



Precise thinking

NovAtel's precise thinking makes it possible

NovAtel designs, markets and sells high-precision GPS and other positioning components and sub-systems used in a variety of commercial applications within the aviation, geomatics (surveying and mapping), mining, precision agriculture, marine and defense industries.

We put our precise thinking to work by developing products that combine hardware, such as receivers and antennas, with software to enable customers to fully integrate our high-precision GPS technology into their systems.

NovAtel is also the principal supplier of reference receivers to national aviation ground networks in the US, Japan, Europe, China and India.

To learn how NovAtel's precise thinking can benefit you, visit www.novatel.com.



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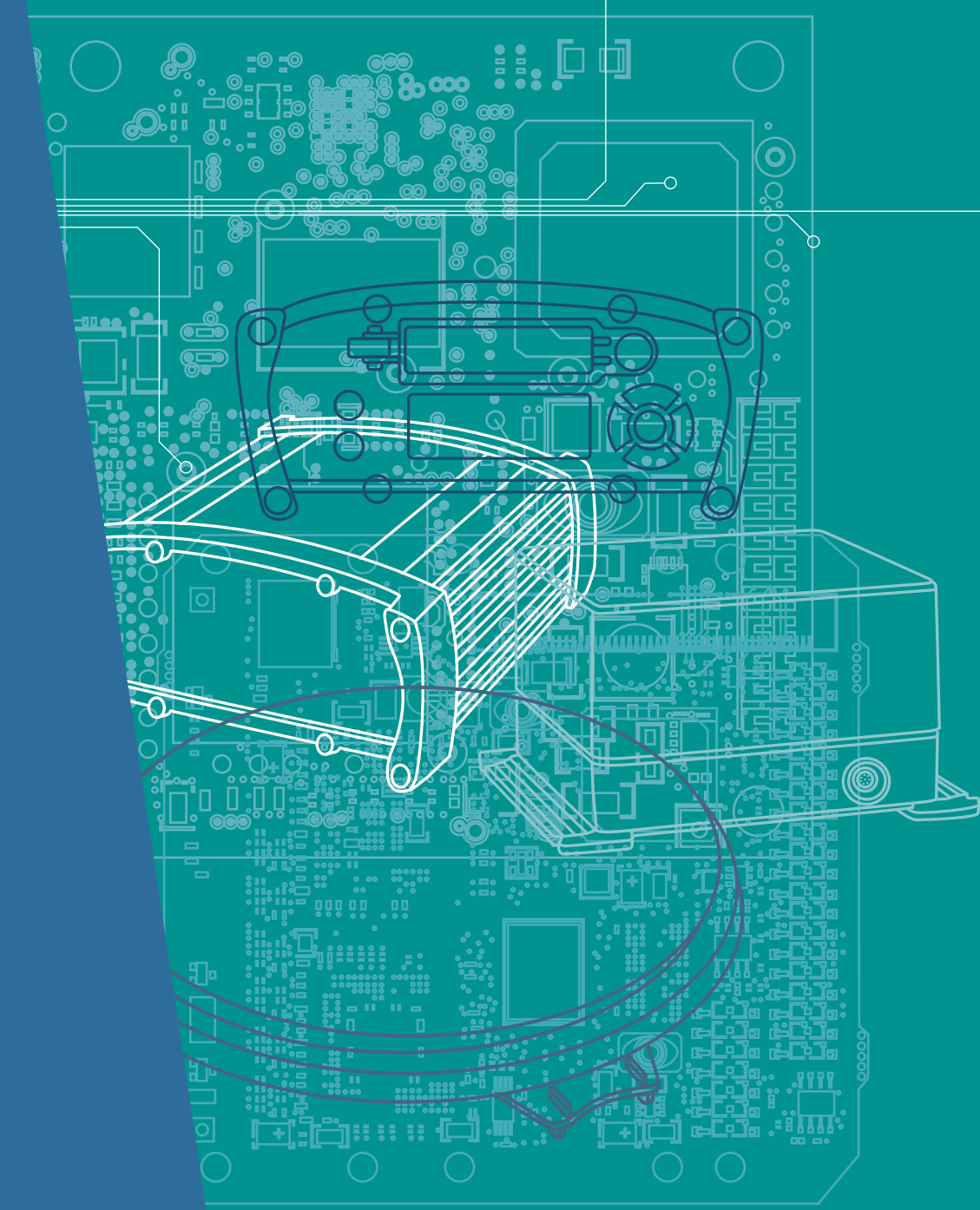
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SPAN™ Technology





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NovAtel's SPAN™ (Synchronized Position Attitude Navigation) Technology product features a tight integration of a NovAtel GPS receiver and an Inertial Measurement Unit. SPAN provides continuous operation through short GPS outages with accurate position and attitude measurements. Designed for dynamic applications, SPAN also provides precise velocity, acceleration and rotational measurements.

By complementing GPS with inertial measurements, SPAN Technology provides robust positioning in challenging conditions where GPS alone is less reliable. During short periods of GPS outage, or when less than four satellites are received, SPAN Technology offers uninterrupted position and attitude output. The tight coupling of inertial technology with GPS also provides the benefits of faster satellite reacquisition and faster RTK initialization after outages.

NovAtel's OEM4 and OEMV receivers are the processing engines of the SPAN Technology system. Separate GPS and IMU enclosures provide a simple modular system. This allows the IMU mounting at the most suitable location, while the GPS receiver is mounted where it is most convenient. System modularity also allows GPS-only users to upgrade to GPS/INS. In conditions where GPS alone is desired, the SPAN receiver can be operated independently. As a result, SPAN Technology provides a robust GPS and Inertial solution as well as a portable, high-performance GPS receiver in one system.



