

Contact your local IFEN sales representative for expert advice regarding the optimum Simulator configuration to meet your current and future needs



NCS TITAN GNSS Simulator



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NCS TITAN - The most powerful GNSS Simulator

Outstanding Capability in a Flexible and Cost Effective Package



The new NCS TITAN multi-GNSS, multi-frequency and multi-RF output simulator, pushing the boundaries in fidelity, flexibility and scalability. With the customer proven performance and reliability of the NCS signal simulator series.

NCS TITAN putting unrivaled simulation power in the hands of the user. Highly capable hardware & feature rich software, with the superior flexibility to address a wide range of test requirements, in an easy to use and realistically priced package.

NCS TITAN

GNSS Navigation Constellation Simulator

Features

Scalability & Flexibility

- Support of all global satellite navigation systems (GNSS), regional satellite navigation systems (RNSS) and augmentation systems (SBAS)
- 32 - 256 signal channels (up to 8 RFSIM signal generation engines)
- Each RFSIM engine of 32 channels is divided into 4 blocks of 8 channels each
- Each block of eight channels is fully configurable in terms of frequency and signal modulation
- Additional 4 embedded multipath channels per LOS signal (up to 1024 multipath signals)
- In-field extension of signal capability and GNSS functionality by software license
- On-the-fly re-configuration of constellation and signal configurations
- All GNSS constellation types and all frequencies brought into a single chassis
- Multi-RF output options available, with up to 4 independent RF outputs per chassis
- RF Switch Matrix allows the user to assign each block of 8 channels to any RF output

Connectivity

- Remote control capability via Ethernet interface
- 1 PPS in / out and 10 MHz reference in / out
- External trigger and interference signal input

Usability and Control

- Advanced graphical user interface (GUI) for scenario definition, simulation configuration and control
- Easy modification of variables
- Full constellation, user and vehicle motion control
- Flexible user trajectory generation (pre-defined, from file, via editor or remote motion data)
- Real-time data logging of a range of simulation parameters during scenario run-time for analysis

Comprehensive Simulation

- Real-time simulation of space and user segment
- Extensive signal propagation modelling and realistic user environment configuration (multipath, ionosphere, troposphere, scintillation, terrain/earth obstruction, antenna characteristics, ect.)
- Support of Differential GNSS (DGNSS) test scenarios, including generation of DGNSS correction data in RTCM format.
- Real-time external user trajectory streaming for hardware in the loop (HIL) applications
- Enhanced simulation capabilities for space applications and very high signal dynamics for simulation of spinning vehicles / objects to support aerospace and defense applications
- Optional IMU/Sensor emulation package (SEP)
- Optional automotive test platform
- Optional high-end noise generator for realistic SIS simulations

The unique flexibility and outstanding performance of the NCS TITAN GNSS Simulator are beyond the capabilities of any other simulator on the market today. With up to 256 channels and up to 4 RF outputs per chassis, the extra complexity and cost of using additional signal generators or intricate architectures involving several hardware boxes is avoided, improving reliability without compromising on functionality.

Discover the perfect test solution for all types of GNSS applications. The innovative multi-constellation / multi-frequency simulation capability in combination with the multi-RF output option sets new standards in the field of GNSS simulation in terms of fidelity, performance, accuracy and reliability. Designed to deliver maximum flexibility, users are no longer faced with limitations.

In-field upgrade capability through RFSIM module plug-in capability and flexible signal SW licensing are the design drivers for the NCS TITAN GNSS Simulator.

It can also be connected to other external hardware or integrated into existing test environments via its Ethernet remote control interface, which offers full flexibility for a wide variety of applications.

Key Features

► Leading Scalability and Flexibility

The TITAN Simulator may be fitted with up to 8 RFSIM signal generation modules. Each RFSIM channel module providing 32 channels of signal generation, so that in the full configuration up to 256 channels may be simulated per chassis. With up to eight RFSIM modules, the system is scalable with your growing simulation needs.

