



Waypoint®



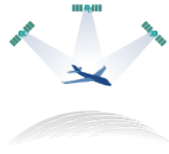
Best-in-class GNSS and GNSS+INS processing software



EXCEPTIONAL POST-PROCESSING SOFTWARE

Enhance your Position, Velocity and Attitude Accuracy

For applications requiring accurate post-mission position, velocity or attitude, post-processing is an ideal solution. Post-processing with Waypoint software maximizes the accuracy of the trajectory by processing forward and reverse in time, backsMOOTHING and combining the results. The trajectory may then be output, at the required data rate, in the coordinate frame required. Waypoint products also provide the ability to assess the solution reliability and accuracy with extensive quality analysis plotting tools.

	Inertial Explorer® Loosely and tightly coupled GNSS+INS post-processing
	Inertial Explorer Xpress Tightly coupled GNSS+INS post-processing for local area mapping
	GrafNav GNSS-only static/kinematic baseline processor

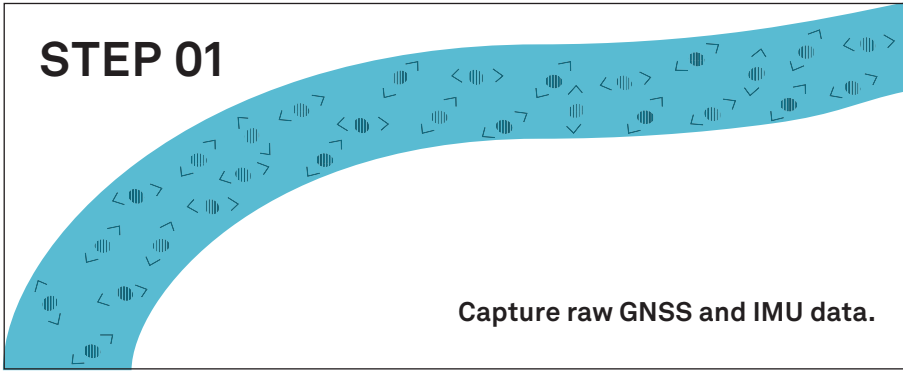
For comprehensive information on Hexagon | NovAtel® SPAN® GNSS+INS technology, visit novatel.com/span

Waypoint Product Matrix

	INERTIAL EXPLORER	INERTIAL EXPLORER XPRESS	GRAFNAV	GRAFNAV STATIC
Multi-constellation GNSS Processing	+	+	+	+
GNSS+INS Processing	+	+		
Moving Baseline Processing			+	
Precise Point Positioning	+	+	+	+
Multi-base Station Support	+		+	+
Heave Computation	+			
GrafNet Network Adjustment			+	+
Kinematic Data Processing	+	+	+	
Distance Measurement Instrument (DMI) Support	+			
Software Development Kit*	+	+	+	+
Command Line Interface*	+	+	+	+

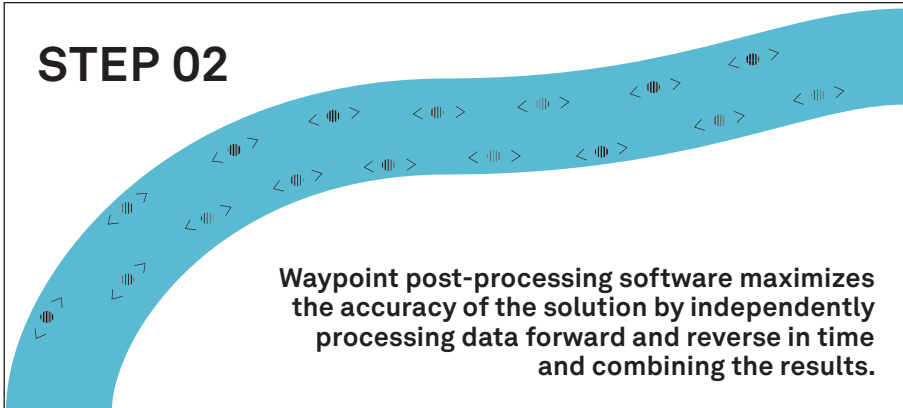
* Available as a separate software license

