

# AsteRx-i S

GNSS/INS positioning and attitude receiver

Contact us for product details and pricing

NavtechGPS

+1-703-256-8900 or 800-628-0885  
info@NavtechGPS.com  
www.NavtechGPS.com



UAV



Mapping



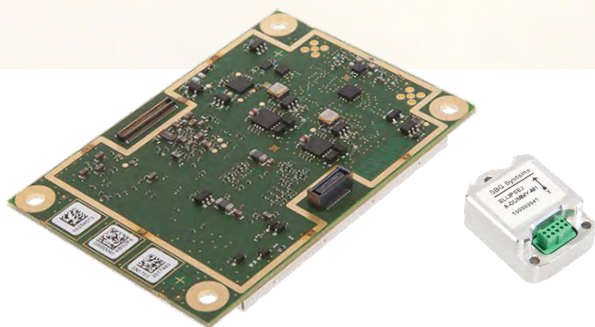
Automation



Logistics



Autonomous



**AsteRx-i S processes high-quality data, from the dual antenna multi-frequency AsteRx GNSS receiver with IMU-measurements to generate an accurate and reliable position and orientation.**

## KEY FEATURES

- ▶ **Reliable and accurate GNSS/INS positioning down to the cm level**
- ▶ **3D attitude - heading pitch and roll**
- ▶ **Ultralight, low power and compact**
- ▶ **AIM+ interference monitoring and mitigation system**
- ▶ **High-update rate, low-latency positioning and attitude**
- ▶ **Robust calibration for wide temperature ranges**

## Reliability, availability and accuracy at their best

Septentrio's quad-constellation, multi-frequency, accurate and reliable RTK is further enhanced by a powerful GNSS/INS integration. Benefiting from a GNSS heading initialization, AsteRx-i S provides 3D attitude and positioning for the POI (point of interest).

The AsteRx-i S includes Septentrio's GNSS+ suite of positioning algorithms to convert difficult environments into good positioning. It also features AIM+ interference mitigation and monitoring system which can suppress the widest variety of interferers, from simple continuous narrowband signals to the most complex wideband and pulsed jammers.

## SWaP matters

Designed around demanding requirements for size, weight and power consumption, the AsteRx-i S is ideal for optical inspection and photogrammetry. Consuming typically 1.5 W and having a unique total weight of 38 g, is ideal for UAVs where space and payload are at a premium. The versatility of design and range of connection interfaces extend the AsteRx-i S applicability to automation, robotics and logistics.

## Ease of integration

Accompanied by a UAS-tailored carrier board, the AsteRx-i S integrates seamlessly into light UAV and robotics platforms. The IMU offers a simple, bolt-on, plug-and-play solution, designed for easy testing and integration. Septentrio's open interfaces and software tools (WebUI, RxTools) make the integration, configuration and control of the AsteRx-i S seem effortless.

# AsteRx-i S

## FEATURES

### GNSS technology

The AsteRx-i S supports tracking of the following signals:

- ▶ GPS: L1, L2
- ▶ GLONASS: L1, L2
- ▶ Galileo<sup>1</sup>: E1, E5b
- ▶ BeiDou<sup>1</sup>: B1, B2
- ▶ SBAS: EGNOS, WAAS, GAGAN, MSAS, SDCM (L1)
- ▶ QZSS: L1, L2

### Septentrio's patented GNSS+ technologies:

- ▶ **AIM+** unique anti-jamming and monitoring system against narrow and wideband interference
- ▶ **APME+** a posteriori multipath estimator for code and phase multipath mitigation
- ▶ **LOCK+** superior tracking robustness under heavy mechanical shocks or vibrations
- ▶ **IONO+** advanced scintillation mitigation

RAIM (Receiver Autonomous Integrity Monitoring)  
RTK-INS (rover)<sup>1</sup>

### Formats

Septentrio Binary Format (SBF), fully documented with sample parsing tools  
RTCM v2.x and v3.x (MSM included)  
CMR and CMR+ (CMR+ input only)  
NMEA 0183 v2.3, v3.01, v4.0 (output only)

### Connectivity AsteRx-i S OEM

4 Hi-speed serial ports (LVTTTL)<sup>2</sup>

1 USB device port

1 PPS output<sup>2</sup>

2 Event markers

SDIO interface for logging (covers µSD, SD, eMMC)

Outputs to drive external LEDs

General purpose output

### Connectivity AsteRx-i S UAS

(PRELIMINARY INFO)

Wide range power supply input (6-30 V)

On-board logging on Micro-SD card (max 32 GB)

Plug compatible with Pixhawk and ArduPilot

1 PPS output<sup>2</sup>

1 Event marker for camera shutter synchronisation

Push-button start/stop logging on the SD-card

LEDs for power, logging and PVT status

3 Hi-speed serial ports (LVTTTL)<sup>2</sup>

1 Full-speed USB device port (micro USB)

## SUPPORTING COMPONENTS

Embedded Web UI with full control and monitoring functionality.

