



CAST-1000

GPS Simulation System



Portable Dual Frequency GPS Simulator

The CAST-1000 GPS simulation system produces GPS RF signals that provide repeatable testing in the laboratory environment or in the field for a wide range of GPS applications. The simulator includes dual frequency GPS RF signal generation technology that is fully programmable and controlled by the simulator software in real time.

The CAST-1000 is capable of generating a full constellation of GPS with 8 to 12 satellites in view selected from the defined 32 Pseudo Random Noise codes. It generates signals for 8 to 12 satellites of C/A Code on L1 and P Code on L1 and L2.

The user has the ability to select from a variety of vehicle types and simulate dynamic motion for terrestrial, aquatic, airborne and space-based vehicles. The user may generate a trajectory by defining a total mission profile or by using six degree of freedom dynamic profile data collected in the field.

The system's performance evaluation module provides the capability to compare raw measurements and filtered data received from the GPS navigation system with true vehicle position for completing post-test analysis.

Simulator Features

- Up to 12 C/A and P Code SVs on L1 and L2
- 6-DOF Motion Generation Capability
- Selectable Host Vehicle Parameters
- Complete SV Constellation Editing
- External Ephemeris and Almanac Loading
- Spoofer Simulation
- Satellite RAIM Events
- Ionosphere and Troposphere Modeling
- Satellite Clock Errors
- Waypoint Navigation
- Multipath Modeling
- Modifiable Navigation Message
- Time-tagged Satellite Events
- Models Selective Availability
- Antenna Pattern Modeling
- External Trajectory Input
- Post Mission Processing



The CAST-1000 System Interface

System Specifications

Output Frequency

- GPS L1 1575.42 MHz
- GPS L2 1227.60 MHz
- GPS L5 1176.45 MHz

Maximum Dynamics

- Velocity > 60,000 m/s
- Acceleration $\pm 150,000$ m/s²
- Jerk $\pm 150,000$ m/s³

Signal Level

- GPS L1 C/A Code -160 dBW
- GPS L1 P Code -163 dBW
- GPS L2 P Code -166 dBW

Signal Level Control

- Range ± 30 dB
- Resolution 0.1 dB

L1/L2 Differential Delay

- Range ± 0.3 m
- Resolution < 1 mm

Signal Accuracy

- Pseudorange 1 mm
- Pseudorange Rate 1 mm/s
- Delta Pseudorange 1 mm
- Interchannel Bias < 1 mm
- Uncontrolled Bias < 1 mm
- Bias Repeatability (initial) < 1 mm
- Bias Stability (operational) < 1 mm

Signal Quality

- Spurious < -45 dBc
- Harmonics < -50 dBc
- Reference Oscillator 100 MHz OCXO
- Frequency Stability 3×10^{-8} per day

System Configuration

- GPS Satellites Generated 8 to 12
L1 and L2
- Size (H x W x D) 17" x 14" x 10"
- Weight (approximate) 34 lbs
- Power Required 110/220 VAC
50/60 Hz, 600 W
- Operating System Windows, Lynx

System Options

- 6-DOF Real Time Interface
- Y-Code
- SAASM
- M-Code
- SBAS
- L2C
- L5