STEP 01



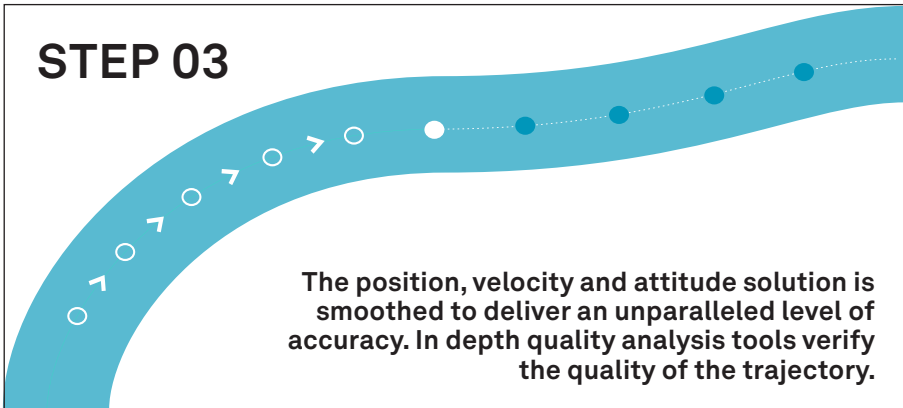
Capture raw GNSS and IMU data.

STEP 02



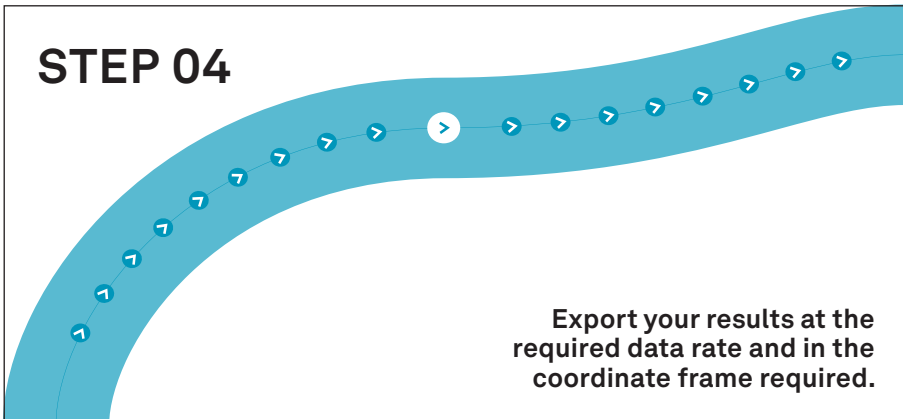
Waypoint post-processing software maximizes the accuracy of the solution by independently processing data forward and reverse in time and combining the results.

STEP 03



The position, velocity and attitude solution is smoothed to deliver an unparalleled level of accuracy. In depth quality analysis tools verify the quality of the trajectory.

STEP 04



Export your results at the required data rate and in the coordinate frame required.

Inertial Explorer®



GNSS+INS POST-PROCESSING SOFTWARE

Post-Processing for Improved Accuracy

Inertial Explorer (IE) maximizes the performance of your GNSS+INS hardware by providing the position, velocity and attitude accuracy your application requires. Inertial Explorer is suitable for demanding applications such as mobile mapping, aerial photogrammetry and hydrographic surveying.

Real-time GNSS+INS system accuracy is limited by the quality of the IMU and the duration of GNSS outage periods. The performance of these systems can be greatly improved through post-processing. Inertial Explorer significantly reduces the solution drift during GNSS outages and virtually eliminates the solution convergence time experienced in real-time operation.

Flexible Workflow Capabilities

Inertial Explorer has a workflow to match your business and your expertise. A project wizard is available to allow new GNSS+INS users to quickly become productive. For more experienced users, a variety of processing configuration options are available. Automated processing environment detection allows appropriate GNSS+INS processing settings to be applied automatically, simplifying workflow and reducing the learning curve needed to start producing quality results.

Features such as automated alignment, robust automatic ZUPT detection and the application of various external updates ensure the best possible accuracies are achieved, even in conditions challenging to GNSS signal reception.

IE includes support for both tightly and loosely coupled processing, multiple base stations for large project areas and Precise Point Positioning (PPP) for applications that do not require a base station.

With access to over 50 quality control plots, users can gauge solution accuracy and provide added confidence if problem areas are identified. Inertial Explorer provides access to powerful reprocessing options, quality analysis tools and world class customer support to ensure the success of your application.

