AsteRx-i3 D Pro

Ready-to-use GNSS/INS single-board receiver

Septentrio

Precision Agriculture

Robotics

UAV

Logistics

AsteRx-i3 D Pro delivers reliable centimeter level positioning combined with 3D orientation in demanding environments. Its onboard inertial sensor provides orientation and positional dead-reckoning, making it ideal for systems that require continuous positioning even during short GNSS outages.

KEY FEATURES

▶ **Centimeter-level GNSS positioning enhanced by an IMU and optionally vehicle velocity**

▶ **Single GNSS antenna with heading, pitch and roll**

▶ **Lightweight, low power and compact**

▶ **AIM+ Advanced Interference Mitigation technology, as part of the GNSS+ algorithm suite**

Designed for industrial applications

The AsteRx-i3 D Pro is a state-of-the-art GNSS/INS rover receiver designed to provide robust and reliable positioning and 3D attitude for the most challenging industrial applications. Septentrio's multi-constellation, multi-frequency, accurate and reliable 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.

Ultra-low power design

The AsteRx-i3 D Pro provides RTK/INS positioning at the lowest power consumption of any comparable device on the market. This means longer operation on a single battery charge or smaller batteries, decreasing platform payload.

Easy to integrate

The AsteRx-i3 D Pro delivers a full INS system on a single board for the maximum ease of HW integration. All its interfaces, commands and data messages are fully documented.

Septentrio's web interface and software tools make it easy to integrate, configure and control the AsteRx-i3 D Pro receiver.

AsteRx-i3 D 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

4 Hi-speed serial ports (LVTTL)
1 USB device port (TCP/IP communication and with 2 extra serial ports)
xPPS output (max 100Hz)
Ethernet port (TCP/IP, UDP, LAN 10/100 Mbps)
2 Event markers
Outputs to drive external LEDs
General purpose output
NTRIP (client)

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

Size	47.5 × 70 × 10.5 mm
	1.87 × 2.75 × 0.41 in
Weight	30 g / 1.06 oz
Input voltage	3.3 VDC ± 5%

Power consumption

GPS/GLO L1/L2	1.0 mW
All signals, all GNSS constellations	1.2 mW

Antenna

Connector	MMCX
Antenna supply voltage	3-5.5 VDC
Maximum antenna current	150 mA
Antenna gain range	15-45 dB

I/O connectors

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

Environment

Operating temperature	-40° C to +85° C
	-40° F to +185° F
Storage temperature	-55° C to +85° C
	-67° F to +185° F
Humidity	5% to 95% (non-condensing)
Vibration	MIL-STD-810G

Certification

RoHS, WEEE, ISO 9001-2015

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

[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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