XPLORA Pro

GNSS Simulation in Real-Time for High-End-Applications

GNSS equipment development requires testing under controlled conditions. Engineers, scientists, manufacturers, and system integrators involved in GNSS development must be able to control test conditions, repeat tests precisely, simulate new satellite constellations and signals in advance (before the systems and signals are even available), and perform realistic tests in GNSS denied environments (without a line of sight to the satellites).

With **XPLORA Pro** system integrators, GNSS equipment manufacturers and users, governmental authorities, and armed forces in a navigation warfare scenario can harden their GNSS-based infrastructure or equipment against interference.

Supported GNSS signals	GPS: L1 C/A, L2C, L5 Galileo: E1 B/C, E5a-I/Q, E5b-I/Q GLONASS: G1 C/A, G2 C/A BeiDou: B1, B2 SBAS: L1 C/A
Bandwidth	up to 120 MHz per RF output
Constellation update rate	up to 250 Hz
Resolution	up to 2 x 16 bit (complex I/Q)
Number of channels	up to 208 (depending on selected signal components)
Simulation	• Satellite orbits based on generation ephemeris or orbit integration • Satellite clock model • Atmospheric delays • Ionospheric delay models: Klobuchar, Nequick-Gal, IONEX Tec Maps • Tropospheric delay models: Saastamoinen, Hopfield, GPT2w • Multipath models (statistical and deterministic) • Noise models for all delays customizable and highly (bit-true) reproducible • Antenna gain pattern and obstruction mask • IF signal parameters including RFFE simulation • User-configurable navigation message • Receiver movement simulation (input through GUI, user file or API) • Simulation of multiple receivers within one simulation
Accuracy between RF1, RF2	Lower than 100µs
Reference accuracy	OCXO ±5 x 10-8 ageing per year < ±1 x 10-8 temperature stability 10 min warm-up time
Power level	Maximum power output: +20 dBm typical Resolution: 0.1 dB Uncertainty: ±0.5 dB: +10 dBm – -50 dBm Range: ±1.0 dB: below -50 dBm Dynamic range: -134 dBm – +20 dBm (peak); <75 dB typical
Spectral purity	Harmonics f >30 MHz: <-30 dBc at +10 dBm Harmonics f <30 MHz: <-40 dBc at +10 dBm Non harmonics >30 MHz: <-75 dBc typical Non harmonics <30 MHz: <-80 dBc typical
Simulation of hardware in the loop HIL	250Hz, 100Hz, 50Hz, 10Hz, Latency to RF output < 2ms
Simulation of receiver antenna	Gain
Logging capabilities	• Time related parameters • Simulated vehicle trajectory parameters • Receiver antenna parameters • Satellite trajectory parameters • Satellite transmit antenna parameters • Received signal parameters
Usability	Designed for GNSS simulation in real-time for high-end applications

esa Acknowledgement: XPLORA (former „GIPSIE") was partially developed under a programme of and funded by the European Space Agency. The view expressed herein can in no way be taken to reflect the official opinion of the European Space Agency.

