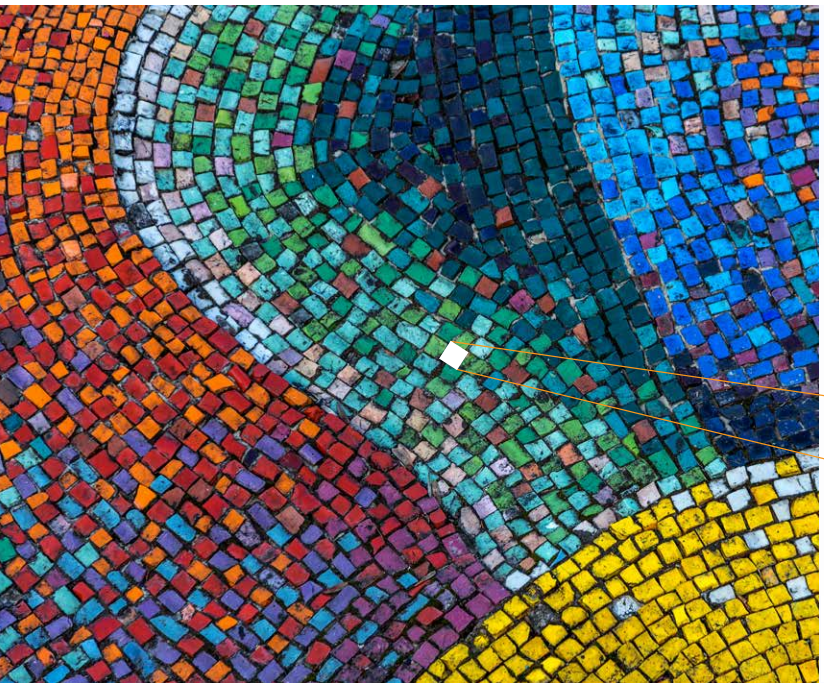
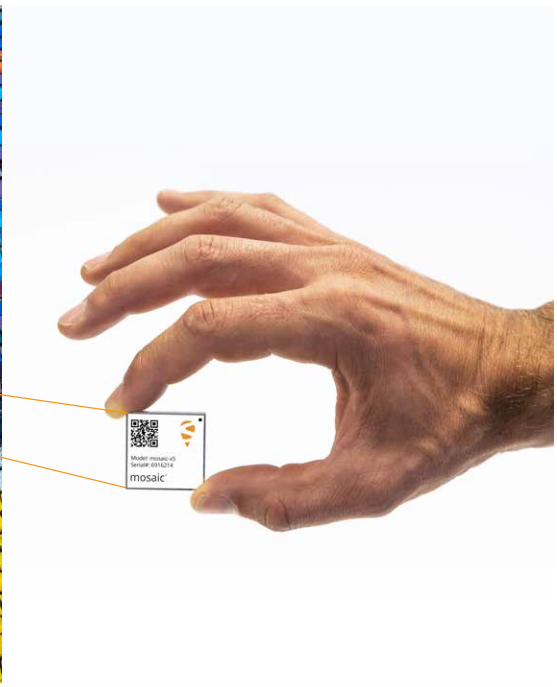
mosaic-X5

Compact multi-constellation GNSS receiver

septentrio





Robotics

Autonomous

Automation

Logistics & Port Operations

Rail

UAV

Septentrio mosaic-X5™ is a multi-constellation receiver packaged in a low-power surface mount module. With a wide array of interfaces, mosaic-X5™ has been specifically designed for the needs of mass market applications like robotics and autonomous systems. This high-reliability receiver tracks all Global Navigation Satellite System (GNSS) constellations and supports all 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.

KEY FEATURES

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

BENEFITS

No performance compromises

Sized at only 31 x 31 x 4 mm / 1.22 x 1.22 x 0.16 inches and weighing only 7 g, mosaic-X5™ offers unmatched size to performance ratio. mosaic-X5™ includes:

- High update rate (>100 Hz) and low latency, both crucial for control systems of autonomous applications
- Reliable centimetre-level positioning
- Full L2 support via P(Y) code

Designed for automated assembly

The mosaic-X5™ module is designed for high volume automated assembly lines with minimal amount of additional components required. All interfaces, commands and data messages are fully documented. The RxTools software suite allows convenient receiver configuration, monitoring, data logging and analysis. Offline processing is easy via our GeoTagZ software and its SDK library for PPK (Post Processed Kinematic).

Advanced technologies inside

Septentrio's **GNSS+** toolset enables accuracy and reliability in the toughest conditions, allowing you to complete projects with high quality and efficiency. It includes:

- **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.

mosaic-X5

mosaic
Your positioning cornerstone

FEATURES

GNSS technology

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

- GPS: L1C/A, L1PY, L2C, L2P, L5
- GLONASS: L1CA, L2CA, L2P, L3 CDMA
- Beidou: B1I, B1C, B2a, B2I, B3
- Galileo: E1, E5a, E5b, E5 AltBoc
- QZSS: L1C/A, L2C, L5
- 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
- **RAIM+** receiver autonomous integrity monitoring

5 constellation RTK (base and rover)

Moving base RTK[2]

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

2 Event markers[1]

1 Configurable PPS out[8]

PERFORMANCE

RTK performance [3,4,5]

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

Other positioning modes accuracy [3,4]

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

Velocity accuracy

3 cm/s

Maximum update rate

Position	100 Hz
Measurements only	100 Hz

Latency [7]

<10 ms

Time precision

xPPS out[8]	5 ns
Event accuracy	< 20 ns

Time to first fix

Cold start[9]	< 45 s
Warm start[10]	< 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, ISO 9001-2015

[1] Configuration dependent

[2] Output rate 20 Hz

[3] Open sky conditions

[4] RMS levels

[5] Baseline <40 km

[6] After convergence

[7] 99.9%

[8] Incl. software compensation of sawtooth effect

[9] No information available (no almanac, no approx position)

[10] Ephemeris and approx. position known

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