

# SMART7-S™



## GNSS SMART ANTENNA FEATURING NOVATEL'S POWERFUL OEM7® AND SPAN® TECHNOLOGY

### MAXIMUM PERFORMANCE

The 555 channel 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 NovAtel's tightly-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 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

NovAtel® ALIGN® technology is optionally supported when combined with a second SMART7 or NovAtel receiver to provide relative heading and velocity 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 centimeter level RTK. TerraStar services provide decimeter or centimeter 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.

### 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. Wi-Fi and Ethernet connectivity can also be used to receive RTK or TerraStar corrections over NTRIP.



### BENEFITS

- + Centimeter level TerraStar-C PRO and RTK accuracy
- + High quality measurements and stable phase center for precision applications
- + Integrated SPAN for accurate vehicle attitude, terrain compensation and bridging of GNSS outages
- + Simplified setup and configuration with optional on board Web UI 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

For more information about our SMART antenna products, visit [www.novatel.com/smart-antennas](http://www.novatel.com/smart-antennas)

## PERFORMANCE<sup>1</sup>

### Channel Configuration

555 channels

### Signal Tracking

GPS	L1, L2, L2C, L5
GLONASS	L1, L2
Galileo	E1, E5a/b, E5 AltBOC
BeiDou	B1I, B1C, B2I, B2a
QZSS	L1, L2
SBAS	L1
L-Band	

### Horizontal Position Accuracy (RMS)

Single point L1/L2	1.2 m
SBAS <sup>2</sup>	60 cm
DGPS	40 cm
TerraStar-L <sup>3,4</sup>	40 cm
TerraStar-C PRO <sup>3,4</sup>	2.5 cm
TerraStar-X <sup>3,4</sup>	2.0 cm
RTK	1 cm + 1 ppm

### (95%)

Single point L1/L2	2.4 m
SBAS <sup>2</sup>	120 cm
DGPS	80 cm
TerraStar-L <sup>3,4</sup>	50 cm
TerraStar-C PRO <sup>3,4</sup>	3 cm
TerraStar-X <sup>3,4</sup>	2.5 cm
RTK	2.5 cm + 2 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	Up to 200 Hz

### Time to First Fix

Cold start <sup>5</sup>	<40 s (typical)
Hot start <sup>6</sup>	<20 s (typical)

### Signal Reacquisition

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

### Velocity Accuracy<sup>7</sup>

0.03 m/s RMS

### Time Accuracy<sup>8</sup>

20 ns RMS

### Attitude Accuracy (deg)<sup>9</sup>

	(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<sup>10</sup>  
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 Method 507.6

### Immersion

MIL-STD-810G Method 512.6

### Shock

MIL-STD-810G 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 Method 510.5

### Vibration

Random MIL-STD-810G,  
Method 514.7

### Ingress Protection Rating

IP67

## COMPLIANCE

FCC, ISED, CE, E-Mark

## 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
- 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

## OPTIONAL ACCESSORIES

- Mounting plate
- Interface cable

For the most recent details of this product contact NovAtel Customer Support: [www.novatel.com/support](http://www.novatel.com/support)

## novatel.com

sales@novatel.com

1-800-NOVATEL (U.S. and Canada) or 403-295-4900

China 0086-21-68882300

Europe 44-1993-848-736

SE Asia and Australia  
61-400-883-601

**Version 3** Specifications subject to change without notice.

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## PERFORMANCE DURING GNSS OUTAGES<sup>1, 11</sup>

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	0.030	0.150

<sup>1</sup> Typical values (open sky conditions). 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 sources.

<sup>2</sup> GPS only.

<sup>3</sup> Requires subscription to TerraStar data service. Subscriptions available from NovAtel.

<sup>4</sup> 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.

<sup>5</sup> Typical value. No almanac or ephemerides and no approximate position or time.

<sup>6</sup> Typical value. Almanac and recent ephemerides saved and approximate position and time entered.

<sup>7</sup> Export licensing restricts operation to a maximum of 5.15 metres per second.

<sup>8</sup> Time accuracy does not include biases due to RF or antenna delay.

<sup>9</sup> With SPAN model firmware installed.

<sup>10</sup> Power consumption values for GPS L1/L2.

<sup>11</sup> 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.