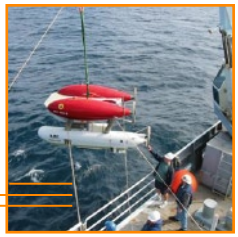
MTi

Miniature Attitude and Heading Reference System

The MTi is a miniature, gyro-enhanced Attitude and Heading Reference System (AHRS). Its internal low-power signal processor provides drift-free 3D orientation as well as calibrated 3D acceleration, 3D rate of turn (rate gyro) and 3D earth-magnetic field data. The MTi is an excellent measurement unit for stabilization and control of cameras, robots, vehicles and other equipment.

Features

- accurate full 360 degrees 3D orientation output (Attitude and Heading)
- highly dynamic response combined with long-term stability
- 3D acceleration, 3D rate of turn and 3D earth-magnetic field data
- all solid state miniature MEMS inertial sensors inside
- compact design
- high update rate
- various digital or analog output modes
- accepts or generates synchronization pulses
- temperature, 3D misalignment and sensor cross-sensitivity compensated



Fields of use

- robotics
- aerospace
- autonomous vehicles
- marine industry
- bore industry

The MTi uses 3 rate gyros to track rapidly changing orientations in 3D and it measures the directions of gravity and magnetic north to provide a stable reference. The systems real-time algorithm fuses the sensor information to calculate accurate 3D orientation, with a highly dynamic response and stable over time.

With the MTi Development Kit, the MTi can easily be integrated in any system or (OEM) application.

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Output

3D orientation (Quaternions/Matrix/Euler angles)
3D acceleration
3D rate-of-turn
3D earth-magnetic field (normalized)
Temperature

Orientation performance

Dynamic Range:	all angles in 3D
Angular Resolution[1]:	0.05 deg
Static Accuracy (Roll/Pitch):	<0.5 deg
Static Accuracy[2] (Heading):	<1 deg
Dynamic Accuracy[3]:	2 deg RMS

Sensor performance

	rate of turn	acceleration	magnetic field	temperature
Dimensions	3 axes	3 axes	3 axes	-
Full Scale (standard)	± 300 deg/s	± 17 m/s²	± 750 mGauss	-55...+125 °C
Linearity	0.1% of FS	0.2% of FS	0.2% of FS	<1% of FS
Bias stability[4] (1σ)	5 deg/s	0.02 m/s²	0.5 mGauss	0.5 °C accuracy
Scale Factor stability[4] (1σ)	-	0.05%	0.5%	-
Noise density	0.1 deg/s/√Hz	0.001 m/s²/√Hz	0.5 mGauss (1σ)	-
Alignment error	0.1 deg	0.1 deg	0.1 deg	-
Bandwidth (standard)	40 Hz	30 Hz	10 Hz	-

Options

Full Scale	± 150 deg/s	± 100 m/s²
	± 900 deg/s	
	± 1200 deg/s	

Other options on request

Interfacing

Max update rate:	512 Hz (calibrated sensor data)
	100 Hz (orientation data)
Digital interface:	RS-232, RS-422 and USB (external converter)
Analog interface (optional):	0 - 3.3V (Roll, Pitch, Heading)
Operating voltage:	4.5 - 15V
Power consumption:	360 mW (orientation output)

Housing

Dimensions:	58x58x22 mm (WxLxH)
Weight:	50 g
Ambient temperature operating range:	0 - 55 deg Celsius

1 1σ standard deviation of zero-mean angular random walk
2 in homogenous magnetic environment
3 may depend on type of motion
4 deviation over operating temperature range (1σ)
specifications subject to change without notice

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