



# iTAHS

## Tactical Alignment & Heading Sensor 3D Magnetometer with integrated Inertial Sensors

iTAHS is a 3D magnetometer, which allows the determination of magnetic heading based in the earth magnetic field. To perform a correct compensation of inclination (dip angle), the iTAHS contains beside of the magnetic core also three precise MEMS accelerometers and three MEMS based gyroscopes, which makes it very simple to be used. The iTAHS provides magnetic heading with up to 18 Hz via UART RS232 (TTL level) and via SPI with 0.5 deg rms accuracy.

- Output of Magnetic North / Azimuth, pitch / elevation and roll, compensated in static and semi dynamic applications with 9 mil (0.5 deg) accuracy.
- Output of calibrated magnetic field and acceleration for advanced integrators.
- UART (TTL) and SPI interface.
- robust, compact, light weight (titanium enclosure), pressure resistant up to 3'000 m water depth, IP69.
- based on integrated solid state fluxgate sensors, MEMS accelerometers and MEMS gyroscopes (IMU).
- fully calibrated regarding magnetic field and temperature.
- integrated calculation of hard & soft iron compensation
- External attitude aiding possible for dynamic carrier applications (option)
- option: delivery w/o pressure enclosure
- applications: AUVs, UAVs, ROVs, buoys, towed platforms etc.

Due to its optimized architecture, iTAHS operates fully autonomous and provides azimuth and elevation under nearly all conditions. Thanks to the integrated signal processing, environmental disturbances can be reduced to achieve a high, angular performance. The iTAHS provides magnetic heading, calibrated and uncalibrated magnetic field vector, calibrated and uncalibrated acceleration vector, temperature and BIT. The integrated low-power microcontroller performs the data fusion (magnetometer + IMU), built-in test and data output of the heading in respect to magnetic north. A magnetic correction matrix, obtained from the environmental setup (e.g. hard

or soft magnetic distortions being present on the vehicle where the iTAHS is installed) , can be applied on the iTAHS to obtain even then most accurate results.

The iTAHS contains two separate interfaces (UART and SPI) to perform also firmware updates at operator's or integrator's site without removing the sensor from the application.

So, the iTAHS is a most suitable and robust sensor for rapid and reliable orientation of optics, weapons, antenna arrays etc.

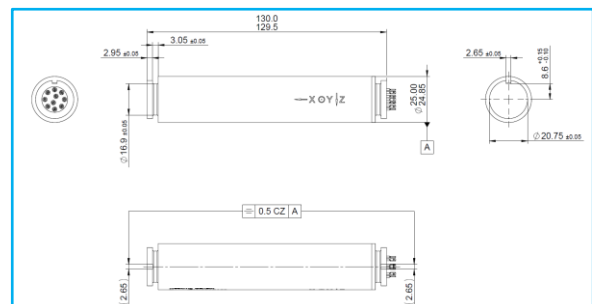


Figure 1: iTAHS for deep sea applications



## Technical Data iTAHS Magnetometer (rms):

<u>Output Accuracy</u>	<u>Earth's Field Dip Angle</u>
Magn. Heading Accuracy: < 0.5 deg magnetic heading (rms) for all roll and pitch angles	up to 67 deg
< 1.25 deg magnetic heading (rms) for all roll and pitch angles	67...80 deg
< 2.2 deg magnetic heading (rms) for all roll and pitch angles	80...85 deg

### Operation

Attitude/Heading Range:	all roll (360 deg contin.), all pitch (-90...+90 deg contin.), all heading (360 deg contin.)
Recovery time:	< 1 sec (e.g. after shock impact)
Synchronisation:	Trigger IN
Integrated Sensors:	3D magnetometer (Fluxgate), 6DOF inertial sensors, temperature

### Output & Interfaces

Output Data:	Magnetic North (Azimuth), Pitch (Elevation), Roll (Cross Leveling), BIT, compensated data and raw data of magnetic field vector and acceleration vector, temperature
Digital Interfaces:	SPI and UART RS232 (RxD and TxD on TTL level with 19.2 kBd)
Data Output Rate:	1...18 Hz; all data available in real time
Configuration Input:	Magnetic Distortion Compensation Matrix (once after calibration)
Graphical User Interface:	MS Windows / LINUX software iTAHS-CMD for configuration, calibration and data readout

### Mechanical Data & Environment

Temperature:	-5...+35 °C (option: up to -30...+52 °C) [outer case temperature]
Shock, Vibration:	37 g / 25 ms and 1'500 g / 3 ms half sinus; 20...2'000 Hz 5 g (rms) endurance; MIL-STD-810G
Power Supply:	5...15 V DC, approx. 30 mA @ 9 V (depends on options)
Start-up Time:	< 10 sec
Mass, Size, Material, IP:	approx. 220 grams ; approx. L = 130 mm , Ø = 25 mm; titanium; IP69
Pressure Resistance:	up to 3'000 m water depth (300 bar), other on request

### Deliverables & Options

Deliverables:	<ul style="list-style-type: none"> <li>• iTAHS Magnetometer, integrated inpressure resistant enclosure (300 bar)</li> <li>• MS Windows / LINUX based GUI software iTAHS-CMD</li> </ul>
Options:	<ul style="list-style-type: none"> <li>• OEM version without pressure resistant enclosure (aluminum enclosure, standard bare cables output (no pressure resistant sealings)</li> <li>• Interface box with Bluetooth data transmission and chargeable battery</li> <li>• customized form factors or interfaces</li> </ul>

### Raw Sensor Data Performance (for OEM users only)

Magn. Field Range:	-800 ... +800 µT	
Linearity error:	< 0.5 %	(within +/- 200 µT range)
Meas. Noise:	1.2 nT/sqrt(Hz)	
Meas. Repeatability:	10 nT	(within +/- 200 µT range)
Meas. Hysteresis:	< 15 nT	(within +/- 200 µT range)
Accelerometer Range:	± 2 g	
Accelerometer Bias:	< 6 mg	
Gyro Range:	± 250 deg/s	