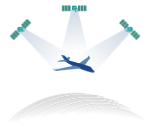
Powerful Features for Diverse Applications

- Simultaneous GNSS, IMU, DMI (wheel sensor), HMR (dual antenna) and MMR (gimble mount) raw data conversion if using NovAtel SPAN GNSS+INS hardware
- Simultaneous GNSS and IMU processing and simultaneous forward and reverse processing
- Download utility provides access to thousands of publicly available base stations
- Import GNSS data from multiple receiver manufacturers
- Heading updates decoded automatically from NovAtel's ALIGN® help maximize accuracy in low dynamic applications
- Flexible export tool permits reproduction of most ASCII file formats
- Output w-p-k angles for photogrammetric applications
- Solve for camera IMU orientation difference given w-p-k angles from an external source¹
- Remove up to 95% of position error over GNSS outages as compared with a real-time solution
- Model wave dynamics with NovAtel's Heave option
- Solve the IMU to GNSS lever arm
- Preloaded error models for most popular IMUs as well as customer created error models

Maximize Accuracy

- Multi-pass processing optimizes attitude accuracy, especially for low dynamic surveys
- Raw data and solution specific quality control plots
- IMU-only processing when provided regular external coordinate updates
- Extensive control over GNSS and IMU processing options
- DMI data input to further maximize performance in challenging environments
- Automatic ZUPT detection to help maximize performance in challenging environments

1 Requires separate photogrammetric adjustment package to determine camera exterior orientation angles.



GNSS POST-PROCESSING SOFTWARE

Enhanced GNSS Accuracy

GNSS technology is used to compute position and velocity for a variety of real-time applications, including vehicle navigation and tracking. The real-time accuracy of GNSS, however, is limited by real-time transmission of correction data. In many applications, where absolute position accuracy is critical, the position information is not required in real-time. For these applications, the accuracy of the GNSS position and velocity solution can be greatly improved by post-processing with GrafNav.

Multiple Processing Options with GrafNet

Included with GrafNav is a batch static baseline processor and network adjustment package called GrafNet. It can be used to establish or check base station coordinates for later use within GrafNav or to survey entire static networks.

Within minutes, GrafNet processes the entire project, containing multiple stations, in a single operation. When the processing is completed, GrafNet color codes the baselines so problematic baselines are isolated from the project and are easily analyzed. Statistics are available on each baseline misclosure and on the adjustment as a whole. GrafNet allows three types of static baseline processing solutions:

- Fixed static
- Float
- Ionospheric free

Powerful, Highly Configurable Processing

GrafNav post-processing software features powerful, highly configurable processing engine that allows for the best possible static or kinematic GNSS accuracy. Support of data formats from most single and multi-frequency commercial receivers means GrafNav will work with your existing hardware. A full suite of data and solution visualization and diagnostic tools are available for quality assurance. Precise satellite clock and orbit data can be downloaded from within GrafNav to achieve cm-level position accuracy without a base station.

- Configure to optimize results
- Easily make use of project specific base station data
- Achieve centimetre level position accuracy with publicly available reference station data
- Supports multi-base processing for large area projects
- A float static solution for long and/or noisy baselines
- Built-in ionospheric processing improves accuracies for dual-frequency users

TerraStar®-NRT

PRECISE CLOCK AND ORBIT PRODUCTS

TerraStar-NRT provides accurate and reliable precise clock and orbit products for Waypoint users.

The TerraStar-NRT service is multi-constellation delivering GPS, GLONASS, BeiDou and Galileo clock and orbit corrections at a high rate.

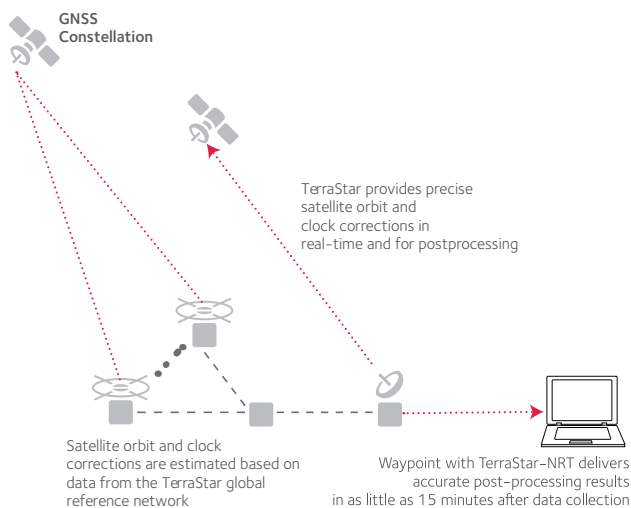
TerraStar-NRT License

A TerraStar-NRT license is available as a yearly subscription and must be activated in Waypoint software through the local license manager to download and use the service.

