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.

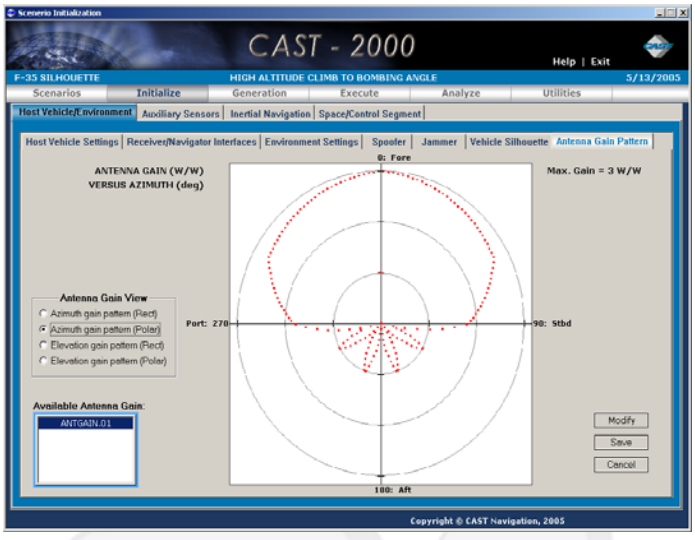
The system is capable of generating a full constellation of GPS with 8 to 12 satellites in view selected from the defined 32 Pseudo Random Noise codes. To support more than 12 satellites in view.

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

- 8 to 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
- Ionosphere and Troposphere Modeling
- Selectable Host Vehicle Parameters
- Models Selective Availability
- Time-tagged Satellite Events
- Antenna Pattern Modeling
- 6-DOF Motion Generator
- Waypoint Navigation
- SV RAIM Events
- Multipath Modeling
- Spoofer Simulation
- Satellite Clock Errors



The CAST-2000 Antenna Gain Editor

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CAST-2000

GPS Simulation System

System Specifications

Output Frequency

GPS L1	1575.42 MHz
GPS L2	1227.60 MHz

Maximum Dynamics

Velocity	> 60,000 m/s
Acceleration	± 150,000 m/s^2
Jerk	± 150,000 m/s^3

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	1.5 mm/s
Delta Pseudorange	1.5 mm
Interchannel Bias	< 1 mm
Uncontrolled Bias	< 1 mm
Bias Repeatability (initial)	< 1 mm
Bias Stability (operational)	< 1 mm

Signal Quality

Spurious	< -30 dBc
Harmonics	< -35 dBc
Reference Oscillator	100 MHz OCXO
Frequency Stability	3x10^{-8} per day

System Configuration

GPS Satellites Generated	8 to 12 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

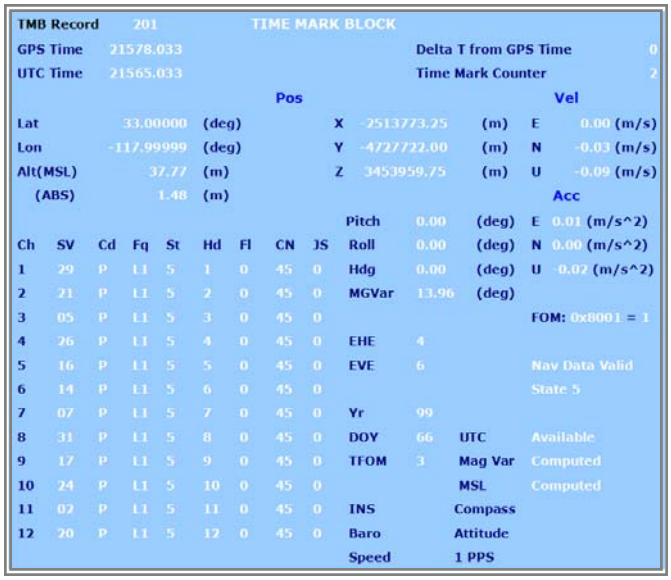
- Up to 8 Interference Generators
- Precision Guided Munitions Testing
- Additional GPS SVs
- 1553 / 1394
- External Precision Oscillator
- 6-DOF Real Time Interface
- Y-Code
- SAASM
- GPS OFP Loading
- Terrain Obscuration (TOP)
- TOP with Enhanced 3-D Visualization
- M-Code
- SBAS Simulation

System Upgrades

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

Capture GPS Performance

ICD-GPS-215/150 Instrumentation Port (IP) data is captured via RS-422 and can be replayed to isolate anomalies observed in navigation equipment performance.



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