

Avionics

GPSG-1000

GPS/Galileo Portable Positional Simulator

AEROFLEX
A passion for performance.



Versatile time-saving portable test set for GPS/GALILEO receivers

- GPS signals simulated: L1, L1C, L2C, L5
- Galileo signals simulated: E1, E5, E5a, E5b, E6
- Simultaneous GPS/Galileo simulation
- SBAS satellites simulated
 - WAAS/EGNOS L1, L5
 - MSAS (available 2011)
 - GAGAN (available 2011)
- Static or multi-leg dynamic positional simulation via waypoint entry system
- 6 or 12 channel configurations available with upgrade path (RAIM supported)
- Programmable satellite vehicle (SV) parametrics and health
- User or UTC referenced time and date
- Direct-connect to receiver or to installed system via antenna coupler
- Large touch-screen display with simple user interface
- Remote control interface USB/LAN
- NMEA 0183 data input



Channels

The six channel GPSG-1000 configuration provides 3D positional simulation with five channels for RAIM operation and one channel dedicated to SBAS, WAAS or EGNOS simulation.

The twelve channel GPSG-1000 configuration provides the same capability as the six channel unit, plus six additional channels. This allows any combination of visible SVs to be selected.

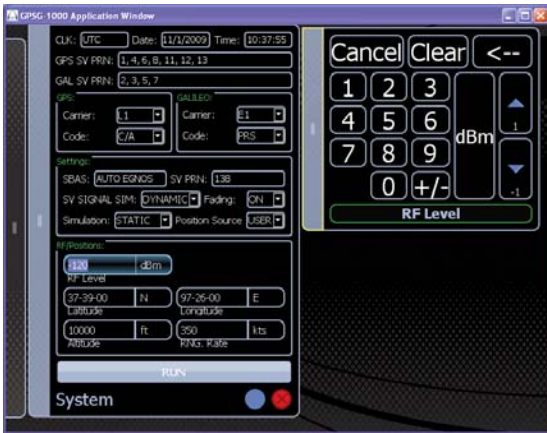
For the very latest specifications visit www.aeroflex.com

P r e l i m i n a r y

System

Simulated 3D position may be user entered in latitude/longitude/height format, or 3D position may be dynamically simulated utilizing a 50 leg waypoint entry scheme. Up to 20 navigation plans may be saved and recalled under a user assigned name.

A built-in GPS receiver allows positional simulation in the form of a range, heading and altitude offset from current test set position.



Satellite Vehicle (SV) Selection

All GPSG-1000 configurations allow GPS and Galileo satellites to be mixed.

Note: The Galileo codes may be updated via a text file upload.

Each SV may have doppler, amplitude, step error and code carrier coherence parameters deviated from nominal and satellite health set. Signal fading and dynamic signal amplitude and simulator RF level may be applied to all satellites simultaneously.



Waypoints (2nd Release)

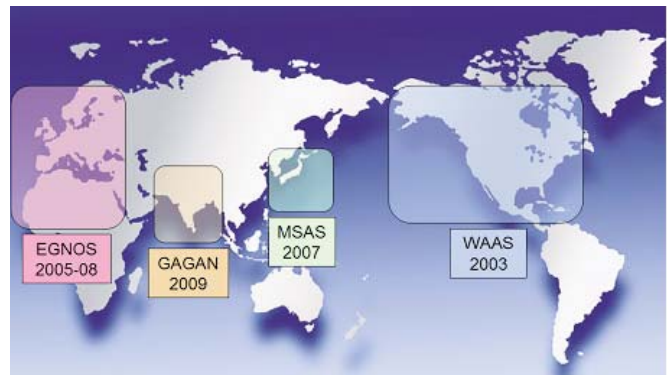
Waypoint legs join up in 3D space with either range rate or altitude rate being auto calculated. Trajectory changes are calculated to simulate real world navigation, i.e. waypoint leg heading changes utilize realistic rates of turn; altitude changes utilize realistic rates of descent or climb. Waypoints may be entered in LAT/LONG form or automatically recalled from an airport or city database.



SBAS

SBAS satellites WAAS/EGNOS/MSAS*/GAGAN* may be manually selected or automatically based on simulated position.

* Available 2011



Setup

The setup screen allows system, user and RF connection parameters to be set by the user.



