SMART7-S

GNSS SMART antenna featuring powerful OEM7 and SPAN technology from Hexagon | NovAtel

Maximum performance

The OEM7 receiver and VEXXIS antenna inside the SMART7-S allow it to receive GPS, GLONASS, BeiDou, Galileo and QZSS signals. Multiple GNSS signals deliver better satellite availability under variable terrain and environmental conditions. The SMART7-S also receives L-Band signals providing easy access to the world-wide correction signals provided by TerraStar.

Integrated inertials

The SMART7-S includes deeply-coupled GNSS+Inertial Navigation System (INS) SPAN technology and is optimized for the unique dynamics commonly experienced in demanding applications like precision agriculture and machine control. SPAN technology provides accurate attitude information and terrain compensation that can simplify the development of vehicle guidance systems and bridge GNSS signal outages caused by trees, buildings and other obstacles.

ALIGN

ALIGN technology from NovAtel is optionally supported when combined with a second SMART7 or NovAtel receiver to provide relative heading and position that can be used to guide accessory vehicles.

Maximum accuracy

The SMART7-S can provide a range of performance accuracies from dual-frequency GLIDE to full centimetre-level RTK. TerraStar services provide decimetre or centimetre-level accuracy using globally transmitted satellite corrections.

Maximum connectivity

The SMART7-S supports RS-232 and CAN bus communications. Optional 2.4 GHz Wi-Fi and 10/100 Ethernet connectivity allows connection to a vehicle's Wi-Fi network, routers, terminals or other SMART7 antennas. Wi-Fi and Ethernet connectivity can also be used to receive RTK or TerraStar corrections over NTRIP.

Durable, field-ready design

This rugged SMART7-S antenna is enclosed in a durable, waterproof housing that meets MIL-STD-810G environmental standards for many years of reliable use in the field. Magnetic and screw mounting is supported.

Benefits

- Centimetre-level accuracy using TerraStar-C PRO, TerraStar-X and RTK
- High quality measurements and stable phase centre for precision applications
- Integrated IMU for accurate vehicle attitude, terrain compensation and bridging of GNSS outages
- Simplified setup and configuration with optional onboard Setup & Monitor (Web) and wireless connectivity

Features

- GPS, GLONASS, BeiDou, Galileo, QZSS plus TerraStar correction signal reception
- Simultaneously track up to 3 TerraStar Correction Service satellites
- Optional heading and relative positioning using ALIGN
- Integrated NTRIP client using optional Ethernet/Wi-Fi interface
- Advanced ISOBUS-compatible CAN interface supports NMEA2000, NovAtel messages and firmware updates
- Precision Time Protocol (PTP) support using optional Ethernet interface

Performance[1]

Signal tracking

GPS	L1 C/A, L1C, L2C, L2P, L5
GLONASS[2]	L1 C/A, L2 C/A, L2P, L3, L5
Galileo[3]	E1, E5 AltBOC, E5a, E5b, E6
BeiDou	B1I, B1C, B2I, B2a, B2b, B3I
QZSS	L1 C/A, L1C, L1S, L2C, L5, L6
NavIC (IRNSS)	L5
SBAS	L1, L5
L-Band	up to 5 channels

Horizontal position accuracy	(RMS)
Single point L1/L2	1.2 m
SBAS[4]	60 cm
DGPS	40 cm
TerraStar-L[5, 6]	40 cm
TerraStar-C PRO[5, 6]	2.0 cm
TerraStar-X[5, 6]	2.0 cm
RTK	1 cm + 1 ppm
	(95%)
Single point L1/L2	2.4 m
SBAS[4]	120 cm
DGPS	80 cm
TerraStar-L[5, 6]	50 cm
TerraStar-C PRO[5, 6]	2.5 cm
TerraStar-X[5, 6]	2.5 cm
RTK	2.5 cm + 1 ppm

Pass-to-pass accuracy (95%)	
L1/L2 GLIDE single point	35 cm
TerraStar-L	15 cm
TerraStar-C PRO	2 cm

