AsteRx-i S UAS

GNSS/INS positioning and attitude receiver for easy UAS integration

septentrio

UAV

Mapping

Automation

Logistics

Autonomous

AsteRx-i S UAS delivers 3D orientation and continuous centimeter positioning even in areas without GNSS signals (coasting). This multi-frequency GNSS receiver offers the possibility of an onboard IMU (Internial Measurement Unit) or an externally tethered IMU.

KEY FEATURES

- **Reliable and accurate GNSS/INS positioning down to the cm level**
- **3D attitude/orientation - 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**
- **44 pins I/O connector for autopilots such as Pixhawk**

Reliability and interference robustness

Septentrio's multi-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 UAS provides 3D attitude and positioning for the POI (point of interest).

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.

Designed for UAS

Designed around demanding requirements for size, weight and power consumption, the AsteRx-i S UAS is ideal for optical inspection and photogrammetry. Consuming typically 2 W with a total weight of under 60 g, it is ideal for UAVs where space and payload are at a premium. The 4.5-30V input power range allows powering the receiver directly from the UAS power bus. The versatility of its design and the wide range of connection interfaces extend the AsteRx-i S UAS applicability to automation, robotics and logistics.

Ease of integration

Mounted on a UAS-tailored carrier board, the AsteRx-i S UAS 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 UAS seem effortless.

AsteRx-i S UAS

NavtechGPS is a U.S. distributor for Septentrio.
Please contact NavtechGPS for U.S. inquiries

FEATURES

GNSS technology

The AsteRx-i S UAS 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 (input only)
CMR and CMR+ (input only)
NMEA 0183 v2.3, v3.01, v4.0 (output only)

Interface board

Wide range power supply input
On-board logging on micro-SD card (max 32 GB)
Plug compatible with Pixhawk and ArduPilot
1 PPS output
Ethernet
USB OTG
2 Event markers for camera shutter synchronisation
Push-button start/stop logging on the SD-card
SDIO interface for logging (covers µSD, SD, eMMC)

Connectivity

1 Hi-speed serial ports (LVTTL)
1 Hi-speed RS232
44 PIN connector I/O, SAMTEC TMM-122-03-S-S-MW
1 Full-speed micro USB device port

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.

Optional accessories

- Antennas
- GeoTagZ re-processing software and SDK library for Unmanned Systems

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 [2,3,4]

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

Integrated attitude accuracy [2,3,4]

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

INS velocity [2,3,4]

	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 [5]	< 45 s
Warm start [6]	< 20 s
Re-acquisition	avg 1.2 s

Tracking performance (C/N0 threshold)[7]

Tracking	20 db-Hz
Acquisition	33 db-Hz

PHYSICAL AND ENVIRONMENTAL

AsteRx-i S UAS

Size	47.5 × 70 × 20 mm 1.87 × 2.75 × 0.79 in
Weight	60 g / 2.1 oz
Input voltage	5 VDC or 4.5–30 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

Typical configuration	2W [8]
Onboard logging	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] Open-sky conditions
[3] RMS levels
[4] Baseline < 40 Km
[5] No information available (no almanac, no approximate position)
[6] Ephemeris and approximate position known
[7] Depends on user settings of tracking loop parameters, Max speed 600 m/s
[8] Preliminary data

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