HG1700

The HG1700 is a low-cost IMU developed for missile guidance applications and features gyros with a bias of 1 degree to 10 degrees per hour.

- Low-cost tactical Ring Laser Gyro
- High accuracy and reliability
- Fast start-up and operation
- Data rate 100 Hz/600 Hz (100 Hz data supported by SPAN)

LN-200

The LN-200 uses state-of-art inertial fibre optic gyros and micro-machined accelerometers and features gyros with bias of 1 degree per hour to 10 degrees per hour. The LN-200 is widely used in a number of applications including stabilization, navigation and mapping.

- 3 solid-state fibre optic gyros
- 3 solid-state silicon accelerometers
- Small and lightweight
- High MTBF > 20,000 hours
- Data rate up to 400 Hz (200 Hz supported by SPAN)



iIMU-FSAS

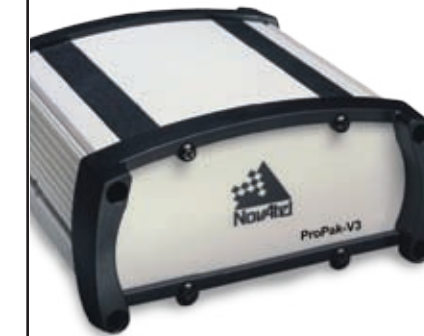
The iIMU-FSAS is a small-sized IMU consisting of 3 fibre optical gyros in closed-loop technology of class 0.75 deg/hr and 3 servo-accelerometers of class 1 mg. This IMU comes with an interface for direct operation with NovAtel's SPAN Technology solution. It is designed for rugged applications and is internally equipped with shock absorbers.

- 3 fibre optic gyros
- 3 servo-accelerometers
- High MTBF >35,000 hours
- Custom NovAtel SPAN interface
- Odometer interface (iMWS)
- Data rates up to 500 Hz (200Hz supported by SPAN)

ProPak-V3

NovAtel's ProPak-V3 can be used as either a base station or a rover and delivers the same easy-to-use interface of the ProPak-G2plus. All the features of the OEMV-3 are available within this enclosure, including GLONASS measurement capability, OmniSTAR or CDGPS correction services, L2C signal support and future support for the L5 GPS frequency.

- Features:
- Three high-speed RS232 and RS422 serial ports and USB 1.1 capability
 - External oscillator input, configurable event and mark inputs, PPS output
 - Support of peripheral devices, including an Inertial Measurement Unit (IMU) for combined GPS-inertial navigation
 - Fully qualified robust waterproof housing



Dimensions	IMU 94mm D X 74mm H. Enclosure: 193mm x 160mm x 100mm tall	IMU 89mm D x 85mm H Enclosure: 135mm x 153mm x 130mm tall	128 x 128 x 104 mm
Weight (input weight and enclosure)	< 0.73kg. ~ 3.4kg	< 0.75kg. ~ 3kg	2.1kg
IMU Power	< 8 W	12 W Steady State	16 W max.
System Power	12 W Steady State	18W Steady State	20 W Steady State
Gyro Technology:	Ring Laser Gyro	Fibre Optic Gyro	Fibre Optic Gyro
MTBF (hrs)	2,000	20,000	35,000
Gyro Bias	1°/hr to 10°/hr, 1	1°/hr to 10°/hr, 1	0.75°/hr

Size	185 x 154 x 71 mm	
Weight	1.0 kg	
Power Consumption	1.8 W typical	
Signals Tracked	GPS L1 L2 P(Y) , L2C L5	GLONASS L1 GLONASS L2 SBAS L-Band
Number of Channels:	14 L1, 14 L2, 6 L5 GPS 12 L1, 12 L2 GLONASS 2 SBAS L-Band	
Communication Ports	2 RS-232 or RS-422 1 RS-232	
Integrated L-band	OmniSTAR HP, XP & VBS	
Maximum Data Rate	20 Hz	
Real Time Performance (CEP)	RT-2 1 cm + 1 ppm OmniSTAR HP 10 cm RT-20 <20 cm OmniSTAR XP 20 cm DGPS 0.45 m	CDGPS 0.7 m WAAS 0.8 m OmniSTAR VBS 1.0 m WAAS L1 & WAAS L1/L2 accuracy
Time to First Fix	Cold Start 50 s Warm Start 40 s	Hot Start 30 s
Signal Reacquisition (typical)	L1 0.5 s L2 1.0 s	L5 1.0 s
Time Accuracy	20 ns RMS	
Operating Temperature	-40°C to +75°C	

Control and Display Unit

The NovAtel Control and Display Unit (CDU) is a modern Graphical User Interface used from a PC with Windows 2000 OS or newer. SPAN configuration is accomplished through a set of simple application wizards that allows the user to apply system setup and installation parameters. The CDU also allows the user to monitor a multitude of pertinent GPS and SPAN-related navigational information including both position and attitude data. The interface is also designed to provide the user a powerful real-time tool to quickly analyze specific quality measures important to SPAN applications. Additionally, data logging is supported in the NovAtel CDU software for post mission analysis and/or post-processing with Waypoint Inertial Explorer.

Inertial Explorer

Waypoint Inertial Explorer is a powerful post-processing software applied to GNSS, IMU, and wheel sensor data to improve accuracy and integrity compared to real-time solutions. Raw GPS and IMU data collected with a SPAN system is easily imported into Inertial Explorer. The product features Forward and Reverse processing of GNSS data to optimize the recorded trajectory and provide superior aiding to combine with IMU processing. A Rauch-Tung-Striebel smoother is employed to significantly reduce inertial error growth during GNSS data gaps for increased accuracy. Inertial Explorer allows multiple processing runs with different settings for optimal result accuracy.

