

AsteRx SBi3 Pro

Ruggedized receiver for high-accuracy positioning and orientation



Precision Agriculture



Robotics



UAV



Logistics

AsteRx SBi3 Pro GNSS/INS multi-frequency receiver delivers 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. This housed high-performance GNSS/INS system is ideal for rapid integration into machine control or ground robotic applications.

KEY FEATURES

- ▶ **Centimeter-level GNSS positioning enhanced by an IMU and optionally vehicle velocity**
- ▶ **Heading with a single or dual GNSS antenna**
- ▶ **Pitch and roll**
- ▶ **Robust and compact IP68 weatherproof housing**
- ▶ **AIM+ Advanced Interference Mitigation technology, as part of the GNSS+ algorithm suite**

Reliable and robust

The AsteRx SBi3 Pro is a state-of-the-art GNSS/INS rover receiver designed to provide robust and reliable position and 3D attitude in the most challenging of conditions. Septentrio's renowned multi-constellation, multi-frequency RTK is further enhanced by a powerful GNSS/INS integration that allows to have accurate heading, pitch and roll using a single antenna for the most efficient and lean integration. It features Advanced Interference Mitigation (AIM+) technology which can suppress the widest variety of interferers, from simple continuous narrowband signals to the most complex wideband and pulsed jammers.

Ease of use

The integrated positioning + orientation solution of AsteRx SBi3 Pro streams out into several wired connectors. With clear marking of the inertial reference point together with a sturdy mounting connector it is an ideal system for those who are looking for an intuitive GNSS/INS, ready for production.

Easy-to-integrate

The AsteRx SBi3 Pro provides a full GNSS/INS system in a single easy to mount, low weight and low power box. With a quick and easy fit into any type of application it ensures reduced integration time and fast time to market. Septentrio's intuitive software tools (WebUI, RxTools) make it easy to integrate, configure and control the AsteRx SBi3 Pro. All of its interfaces, commands and data messages are fully documented.

AsteRx SBI3 Pro

FEATURES

GNSS signals

544 Hardware channels for simultaneous tracking of most visible signals:

- ▶ GPS: L1 C/A, L1C, L2C, L2 P, L5
- ▶ GLONASS: L1 C/A, L2C/A
- ▶ BeiDou: B1I, B2I, B3I
- ▶ Galileo: E1, E5a, E5b
- ▶ SBAS: EGNOS, WAAS, GAGAN, MSAS, SDCM

Septentrio's patented GNSS+ technologies

- ▶ **AIM+** unique anti-jamming and monitoring system against narrow and wideband interference with spectrum analyser
- ▶ **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)

Formats

Septentrio Binary Format (SBF), fully documented with sample parsing tools
 NMEA 0183, v3.01, v4.0
 RTCM v2.x, v3.x (MSM messages included)
 CMR v2.0 and CMR+

Connectivity

3 Hi-speed serial ports (RS232)
 Ethernet port (TCP/IP, UDP, LAN 10/100 Mbps)
 Power over ethernet
 1 High-speed/full-speed USB device port
 2 Event markers
 NTRIP (client)

Dead reckoning positioning and attitude accuracy ^{2,8}

GNSS/INS

Duration (s)	Horizontal (m)	Vertical (m)	Heading (deg)	Pitch/roll (deg)
5	0,106	0,04	0,35	0,04
10	0,306	0,06	0,35	0,06
30	3,006	0,25	0,4	0,1

PERFORMANCE

Integrated position accuracy ^{1,2}

	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 ^{1,2,3}

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

Integrated attitude accuracy ^{1,2,3}

	Non RTK mode	RTK mode
Heading	0.3°	0.2°
Pitch/roll	0.04°	0.02°

INS velocity ^{1,2,3}

	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 ⁴	0.15 - 0.2°/√hr

Accelerometer performance

Input range	±8 g
Bias in-run instability ⁴	2.7 - 4.4 µg
Random walk / noise density ⁴	17.0 - 24.8 µg/√Hz

Maximum update rate

Integrated position	10 Hz
Latency ⁷	<20 ms

Time precision

xPPS out	5 ns
Event accuracy	< 20 ns

Time to first fix

Cold start ⁵	< 45 s
Warm start ⁶	< 20 s
Re-acquisition avg.	avg 1 s

Tracking performance (C/N0 threshold)

Tracking	20 dB-Hz
Acquisition	33 dB-Hz

PHYSICAL AND ENVIRONMENTAL

AsteRx SBI3

Size	102 × 36 × 118 mm 4.0 × 1.4 × 4.6 in
Weight	490 g / 17.3 oz
Input voltage	4.5 to 36 VDC

Power consumption

GPS/GLO L1/L2	1.3 W
All signals, all GNSS constellations	1.5 W
Maximum	2.5 W

Connectors

Antenna	TNC female
ETH	ODU 4 pins female
COM1/GPIO	ODU 7 pins female
PWR/USB/COM2/COM3	ODU 7 pins female

Antenna

Output voltage	5 VDC
Maximum current	150 mA

Environment

Operating temperature	-30° C to +65° C -22° F to +149° F
Storage temperature	-40° C to +75° C -40° F to +167° F

Humidity MIL-STD-810G, Method 507.5, Procedure I
 Dust MIL-STD-810G, Method 510.5, Procedure I
 Shock MIL-STD-810G, Method 516.6, Procedure I/II
 Vibration MIL-STD-810G, Method 514.6, Procedure I

Certification

RoHS, WEEE, ISO 9001-2015



¹ Open-sky conditions

² RMS levels

³ Baseline < 40 Km

⁴ Z-axis (lower value is for X & Y)

⁵ No information available (no almanac, no approximate position)

⁶ Ephemeris and approximate position known

⁷ 98% of samples

⁸ RTK fix before outage

⁹ Using high accuracy and low latency velocity input

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