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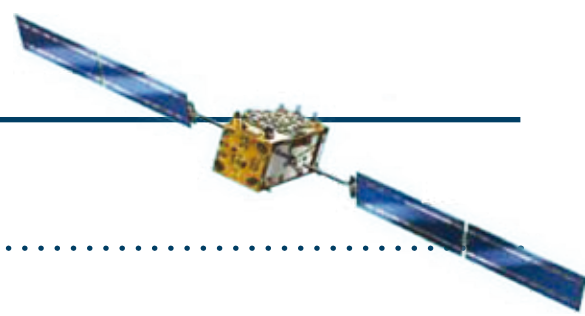
GNSS SIGNAL SIMULATION

# XPLORA Pro

## The GNSS Simulator for High-End Applications

Experience real-time simulation with high-end hardware, enabling on-the-go environmental modifications

# KEY FEATURES



Supported GNSS signals	<p>GPS: L1 C/A, L2C, L5</p> <p>Galileo: E1 B/C, E5a-I/Q, E5b-I/Q</p> <p>GLONASS: G1 C/A, G2 C/A</p> <p>BeiDou: B1, B2</p> <p>SBAS: L1 C/A</p>
Bandwidth	up to 120 MHz per RF output
Constellation update rate	up to 100 Hz
Resolution	up to 2 x 16 bit (complex I/Q)
Number of real-time channels	up to 208 (depending on selected signal components)
Simulation	<p>Satellite orbits based on ephemeris or orbit integration</p> <p>Satellite clock model</p> <p>Atmospheric delays</p> <p>Ionospheric delay models: Klobuchar, Nequick-Gal, IONEX Tec Maps</p> <p>Tropospheric delay models: Saastamoinen, Hopfield, GPT2w</p> <p>Multipath models (statistical)</p> <p>Noise models for all delays customizable and highly (bit-true) reproducible</p> <p>Antenna gain pattern and obstruction mask</p> <p>User-configurable navigation message</p> <p>Receiver movement simulation (input through GUI, user file or API)</p> <p>Simulation of multiple receivers within one simulation</p>
Accuracy between RF1, RF2	Lower than 100 $\mu$ s
Reference accuracy	<p>OCXO</p> <p><math>\pm 5 \times 10^{-8}</math> ageing per year</p> <p><math>&lt; \pm 1 \times 10^{-8}</math> temperature stability</p> <p>10 min warm-up time</p>
Power level	<p>Maximum power output: +20 dBm typical</p> <p>Resolution: 0.1 dB</p> <p>Uncertainty: <math>\pm 0.5</math> dB: +10 dBm – -50 dBm</p> <p>Range: <math>\pm 1.0</math> dB: below -50 dBm</p> <p>Dynamic range: -134 dBm – +20 dBm (peak); <math>&lt; 75</math> dB typical</p>
Spectral purity	<p>Harmonics <math>f &gt; 30</math> MHz: <math>&lt; -30</math> dBc at +10 dBm</p> <p>Harmonics <math>f &lt; 30</math> MHz: <math>&lt; -40</math> dBc at +10 dBm</p> <p>Non harmonics <math>&gt; 30</math> MHz: <math>&lt; -75</math> dBc typical</p> <p>Non harmonics <math>&lt; 30</math> MHz: <math>&lt; -80</math> dBc typical</p>
Simulation of hardware in the loop HIL	100Hz, 50Hz, 10Hz, Latency to RF output $< 2$ ms
Simulation of receiver antenna	Gain
Logging capabilities	<p>Time related parameters</p> <p>Simulated vehicle trajectory parameters</p> <p>Receiver antenna parameters</p> <p>Satellite trajectory parameters</p> <p>Satellite transmit antenna parameters</p> <p>Received signal parameters</p>
Usability	Designed for GNSS simulation in real-time for high-end applications

# GNSS SIGNAL SIMULATION

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Products and systems relying on GNSS-technology for positioning and/or timing have to be tested for ensuring a reliable, safe operation before putting them into operation. As the possibilities for comprehensive testing in real life are very limited, the use of a GNSS simulation system is the perfect option for ensuring a high coverage of test scenarios, efficient execution of many test cases, having in mind the requirement to standardize and repeat tests.

With **XPLORA Pro** system integrators, governmental authorities and GNSS equipment manufacturers and users can harden their GNSS-based infrastructure or equipment against interference.

**Benefit** from quickly created simulations and parameters that can be adjusted down to the smallest detail for more complex test scenarios.

**Configure** satellite orbits, navigation-messages and change simulation parameters on-the-fly or in a hardware-in-the loop setup.

**Improve** your interference and spoofing countermeasures and mitigation strategies by using highly detailed signal simulations.

**A GNSS simulator for all your needs** – testing and validating GNSS hardware, research or satellite constellation simulation.



**XPLORA Pro** is a GNSS simulator that is capable of generating all public GNSS signals and frequencies available today. It offers direct RF signal playback in real-time or alternatively digital IF baseband signal generation. Additionally, simulation of GNSS receiver observables is available.

The simulator capabilities can be adjusted in terms of features to meet the user requirements exactly by offering optional signals, frequency bands and simulation of interference and multiple receivers.

## **XPLORA Pro provides a rich set of core features:**

- Orbit simulation for all GNSS freely customizable
- Accurate models for atmospheric delays – ionosphere and troposphere
- Receiver movement by defining position, velocity, acceleration and receiver attitude
- Unlimited number of simulated receivers and antennas
- Modelling of user-defined antenna characteristics and antenna arrays
- Multipath modelling
- Navigation message simulation based on GNSS ICDs or customized user-defined message formats
- In-depth GNSS interference simulation in the form of jamming and spoofing
- Real-time modification of scenario parameters during simulation runtime via API or GUI
- Graphical user interface or command line interface



## XPLORA PRO

**XPLORA Pro** offers a multi-channel high-performance platform for complex and versatile GNSS testing in one complete system. **XPLORA Pro** is modular, functional and intuitive and enables GNSS simulation for novices and experts alike.

Enjoy **XPLORA Pro**'s simulation capabilities

- Test under laboratory environment and simulate the GNSS signals realistically with a lot of impacts that affect the GNSS measurements in real life
- Control all parameters for a realistic and authentic GNSS signal environment
- Precisely repeat all tests
- Benefit from the real-time input interface for HIL (Hardware-in-the-loop)

Making **XPLORA Pro** the perfect solution for highly sensitive professional applications requiring real-time simulation of GNSS, jamming and spoofing signals, as well as for testing systems requiring HIL (Hardware-in-the-loop) scenarios.

**Get in touch with us to learn how to optimize your resources and time in development, qualification and certification of GNSS equipment and GNSS applications!**

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**OHB Austria GmbH**  
  
**OHB**  
**AUSTRIA**

Kärntner Straße 7b/1  
A-8020 Graz, Austria

+43-316-890971-0  
[www.ohb-austria.at](http://www.ohb-austria.at)  
[office@ohb-austria.at](mailto:office@ohb-austria.at)