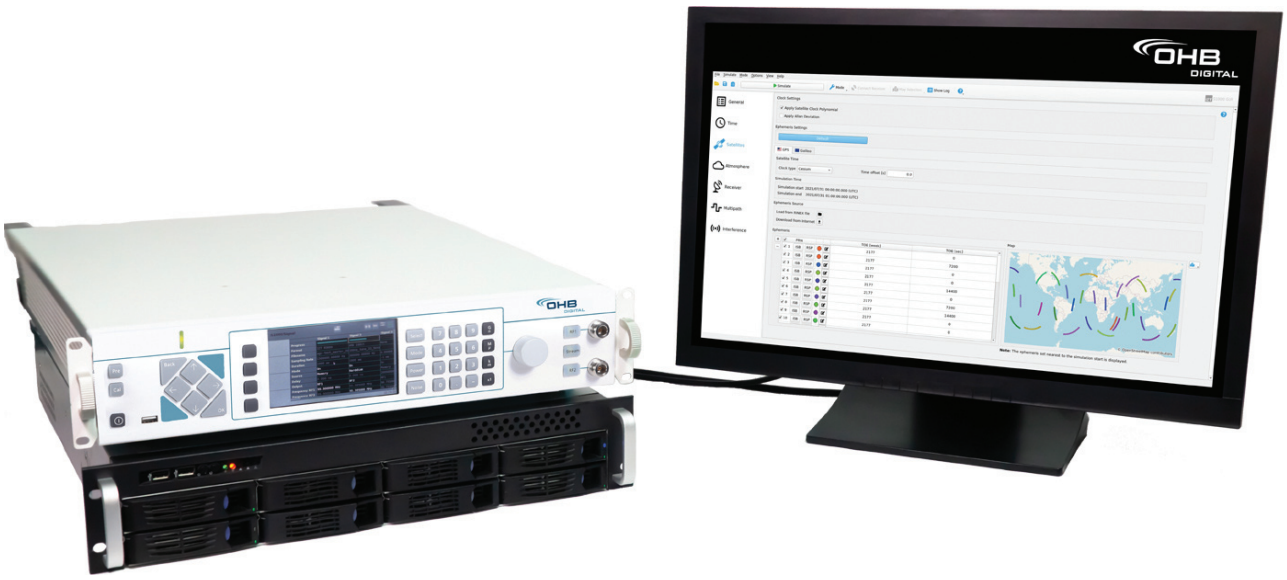
XPLORA Pro is a GNSS simulator that is capable of generating all public GNSS signals and frequencies available today. It offers direct RF signal playback in real-time or alternatively digital IF baseband signal generation. Additionally, simulation of GNSS receiver observables is available.
The simulator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

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

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

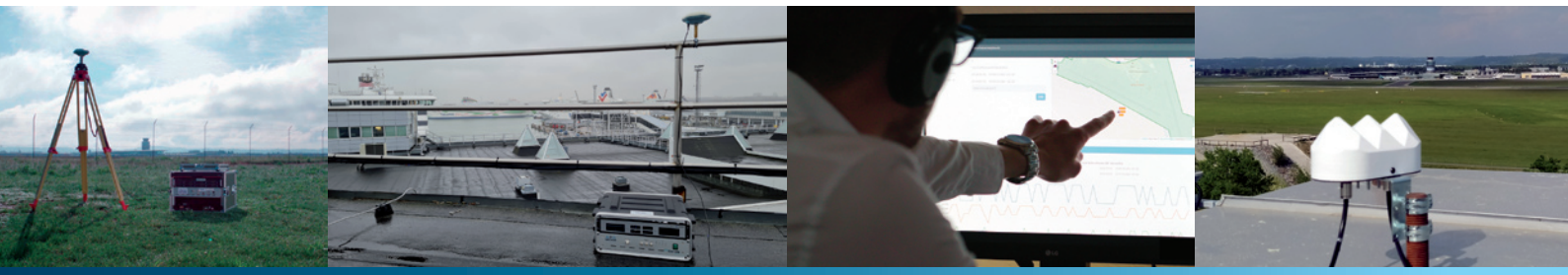
Configure satellite orbits, navigation-messages and change simulation parameters on-the-fly or in a hardware-in-the loop setup.

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



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
- In-depth interference and spoofing simulation
- Navigation message simulation based on GNSS ICDs or customized user-defined message formats
- 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

- Control all parameters for a realistic and authentic GNSS signal environment
- Precisely repeat all tests
- Simulate new satellite constellations and signals in advance
- Test under laboratory environment and simulate GNSS denied environments realistically

Making **XPLORA Pro** the perfect solution for highly sensitive professional applications requiring real-time simulation of GNSS, jamming and spoofing signals, as well as 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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