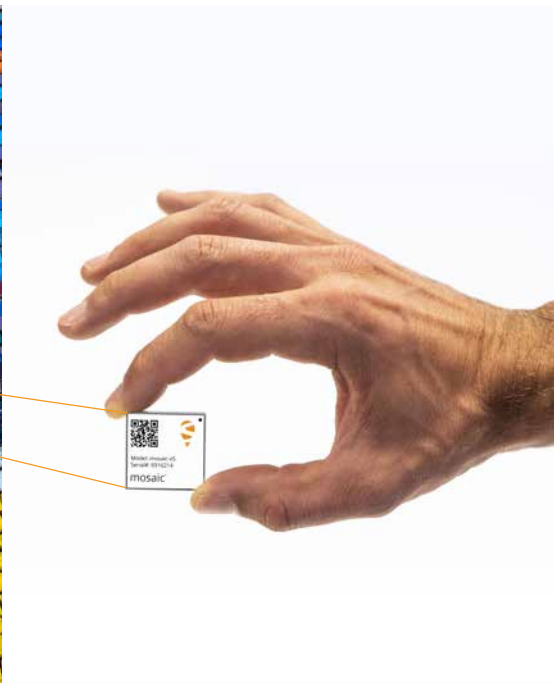
mosaic-X5

Compact, multi-constellation GNSS receiver

septentrio



Robotics

Autonomous

Automation

Logistics & Port Operations

Rail

Timing

UAV

Septentrio mosaic™-X5, a brand new multi-band, multi-constellation receiver, packaged in a low power surface mount module, offers a wide array of interfaces. mosaic™ has been specifically designed with the needs of mass market applications like robotics and autonomous systems in mind.
Capable of tracking all Global Navigation Satellite System (GNSS) constellations and supporting current and future signals. With Septentrio's unique AIM+ technology for interference mitigation included, Septentrio is now offering a performance benchmark in mass market GNSS positioning building blocks.

KEY FEATURES

- **Small size, big performance**
- **All-in-view satellite tracking: multi-constellation, multi-frequency**
- **Uncompromisable RTK performance**
- **AIM+ unique interference monitoring and mitigation technology**
- **Industry-leading ultra-low power consumption**
- **Easy-to-integrate**

BENEFITS

No compromises

The best of both worlds: small sized with solid performance. High update rates (>100 Hz) and low latency, both are crucial for control systems of any type of autonomous applications. High accuracy centimetre level positioning. Multi-constellations and multi-frequency. Full L2 support via P(Y) code.

More compact than ever

Sized at only 31 x 31 x 4 mm / 1.22 x 1.22 x 0.16 in mosaic™ offers unparalleled size to performance ratio. Lighter than ever too, at less than 7 g / 0.24 oz your automated assembly is going to be hassle free.

Meant for automated assembly

The mosaic™ module is designed for high volume automated assembly lines. With minimal amount of additional real estate required for design in. Fully-documented interfaces, commands and data messages are provided. The compatible and free of charge RxTools software suite allows receiver configuration, data logging and analysis. Offline processing is enabled via our GeoTagZ software and its SDK library for PPK (PostProcessed Kinematic).

Advanced technologies inside

Septentrio's GNSS+ toolset enables accuracy and reliability in the toughest conditions through:

- **AIM+** the most advanced on-board interference mitigation technology on the market (narrow and wide band, chirp jammers).
- **LOCK+** for robust tracking during high vibrations and shocks.
- **APME+** multipath mitigation to disentangle direct signal and those reflected from nearby structures.
- **IONO+** provides advanced protection against ionospheric disturbances.

Allowing you to carry on with the highest possible efficiency.

mosaic-X5

Your positioning cornerstone

FEATURES

GNSS technology

448 hardware channels for simultaneous tracking of all visible supported satellite signals[1]:

- GPS: L1C/A, L1C, L1PY, L2C, L2P, L5
- GLONASS: L1CA, L2CA, L2P, L3 CDMA
- Beidou: B1I, B1C, B2a, B2I, B3[12]
- Galileo: E1, E5a, E5b, E5 AltBoc, E6[12]
- QZSS: L1C/A, L1C, L2C, L5, L6[12]
- Navic: L5
- SBAS: Egnos, WAAS, GAGAN, MSAS, SDCM (L1, L5)
- On module L-band

Septentrio's patented GNSS+ technologies

- **AIM+** interference monitoring and mitigation (narrow band, wide band, chirp jammers)
- **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

4 constellation RTK (base and rover)[2]
RAIM (Receiver Autonomous Integrity Monitoring)
PPP SECORX[1,2]
Moving base RTK[3]

Protocols

Septentrio Binary Format (SBF)
NMEA 0183, v2.3, v3.03, V4.0
RINEX v2.x, v3.x
RTCM v2.x, v3.x (MSM included)
CMR v2.0 (out/in), CMR+ (input only)

Interfaces

4 UART (LVTTL, up to 4 Mbps)
Ethernet (RMII/MDIO), 10/100 Mbps
USB device (2.0, HS)
SDIO (mass storage)
2 GPIO user programmable
CAN[12]
2 Event markers[1]
1 Configurable PPS out[9]
Auxiliary RF interface

PERFORMANCE

RTK performance [4,5,6]

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

Other positioning modes accuracy [4,5]

	Horizontal	Vertical
Standalone	1.2 m	1.9 m
SBAS	0.6 m	0.8 m
DGNSS	0.4 m	0.7 m
SECORX (PPP)[2,7]	0.04 m	0.06 m

Velocity accuracy

3 cm/s

Maximum update rate

Position	100 Hz
Measurements only	100 Hz

Latency [8]

<10 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	1 s

Tracking performance (C/N0 threshold)

Tracking	20 dB-Hz
Acquisition	33 dB-Hz

Firmware

Free product lifetime upgrades.

PHYSICAL AND ENVIRONMENTAL

Package

Type	SMT solderable land grid array
Size	31 x 31 x 4 mm / 1.29 x 1.29 x 0.15 in
Weight	6.8 g / 0.24 oz

Electrical

Antenna pre-amplification range	15-50 dB
Antenna bias voltage	3.0-5.5 V Build-in current limit (150 mA)
Input voltage	3.3 VDC +/-5%
Power consumption	0.6 W typ 1.1 W max

Environmental

Operating temp	-40 to 85° C -40 to 185° F
Storage temp	-55 to 85° C -67 to 185° F
Humidity	5% 95% (non-condensing)
Vibration	MIL-STD-810G
Certification	CE, RoHS, WEEE

[1] Configuration dependent
[2] Service subscription required
[3] Output rate 20 Hz
[4] Open sky conditions
[5] RMS levels
[6] Baseline <40 km
[7] After convergence
[8] 99.9%
[9] Incl. software compensation of sawtooth effect
[10] No information available (no almanac, no approx position)
[11] Ephemeris and approx. position known
[12] Hardware ready

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