Generate Faster Results

With TerraStar-NRT, centimetre-level post-processing accuracy can be reached without having to wait for open source correction data. Precise ephemeris is available every 15 minutes to provide low noise Precise Point Positioning (PPP) trajectories when processing with Waypoint software. Post-processing using Waypoint with TerraStar-NRT, enables PPP and PPP Tightly Coupled (TC) solutions almost immediately after data collection with accuracy equivalent to products that are currently only available more than two weeks post-mission.

- Save time and achieve accurate post-processing results directly after data collection
- With over 80 independently owned and operated GNSS reference stations, TerraStar's world-wide reference network offers consistent accuracy anywhere in the world
- Simplify work flow by eliminating the need for a base station
- Use TerraStar-NRT to supplement incomplete GPS, BeiDou, Galileo or QZSS broadcast ephemeris data within a Waypoint Project



Waypoint® SDK

GNSS AND GNSS+INS POST-PROCESSING DEVELOPMENT KIT

Automate your GNSS or GNSS+INS Post-Processing

The Waypoint Software Development Kit (SDK) delivers complete control over the GrafNav and Inertial Explorer post-processing functions. Base station downloads, data conversion, data processing, solution output and quality control can all be customized to meet the requirements of any application.

GRAFNAV AND INERTIAL EXPLORER FUNCTIONALITY

- Static and kinematic processing
- Forward/reverse and triple-pass processing
- Tightly coupled differential processing and tightly coupled PPP processing
- Data decoding of multiple receiver and IMU formats
- Trajectory smoothing
- Local base station, multi-base station and PPP
- GPS, GLONASS, BeiDou, Galileo and QZSS support
- Data download for reference stations and precise satellite orbit and clock data
- Easy import of NovAtel SPAN® data
- Flexible solution export
- Data and solution quality and assurance tools
- Coordinate system and datum support

SYSTEM REQUIREMENTS

- Microsoft Visual Studio 2010 or later
- Microsoft Windows 7, 8 and 10
- 2 GB RAM or more

Speed Up and Automate Survey Quality Control

With complete access to the trajectory information, the Waypoint SDK allows you to set the rules for determining if the survey meets your accuracy requirements.

Whether you have just a few systems or hundreds of them, automated post-processing with the Waypoint SDK improves results, while saving time and money by increasing the speed of your workflow.

Software Integration

Nearly all of the functionality contained in Waypoint's GrafNav and Inertial Explorer software can be accessed within the Waypoint SDK. This allows you to embed GNSS or GNSS+INS processing functionality into your software, provide an optimized workflow for your customers and increase the value of your software products. For your programming convenience, two separate interfaces are available:

- C++/Win32
- .NET 4.0 or higher

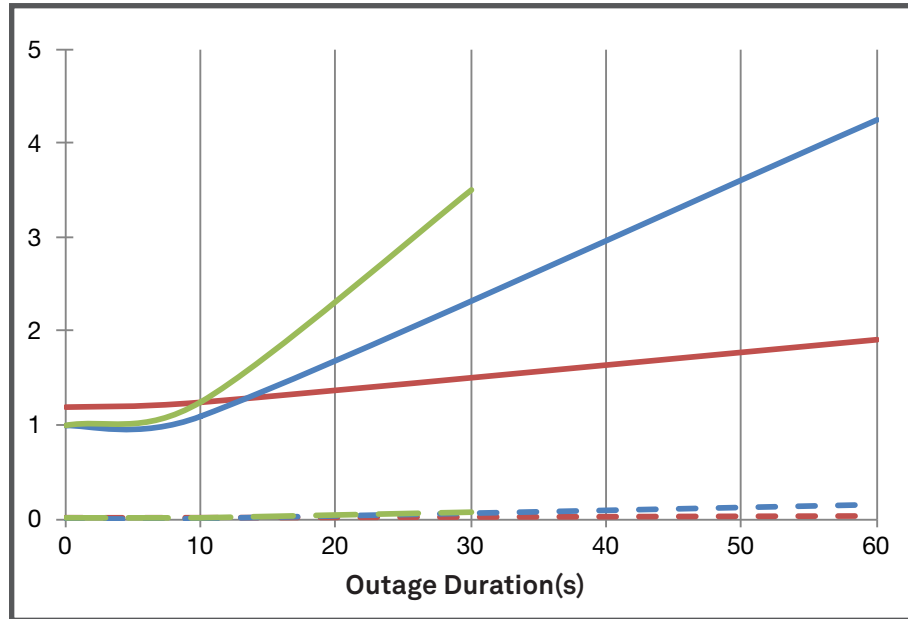
SOFTWARE LICENSING

- Software based licensing with support for remote/virtual desktop
- One time software activation through the Internet
- Term based licensing with scalable pricing option