RxTools, a complete and intuitive GUI tool set for receiver control, monitoring, data analysis and conversion.

GNSS receiver communication SDK. Available for both Windows and Linux.

## PERFORMANCE

### Integrated position accuracy<sup>3,4</sup>

	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<sup>3,4,5</sup>

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

### Integrated attitude accuracy<sup>3,4,5</sup>

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

### INS velocity<sup>3,4,5</sup>

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

### Position accuracy after outages

Outage duration (s)	Horizontal error (RMS)	Vertical error (RMS)
5	0.1 m	0.03 m
10	0.3 m	0.05 m
30	3.0 m	0.24 m

### Attitude accuracy after outages

Outage duration (s)	Heading error (RMS)	Pitch/Roll error (RMS)
5	0.23°	0.06°
10	0.25°	0.07°
30	0.3°	0.12°

## IMU performance

### Gyroscope performance

Input range	± 450°/s
Bias in-run instability	7°/hr
Random walk / noise density	0.15°/√hr

### Accelerometer performance

Input range	±16 g
Bias in-run instability	5 mg
Random walk / noise density	57 µg/√Hz

### Maximum update rate

Integrated position	100 Hz
Latency	<20 ms

### Post-processing:

GNSS measurements	2 Hz
IMU raw data	200 Hz

### Time precision

PPS out	5 ns
Event accuracy	< 20 ns

### Time to first fix

Cold start <sup>6</sup>	< 45 s
Warm start <sup>7</sup>	< 20 s
Re-acquisition	avg 1.2 s

## PHYSICAL AND ENVIRONMENTAL

### AsteRx-i S OEM

Size	47.5 × 70 × 7.6 mm 1.87 × 2.75 × 0.29 in
Weight	28 g / 0.987 oz
Input voltage	3.3 VDC ± 5%

### Connectors

30 pins Hirose DF40 socket  
60 pins Hirose DF40 socket for expanded connectivity

### AsteRx-i S UAS (PRELIMINARY INFO)

Size	47.5 × 70 × 14.9 mm 1.87 × 2.75 × 0.58 in
Weight	38 g / 1.34 oz
Input voltage	5 V or 6–30 VDC

### Connectors

COM1	6 pins DF13-6P-1.25DSA (plug compatible with Pixhawk and ArduPilot)
COM2	6 pins DF13-6P-1.25DSA
COM3	4 pins DF13-4P-1.25DSA
Event-markers	2 pins header
PPS-Out (IMU)	3 pins header

### IMU

Size	26.8 × 18.8 × 9.5 mm 1.05 × 0.74 × 0.37 in
Weight	10 g / 0.35 oz
Input voltage	4 V to 15 V

### Antenna

Antenna connectors	2 × U,FL
Antenna supply voltage	3 - 5.5 VDC
Maximum antenna current	200 mA
Antenna gain range	15-45 dB

### System power consumption

	AsteRx-i S OEM	AsteRx-i S UAS
GPS/GLO (L1/L2)	1.5 W	1.6 W
All signals	1.5 W	1.7 W
Onboard logging	NA	0.3 W

### Environment

Operating temperature	-40° C to +85° C -40° F to +185° F
Storage temperature	-40° C to +85° C -40° F to +185° F
Humidity	5% to 95% (non-condensing)
Vibration	MIL-STD-810G
Certification	RoHS, WEEE

<sup>1</sup> Optional feature

<sup>2</sup> One port/signal used by the IMU

<sup>3</sup> Open-sky conditions

<sup>4</sup> RMS levels

<sup>5</sup> Baseline < 40 Km

<sup>6</sup> No information available (no almanac, no approximate position)

<sup>7</sup> Ephemeris and approximate position known



NavtechGPS is a U.S. distributor for Septentrio.  
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