ADVANCED NAVIGATION

MOTUS
MEMS IMU

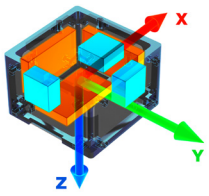
Motus is a miniature ultra high accuracy MEMS IMU. It features some of the highest accuracy MEMS accelerometers and gyroscopes currently available combined with magnetometers.

Motus is fully calibrated for all sensor errors over a wide temperature range and can be software upgraded to AHRS or INS functionality. It is available in both OEM and enclosed packages.

PERFORMANCE

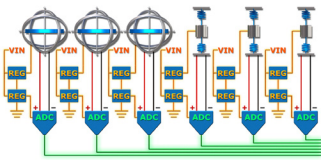
- 0.03 ° Roll and Pitch
- 0.08 ° Heading
- 0.4 °/hr MEMS Gyroscope
- 1000 Hz Update Rate
- 2000 g Shock Limit

FEATURES



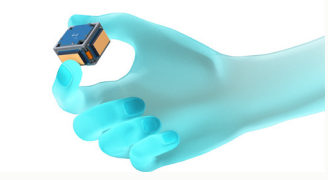
ULTRA HIGH ACCURACY MEMS SENSORS

Motus features some of the highest accuracy MEMS accelerometers and gyroscopes currently available. Motus's inertial performance exceeds some FOG IMUs and is up to 100x smaller and 10x cheaper. Motus is put through Advanced Navigation's intensive calibration process to provide consistently accurate data over an extended temperature range of -40°C to 85°C. As part of this calibration, every Motus unit spends 22 hours in our specially built rotating temperature chamber.



ADVANCED SIGNAL PROCESSING

Motus samples its sensors synchronously at 1000Hz through six individual 24-bit differential ADCs which minimises noise as well as providing optimal thermal calibration and performance characteristics. The sensor data is fully compensated for coning and sculling at any data rate output that is chosen. 14 seperate heavily filtered regulated power supplies ensure that each sensor and ADC is operating off the cleanest possible power supply.



MINIATURE PACKAGE

Never before has such high inertial performance been available in such a small package. Motus consumes just over 1 cubic inch in volume and weighs only 26 grams. This makes it ideal for weight and size sensitive applications. Motus is available in an OEM package suitable for integration into larger products or an enclosed package for external and standalone use.

AHRS OR INS UPGRADEABLE

Motus can be upgraded to full AHRS or INS capability through a software license upgrade. As an INS it can be interfaced to any of the leading brands of GNSS receivers to create an OEM GNSS/INS solution.

SPECIFICATIONS

HARDWARE

Operating Voltage (OEM)	5 V
Operating Voltage (Enclosed)	5 to 36 V
Input Protection (Enclosed only)	± 60 V
Power Consumption (Typical)	0.95 W
Hot Start Battery Capacity	> 48 hrs
Hot Start Battery Charge Time	30 mins
Hot Start Battery Endurance	> 10 years
Operating Temperature	-40 °C to 85 °C
Environmental Protection (Enclosed)	IP67 MIL-STD-810G
MTBF	200,000 hrs
Shock Limit	2000 g
Vibration Limit	8 g
Dimensions (OEM)	31 x 31 x 24 mm
Dimensions (Enclosed)	42 x 55 x 30 mm
Weight (OEM)	26 grams
Weight (Enclosed)	72 grams

COMMUNICATION

Interface (OEM)	UART
Interface (Enclosed)	RS232 (RS422 version available)
Speed	4800 to 2M baud
Protocol	AN Packet Protocol or NMEA
Peripheral Interface	2x GPIO and Auxiliary RS232
GPIO Level	5 - 20 V
GPIO Functions	1PPS Input Sensor sync input Sensor sync output Odometer Stationary Air Data Input NMEA input/output Novatel GNSS input Trimble GNSS input AN Packet Protocol

SENSORS

SENSOR	ACCELEROMETERS	GYROSCOPES	MAGNETOMETERS
Range	± 10 g	± 475 °/s	± 8 G
Bias Instability	8 ug	0.4 °/hr	-
Initial Bias	< 1 mg	< 10 °/hr	-
Initial Scaling Error	< 0.03 %	< 0.02 %	< 0.07 %
Scale Factor Stability	< 0.04 %	< 0.03 %	< 0.09 %
Non-linearity	< 0.05 %	< 0.03 %	< 0.08 %
Cross-axis Alignment Error	< 0.05 °	< 0.05 °	< 0.05 °
Noise Density	12 ug/√Hz	7 °/hr/√Hz	210 uG/√Hz
Bandwidth	290 Hz	200 Hz	110 Hz