Each 32 channel module is divided into 4 blocks of 8 channels. Each channel block may simulate any GNSS frequency. The user may also allocate each channel block to any of the RF outputs fitted. The signal and RF output designations may be altered for each test scenario. This capability provides unrivaled flexibility to the user.

Each primary signal channel of the RFSIM architecture also supports additional four multipath channels per satellite signal source that are delayed and attenuated copies of the primary channel. This will give up to a total of 1024 multipath channels per chassis in a full configuration with eight RFSIM modules.

Each TITAN chassis may be fitted with up to 4 independent RF outputs, allowing multiple antenna locations to be simulated simultaneously. This may include multiple antennas on one vehicle (for antenna diversity, heading determination, dual tracking, radio occultation, precise orbit determination and attitude determination), a static location plus mobiles (differential GNSS), multiple vehicles (formation flying) and simulating signals at different elements of a controlled reception pattern antenna (CRPA).

► Best Performance and Fidelity

The simulation performances (simulation iteration rates, signal and navigation characteristics) achieved with the NCS TITAN Simulator are at least equal, but typically beyond the specification of any other simulator on the market. See the TITAN specification for details.

With the NCS TITAN Simulator, the boundary in performance and fidelity is re-defined.

► All GNSS Signals and Systems Supported

All navigation systems and signals supported by the NCS TITAN GNSS Simulator are given below. All signals are available using a flexible licensing scheme.

System	Frequency Band	Signal(s)
GPS	L1 L2 L5	C/A Code, P-Code, L1C, Pseudo-Y, M-Noise C/A Code, P-Code, L1C, Pseudo-Y, M-Noise I, Q
Galileo	E1 E5 E6	OS Data/Pilot, PRS Noise E5a Data/Pilot + E5b Data/Pilot, AltBOC CS Data/Pilot (unencrypted), PRS Noise
GLONASS	G1 G2 G3	Standard and high accuracy Standard and high accuracy L3 ready (pending ICD availability)
BeiDou	B1 B2 B3	B1-I B2-I (as B1-I) B3-I (as B1-I) / B3-Q
IRNSS	L5 S-Band	SPS, RS-Noise SPS, RS-Noise
QZSS	L1 L2 L5 LEX	C/A Code, SAIF, L1C L2C I, Q LEX
SBAS (WAAS, EGNOS, MSAS, GAGAN, SDCM)	L1 L5	C/A Code I

► Customer focused Usability

The NCS TITAN GNSS Simulator consists of a signal generation hardware and a control computer including the pre-installed Linux or Windows®-based 'NCS Control Center'.

The 'usability' driven NCS Control Center software provides the user with full control over all aspects of the test scenario configuration, interactive control, monitoring and data logging. This capability allows a wide range of GNSS testing to be conducted, for any customer application, with the same hardware ensuring maximum benefit of the investment.



Applications

Discover the perfect test solution for all GNSS applications. The innovative multi-constellation/multi-frequency simulation capability in combination with the Multi-RF output option sets new standards in the field of GNSS simulation. Designed to deliver maximum flexibility, users are no longer faced with limitations.

Dual-RF Output Applications

- **Antenna Diversity**
Two antennas of the same type but with different orientation at the same receiver.
- **Heading Determination**
Two antennas with the same orientation at one receiver.
- **Differential GNSS**
Static reference receiver and mobile rover.
- **Dual Tracking**
Two antennas with different gain patterns optimised for special visibility at the same receiver.

Multi-RF Output Applications

- **Attitude Determination**
3 or 4 antenna based attitude determination.
- **Formation Flying**
Spacecraft formation flying with up to 4 spacecrafts.
- **Radio Occultation (RO) and Precise Orbit Determination (POD)**
3 antenna approach with Dual-Frequency and Multi-GNSS capability. 1 zenith antenna for POD, 1 velocity-direction antenna and 1 anti-velocity antenna for RO.
- **CRPA Applications**
Test your steered antenna beam array applications with 4 antennas for multipath mitigation, interference suppression, anti-spoofing and more. You need more than 4 antennas for your sophisticated CRPA application? Ask us for a solution.

