

MicroStrain 3DM-GQ7-GNSS/INS

Tactical Grade RTK-Enabled Navigation System



Setting the Standard in Inertial Navigation:

The MicroStrain 3DM-GQ7-GNSS/INS is a complete RTK-enabled navigation solution featuring centimeter-level position accuracy.

The system includes dual multiband GNSS receivers, low-noise and low-drift MEMS inertial sensors, and a robust Adaptive Extended Kalman Filter (EKF).

MicroStrain sensors have set the standard for inertial sensor performance for over 20 years. The 3DM-GQ7-GNSS/INS continues to build upon that legacy and includes a host of new features that ensure optimum performance in even the most demanding applications.

Product Features:

-  1.5°/h Gyro Bias Instability
-  Dual Antenna GNSS Heading
-  Centimeter Level Accuracy with RTK
-  Adjustable Sampling Rates Up to 1 KHz
-  Tactical Grade IMU
-  Advanced Tightly-Coupled EKF
-  Lightweight (78g) and Low Profile



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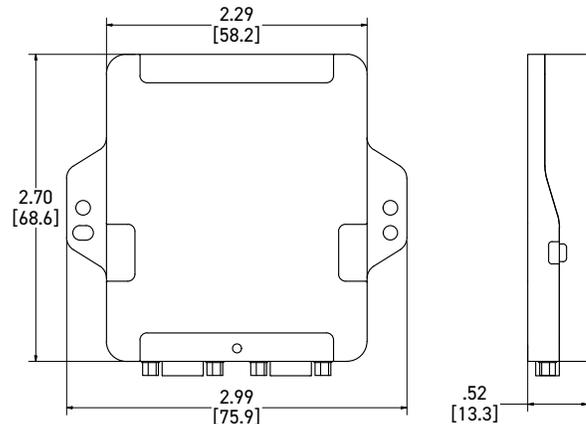


ENGINEERING YOUR SUCCESS.

MicroStrain 3DM-GQ7-GNSS/INS Specifications

System Performance

Position	
Single Point, Horizontal ^[1]	1.25 m
Single Point, Vertical ^[1]	2 m
RTK ^[1,2]	2 cm
Attitude	
Roll, Pitch	0.05°
Heading ^[3]	0.25°
Dynamic	
Velocity	0.05 m/s



IMU

	Accelerometer	Gyroscope	Magnetometer	Barometer
Range	±8 g	± 300 °/s	±8 Gauss	260 to 1260 mbar
Random Walk	20 µg/√Hz	0.15 °/√h	-	-
Bias Instability	5 µg	1.5 °/h	-	-
Noise Density	20 µg/√Hz	8.75 °/h/√Hz	-	-
Turn-on to Turn-on Bias ^[4]	50 µg	0.002 °/s	-	-
Bias Error Over Temperature	0.4 mg	0.03 °/s	-	-
Scale Factor Error Over Temperature	600 PPM	1000 PPM	-	-

Interface

Connectors	2x Micro-D9
Communications Interface	2x RS-232, 2x USB
GNSS Antenna Ports	2x MMCX
Output Data Rate (IMU and EKF)	1 to 1000 Hz
External Aiding Input	RTCM 3.1, GNSS, Odometer, Heading
I/O	4x GPIO

GNSS

Number of Receivers	2
Channel Count	184
Constellations	GPS/QZSS, GLONASS, Galileo, BeiDou*, SBAS
Frequencies	L1C/A, L2C, L10F, L20F, E1B/C, E5b, B1, B2
Operational Limits	Altitude 50,000 meters, Velocity 500 m/s

[*] BeiDou support to be provided in future firmware release

Physical and Electrical

Weight	78 g
Size	76 mm x 68.6 mm x 13.3 mm
Power Consumption	2.0 W (Typical), 2.5 W (Max)
Operating Voltage	5 to 16 VDC
GPIO Voltage	5 V
Operating Temperature	-40°C to 85°C
Antenna Output Voltage	3 V
Antenna Output Current	100 mA
MTBF	389,237 hours (Telecordia Method, GM/35C)

[1] 24 hour static, RMS

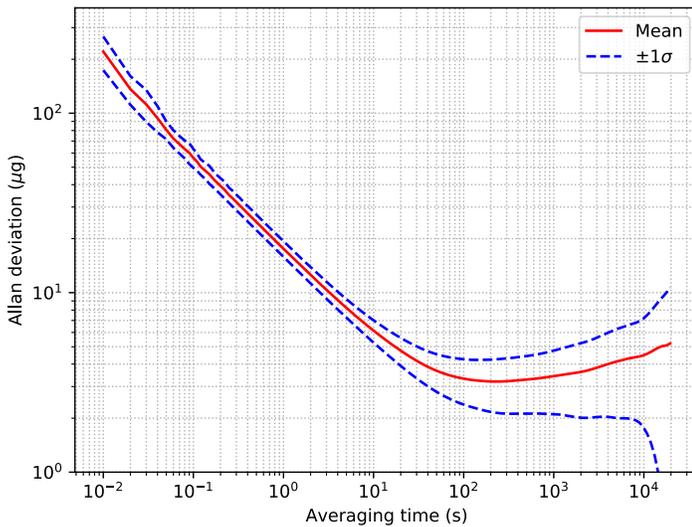
[2] 1 cm + 1 ppm, 2 cm at 10 km from base station

[3] Dual antenna, RMS, 1.5 m baseline

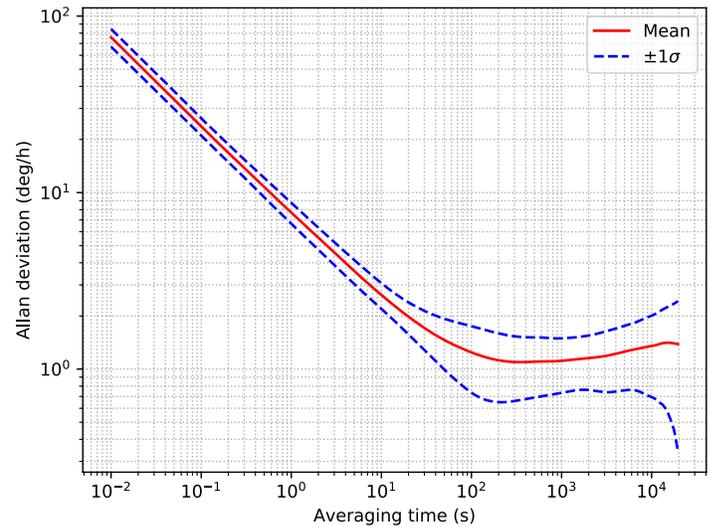
[4] Bias repeatability, <24 hours

MicroStrain 3DM-GQ7-GNSS/INS Allan Variance (AVAR)

Accelerometer AVAR



Gyroscope AVAR



MicroStrain 3DM-RTK

Minimizing your time to market by removing the need for base station infrastructure

The MicroStrain 3DM-RTK Cellular Correction Modem transmits 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 cumbersome radio-based stations.

With RTK corrections the 3DM-GQ7 can achieve centimeter-level positional accuracy.

3DM-RTK Specifications

Output Data 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	1.0 W (Typical), 2.0 W (Max)
Weight	48 g



[*] Some regional restrictions apply. Coverage only where LTE CAT-M1/2G deployment is available.

