AsteRx-i S

GNSS/INS positioning and attitude receiver

septentrio

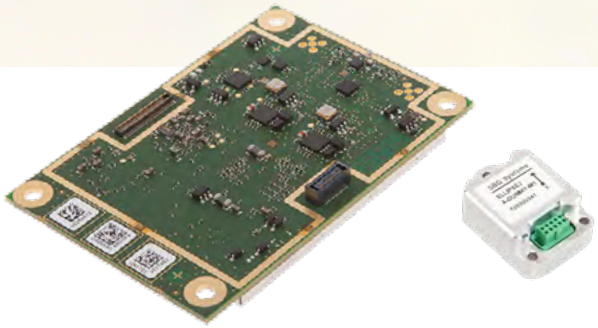
UAV

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[1]: E1, E5b
- BeiDou[1]: 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)[1]

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 (LVTTL) [2]
1 USB device port
1 PPS output [2]
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 VDC)
On-board logging on Micro-SD card (max 32 GB)
Plug compatible with Pixhawk and ArduPilot
1 PPS output [2]
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 (LVTTL) [2]
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 [3,4]

	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 [3,4,5]

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

Integrated attitude accuracy [3,4,5]

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

INS velocity [3,4,5]

	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	0.014 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 [6]	< 45 s
Warm start [7]	< 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 VDC 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 x 18.8 x 9.5 mm 1.05 x 0.74 x 0.37 in
Weight	10 g / 0.35 oz
Input voltage	4-15 VDC

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 + IMU	AsteRx-i S UAS + IMU
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

[1] Optional feature
[2] One port/signal used by the IMU
[3] Open-sky conditions
[4] RMS levels
[5] Baseline < 40 Km
[6] No information available (no almanac, no approximate position)
[7] Ephemeris and approximate position known

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