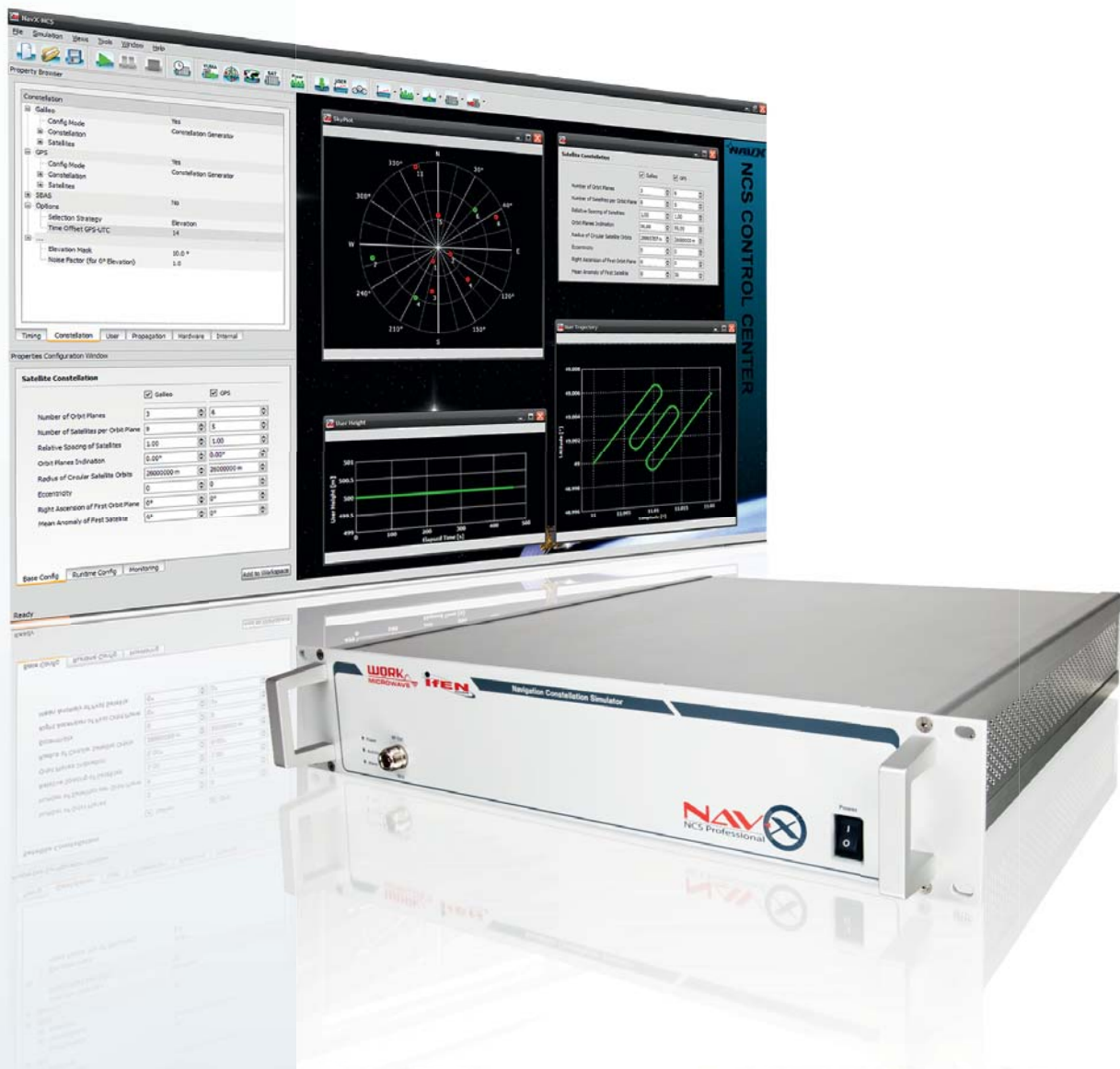


NavX[®]-NCS Professional

Data Sheet | August 2011



Multi-Frequency GNSS RF Signal Generator

The test reference for multi-frequency GNSS professional applications. Your future-proof investment in the leading edge test solution.

