Spirent™
Promise. Assured.

GSS9000 Series

The very best in performance, flexibility and capability for GNSS developers and testers

GSS9000 Series

GNSS Simulation System

Why Choose the GSS9000?

To develop positioning, navigation and timing systems for military, space, and other high precision applications you require comprehensive, highly sophisticated testing. The updated GSS9000 Series multi-frequency, multi-GNSS RF constellation simulator sets a new standard of excellence in future-proofed simulation for R&D and performance testing.

Powered by SimGEN®, and using the latest state-of-the-art technology designed specifically for GNSS signal simulation, the GSS9000 Series produces a comprehensive range of emulated RF signals with industry-leading flexibility, fidelity, performance and reliability.

- Comprehensive and feature rich simulation
- Full control of all aspects of the GNSS operating environment
- Exact repeatability
- Ability to apply systematic errors and incidents unrealisable with real-world signals

Key Attributes

Performance

- 1000 Hz simulation iteration rate (SIR) and hardware update rate (HUR) – enabling real-time remote control and trajectory delivery
- Precision simulation of high dynamic motion with ultra-low latency
  - 120 km/s relative velocity
  - 193 km/s2 relative acceleration
  - 890km/s³ relative jerk
  - >60π rad/s angular rate
- 0.3 mm RMS pseudorange accuracy
- Full performance specification met under all simulation conditions

Modelling

- Full satellite constellation ephemeris and almanac
- Extensive multipath
- Tx and Rx antenna gain and phase pattern
- Lever arm effects
- Ionosphere and troposphere
- DGPS corrections
- Pseudorange ramps for RAIM testing and spoofing
- Vehicle motion

Unrivalled global support

- Regional technical support centre network
  - Email
  - Online
  - Phone
- Regular software upgrades
- Application notes and test methodologies via online knowledge base
- Test scenario packs

Professional GNSS testing services

Features

- Up to 320 channels in one chassis
- Highly flexible configurations selectable via a cabinet of licence keys
- Single and dual RF versions
- Complete portability of Spirent SimGEN scenarios
- In-field upgradability of principle GNSS functionality and capability
- On-the-fly reconfiguration of constellations and signals
- Up to 10 outputs in one chassis for multi-antenna/wave-front and multi-vehicle applications
- Multi-copy constellations – up to 10 copies of any licenced constellation can be created for sophisticated spoofing testing
- Multiple vehicles can be specified at one RF output to easily orchestrate trajectory spoofing and meaconing
- Flexible signals – enabling users to set up and control non-current SIS ICD PRN codes, nav data content/rate, chipping rate, edge shaping and modulation types
- Extensive real-time plotting, bulk logging and streaming of all scenario truth data

GSS9000

GNSS Constellation Simulator

Full Signals Capability

Whether testing with multiple signals from a single constellation, or testing hybrid systems with signals from multiple constellations, the GSS9000's flexible modular design is easily user-configurable to meet all needs.

Select any combination of signals from:

Constellation	Carrier	Standard Signal Types	Optional Signal Types
GPS	L1	C/A, L1c Data/Pilot, P, M Noise, Pseudo Y, GTx	Y*, MNSA*, AES-M* and SDS M-code via data server*
	L2	P, M Noise, Pseudo Y, GTx	Y*, MNSA*, AES-M* and SDS M-code via data server*
	L5	I, Q	
Galileo	E1	PRS Noise, OS Data/Pilot	PRS[WARE]*†
	E6	PRS Noise, CS Data/Pilot (without encryption)	PRS[WARE]*†, CS Data/Pilot (with encryption)*
	E5ab	E5a Data/Pilot, E5b Data/Pilot	
GLONASS	L1	C/A, P (Chan No. -7 thru +6)	
	L2	C/A, P (Chan No. -7 thru +6)	
BeiDou	B1	B1I	
	B1	B1C	
	B2	B2I	
	B2	B2a	
	B3	B3I	
QZSS	L1	L1S, C/A, L1c	
	L2	L2c	
	L5	I, Q	
	L6	D/E	
SBAS	L1	C/A	
	L5	I	
NavIC	L5	BPSK	S, RS*

For authorised users only

†*Available via 3rd party solution*

Your GSS9000 can be field upgraded to meet your evolving test needs.

