

AsteRx-U3 Marine

Multi-constellation, dual-antenna GNSS receiver for marine applications



Marine



Offshore
Operations

The AsteRx-U3 Marine is designed for marine survey and construction users. It is a multi-frequency GNSS receiver offering precise GNSS positioning and heading with enhanced Iridium and Inmarsat uplink interference mitigation.

KEY FEATURES

- ▶ Full-constellation, triple-frequency satellite tracking on both antennas
- ▶ Sub-degree GNSS heading & pitch or heading and roll
- ▶ Centimetre-level (RTK) and sub decimetre-level (PPP) position accuracy
- ▶ L-band reception, robust against Iridium and Inmarsat uplink interference
- ▶ Support for FUGRO Marinestar corrections
- ▶ Septentrio GNSS+ algorithms for reliable performance
- ▶ Integrated UHF radio, cellular modem, Bluetooth and Wi-Fi

BENEFITS

Consistently accurate now and into the future

The AsteRx-U3 Marine is the most advanced integrated multi-constellation dual-antenna receiver from Septentrio.

Its multi-frequency engine can track signals from all Global Navigation Satellite System (GNSS) constellations: GPS, GLONASS, Galileo, BeiDou, NavIC and QZSS – on both antennas. This guarantees you reliable and accurate GNSS positioning now and into the future.

Reliable centimetre accuracy

Septentrio's 25+ years of experience in the GNSS industry ensures that the AsteRx-U3 Marine offers you the highest possible accuracy, down to a centimetre. LOCK+ technology maintains tracking during heavy vibration and IONO+ ensures position accuracy even under periods of elevated ionospheric activity. The AsteRx-U3 Marine offers the very latest in advanced interference mitigation technology AIM+, which filters out ambient intentional and unintentional RF interference and allows this receiver to be resilient to interference from Iridium and Inmarsat uplinks.

Any device, any platform

Use any device with a web browser to operate the AsteRx-U3 Marine without any special configuration software via the Web interface accessible over Ethernet, Wi-Fi or a USB connections.

FEATURES

GNSS technology

544 hardware channels for simultaneous tracking of all visible supported satellite signals:

- GPS: L1 C/A, L1C¹, L2C, L2 P(Y), L5
- GLONASS: L1 C/A, L2 C/A, L3, L2P
- Beidou: B1I, B1C, B2a, B2I, B3I
- Galileo: E1, E5a, E5b, E5 AltBOC, E6
- QZSS: L1 C/A, L1C¹, L2C, L5
- NavIC: L5
- SBAS: EGNOS, WAAS, GAGAN, MSAS, SDCM

Septentrio's patented GNSS+ technologies

- **AIM+** unique mitigation and monitoring system against narrow and wideband interferences with spectrum analyser
- **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

RTK (base and rover)

Integrated L-band receiver with dedicated antenna input

Moving base

GNSS heading & pitch or heading & roll

16 GB internal memory

Support for FUGRO Marinestar PPP service²

Formats

Septentrio Binary Format (SBF), fully documented with sample parsing tools RTCM v2x and 3x (MSM included)

CMR 2.0 and CMR+ (CMR+ input only)

NMEA 0183, v3.01, v4.0

UHF: Satel, Trimtalk (450S) Pacific Crest (GMSK, 4FSK, FST)

Connectivity

3 Hi-speed serial ports (RS232 / RS422)

Ethernet port (TCP/IP and UDP)

High-speed USB

CAN port

1 Event marker

xPPS output (max. 100 Hz)

Bluetooth³ (2.1 + EDR/4.0)

WiFi³ (802.11 b/g/n)

UHF³ (410-475 MHz)

Cellular modem³: LTE CAT4

4G LTE CAT4 (B1, B3, B5, B7, B8, B20)

3G UMTS/HSDPA/HSUPA (850/900/1900/2100)

2G GSM/GPRS/EDGE (850/900/1800/1900)

PERFORMANCE

Position accuracy^{4,5}

	Horizontal	Vertical
Standalone	1.2 m	1.9 m
SBAS DGNSS	0.6 m	0.8 m
RTK performance	0.4 m	0.7 m

RTK performance^{4,5,6,7}

Horizontal accuracy	0.6 cm + 0.5 ppm
Vertical accuracy	1 cm + 1 ppm
Initialization time	7 s

GNSS attitude accuracy^{4,5}

Antenna separation	Heading	Pitch/Roll
1 m	0.15°	0.25°
5 m	0.03°	0.05°

Velocity accuracy^{4,5}

0.03 m/s

Maximum update rate

Position	100 Hz
Position and attitude	50 Hz
Measurements	100 Hz

Latency⁸

< 20 ms

Time precision

xPPS out ⁹	5 ns
Event accuracy	< 20 ns

Time to first fix

Cold start ¹⁰	< 45 s
Warm start ¹¹	< 20 s
Re-acquisition	avg. 1 s

Tracking performance (C/N0 threshold)¹⁰

Tracking	20 dB-Hz
Acquisition	33 dB-Hz



PHYSICAL AND ENVIRONMENTAL

Size 157 x 245 x 45mm

Weight 1.5 kg

Input voltage 9-36 VDC

Power consumption 8 W typical

Operating temperature -30° C to +65° C

Storage temperature -40° C to +75° C

Humidity IEC60721-3-5, Class 5K2

Dust MIL-STD-810H, Method 510.7, Procedure I

Shock MIL-STD-810H, Method 516.8, Procedure I/II

Vibration MIL-STD-810H, Method 514.8, Procedure I

Corrosion IEC60068-2-52, Method 2

Connectors

Antennas	TNC female
Power	LEMO 4 pins female
USB/ETH	LEMO 16 pins female
PPS OUT	LEMO 5 pins female
Serial 2	LEMO 9 pins female
Serial 1 & 3	LEMO 14 pins LEMO
Events/GPIO	7 pins female

Antenna LNA power output

Output voltage	User selectable 3.3V/5V
Maximum current	150 mA

Certification

IP68, RoHS, WEEE, CE, FCC



- 1 Hardware ready
- 2 Service subscription required
- 3 Optional feature
- 4 Open sky conditions
- 5 RMS levels
- 6 RTK fixed ambiguities
- 7 Baseline < 40 Km
- 8 99.9%
- 9 Including software compensation of sawtooth effect
- 10 No information available (no almanac, no approximate position)
- 11 Ephemeris and approximate position known

EMEA

Greenhill Campus (HQ)
 Interleuvenlaan 15i
 3001 Leuven, **Belgium**

Espoo, **Finland**

Americas

2601 Airport Drive,
 Suite 360
 Torrance, CA 90505, **USA**

septentrio.com/contact

Asia-Pacific

Shanghai, **China**
 Yokohama, **Japan**
 Seoul, **Korea**

septentrio.com

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