Multi-GNSS Platform

Coherent GPS, Galileo, GLONASS, QZSS and SBAS signals

Multi-Frequency Platform

Up to 9 L-band frequencies at the same time freely selectable

Flexible Capability Licensing

Extend your GNSS capabilities by simple SW licensing

Modular HW Plug-Ins

Scalable from 12 to 108 signal channels according to your needs

NavX®-NCS Professional

RF Simulation Test Environment for all Professional GNSS Signals

Features

Multi-GNSS Capabilities

- GPS L1, L2/L2C, L5
- Galileo E1, E5, E6
- GLONASS G1, G2
- QZSS L1
- SBAS (WAAS, EGNOS, MSAS, GAGAN)

Scalability & Flexibility

- 12 - 108 signal channels (up to 9 MERLIN modules)
- Internal noise generator module
- Free mapping of channels to modulations and GNSSs by software configuration
- Extension of capability by SW license

Connectivity

- Remote control capability
- 1 PPS and 10 MHz reference

Usability and Control

- Advanced graphical user interface (GUI) for scenario definition, simulation configuration and control
- Intuitive operation allows easy modification of variables from preset defaults
- Full constellation, user and vehicle motion control
- Flexible user trajectory generation (pre-defined, from file or via editor)
- Data logging to a file during scenario run-time for analysis
- Start on external trigger

Comprehensive Simulation

- Space and user segment
- Extensive signal propagation modelling (multipath, ionosphere, troposphere, terrain)
- Antenna gain and phase pattern
- Lever arm effects modelling
- Differential GNSS corrections

The NavX®-NCS Professional has been designed to fully meet the requirements for GNSS RF research and development testing of multi-frequency GNSS safety and professional applications. The NavX®-NCS Professional is the leading solution on the market providing all 9 L-band frequencies for GPS, Galileo, GLONASS, QZSS, SBAS and beyond in one box simultaneously.

Due to its superior technology, the outstanding performance features of the NavX®-NCS Professional are beyond the capabilities of any other signal generator on the market today. Besides, you avoid the extra complexity and cost of using additional signal generators or intricate architectures involving several hardware boxes, while improving reliability and not compromising on functionality.

It is the only GNSS simulator in the market today offering both flexibility and scalability with full multi-constellation capability, all in a single chassis.

Unlike other GNSS simulators, the NavX®-NCS gives you full control on scenario generation. Full GNSS simulation power just a few clicks away!

Benefits

► Ready for Today – Prepared for Tomorrow

With up to 108 signal channels, current multi-GNSS receivers can be tested with just one NavX®-NCS Professional. For more demanding applications, even receivers with 216 channels can be covered today by just two NavX®-NCS Professional simulators.

► Future-Proof Investment

The NavX®-NCS hardware is GNSS system agnostic. That means the NavX®-NCS can generate any known GNSS signal today, and also cope with modulations and signal structures yet to be developed. The NavX®-NCS is a safe investment for years to come.

► Custom Made ... for You

Because of its unique hardware and software architecture, you can configure the NavX®-NCS with just what you need today. No need to be tied to features you may never need. Add new capabilities as your testing needs grow.

► No Testing Down-Time

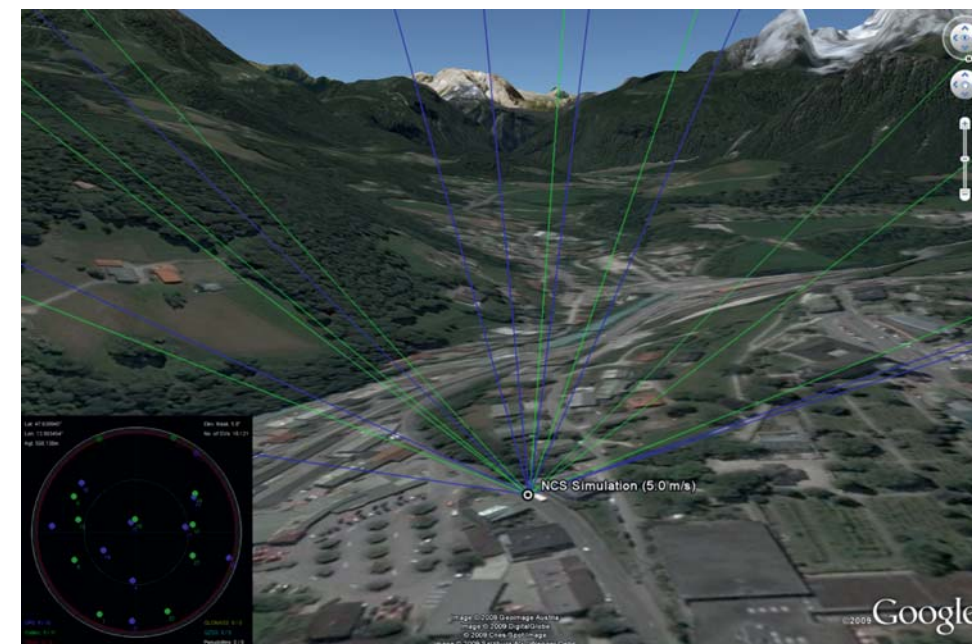
Because we know that time is money, unlike other existing simulators, the NavX®-NCS can be upgraded by a software license. No need to send your NavX®-NCS back to us. Tell us what you need, and in a matter of minutes (not weeks!) you'll be up and running with a complete new GNSS system, frequency options, etc.