Extensions and Options

Increasingly, GNSS receivers and sensors do not operate in isolation. The GSS9000 has been designed to operate with all of Spirent's extensive range of options and system extensions, ensuring all additional signals are reproduced coherent with GNSS.

SimINERTIAL™: Operational performance of an integrated GPS/inertial (IGI) system can be established in the laboratory using real-time emulation of the inertial sensor outputs. All signals are coherently generated to exactly match the simulated vehicle trajectory. Typical inertial sensor performance can be represented by a sensor error model driven by the simulated motion, with appropriate coefficients entered by the user.

SimMNSA™: Supporting GPS Directorate approved MNSA M-Code testing with SimMNSA.

SimMCODE™: AES M-Code testing with SimMCODE, and server-based SDS M-Code testing via a SimMCODE extension.

SimCLASS™ / SimSAAS™: Providing SA/A-S simulation for the testing of SAASM equipment with Y Code.

Sim3D™: Realistic multipath and obscuration testing by simulating the impact of the 3D local environment on GNSS signals.

GSS7765: Offering a broad range of interfering signal options, which can be used to represent an array of threat sources, supports noise generation with variable bandwidth, and can be configured to support multiple fully independent interference sources.

SimREMOTE™: Extend the GSS9000's native Ethernet remote control facility to include GPIB and SCRAMNet. Allows input and output of simulation, signal control and external 6DOF motion data.

SimSAFE™: Evaluate the vulnerability of a receiver to deliberate spoofing or meaconing attacks, and assess the effectiveness of mitigation techniques and strategies.

Flexibility and Connectivity

The GSS9000 is designed for real-world testing environments, with a wide range of both analogue and digital interfaces.

- Low level RF outputs are supplemented by high level RF inputs and outputs for monitoring and signal injection
- Digital interfaces include IEEE-488, Ethernet and SCRAMNet GT
- Extensive timing, trigger and control access

GSS9000 Series
GNSS Simulation System

About Spirent Positioning Technology

Spirent enables innovation and development in the GNSS (global navigation satellite system) and additional PNT (positioning, navigation and timing) technologies that are increasingly influencing our lives.
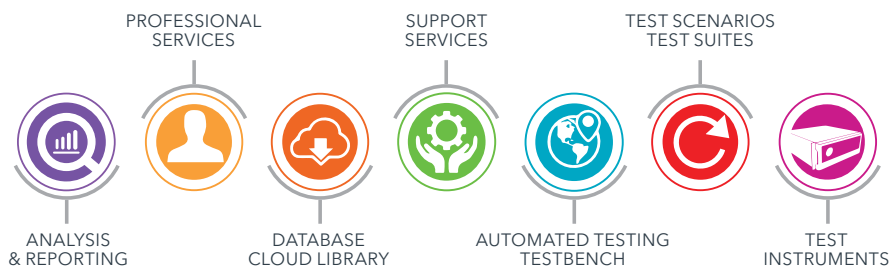
Our clients promise superior performance to their customers. By providing comprehensive and tailored test solutions, Spirent assures that our clients fulfil that promise.

Why Spirent?

With experience gained over more than 30 years of supporting GNSS development, our systems offer the proven performance and reliability our customers demand. They have been successfully deployed globally in over 50 countries and approved by all major GNSS design authorities

Spirent offers:

- Comprehensive features as standard
- Highly extensible and future-proofed solutions
- Ongoing investment in cutting edge developments and continuous improvements
- Quality systems backed up by a global support network
- Tailored Solutions capability to support special applications and configurations
- Large team dedicated to implementing new signals and ICDs

PROFESSIONAL SERVICES · SUPPORT SERVICES · TEST SCENARIOS TEST SUITES

ANALYSIS & REPORTING · DATABASE CLOUD LIBRARY · AUTOMATED TESTING TESTBENCH · TEST INSTRUMENTS

ISO/IEC 17025:2005
The GSS9000 is calibrated to the ISO 17025 standard at the time of delivery.

ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007

Contact Us

For more information, call your Spirent sales representative or visit us on the web at www.spirent.com/ContactSpirent.

www.spirent.com

Americas 1-800-SPIRENT
+1-800-774-7368 | sales@spirent.com

US Government & Defense
info@spirentfederal.com | spirentfederal.com

Europe and the Middle East
+44 (0) 1293 767979 | emeainfo@spirent.com

Asia and the Pacific
+86-10-8518-2539 | salesasia@spirent.com