Maximum data rate	
Measurements	up to 20 Hz
Position	up to 20 Hz
INS solution	up to 200 Hz

Time to first fix[7]	
Cold start	<34 s (typical)
Hot start	<20 s (typical)

Signal reacquisition	
L1	<0.5 s (typical)
L2	<1.0 s (typical)

Velocity accuracy	<0.03 m/s RMS
Time accuracy[8]	<5 ns RMS

Attitude accuracy (deg)[9]	(95%)	(RMS)
Roll	0.06	0.03
Pitch	0.06	0.03
Heading	0.5	0.1

Physical and electrical

Dimensions	220 L x 192 W x 66 H mm
Weight	<1.1 kg

Connectors
14-pin Tyco Ampseal
Optional M12 D-Coded

Mounting
4 x M4 screw inserts
Integrated magnetic mount

Power	
Input voltage range	+7 to +30 VDC
Power consumption[10]	4 W (typical)

Status LEDs
Multi-colored, daylight viewable

Communication ports

RS-232 dedicated ports	3
CAN Bus	1
1 PPS	1
Ground speed output	1
Wi-Fi	optional
Ethernet	optional

Environmental

Temperature	
Operating	-40°C to +70°C
Storage	-45°C to +80°C

Humidity	MIL-STD-810G(CH1) Method 507.6
Immersion	MIL-STD-810G(CH1) Method 512.6
Shock	MIL-STD-810G(CH1) Method 516.7
Solar radiation	EN60950-22 8.2 ISO 9022-9, Method 20, Severity Degree 03
Salt fog	IEC 60068-2-11
Sand and dust	MIL-STD-810G(CH1), Method 510.5
Vibration random	MIL-STD-810G(CH1), Method 514.7
Ingress protection rating	IP67, IP69

Compliance

FCC, ISED, CE, E-Mark and Global Type Approvals

Standard features

- 20 Hz data rates
- Field upgradable software
- PAC multipath mitigating technology
- Differential correction support for RTCM 2.1, 2.3, 3.0, 3.1, CMR, CMR+ and RTCA
- Navigation output support for NMEA 0183 and detailed NovAtel ASCII and binary logs
- GLIDE smoothing algorithm
- 1 PPS output
- Ground speed output

Correction services

- TerraStar-L
- TerraStar-C PRO
- TerraStar-X
- RTK ASSIST
- RTK ASSIST PRO

Available hardware options

- SMART7-S with SPAN
- SMART7-SI with SPAN, Wi-Fi and Ethernet

Firmware solutions

- GLONASS tracking
- Galileo tracking
- BeiDou tracking
- L-Band tracking
- ALIGN
- RTK
- SPAN
- Precision Time Protocol (PTP) with SMART7-SI

Optional accessories

- Mounting plate
- Interface cable
- RELAY7

Performance during GNSS outages[1, 11]

Outage duration	Positioning mode	Accumulated position error (m) RMS		Accumulated velocity error (m/s) RMS		Accumulated attitude error (degrees) RMS	
		Horizontal	Vertical	Horizontal	Vertical	Roll/Pitch	Heading
10 s	All	0.50	0.20	0.075	0.020	0.030	0.150

1. *Typical values under ideal, open sky conditions.*
2. *Hardware ready for L5.*
3. *E1bc and E6bc support only.*
4. *GPS only.*
5. *Requires subscription to TerraStar data service.*
6. *RMS/95% accuracy under ideal conditions and may vary based upon user's geographic region, ionospheric activity, scintillation levels, GNSS availability and constellation health, multipath conditions and presence of interference sources.*
7. *Cold start: no almanac or ephemerides and no approximate position or time.*
   Hot start: almanac and recent ephemerides saved and approximate position and time entered.
8. *Time accuracy does not include biases due to RF or antenna delay.*
9. *With SPAN model firmware installed.*
10. *Power consumption values for GPS L1/L2.*
11. *10s Outages are the Position/Velocity/Attitude error that has accumulated over the GNSS outage duration, initial accuracies are dependent on the positioning mode in which you are operating.*

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