



CAST-2000

GPS Simulation System



Dual Frequency GPS Satellite Simulator

The CAST-2000 GPS simulator assists in the development and verification/validation of navigation systems for virtually all applications. With a new graphical user interface and fully programmable GPS RF signal generation technology, the CAST 2000 totally supports next generation navigation technologies.

The simulator generates a composite GPS RF signal that enables repeatable testing in the laboratory environment for a wide range of GPS applications. The CAST-2000 includes dual frequency GPS RF signal generation technology that is fully programmable and controlled by simulator software in real time.

The system is capable of generating a full constellation of GPS with 12 satellites in view selected from the defined 32 Pseudo Random Noise codes. To support more than 12 satellites in view, the system is upgradeable to support 24 satellites.

The user has the ability to select from a wide 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 CAST-2000 performance evaluation module compares raw measurements and filtered data received from the navigation system with true vehicle position for complete test analysis.

Simulator Features

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

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 Upgrades

- CAST-3000 for EGI Integration
- CAST-4000 for Inertial Modeling
- CAST-5000 for CRPA System Testing

System Configuration

- GPS Satellites Generated 12 to 16
L1 and L2
- Size (H x W x D) 31" x 24" x 32"
- Weight (approximate) 250 lbs
- Power Required 110/220 VAC
50/60 Hz, 600 W
- Operating System Windows, Lynx

System Options

- Up to 8 Interference Generators
- Precision Guided Munitions Testing
- Additional GPS SVs
- External Precision Oscillator
- 6-DOF Real Time Interface
- Y-Code
- SAASM
- GPS OFP Loading
- Terrain Obscuration (TOP)
- TOP with Enhanced 3-D Visualization
- M-Code
- SBAS Simulation
- L2C
- L5