GENERAL SPECIFICATIONS

USER INTERFACE

Display

12" color LCD, sunlight readable with back light

Controls

Touch screen

ANTENNA COUPLER

Antenna Coupler

Far field cavity

Coupling

-15 dB typical at 1575.42 MHz. Characterized @ 1127.60 MHz, 1176.45 MHz, 1191.795, 1278.75 MHz

Isolation

>25 dB at 1575.42 MHz

>30 dB typical at 1575.42 MHz

DIRECT CONNECTION PORTS

Impedance

50 Ω

SWR

1.3:1 maximum

Connector

TNC x 2

Coupling

AC (maximum DC input 50 V)

GENERATOR

GPS Frequencies

L1: 1575.42 MHz (C/A, pseudo P(Y), SBAS)

L2C: 1227.60 MHz

L5: 1176.45 MHz (New Civil SOL)

Galileo Frequencies

E1: 1575.420 MHz (pseudo-PRS, [pseudo-G/NAV]), (OS, CS, SOL, I/NAV))

E5: 1191.795 MHz center frequency

E5a: 1176.45 MHz (OS, (F/NAV))

E5b: 1207.14 MHz (CS, SOL, (I/NAV))

E6: 1278.750 MHz (pseudo-PRS, CS) (pseudo-G/NAV & C/NAV)

Glonass (future use)

1602 MHz

Accuracy

Same as master oscillator

Inter Channel Bias

Zero (digital design)

Frame Sync Output

LVTTL

Channels

1-6, 1-12 SV simulation, selectable

GPS: PRN=1 to 32

Galileo: PRN=1 to 30

SBAS: PRN=120 to 138. Positional simulation via menu entry of Latitude and Longitude or positional offset and waypoint.

User Defined Doppler Error

Selectable frequency offset ± 5.0 kHz, 1 Hz increment

Amplitude Offset

Sets SV carrier amplitude offset from nominal ± 30 dB in 1 dB increments.

Step Error

Sets SV pseudo range error ± 10 km in 1 m increments (used for RAIM testing)

Satellite Health

Allows selection of GOOD or BAD. (Carried in GPS Nav Data)

Gal Integrity

Allows selection of CONNECTED or DISCONNECTED. (Carried in Galileo Nav Data)

Code Carrier Coherence

Sets frequency variation between code carriers

Range 2 m/S

Increment 1 mm/S

GPS CODES

C/A

Code Rate

1.023 Mc/s

Primary Sequence Length

1023 bits

Secondary Length

50 bits

Modulation

BPSK

Symbol Rate

50 sps

SBAS

WAAS/EGNOS L1, L5

* MSAS

* GAGAN

* Available 2011

L2C

Code Rate

0.5115 Mc/s

Sequence Length

10230/767250 bits

Modulation

BPSK

Symbol Rate

50 sps

L1 (P)Y (*not encrypted)**Code Rate**

10.230 Mc/s

Sequence Length

15345000 bits

Modulation

BPSK

*Note: Long random codes simulated***Symbol Rate**

250 sps

Modulation

Interplex/CBOC

Sub Modulation

CBOC(6,1,1)

L1C**Code Rate**

1.023 MHz

Primary Sequence Length

10230 bits

Modulation

BOC (1, 1)

E5a F/NAV (OS)**Code Rate**

10.23 Mc/s

Sequence Length

10230 (primary) x 20 (secondary) bits

Symbol Rate

50 sps

Modulation

ALTBOC

Sub Modulation

None

L5**Code Rate**

10.230 Mc/s

Sequence Length

10230 bits

Modulation

QPSK

E5b I/NAV (OS, CS, SOL)**Code Rate**

10.23 Mc/s

Sequence Length

10230 (primary) x 4 (secondary) bits

Symbol Rate

250 sps

Modulation

ALTBOC

Sub Modulation

None

GALILEO SERVICES**E1 G/NAV (PRS)****Code Rate**

2.5575 Mc/s

Sequence Length

TBC

Symbol Rate

TBC

Modulation

Interplex/CBOC

Sub ModulationBOC_c (15,2.5)*Note: Long random codes simulated***E6 C/NAV (CS)****Code Rate**

5.115 Mc/s

Sequence Length

TBC

Symbol Rate

1000 sps

Modulation

Interplex

Sub Modulation

None

E1 I/NAV (OS, CS, SOL)**Code Rate**

1.023 Mc/s

Sequence Length

4092 (primary) x 1 (secondary) bits

E6 G/NAV (PRS)**Code Rate**

5.115 Mc/s

Sequence Length

TBC

Symbol Rate

TBC

Modulation

Interplex

Sub Modulation

BOCc(10,5)

NAV Data

Navigation data is computed in real-time to match the simulation.