► Full Advanced Simulation Control

Our user-friendly GUI allows you to detail satellite orbits, user trajectories, various vehicle motion models (6DOF), signal characteristics and propagation. And the list goes on. Please contact us to know more on how far your testing can go with the NavX®-NCS Professional.

The NavX®-NCS Professional consists of the signal generation hardware and a control computer including the pre-installed Windows®-based 'NCS Control Center', a flexible and powerful software for simulation configuration and interactive control.

The NavX®-NCS Professional can also be connected to other hardware or be integrated into existing test environments. Various input and output interfaces like 1PPS, a hardware trigger, input for external oscillators offer full flexibility for a variety of applications.



Visualization of NavX®-NCS simulation data



NavX®-NCS Control Center

Innovation

MERLIN Technology

With the introduction of the powerful MERLIN simulation engine at the heart of the NavX®-NCS Professional, it is for the first time possible to simulate any GNSS system and frequency by using the same hardware. Any GNSS constellation and frequency can be freely assigned to any MERLIN simulation engine installed.

Re-using the same MERLIN simulation engines by just adding additional system licenses enables a new level of GNSS constellation and frequency configuration, which was not existing before, providing the user with full flexibility and outstanding benefit.



MERLIN signal generation engine

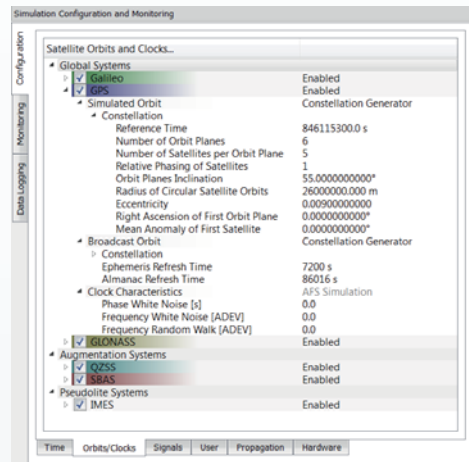


Nine MERLIN engines fit into one NCS Professional

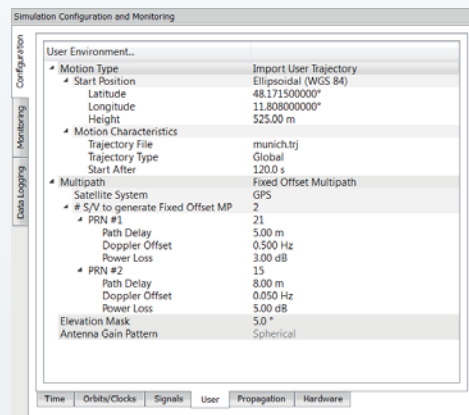
NavX®-NCS Professional

System Capabilities and Specifications

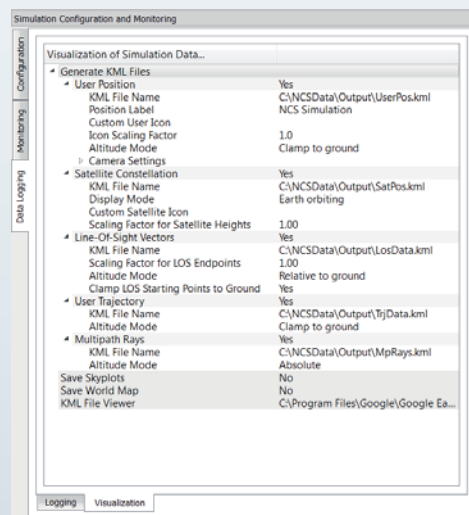
Control Center SW



Fully flexible constellation editor



Comprehensive user trajectory generation



Outstanding data visualization

Simulation Capabilities

Supported GNSS and Augmentation System Capability

- Galileo (E1 BOC/CBOC, E5ab AltBOC, E6)
- GPS (L1, L2/L2C, L5)
- GLONASS (G1, G2)
- QZSS (L1)
- SBAS (L1) (EGNOS, WAAS, MSAS, GAGAN)

