

BROCHURE

# GSS9000 Series

GNSS Simulation System

Maximum performance without  
compromise for GNSS developers  
and testers



## 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

### Hardware Configuration

- Single and dual RF versions
- Up to 320 channels per chassis
- Up to 10 outputs in one chassis for multi-antenna/wave-front and multi-vehicle applications
- Highly flexible configurations selectable via a cabinet of licence keys
- Complete portability of Spirent SimGEN scenarios
- In-field upgradability of principle GNSS functionality and capability

### Performance

- Unrivalled 2000 Hz configurable 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/s<sup>2</sup> relative acceleration
  - 890km/s<sup>3</sup> relative jerk
  - 60π rad/s angular rate
- 0.3 mm RMS pseudorange accuracy
  - 0 mm uncertainty due to inter-channel bias
- Full signal performance specification met under all simulation conditions

### Modelling

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

### Flexibility

- On-the-fly reconfiguration of constellations and signals
- Extensive real-time plotting, bulk logging and streaming of all scenario truth data
- Wide range of spoofing options to support basic and sophisticated test scenarios
- 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
- Embedded interference capabilities supporting signals such as CW, FM, AM, PM, AWGN, BPSK or CW Pulse
- Generation of in-band non-GNSS signals from I/Q data files

### 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

## 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	L2c, 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] <sup>†</sup>
	E6	E6-A, E6-B, E6-C	PRS[WARE] <sup>†</sup> , 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, B2B	
	B2	B2a	
	B3	B3I	
QZSS	L1	L1S, C/A, L1C	
	L2	L2c	
	L5	I, Q, S	
	L6	L61/L62	
SBAS	L1	C/A	
	L5	I	
NavIC	L5	C/A	S, RS*

\* For authorised users only.

<sup>†</sup> Available via third-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™:** Enabling performance testing of integrated and embedded GPS/inertial systems (IGIs and EGIs) in the lab. SimINERTIAL provides real-time emulation of inertial sensor outputs, with all inertial and GNSS signals coherently generated to match the simulated vehicle trajectory.

**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.

**SimIQ™:** Allowing the generation and replay of I/Q data files containing in-band GNSS signals, interference, noise or custom waveforms.



## Americas

## Europe

## Asia

### 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?

Over five decades Spirent has brought unrivalled power, control and precision to positioning, navigation and timing technology. Spirent is trusted by the leading developers across all segments to consult and deliver on innovative solutions, using the highest quality dedicated hardware and the most flexible and intuitive software on the market.

Spirent delivers

- Ground-breaking features proven to perform
- Flexible and customisable systems for future-proofed test capabilities
- World-leading innovation, redefining industry expectations
- First-to-market with new signals and ICDs
- Signals built from first principles – giving the reliable and precise truth data you need
- Unrivalled investment in customer-focused R&D
- A global customer support network with established experts

**ISO/IEC 17025:2005**

*The GSS9000 is calibrated to the ISO 17025 standard at the time of delivery.*



**INVESTORS  
IN PEOPLE**

**Platinum**  
Until 2021

### About Spirent Communications

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks. We help bring clarity to increasingly complex technological and business challenges. Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled. For more information visit: [www.spirent.com](http://www.spirent.com)

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