Positional Simulation**Maximum Relative Velocity** ± 1000 Kts (514 m/s)**Maximum Relative Jerk** ± 20 m/s³**Maximum Altitude**

60,000 ft

Error Models

Atmospheric

Positional Simulation Accuracy**Pseudorange**

<2 mm (RMS)

Pseudorange Rate

<1 mm/s (RMS) with respect to master oscillator

RF Output Level

-60 dBm to -150 dBm in 1 dB steps,

 ± 2 dB accuracy into 50 Ω (AC Coupled) Standard Cable, 4 dB loss**Signal Quality****Spurious**

<-35 dBc over the bandwidth (40 MHz)

Harmonics

<-45 dBc

External Modulation Input

TTL

MASTER OSCILLATOR

Frequency

10 MHz nominal

Temperature Stability ± 1 ppm**Aging Rate**+1 ppm/yr, ± 5 ppm/ 10 yr.**Uncertainty** ± 1 ppm**External Reference Input****Input Level**

0.25 to 6.0 Vp-p

Input Impedance

50 ohm nominal

Input Frequency

10.0 MHz

External Reference Output**Output Level**1.5 Vp-p nominal into 50 Ω **Output Frequency**

10.0 MHz nominal

ENVIRONMENTAL

Test Set Certifications**Operational Temperature** $-20^{\circ} \leq T \leq 55^{\circ} \text{ C}$ **Storage Temperature** $-30^{\circ} \leq T \leq 71^{\circ} \text{ C}$ **Operational Humidity**

MIL-PRF-28800F Class 2

Storage Humidity

MIL-PRF-28800F Class 2

Altitude $\leq 10,000$ meters**Vibration Limits**

MIL-PRF-28800F Class 2

Shock, Functional

MIL-PRF-28800F Class 2

Transit Drop

MIL-PRF-28800F Class 2

Drip Proof

MIL-PRF-28800F Class 2

Dust

MIL-PRF-28800F Class 2

Salt

MIL-PRF-28800F Class 2

Explosive Atmosphere MIL-STD-810F Method 511.4, Procedure 1

Safety Compliance **UL-61010:2001**

CSA 22.2 No 1010.1

WEEE

ROHS

EMC

Emissions

MIL-PRF28800F Class 2

EN 61326:1998 Class A

EN 61000-3-2

EN 61000-3-3

Immunity

MIL-PRF28800F Class 2

EN 61326:1998 Class A

External AC-DC Converter Certifications

Safety Compliance

UL 1950 DS

CSA 22.2 No. 234

VDE EN 60 950

EMI/RFI Compliance FCC Docket 20780 Curve "B"

EMC EN 61326

Transit Case Certifications

Drop Test FED-STD-101C Method 5007.1

Paragraph 6.3, Procedure A, Level A

Falling Dart Impact ATA 300 Category I

Vibration, Loose Cargo FED-STD-101C Method 5019

Vibration, Sweep ATA 300 Category I

Simulated Rainfall MIL-STD-810F Method 506.4

Procedure II of 4.1.2

FED-STD-101C Method 5009.1 Sec 6.7.1

Immersion MIL-STD-810F Method 512.4

ENVIRONMENTAL (SUPPLIED EXTERNAL AC TO DC CONVERTER)

Use

Indoors

Altitude

≤10,000 meters

Operating Temperature

5°C to 40°C

Storage Temperature

-20°C to 71°C

PHYSICAL CHARACTERISTICS

DIMENSIONS

Height

10.63 in. (27.0 cm)

Width

13.97 in. (35.5 cm)

Depth

3.425 in. (8.7 cm)

Weight (Test set only)

<10 lbs. (4.5 kg)

VERSIONS AND OPTIONS

Ordering Number	Description
87339	GPSG-1000 Six Satellite Simulator
87715	OPT1 GPSG-1000 Twelve Satellite Simulator

Standard Accessories

Transit case

AC-DC converter

Antenna coupler

50 ft. coax cable

Operation manual CD

Optional Accessories

87716 Antenna coupler placement pole 8 ft.

87040 External battery charger

86196 Spare battery pack

For the very latest specifications visit www.aeroflex.com

CHINA Beijing

Tel: [+86] (10) 6539 1166
Fax: [+86] (10) 6539 1778

CHINA Shanghai

Tel: [+86] (21) 5109 5128
Fax: [+86] (21) 5150 6112

CHINA Shenzhen

Tel: [+86] (755) 3301 9358
Tel: [+86] (755) 3301 9356

FINLAND

Tel: [+358] (9) 2709 5541
Fax: [+358] (9) 804 2441

FRANCE

Tel: [+33] 1 60 79 96 00
Fax: [+33] 1 60 77 69 22

GERMANY

Tel: [+49] 8131 2926-0
Fax: [+49] 8131 2926-130

HONG KONG

Tel: [+852] 2832 7988
Fax: [+852] 2834 5364

INDIA

Tel: [+91] 80 [4] 115 4501
Fax: [+91] 80 [4] 115 4502

KOREA

Tel: [+82] (2) 3424 2719
Fax: [+82] (2) 3424 8620

SCANDINAVIA

Tel: [+45] 9614 0045
Fax: [+45] 9614 0047

UK Stevenage

Tel: [+44] (0) 1438 742200
Fax: [+44] (0) 1438 727601
Freephone: 0800 282388

USA

Tel: [+1] (316) 522 4981
Fax: [+1] (316) 522 1360
Toll Free: 800 835 2352

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www.aeroflex.com
info-test@eroflex.com



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