

AntaRx-Si3

GNSS/INS smart antenna in an ultra-rugged housing



Triple-band, multi-constellation smart antenna delivering reliable centimeter-level positioning together with 3D orientation in challenging environments. Thanks to the built-in inertial sensor, it provides orientation (heading, pitch and roll) as well as dead reckoning making it ideal for systems that require positioning under any condition.

KEY FEATURES

- ▶ **All-in-one GNSS receiver, inertial sensor and an antenna combined in a single ultra-robust IP69k-rated housing**
- ▶ **Heading with single or dual GNSS antenna**
- ▶ **Pitch and roll**
- ▶ **Centimetre-level (RTK) enhanced by an IMU**
- ▶ **Septentrio GNSS+ algorithms for reliable performance**
- ▶ **Integrated cellular modem**

BENEFITS

Consistently accurate position and orientation

AntaRx-Si3 is a state-of-the-art GNSS receiver designed to provide robust and reliable positioning and 3D attitude in the most challenging environments. Multi-constellation, multi-frequency RTK is further enhanced by a powerful GNSS/INS integration for best positioning performance and heading, pitch and roll angles. While a single antenna allows a lean configuration, adding an auxiliary GNSS antenna enables heading measurement without the need for movement.

Centimetre accuracy

Septentrio's knowledge and experience in the GNSS industry ensures that AntaRx-Si3 offers you the highest possible accuracy, down to a centimetre. LOCK+ technology maintains tracking during heavy vibration and IONO+ ensures position accuracy even under periods of elevated ionospheric activity. The AntaRx-Si3 offers the very latest in special interference mitigation technology which filters out ambient intentional and unintentional RF interference.

Any device, any platform

Keep the hardware installation as simple as possible with this all-in-one solution which combines a receiver, an IMU sensor and a GNSS antenna in a single enclosure. Use any device with a web browser to operate the AntaRx-Si3 without any special configuration software via the Web UI accessible over Ethernet or USB connections.

FEATURES

GNSS technology

544 Hardware channels for simultaneous tracking of most visible signals:

- ▶ GPS: L1 C/A, L1C¹, L2C, L2 P, L5
- ▶ GLONASS: L1 C/A, L2 C/A
- ▶ BeiDou: B1I, B2I, B3I
- ▶ Galileo: E1, E5a, E5b, E5 AltBOC
- ▶ QZSS: L1 C/A, L2C, L5
- ▶ SBAS: EGNOS, WAAS, GAGAN, MSAS, SDCM

Septentrio's patented GNSS+ technologies

- ▶ **AIM+** unique mitigation and monitoring system against narrow and wideband interference with spectrum analyser
- ▶ **FUSE+** fusion of RTK positioning with an inertial sensor
- ▶ **IONO+** advanced scintillation mitigation
- ▶ **APME+** a posteriori multipath estimator for code and phase multipath mitigation
- ▶ **LOCK+** superior tracking robustness under heavy mechanical shocks or vibrations
- ▶ **RAIM+** Receiver Autonomous Integrity Monitoring

RTK (base and rover)

Integrated 4-channel L-band receiver

Moving base

GNSS heading & pitch or heading & roll

16 GB internal memory

Formats

Septentrio Binary Format (SBF), fully documented with sample parsing tools
 RTCM v2x and 3x (MSM included)
 CMR 2.0 and CMR+ (CMR+ input only)
 NMEA 0183, v3.01, v4.0
 NMEA 2000

Connectivity

2 Hi-speed serial ports (RS232/RS422)

Ethernet port (TCP/IP and UDP)

CAN port

High-speed USB

2 Event markers

xPPS output (max. 100 Hz)

Integrated Cellular Modem (EDGE, 2G, 3G, 3.5G, 4G)

PERFORMANCE

Integrated position accuracy ^{2,3}

	Horizontal	Vertical
Standalone	1.2 m	1.9 m
SBAS	0.6 m	0.8 m
DGPS	0.4 m	0.7 m

RTK-INS ^{2,3,6}

Horizontal accuracy	0.6 cm + 0.5 ppm	
Vertical accuracy	1 cm + 1 ppm	
Initialisation	7 s	

Integrated attitude accuracy ^{2,3,6}

	Non RTK mode	RTK mode
Heading, dual antenna	0.3°	0.15°
Heading, single antenna	0.3°	0.2°
Pitch/roll, dual antenna	0.04°	0.02°

INS velocity ^{2,3,6}

	Non RTK mode	RTK mode
Velocity	0.05 m/s	0.02 m/s

IMU performance

Gyroscope performance

Input range	± 500°/s
Bias in-run instability	2.7°/hr
Random walk / noise density	0.15 - 0.2°/√hr

Accelerometer performance

Input range	± 8 g
Bias in-run instability ¹¹	2.7 - 4.4 µg
Random walk / noise density ¹¹	17.0 - 24.8 µg/√Hz

Maximum update rate

Integrated position	100 Hz
Latency ⁷	< 20 ms
GNSS measurements	2 Hz
IMU raw data	200 Hz

Time precision

xPPS out	5 ns
Event accuracy	< 20 ns

Time to first fix

Cold start ⁹	< 45 s
Warm start ¹⁰	< 20 s
Re-acquisition avg.	avg 1 s

Tracking performance (C/N0 threshold)

Tracking	20 dB-Hz
Acquisition	33 dB-Hz

PHYSICAL AND ENVIRONMENTAL

Size 158 x 166 x 83mm

Weight 1.1 kg

Input voltage 9-48 VDC

Power consumption 8 W typical

Operating temperature -30° C to +70° C

Solar radiation cycle A1 (MIL-STD-810H)

Storage temperature -40° C to +75° C

Humidity up to 100% RH (IEC 60068-2-38)

Ingress Protection IP69K (ISO 20655)

Shock 50g (ISO 16750-3)

Vibration 6g RMS (ISO 16750-3)

Connectors

Auxiliary antenna TNC female

Power & I/O 23 pin Souriau UTS type

Certification

RoHS, WEEE, CE, ISO 9001-2015



¹ Hardware ready

² Optional feature

³ Open sky conditions

⁴ RMS levels

⁵ RTK fixed ambiguities

⁶ Baseline < 40 Km

⁷ 99.9%

⁸ Including software compensation of sawtooth effect

⁹ No information available (no almanac, no approximate position)

¹⁰ Ephemeris and approximate position known

¹¹ Z-axis (lower value is for X & Y)

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