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

- 0.05 ° Roll and Pitch
- 0.8 ° Heading (magnetic)
- 0.2 °/hr MEMS Gyroscope
- 1000 Hz Update Rate
- 150 g 6 ms Shock Limit

KEY FEATURES

- IMU, AHRS and INS options
- Rugged and OEM versions
- 500 ms Hot Start

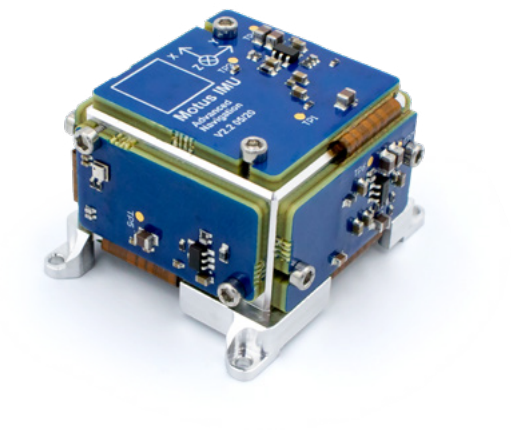
APPLICATIONS

AIR
- UAV Geopointing
- UAV Lidar
- Gimbal Stabilisation

LAND
- Gimbal Stabilisation
- Structural Monitoring
- Vehicle Navigation

SEA
- AUV Navigation
- ROV Navigation
- Hydrography

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.

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.

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.

14 seperate heavily filtered regulated power supplies ensure that each sensor and ADC is operating off the cleanest possible power supply.

RELIABILITY

Motus has been designed from the ground up for mission critical control applications where reliability is very important. It is built on top of a safety oriented real time operating system and all software is designed and tested to safety standards with fault tolerance in mind.

The hardware is designed and manufactured to MIL standards.

HIGH UPDATE RATE

1000 HZ

Motus outputs temperature calibrated sensor data at 1000 Hz as well as filtered attitude at the same rate.

This allows for control of dynamically unstable platforms.

SPECIFICATIONS

NAVIGATION

Roll & Pitch Accuracy	0.05°
Heading Accuracy (magnetic)	0.8 °
Roll & Pitch Accuracy (external GNSS aided)	0.03 °
Heading Accuracy (external GNSS aided)	0.5 °
Horizontal Position Accuracy (external GNSS aided)	0.8 m
Vertical Position Accuracy (external GNSS aided)	1.5 m
Velocity Accuracy (external GNSS aided)	0.007 m/s
Orientation Range	Unlimited
Hot Start Time	500 ms
Internal Filter Rate	1000 Hz
Output Data Rate	Up to 1000 Hz

HARDWARE

Operating Voltage (OEM)	4.5 to 5.5 V
Operating Voltage (Rugged)	5 to 36 V
Input Protection (Rugged only)	± 60 V
Power Consumption (Typical)	1.4 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 (Rugged)	IP67 MIL-STD-810G
MTBF	200,000 hrs
Shock Limit	150 g, 6 ms, half sine
Vibration Limit	8 g RMS
Dimensions (OEM)	34 x 39 x 24 mm
Dimensions (Rugged)	42 x 67 x 30 mm
Weight (OEM)	26 grams
Weight (Rugged)	98 grams

COMMUNICATION

Interface (OEM)	UART
Interface (Rugged)	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 to 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	0.2 °/hr	-
Initial Bias	< 0.45 mg	< 3 °/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	2 ug/√Hz	6 °/hr/√Hz	210 uG/√Hz
Bandwidth	250 Hz	200 Hz	110 Hz