

FSAS SPAN

Features

35,000 hour MTBF

German commercial
export approved

200 Hz output rate

Synchronized GNSS and INS
output



SPAN™ Technology integrates the iMAR FSAS-EI-SN IMU with NovAtel precision GNSS for enhanced navigation performance.

Benefits of combined GNSS Inertial Navigation

NovAtel's SPAN Technology brings together two different, but complementary technologies: GNSS positioning and Inertial Navigation. The absolute accuracy of GNSS positioning and the stability of IMU gyro and accelerometer measurements combine to provide a 3D position, velocity and attitude solution. Unlike GNSS-only navigation systems, the solution is stable and continuously available, even through periods when GNSS signals are blocked.

Why NovAtel SPAN Technology?

The foundation of SPAN Technology is its tightly coupled design that affords exceptional GNSS performance in addition to superior bridging capability when GNSS reception is restricted. Tight integration means satellite data is utilized even when a GNSS position is unavailable.

Furthermore, SPAN Technology delivers dramatically faster GNSS signal reacquisition resulting in more GNSS measurements available to aid the inertial solution. This GNSS acquisition advantage results in enhanced RTK performance while maintaining precise inertial navigation during reduced satellite coverage. All GNSS and inertial data processing is performed onboard the OEMV receiver. The IMU is housed in a separate enclosure from the GNSS card, so the system remains modular. Existing Propak-V3 (RS-422) customers can upgrade their receivers to INS capable models by purchasing a firmware upgrade.

All configuration and data collection is done through the receiver's standard serial ports using a simple command and log interface. Once the hardware is installed, the system can be configured for operation in minutes.

Specific benefits of the iMAR-FSAS SPAN system

The FSAS-EI-SN IMU is manufactured in Germany by iMAR. The IMU features closed-loop technology with gyro biases of less than 0.75 degrees per hour and accelerometer biases of less than 1 mg. The IMU is triggered by the NovAtel receiver so that all IMU measurements are time synchronized to GNSS measurements. For commercial applications, this IMU is available within 2 months ARO and only German export approval is necessary.



Precise thinking

FSAS SPAN

SPAN System Performance¹

Position Accuracy

Single Point L1	1.8 m RMS
Single Point L1/L2	1.5 m RMS
WAAS L1 only	1.2 m RMS
WAAS L1/L2	0.9 m RMS
DGPS	0.45 m RMS
OmniSTAR	
VBS	0.7 m
XP	0.15 m
HP	0.1 m
RT-20 ²	0.2 m RMS
RT-2	1 cm + 1 ppm RMS

Velocity Accuracy **0.02 m/s RMS (nominal)**

Attitude Accuracy³

Pitch	0.015° RMS
Roll	0.015° RMS
Azimuth	0.041° RMS

Acceleration Accuracy **0.03 m/s² RMS**

Max Velocity⁴ **514 m/s**

Max Altitude⁴ **18,288 m**

Data Rate⁵

IMU Measurements	200 Hz
INS Position	200 Hz
INS Velocity	200 Hz
INS Attitude	200 Hz

IMU Performance

IMU-FSAS-EI-SN

Gyro Input Range	± 500 deg/sec
Gyro Rate Bias	<0.75 deg/hr
Gyro Rate Scale Factor	300 ppm
Angular Random Walk	0.1 deg/√hr
Accelerometer Range ⁶	± 5 g
Accelerometer Linearity/Scale Factor	400 ppm
Accelerometer Bias	1.0 mg

- 1 Typical values. Performance specifications subject to GPS system characteristics, US DOD operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length, multipath effects and the presence of intentional or unintentional interference sources.
- 2 Expected accuracy after static convergence.
- 3 When SPAN is in RTK mode.
- 4 Export licensing restricts operation to a maximum of 18,288 meters and 514 meters per second.
- 5 If raw IMU measurements are logged (200 Hz), the max rate position, velocity, attitude logs can be requested is 50 Hz.
- 6 GNSS receiver sustains tracking up to 4g.
- 7 These are RMS values, computed with respect to a full GPS RTK trajectory.

IMU Physical & Electrical

Size **128 x 128 x 104 mm**

Weight **2.1 kg**

Power

Power Consumption 16 W (max)
Input Voltage + 11 to 34 V

Input/Output Connectors

MIL-C-38999-III, 22 pin

Environmental

Temperature
 Operating -40°C to +71°C
 Storage -40°C to +85°C
Humidity 95% non-condensing

MTBF **35,000 hrs**

Performance During GNSS Outages⁷

Outage Duration	Positioning Mode	Position Error (m)		Velocity Error (m/s)		Attitude Error (degrees)		
		Horizontal	Vertical	Horizontal	Vertical	Roll	Pitch	Yaw
10 s	RTK	0.013	0.03	0.018	0.008	0.006	0.007	0.009
	DGPS	0.30	0.28	0.026	0.006	0.007	0.009	0.024
	SP	1.24	1.51	0.028	0.008	0.008	0.010	0.025
30 s	RTK	0.83	0.16	0.055	0.008	0.009	0.010	0.017
	DGPS	1.01	0.41	0.059	0.007	0.010	0.012	0.026
	SP	1.60	1.55	0.062	0.010	0.010	0.016	0.028
60 s	RTK	3.42	0.44	0.129	0.013	0.012	0.014	0.023
	DGPS	3.62	0.69	0.128	0.013	0.012	0.015	0.030
	SP	3.95	1.65	0.131	0.014	0.012	0.015	0.032



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