3DMGQ7-GNSS/INS

Complete RTK Navigation System

3DMGQ7-GNSS/INS

The **3DM**GQ7-GNSS/INS is an all-in-one navigation solution featuring centimeter-level position accuracy. It is equipped with dual multiband GNSS receivers, low noise and low drift MEMS inertial sensors, and a robust adaptive Kalman filter.

3DMGQ7 performance

Position

Single point, horizontal[1]	1.25 m
Single point, vertical[1]	2 m
RTK[1,2]	2 cm

[1] 24 hour static, RMS
[2] 1cm + 1ppm, 2cm at 10km from the base station

Attitude

Roll, Pitch	.05°
Heading [1]	.25°

[1] Dual antenna required

Dynamic

Velocity	0.05 m/s

System architecture
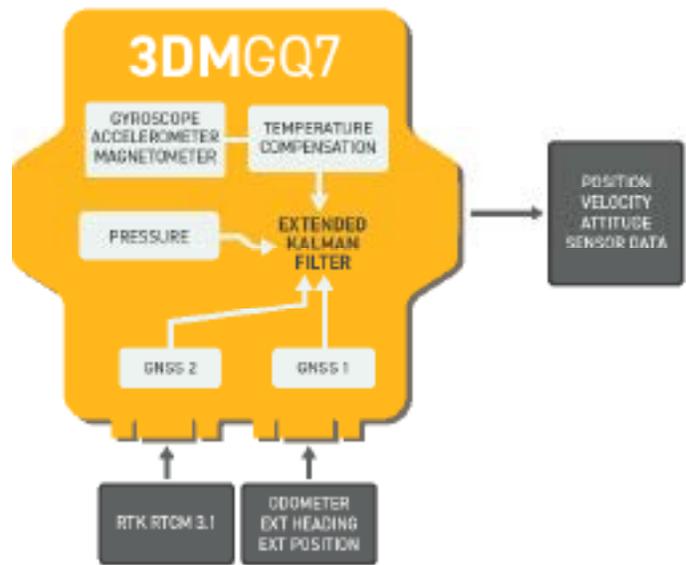
System features

- Dual antenna GNSS
- Centimeter-level accuracy with RTK
- Tactical Grade IMU
- Advanced tightly-coupled extended Kalman filter (EKF) for sensor fusion
- Low profile and lightweight at 78 grams
- Adjustable sampling rates up to 1 KHz
- <2 deg/hour gyro bias instability

3DMRTK
Cellular RTK correction modem

The **3DM**RTK provides easy to use real time Kinematic (RTK) correction data to be utilized by the **3DM**GQ7-GNSS/INS. It provides the simplicity of a cellular connection to our SensorCloud RTK base station network, replacing traditional radio-based stations. With RTK corrections the **3DM**GQ7 can achieve centimeter-level positional accuracy. By removing the need for base station infrastructure the **3DM**RTK minimizes the user's required time to market.

SensorCloud RTK provides seamless cloud-based network RTK corrections without the need for customer-supplied base stations, and includes a cellular data plan and network RTK coverage.

Users can get started instantly with this commitment-free subscription service, available immediately after registration.