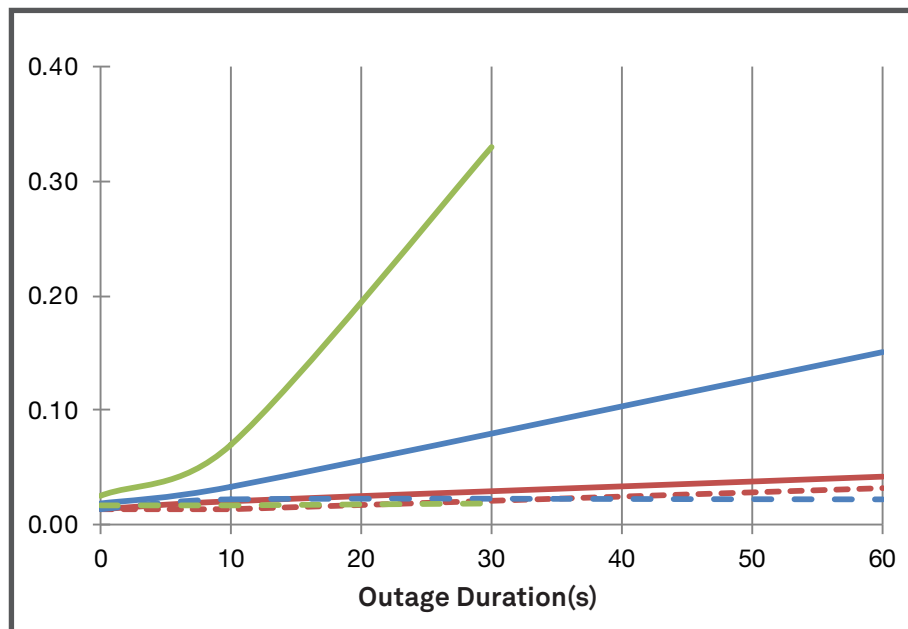
STEADY STATE POST-PROCESSED PERFORMANCE

- IMU-ISA-100C
- IMU-ISA-100C (PP)
- IMU- μ IMU-IC
- IMU- μ IMU-IC (PP)
- PwrPak7-E1
- PwrPak7-E1 (PP)

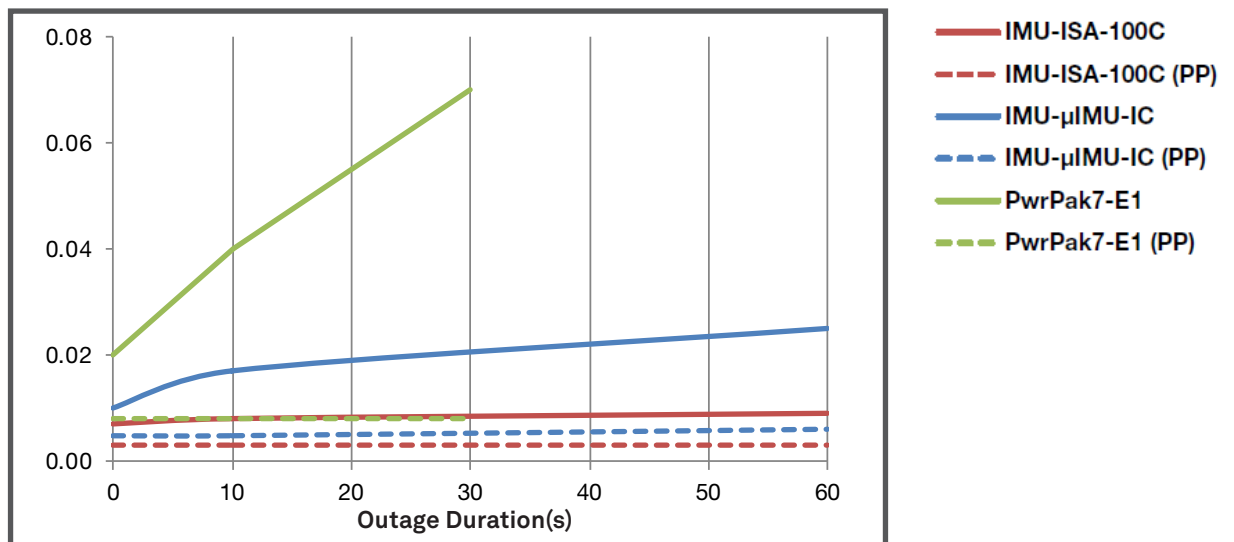
Horizontal Position Error (m)



