

SimHIL

Integrated hardware-in-the-loop testing

Your Trusted PNT Partner

 spirent™



Bringing hardware into the loop with SimHIL

The path to vehicle autonomy is setting developers significant challenges. Increasing numbers of use cases and corner cases, difficult or impossible to reproduce in a real environment, dictate that costly drive testing is no longer practicable, and the need to provide a realistic simulated environment in the lab is critical.

SimHIL is a software solution that provides dedicated APIs to integrate Spirent's GSS7000 and PNT X simulation systems with dynamic hardware-in-the-loop (HIL) environments. Providing ultra-low latency, combined with an extensive level of control, greater realism, and Spirent's assured ease of use and set-up, SimHIL brings the responsive motion of the antenna into the test in real-time. This function is essential for automotive manufacturers and Tier 1 suppliers developing ADAS, V2X and sensor fusion engines for autonomy and infotainment systems.

External motion

SimHIL enables the direct input of motion and trajectory data into the GNSS simulator from the HIL platform in real-time.

Sensor fusion

Vehicles are incorporating an increasing number of sensors, and these must be tested both independently and simultaneously. SimHIL brings global navigation satellite systems (GNSS) into this real-time co-simulation environment.

Testing V2X

In partnership with Tata Elxsi, Spirent has developed a V2X test bed that can be used for validation and performance benchmarking of V2X applications running on V2X ECUs. Spirent's GNSS simulators play a key role in providing a precise source of timing, as well as the position transmitted in messages such as Basic Safety Messages (BSM).

Testing infotainment systems

To test user experience, infotainment system developers are bringing the driver into the loop. SimHIL facilitates dynamic real-time feedback to the driver through visual, audio and navigation information – highlighting system and driver responses to different scenarios.

Vehicle-in-the-loop (VIL)

For complex and expensive VIL platforms to be effective, the virtual environment needs to be as close to reality as possible. SimHIL brings Spirent's world-leading GNSS simulation capability into this equation. Combined with Spirent's multi-output simulation platforms, SimHIL has also enabled over-the-air (OTA) angle of arrival (AoA) testing with VIL in an anechoic chamber. This means developers can now include the antenna in their procedure, testing the final product in its production form.

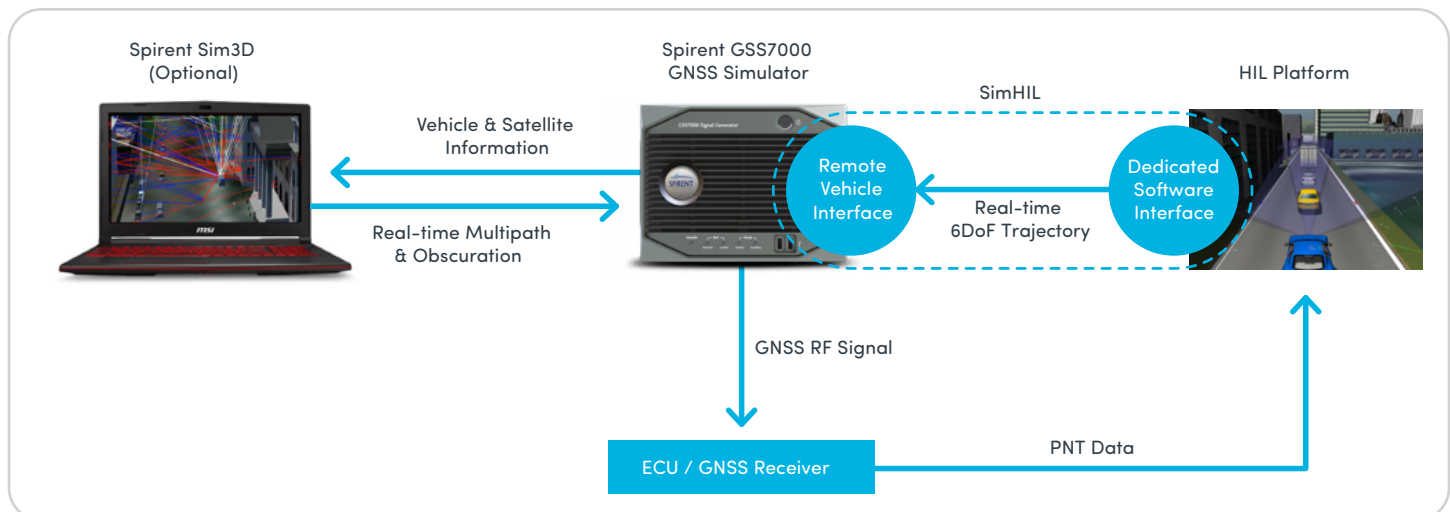


Supported Interfaces

Spirent has worked closely with industry leaders to provide a HIL solution for our GNSS simulators – fully controlled from the third-party environment.