Configuration and Control

- Time, date and user position
- Support of user trajectories
- Pre-configured simulations available

Space and User Segment

- Import YUMA almanac files
- Definition of orbit parameters per satellite
- Single-step constellation generator
- Definition of satellite clock characteristics
- Definition of user and satellite antenna gain and phase pattern
- Definition of various user vehicle motion models (6DOF)
- Definition of arbitrary elevation masks

Signal Propagation

- Definition of terrain obstructions
- Configuration of various multipath scenarios
- Definition of tropospheric and ionospheric influences

User Trajectories

- Predefined user trajectories available
- Import of NMEA files
- Integrated trajectory editor
- Preview of trajectory characteristics

Analysis and Interactive Control

- Display and monitoring of simulation data during run time
- Export of simulation data to file
- Interactive control of signal parameters during run time

Signal Specifications

Frequency Bands

• GPS L1	1,575.42 MHz
• GPS L2/L2C	1,227.60 MHz
• GPS L5	1,176.45 MHz
• Galileo E1	1,575.42 MHz
• Galileo E5ab	1,191.79 MHz
• Galileo E6	1,278.75 MHz
• GLONASS G1	1,602.00 MHz
• GLONASS G2	1,246.00 MHz

Modulation Schemes

- BPSK, QPSK, BOC, CBOC, FDMA
- AltBOC, Tri-Phase Interplex (CASM)

Signal Dynamics

• Max. velocity (LOS):	$\pm 22,800$ m/s
• Max. acceleration:	$\pm 1,500$ m/s ²
• Max. jerk:	$\pm 15,600$ m/s ³

Signal Accuracy

• Pseudorange:	< 1 mm RMS
• Pseudorange rate:	< 1 mm/s RMS
• Interchannel bias:	zero
• Intermodule bias:	< ± 1.0 ns

Signal Quality

• Spurious (max.):	< -70 dBc
• Harmonics (max.):	< -40 dBc
• Phase noise (max.):	0.005 rad RMS
• Frequency stability (24h):	< $\pm 5 \times 10^{-10}$

Nominal RF Signal Levels

• RF monitoring port:	- 60 dBm
• RF signal output(max.):	- 90 dBm
• RF signal output(min.):	- 170 dBm

Signal Level Control

• RF attenuation:	0.0 - 40.0 dB	at 0.1 dB steps (per module)
• Digital attenuation:	0.0 - 40.0 dB	at 0.1 dB steps (per channel)

Hardware

Input Interfaces

- Power supply: 85 – 264 VAC, 40-70 Hz
- Ethernet: RJ45
- 10 MHz reference (sine wave): BNC
- Hardware trigger input: BNC

Output Interfaces

- RF signal output (front side): N
- RF monitoring port (rear panel): SMA
- 10 MHz reference (sine wave): BNC
- 1 pulse per second (1 PPS): BNC



NCS Professional front side



NCS Professional rear side

Plug-In Modules

- MERLIN: up to 9 modules
- Channels per module: 12
- GNSS per module: one GNSS



MERLIN signal generation modules

Physical Parameters

- Mounting: 19" rack mounting, 2 HU
- Size (H x W x D): 86 x 483 x 570 mm
- Weight: < 10 kg
- Power consumption: < 120 W
- Operating Temperature: +10° to +55° C
- Storage Temperature: -40° to +70°

Control Computer

- Laptop: INTEL i7 based
- Operating systems: MS Windows® 7
- Control SW: NCS Control Center



NCS Control Computer

Disclaimer

Specification subject to change without prior notice

NavX[®]-NCS Professional

Sales Worldwide | August 2011



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Global Sales

For additional product information or sales orders outside of the EMEA area, please contact our distributors and sales agents directly.

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