PRODUCT BROCHURE

PNT X

Accelerate and Simplify PNT Testing

KEYSIGHT

Introducing PNT X

Keysight PNT X is a revolutionary positioning, navigation, and timing (PNT) simulator that addresses the increasing complexity of the PNT environment. This all-in-one solution generates all GNSS constellations, RF threats, and signals of opportunity available for comprehensive test coverage and realism.

In an era when compromising on PNT performance is not an option, PNT X delivers new patented capabilities, simplified software for configuring complex test scenarios, and critical simulation integrity to ensure trustworthy results.

Figure. 1. PNT X positioning, navigation, and timing simulator

New Benchmark for Performance

- Unrivaled 2 kHz configurable simulation iteration rate — 2 ms latency in HIL applications
- 100 kHz update rate for spinning vehicles
- Precise simulation of high dynamic motion — up to 350 Mach
- Our highest-ever signal fidelity

- Full signal performance met under all simulation conditions

Flexibility

- Embedded Python IDE to develop software add-ons and automate testing
- Remote control libraries available for different programming languages via gRPC
- On-the-fly reconfiguration of constellations and signals
- Extensive data logging and post-processing tools
- Native signal interference capabilities supporting configurable CW, FM, AM, PM, wideband AWGN, BPSK, CW pulses, Chirp, and matched spectrum
- Support for multiple spoofers with independent noise patterns in a single scenario
- Record or replay I/Q data — and apply patented I/Q spatial awareness for highly realistic I/Q replay

Purposed-Designed Hardware

- Dual combined RF output
- 10 individual RF outputs for multi-antenna and multi-vehicle wavefront simulation
- Flexible software-defined hardware architecture for infinite scalability
- Modern approach to signal generation — assuring the right technology for every application
- Optimized in-field upgradability

Precise Models

- 3D environment modeling for real-time obscuration and multipath
- Realistic LEO and MEO orbital models for constellation ephemeris and device-under-test (DUT) trajectories
- Tx and Rx antenna gain and phase patterns
- Configurable ionosphere and troposphere
- Scintillation and solar weather
- High-dynamics vehicle motion
- Coherent inertial sensor simulation
- DGPS corrections

Unrivaled Test Experience and Support

- Regional technical support network
- Regular software updates
- Application notes and test methodologies available via online knowledge base
- Test scenario packs
- Professional PNT testing services

Full GNSS Support

Whether testing multi-frequency or multi-constellation receivers, the flexible software-defined architecture of the PNT X is easily configurable to meet all testing needs. Supports enhanced services such as Galileo OSNMA and HAS.

Custom Signal Generation

Easily generate custom waveforms, noise, interference, or non-current ICD SIS at RF using the PNT X flexible signal simulation capability (FLEX) or directly injecting I/Q data (SimIQ).

I/Q Spatial Awareness

The new Keysight-patented Spatial Awareness capability provides further control over I/Q-defined signals in the scenario, enabling highly realistic NAVWAR jamming and other-sensor simulation.

Spatial Awareness superimposes real-time power level and doppler offsets onto I/Q data based on transmitter-to-receiver 3D position.

Secure Signals

PNT X supports GPS-Directorate-approved MNSA M-Code, Regional Military Protection (RMP), AES M-Code, and server-based SDS M-Code. Galileo FOC authorized testing is supported with PRS and CS signals.

LEO PNT Models

PNT X includes accurate LEO satellite models that take into account complex gravitational effects and physical properties such as atmospheric drag. Testing signals broadcast to and from LEO satellites has never been so realistic.

3D Environment

PNT X introduces embedded 3D environmental modeling, enabling obscuration and multipath effects for all PNT signals and frequencies based on realistic 3D-world models.

With PNT X, receive real-time visual feedback of dynamic spoofers and jammers in the scenario.

Beyond L-Band

PNT X incorporates S-band radio cards to support existing GNSS regional signals and new PNT signals and applications such as lunar and LEO.

Inertial Simulation

PNT X enables 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.

Navigation Warfare

From jamming to spoofing, PNT X offers a broad range of interference signal options to represent an array of threat sources. It also supports noise generation with variable bandwidth and can be configured to support multiple fully independent and dynamic interference sources. PNT X enables unparalleled CRPA testing through precise phase-aligned wavefronts.

Environmental, Social, and Governance (ESG)

Keysight's Positioning Technology business unit has been committed to ESG good practice and improvement since achieving ISO14001:2015 Environmental Managemental System certification in 2004.

ESG is a priority for Keysight across all aspects of our business, from sustainable buildings and sustainable product design to sustainable supply chain, manufacturing and shipping/export processes. As is best practice, we follow a continuous improvement process in respect of ESG.

Many of Keysight's test solutions rely on physical test equipment used in situ by our customers. We are working to reduce the lifecycle impacts of our products, and the environments in which they are used, in a number of ways:

- Designing for environment and end of life, including compliance with all legal requirements
- Reducing the size, weight, noise, and power use of our products
- Visualization and the development of Test-as-a-Service via PNT Professional Services
- Improving utilization and automation
- In-field servicing and upgrades

We use formal sustainability metrics in the product development process.

For more specific information on how ESG applies to our PNT test solutions, please contact your Keysight representative.

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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