rtk.sensorcloud.com
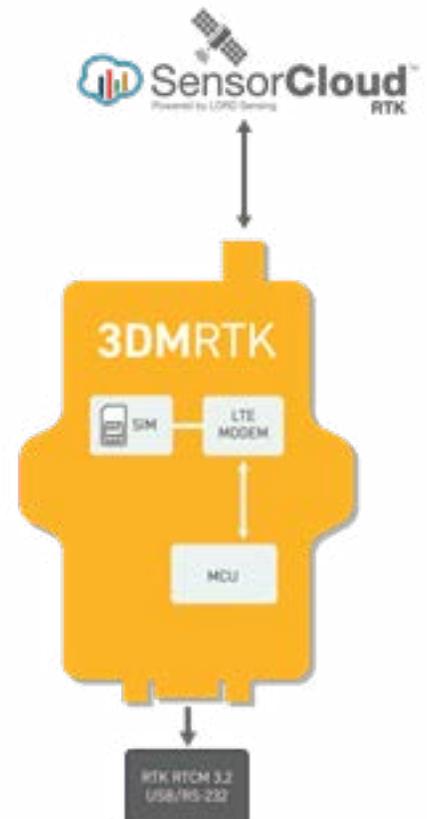
SensorConnect

SensorConnect is PC software for sensor configuration and data collection. Configure inertial parameters, device settings, data channels, and sample rates. Visualize massive amounts of data instantly using built-in intelligent data collection and graphing algorithms. Create immersive dashboards with rich data visualization.
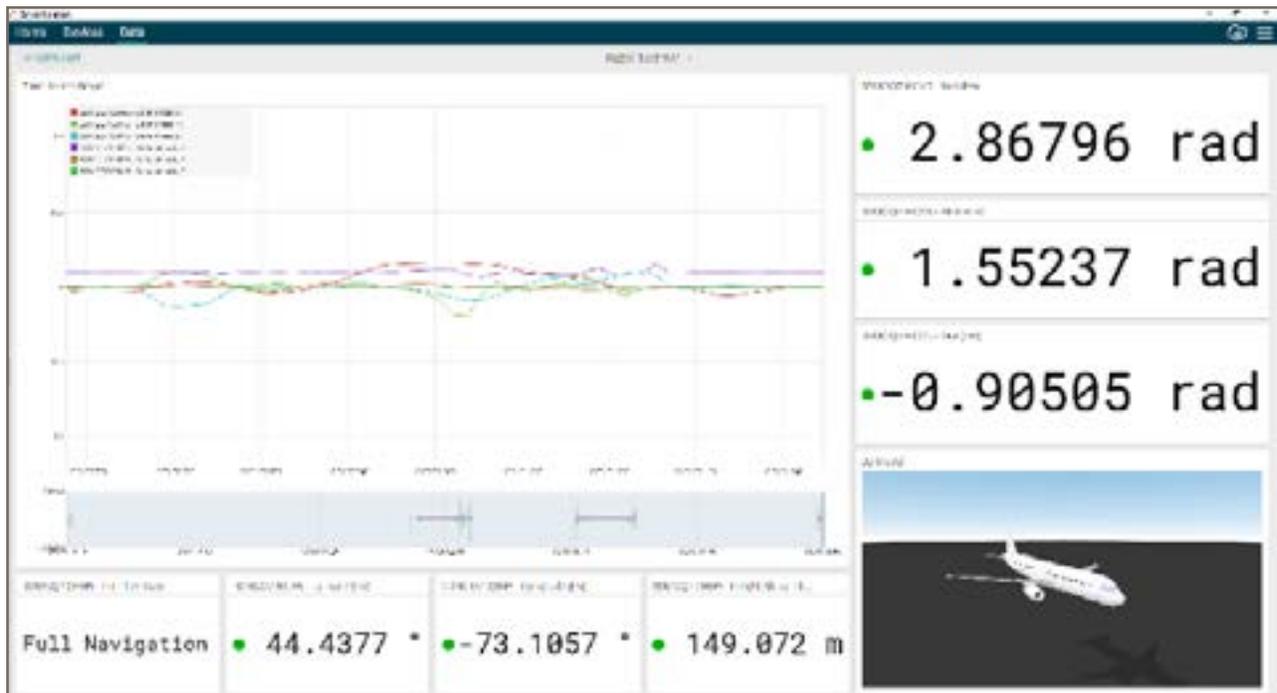
MSCL™ & APIs

The MicroStrain Communication Library simplifies writing code to interact with our sensors. MSCL is our open-sourced API, readily available and fully-documented on GitHub, featuring valuable tools such as full documentation, example code, and a quick start guide.

Byte-level data communication protocols are available in the DCP section of our user manual.

:::ROS

MicroStrain offers an open source, license-free (MIT License) series of drivers specifically designed and tested for Robot Operating System (ROS).

Use ROS for building and simulating robotics applications, unmanned ground vehicles(UGV's) and simultaneous localization and mapping (SLAM).
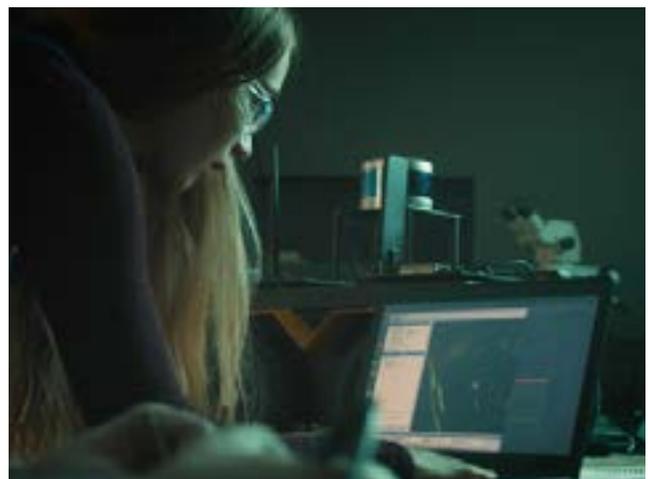
3DMGQ7 Specifications

	Accelerometer	Gyroscope
Range	±8 g	±300 °/s
Random walk	20 µg/√Hz	.15 °/√hr
Bias instability	5 µg	1.5 °/h

Interface

Connectors	2 x Micro-D9
Communications interface	2 x RS-232, 2 x USB
GNSS antenna ports	2 x MMCX
Data output rate	1 to 1000 Hz
External aiding input	RTCM 3.1, GNSS, odometer, heading
I/O	4 x GPIO
GPIO Functions	Odometer, event triggering, PPS input/output

GNSS

Number of receivers	2
Channel count	184
Constellations	GPS/QZSS , GLONASS, Galileo, BeiDou*
Frequencies	L1C/A, L2C, L1OF, L2OF, E1B/C, E5b, B1, B2
Operational Limits	Altitude 50,000 meters	Velocity 500 m/s

*BeiDou RTK support to be provided in a future firmware release.

Physical and Electrical

Weight	78g
Size	76 mm x 68.6 mm x 13.3 mm
Power Consumption	2.0W (typical), 2.5W (max)
Operating voltage	5 to 16 VDC
GPIO Voltage	5V
Operating Temperature	-40° to 85°C
Antenna output voltage	3V
Antenna output current	100mA
MTBF	389,237 hours (Telcordia method, GM/35C)

3DMRTK Specifications

Data output rate	1 Hz
Interface	Micro-D9, RS 232, USB
Protocols	MIP, RTCM 3.1, NMEA
Cellular Network	Cellular Coverage: Global*
Voltage	5 to 16 VDC
Power	1.0W (typical), 2.0W (max)
Weight	48g

*Some regional restrictions apply. Coverage only where LTE CAT-M1/2G deployment is available. Please see our RTK webpage for details.

Applications

application video