Product	Hardware Supported	Software Supported	Vehicle Models Supported
SimHIL for dSPACE	dSPACE SCALEXIO dSPACE SCALEXIO LabBox	dSPACE ConfigurationDesk dSPACE ControlDesk dSPACE ModelDesk dSPACE MotionDesk	dSPACE ASM FMU IPG CarMaker Matlab Simulink Mechanical Simulation CarSim
SimHIL for IPG	IPG XPack 4 NI PXI NI PXIe	IPG CarMaker IPG TruckMaker	IPG CarMaker IPG TruckMaker Matlab Simulink
SimHIL for AV Simulation		SCANeR Studio	CALLAS

If you are looking for a different third-party integration, let us know. Thanks to our TCP/UDP based API, we offer the flexibility our customers need for their HIL set-ups.



Integration support

Spirent offers support for each of the interfaces provided with SimHIL. Our consolidated partnerships with third-party providers ensures that our customers receive all the support they need to set-up and run simulations to test their GNSS receivers and ECUs.

Spirent offers a range of services to SimHIL customers, from the setup and commissioning of the existing dedicated software interface (DSI), to the development of a custom DSI specific to customer HIL environments. Spirent's expert team of engineers are perfectly positioned to deliver the knowledge and the speed required in innovative and fast-paced businesses.

Ease of use

Thanks to its open and rich API, users can configure and control the GNSS scenario and signal generation from a control panel within the integrated software tool. Controlling the whole simulation environment from a single point greatly simplifies the configuration process and removes the possibility of human error.

Spirent simulation for HIL testing

Spirent's best-in-class GNSS simulators are the ideal tools for HIL testing of challenging applications. With high simulation iteration rates (SIRs), ultra-low latency, fully customisable signals and frequencies, and the capability to add layers of realism through Sim3D, Spirent's GSS7000 and PNT X enable our customers to perform the most accurate and reliable tests.

PNT X	GSS7000
2 kHz SIR	1 kHz SIR
<2 ms overall latency - from motion command input to RF output	<4 ms overall latency - from motion command input to RF output
All GNSS and SBAS supported, and LEO PNT signals	All GNSS and SBAS signals supported

Greater realism in simulation

SimHIL is compatible with all GNSS-specific options and features available with Spirent's GNSS simulators. This includes ionospheric and tropospheric modelling, antenna patterns, date and time settings - and obscuration effects and multipath via Sim3D.

Our Partners



National Instruments
is now NI.



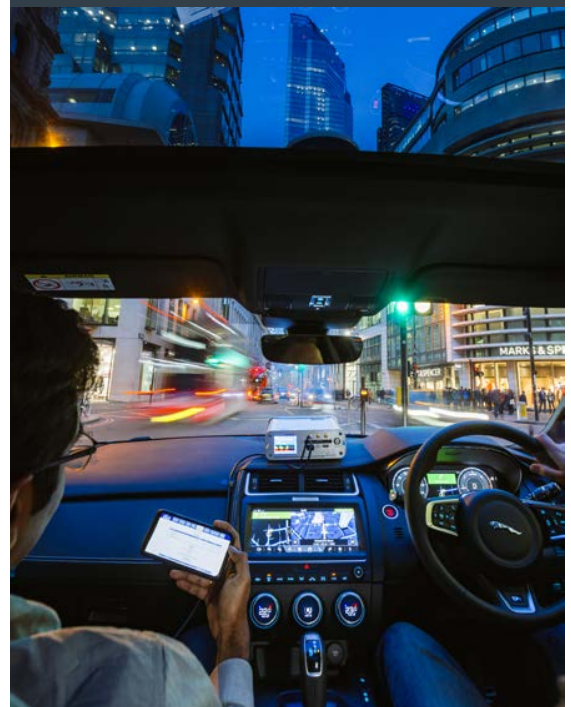
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About Spirent Positioning Technology

Positioning, navigation and timing (PNT) technology is driving the world's most advanced applications. Whether you are looking for robustness in the face of interference, or improved performance in challenging environments, Spirent's flexible test solutions enable you to assure the accuracy, integrity, continuity and reliability your customers demand.

spirent.com/pnt





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 and assurance 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 SDR technology 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



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

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