, different waveforms, degraded signal conditions, re-entry plasma effect, space-based GPS signals in LEO, GEO orbits, cluster missions, networking, formation flying, ocean scattering, variety of multipath effects, and GPS & INS integration. The output of the simulator is a data file that can be directly read by the software GPS receiver. The file is similar to and replicates the data file created using the RF Front Ends where sampled data from the IFs are required.

In conjunction with our software GPS Receiver, the Simulator allows developers to rapidly design and test new GPS algorithms and techniques.

GNSS Signal Simulator

HYBRID SIMULATOR

- The hybrid simulator uses software signal simulation and the data storage units provided by CRS. These data storage units can record, store and playback several terabytes of data at speeds of 200 MBPS.
- It provides numerous uses to generate high fidelity navigation signals for C/A, P(Y), L₂C, L₅, M-codes, and some Galileo signals. WAAS and Pseudolite signals are also available.
- The hybrid simulator allows the generation of complex wavefronts under high dynamics under varying environments
- C/A on L₂ and L₅ are available
- Plans are underway to implement Galileo

FEATURES

- Allows configuration of different geometries
- Allows signal degradation effects
- Allows high dynamics
- Allows wavefront simulation (multiple antennas)
- Allows easy generation of specialized situations
- Allows visualization of signal generation and propagation channels
- Allows vertical upgrades and compatibility
- Allows conditions not possible using conventional simulators

M-CODE MODULES ARE CURRENTLY AVAILABLE

L₂C, L₅ ARE AVAILABLE

WAAS AND PSEUDOLITES AVAILABLE

GALILEO (AS OF NOW) AVAILABLE

REQUIREMENTS

- CRS IMPULSE™ Development Software
- 2.4 GHz Pentium® III
- 512 MB of RAM
- 200 MB of free hard disk space (for simulation output files)

INCLUDES

- IMPULSE™ GPS Module
- Sample signal simulators
- Components to simulate different GPS environments
- M-code modules (optional)

ASSOCIATED PRODUCTS

- Open Architecture Software GPS Receiver
- Hard Disk-Bases Data Storage System for live RF Signals
- Data conversion module for live L₁ and L₂ signals
- Real Time hardware in the loop signal simulator (Signal Generator)

Additional capabilities can be provided, such as hardware implementation or additional classes of signal degradation, new signals, and waveform (Galileo).