

SPAN[®] IMU- μ IMU-IC



HIGH PERFORMING MEMS IMU
COMBINES WITH NOVATEL'S GNSS
TECHNOLOGY TO PROVIDE 3D POSITION,
VELOCITY AND ATTITUDE SOLUTION



SPAN: WORLD-LEADING GNSS+INS TECHNOLOGY

Synchronous Position, Attitude and Navigation (SPAN) technology brings together two different but complementary technologies: Global Navigation Satellite Systems (GNSS) positioning and inertial navigation. The absolute accuracy of GNSS positioning and the stability of Inertial Measurement Unit (IMU) gyro and accelerometer measurements are tightly coupled to provide an exceptional 3D navigation solution that is stable and continuously available, even through periods when satellite signals are blocked.

OVERVIEW

The μ IMU features Northrop Grumman Litef GmbH's proven inertial measurement technology offering exceptional performance when paired with a NovAtel SPAN enabled receiver. The μ IMU interfaces with NovAtel's OEM6 and OEM7 receivers through a highly reliable IMU interface. IMU measurements are used by the SPAN receiver to compute a blended GNSS+INS position, velocity and attitude solution at up to 200 Hz. Small size, low weight and power consumption makes the μ IMU ideal for heading reference, flight control and stabilization applications.

The IMU- μ IMU is available as a complete assembly in an environmentally sealed enclosure. The μ IMU is also available as a stand alone OEM product that can be easily paired with a SPAN enabled GNSS receiver.

IMPROVE SPAN ACCURACY

Take advantage of NovAtel CORRECT[™] to receive your choice of accuracy and performance, from decimetre to RTK-level positioning. For more demanding applications, Inertial Explorer[®] post-processing software from our Waypoint[®] Product Group can be used to post-process SPAN IMU- μ IMU data to offer the highest level of accuracy with the system.

BENEFITS

- + Fully commercial MEMS IMU
- + Continuous, stable positioning
- + Easy integration with NovAtel's OEM6 and OEM7 series GNSS+INS receivers
- + Ideal for aerial and hydrographic survey as well as industrial applications

FEATURES

- + MEMS gyros and MEMS accelerometers
- + 200 Hz data rate
- + 10-34 VDC power input
- + SPAN GNSS+INS functionality

IMU- μ IMU-IC



SPAN SYSTEM PERFORMANCE¹

Horizontal Position Accuracy (RMS)

Single point L1/L2	1.2 m
NovAtel CORRECT	
» SBAS ²	60 cm
» DGPS	40 cm
» PPP ^{3, 4}	
TerraStar-L	40 cm
TerraStar-C	4 cm
» RTK	1 cm +1 ppm

Data Rate

IMU measurements	200 Hz
INS position	200 Hz
INS velocity	200 Hz
INS attitude	200 Hz

Time Accuracy⁵ 20 ns RMS

Max Velocity⁶ 515 m/s

IMU PERFORMANCE⁷

Gyroscope Performance

Input range	± 499 deg/sec
Bias stability	≤ 6 deg/hr
Scale factor error	≤ 1400 ppm
Angular random walk	≤ 0.3 deg/ $\sqrt{\text{hr}}$

Accelerometer Performance

Range ⁸	± 15 g
Bias repeatability	≤ 3 mg
Scale factor error	≤ 1500 ppm
Velocity random walk	≤ 0.25 mg/ $\sqrt{\text{Hz}}$

PHYSICAL AND ELECTRICAL

Dimensions

130 x 130 x 115 mm

Weight 2.57 kg

Power

Power consumption

11 W (typical)

Input voltage +10 to +34 V

Connectors

Power SAL M12, 5 pin, male

Data SAL M12, 4 pin, female

Wheel sensor
SAL M12, 8 pin, male

ENVIRONMENTAL

Temperature

Operating -40°C to +55°C

Storage -40°C to +80°C

Humidity

MIL-STD-810G(Ch1),
Method 507.6

Random Vibe

MIL-STD-810G(CH1),
Method 514.7 (2.0g)

Environment

MIL-STD-810G(Ch1),
Method 512.6
(IEC 60529 IP67)

INCLUDED ACCESSORIES

- Power cable
- Communication cable
- Wheel sensor cable

OPTIONAL ACCESSORIES

- Mounting plate
- Inertial Explorer post-processing software



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Version 2 Specifications subject to change without notice.

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PERFORMANCE DURING GNSS OUTAGES^{1,9}

Outage Duration	Positioning Mode	POSITION ACCURACY (M) RMS		VELOCITY ACCURACY (M/S) RMS		ATTITUDE ACCURACY (DEGREES) RMS		
		Horizontal	Vertical	Horizontal	Vertical	Roll	Pitch	Heading
0 s	SP	1.00	0.60	0.015	0.010	0.010	0.010	0.030
	RTK ¹⁰	0.02	0.03	0.015	0.010	0.010	0.010	0.030
	PP ¹¹	0.01	0.02	0.010	0.010	0.005	0.005	0.009
10 s	SP	1.10	0.68	0.030	0.013	0.017	0.017	0.038
	RTK ¹⁰	0.16	0.10	0.030	0.013	0.017	0.017	0.038
	PP ¹¹	0.01	0.02	0.020	0.010	0.005	0.005	0.009
60 s	SP	4.25	1.25	0.150	0.020	0.025	0.025	0.050
	RTK ¹⁰	3.55	0.75	0.150	0.020	0.025	0.025	0.050
	PP ¹¹	0.15	0.05	0.02	0.01	0.006	0.006	0.010

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. GPS-only.

3. Requires subscription to TerraStar data service. Subscriptions available from NovAtel.

4. TerraStar service available depends on the SPAN receiver used. See the receiver product sheet for details.

5. Time accuracy does not include biases due to RF or antenna delay.

6. Export licensing restricts operation to a maximum of 515 metres/second.

7. Supplied by IMU manufacturer.

8. GNSS receiver sustains tracking up to 4 g.

9. Steady state and outage performance remains the same for the -L model.

10. 1 ppm should be added to all values to account for additional error due to baseline length.

11. Post-processing results using Inertial Explorer software.