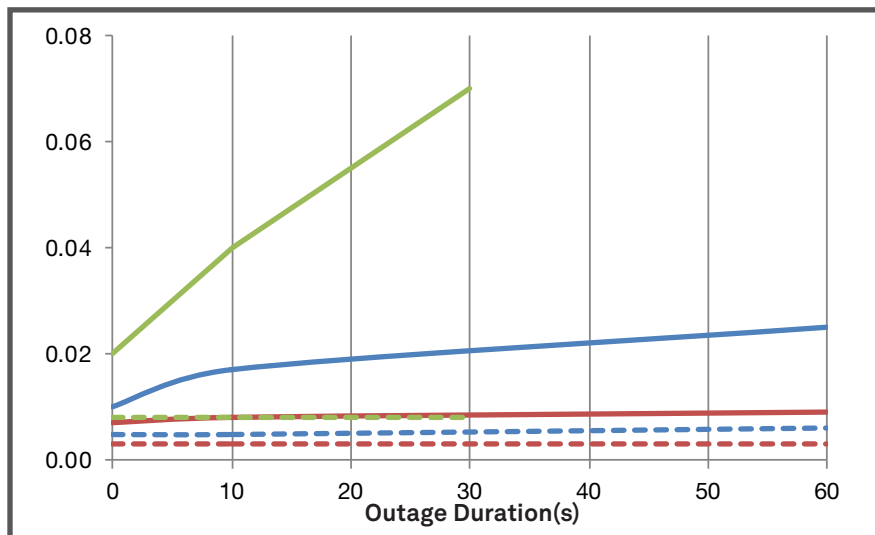
3D Velocity Error (m)



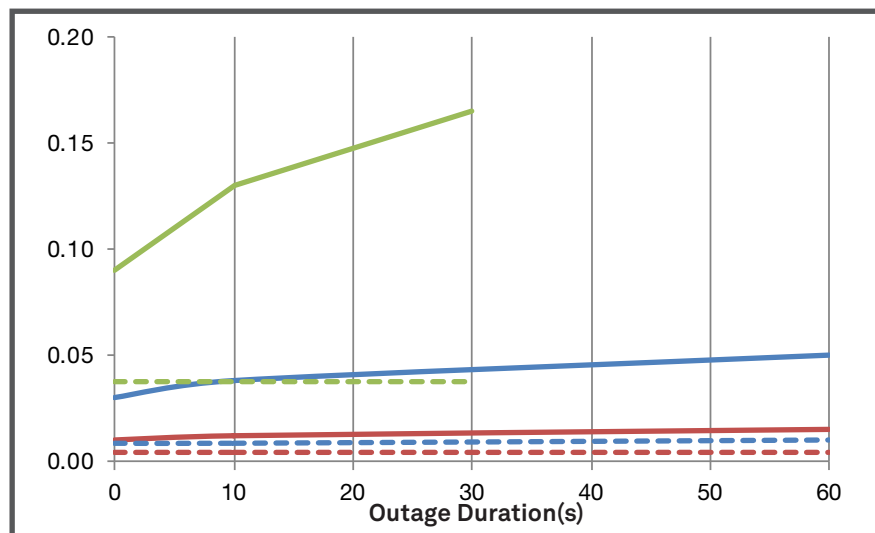
Roll Accuracy (degrees)



Pitch Accuracy (degrees)



Heading Accuracy (degrees)





About Hexagon | NovAtel®

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications. Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous — ensuring a scalable, sustainable future.

NovAtel, part of Hexagon, is a global technology leader, pioneering end-to-end solutions for assured positioning for land, sea, and air. NovAtel designs, manufactures and sells high precision positioning technology developed for efficient and rapid integration. Its solutions are empowering intelligent positioning ecosystems in vital industries that depend on the ability to tackle the most complex challenges in the most demanding environments. Learn more at novatel.com.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 3.8bn EUR. Learn more at hexagon.com and follow us @HexagonAB.

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