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iNAV-FMS-E

Inertial Measuring System for Surveying and Navigation Applications

iNAV-FMS is an IMS product family for inertial navigation and guidance, stabilization, true heading determination and dynamically motion analysis with fiber optical gyros that covers applications, which require high accuracy, reliability and an open interface to the user.

- inertial navigation and surveying system for airborne, naval, subsea, surface and railway applications
- FOG technolog with low angular random walk and high angular resolution (0.75 °/hr, 1.5 mg)
- high data rate, open interface
- integrated time synchronisation module and GPS / RTK-GPS; 8 GByte data storage
- Interfaces: Ethernet TCP/IP - UDP, CAN, RS232, ext. GPS / RTK-GPS

The iNAV-FMS for advanced airborne, naval, subsea, surface and railway applications consists of three high accurate fiber optical gyroscopes with low random walk of 0.1 deg/$\sqrt{hr}$ and gyro angular resolution of 0.0003 deg, three servo accelerometers, a powerful strapdown processor and an open and flexible interface, which can be customized.

As an option the modular designed system provides interfaces to (D)GPS/GLONASS, external trigger input/output and external I/Os for e.g. laser altimeter, SAR, DVL or camera platform control, stabilisation and synchronisation. Possible outputs are Ethernet (TCP/IP or UDP), RS232/422, CAN or analog as well as internal data storage on silicon-disk. Furthermore application specific interfaces can be realized on request (e.g. ARINC 429).

Due to the modular hardware and software architecture special adaptation of housing and mechanical dimensions to customer's requirements is possible. Data processing (strap-down algorithms, global or local navigation, (D)GPS based true heading determination under motion or motion monitoring, platform stabilisation and control) inside of the iNAV-FMS is as well possible as data transmission of pure or corrected raw data.

A key feature is its high available data rate of up to 400 Hz and its high internal gyro sensor resolution of 0.1 arcsec as well as high angular accuracy e.g. for stabilisation tasks.

The iNAV-FMS can be operated in online mode as well as in post-processing mode e.g. to perform advanced Kalman filtering and smoothing. For advanced users it is even possible to integrate user specific online software on the IMU, which is running on a 32 bit realtime OS.

As an option the system can be delivered with an internal power conditioning according to MIL-STD 461 C and transient protection according to MIL-STD 704A/D/E and DO-160E.

The system does not requires an export license.

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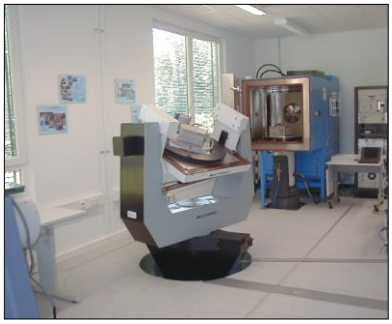
Technical Data of iNAV-FMS-E:

Data Output:	Heading, Roll, Pitch, Angular Velocity, Velocity (body and world), Position, Raw data, internal status information, odo and GPS inf.	
True Heading:	< 0.1 deg absolute with GPS aiding under sufficient motion, < 0.03 deg INS/RTK-GPS post-proc (under sufficient motion dynamics)	
Attitude Accuracy:	< 0.1 deg (GPS); < 0.03 deg DGPS aiding; 0.01 deg post-proc (RTK). (depends on sufficient flight dynamics for Kalman filter observability)	
Position Accuracy:	approx. 15 m GPS S/A off; option: 2 m GPS (L1/L2) < 1 m with DGPS; < 10 cm with INS/RTK-GPS post-proc	
Velocity Accuracy:	< 50 mm/s (online, with DGPS aiding), < 10 mm/s in post-proc.	
Alignment Time:	< 20 seconds roll/pitch (true heading alignment is performed in-flight)	
Range:	± 450 deg/s (no angle limitation)	±5 g (20 g as option)
Bias:	0.75 deg/h (1σ over temp. range)	1.5 mg
Bias Stability (AV):	< 0.1 deg/h (const. temperature)	< 10 µg
Random Walk:	0.15 deg/$\sqrt{h}$	< 50 µg/sqrt(Hz)
Resolution:	0.1 arcsec, < 0.001 deg/s	< 50 µg
Nonlinearity / Scalef.:	< 0.03 % / 0.03 %	< 0.03 % / 0.15 %
Axis Misalignment:	< 250 µrad	
Data Output Rate:	1...400 Hz	
Data Latency:	< 3 ms (sampling accuracy better 10 µs, synchronised to PPS)	
Output (options):	RS232/422, Ethernet (TCP/IP, UDP), PPT pulse per time for triggering external devices, analog output	
Data storage:	8 GByte online data storage flash memory (up to 32 GByte supported)	
GPS receiver:	integrated L1 GPS or L1L2 RTK-GPS	
Inputs (options):	external GPS or GPS/GLONASS, external magnetometer, DVL, marker input trigger, odometer interface (RS422 level), analog inputs	
Synchronization:	Input for pulse-per-second [PPS] (if available)	
Power:	11...34 V DC, approx. 35 W	
Temperature:	-30...+63 °C (operating) -40...+85 °C (storage)	
Rel. Humidity:	8...100 %, IP67	
MTBF / MTTR:	> 30,000 hrs (estimated for surveying appl.) / < 30 minutes	
Shock, Vibration:	25 g, 11 ms ; 60 g, 5 ms (operating); 10…2'000 Hz, 5 g rms	
Weight and Size:	approx. 6.5 kg ; 265 x 145 x 132 mm (without connectors)	

iMAR has extended longtime experience in the manufacturing and development of inertial navigation and guidance systems for all application areas. All systems manufactured by iMAR are maintained at iMAR in Europe / Germany.

In the iNAV-FMS inertial surveying and guidance systems iMAR uses advanced German FOG technology.



iNAV-FMS is running in many applications in torpedo navigation, vehicle dynamics testing, train location, aircraft testing, airborne imaging, airborne platform stabilisation and surveying.

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