SPAN CPT7
Compact Dual Antenna SPAN Enclosure Delivers 3D Position, Velocity and Attitude

SPAN: World-Leading GNSS+INS Technology
Synchronous Position, Attitude and Navigation (SPAN) technology brings together two different but complementary technologies: Global Navigation Satellite System (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.

SPAN CPT7 Overview
The SPAN CPT7 is a compact, single enclosure GNSS+INS receiver, powered by Hexagon | NovAtel’s world class OEM7® technology. Capable of delivering up to centimetre-level accuracy, customers can choose from a variety of positioning modes to ensure they have the optimal level of accuracy for their application.

The SPAN CPT7 contains a high performing and highly reliable Honeywell HG4930 Micro Electromechanical System (MEMS) IMU to deliver leading-edge NovAtel SPAN technology in an integrated, single enclosure solution. It provides tactical grade performance for unmanned vehicles, mobile mapping and other commercial and/or military guidance applications. The SPAN CPT7 is a small, lightweight and low power solution with multiple communication interfaces for easy integration on multiple platforms.

SPAN CPT7 Advantages
The tight coupling of the GNSS and IMU measurements delivers the most satellite observations and the most accurate, continuous solution possible. Further, SPAN CPT7 is comprised entirely of commercial components, simplifying export restrictions involved with traditional GNSS+INS systems.

Improve SPAN CPT7 Accuracy
SPAN CPT7 provides your choice of accuracy and performance, from decimeter to RTK-level positioning. For more demanding applications, Inertial Explorer® post-processing software can be used to post-process SPAN data to provide the system’s highest level of accuracy.

Benefits
- High performance SPAN solution
- Small, low power, all-in-one GNSS/INS enclosure
- Easy integration into space and weight constrained applications
- Commercially exportable system
- Rugged design ideal for challenging environments
- Enhanced connection options including serial, USB, CAN and Ethernet
- Future proof for upcoming GNSS signal support

Features
- MEMS Gyros and Accelerometers
- Small size, rugged and lightweight
- TerraStar® correction services supported over multi-channel L-Band and IP connections
- Advanced interference mitigation features
- SPAN GNSS+INS capability with configurable application profiles
- Dual antenna ALIGN® heading
SPAN System Performance

Channel Count
555 Channels

Signal Tracking
- GPS L1 C/A, L1C, L2C, L2P, L5
- BeiDou B1, B1C, B2I, B2A
- Galileo E1, E5 AltBOC, E5a, E5b
- NavIC (IRNSS) L5
- SBAS L1, L5
- QZSS L1 C/A, L1C, L2C, L5
- L-Band (Primary RF only)

up to 5 channels

Horizontal Position Accuracy (RMS)

- Single Point L1 1.5 m
- Single Point L5 1.2 m
- SBAS 70 cm
- DGPS 40 cm
- TerraStar-C PRO 2.5 m
- TerraStar-X 2.0 m
- RTK 1 cm + 1 ppm
- Initialization time < 1 s
- Initialization reliability > 99.9%

ALIGN Heading Accuracy
Baseline Accuracy (RMS)
2 m 0.08 deg
4 m 0.05 deg

Heave Performance

- Instantaneous Heave 5 cm or 5%
- Delayed Heave 3.5 cm or 3.5%
- Post-Processed Heave 2.5 cm or 2.5%

Maximun Data Rate
- IMU Raw Data Rate 200 Hz
- INS Solution Up to 200 Hz

Time to First Fix
- Cold start < 39 s (typ)
- Hot start < 20 s (typ)

Signal Reacquisition
- L1 < 0.5 s (typ)
- L2/L5 < 1.0 s (typ)

Time Accuracy 20 ns RMS

Velocity Accuracy < 0.03 m/s RMS

Velocity Limit 515 m/s

IMU Performance

- Gyroscope Performance Technology MEMS
- Input rate (max) ±200°/s

- Accelerometer Performance Technology MEMS
- Range ±20 g

IMU Raw Data Rate 100 Hz

Physical and Electrical

Dimensions 90 x 60 x 60 mm
Weight 500 g
Power
- Power consumption 7 W (typ)
- Input voltage +9 to +32 VDC

Performance During GNSS Outages

<table>
<thead>
<tr>
<th>Outage Duration</th>
<th>Positioning Mode</th>
<th>Position Accuracy (m) RMS</th>
<th>Velocity Accuracy (m/s) RMS</th>
<th>Attitude Accuracy (Degrees) RMS</th>
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</thead>
<tbody>
<tr>
<td>0 s</td>
<td>RTK</td>
<td>0.02</td>
<td>0.015</td>
<td>0.010</td>
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<tr>
<td></td>
<td>PPP</td>
<td>0.06</td>
<td>0.15</td>
<td>0.010</td>
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<td></td>
<td>SP</td>
<td>1.00</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-Processed</td>
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<td>0.02</td>
<td>0.015</td>
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<tr>
<td>10 s</td>
<td>RTK</td>
<td>0.12</td>
<td>0.08</td>
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<td>PPP</td>
<td>0.16</td>
<td>0.20</td>
<td>0.035</td>
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<tr>
<td></td>
<td>SP</td>
<td>1.10</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-Processed</td>
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<td>0.02</td>
<td>0.020</td>
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<tr>
<td>60 s</td>
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<td>0.02</td>
<td>0.020</td>
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</tbody>
</table>

1. Typical SPAN system performance values when using this IMU. Performance specifications subject to GNSS system characteristics, Signal-in-Space (SIS) operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length, multipath effects and the presence of intentional or unintentional interference. 2. Model-configurable to only L1/E5a 1145.4 MHz and L2 1020.0 MHz. 3. Requires PRS (Guard Signal) L1C and L5C. 4. Requires IGS (International GPS Service) products. 5. Requires IGS (International GPS Service) products. 6. Requires 1 ppm error due to additional error due to baseline length. 7. Requires 1 ppm error due to additional error due to baseline length. 8. Requires sub-meter accuracy of almanac and ephemeris or approximate position or time. 9. Typical values. Almanac and ephemeris accuracy varies depending on position and time of day. 10. Typical time accuracy includes ionospheric and tropospheric delay. 11. Manufacturer’s specifications are subject to change without notice. 12. Outage statistics were calculated by taking the RMS of the maximum errors over a minimum of 30 complete GNSS outages. Each outage was followed by 120 seconds of full GNSS availability before the next outage was applied. High accuracy GPS updates (fixed ambiguities) were available immediately before and after each outage. The survey data used to generate these statistics had frequent changes in azimuth. 21. Outage performance achieved with one antenna.

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