

iNAV-FJI-001-N

Inertial Navigation System for Advanced Naval Applications

iNAV-FJI is an INS product family for inertial navigation, gyro compassing and dynamically motion measurement with advanced fiber optical gyros that covers applications, which require high accuracy, reliability and an open interface to the user.

- advanced inertial navigation and surveying system for shipborne applications
- FOG technology with very low angular random walk and high angular resolution
- very high bandwidth, fast response
- advanced data for weapon control
- integrated time synchronisation module and GPS
- Interfaces: Ethernet TCP/IP, CAN, RS232; synchro interface as option

The derivation iNAV-FJI-N for advanced naval applications consists of three high precision fiber optical gyroscopes, 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, EM-Log, DVL, external triggers and external I/Os. Possible outputs are Ethernet TCP/IP or UDP, RS232/422, HDLC or analog as well as internal data storage on silicon-disk. Furthermore appli-

cation specific interfaces can be realized on request (e.g. NTDS, ARINC 407 etc.).

Due to the modular hardware and software architecture special adaptation of housing and mechanical dimensions to customer's requirements is also possible. Data processing (strap-



down algorithms, global or local navigation, true north reference, motion monitoring and control) inside of the iNAV-FJI-N 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 1000 Hz and its unique resolution (0.02 arcsec = 5.6 E-06 degree in roll/pitch/yaw) as well as superior accuracy e.g. for stabilisation tasks. As an option special designed algorithms processed in parallel HPST² mode allow to output most stable angular and position information during definable time windows e.g. for precise radar based target tracking (HPST² = High Precision Short Time Tracking Mode) also under difficult motion conditions. iNAV-FJI is also available for AUV / UUV operation.

The iNAV-FJI-AIRSURV 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 iMAR's XIO interface is available to have full access to result data as well as full compensated or uncompensated inertial raw data.

As a special version iNAV-FJI-000x-N is available with most advanced stabilisation and navigation tasks with angular random walk of << 0.0003 deg/sqrt(hr) and 0.001 arcsec angular resolution.

Technical Data of iNAV-FJI-001-N (different accuracy classes available):

Data Output:	Heading, Roll, Pitch, Angular Velocity, Velocity (body and world), Position, Heave, HPST ² - Information (option)	
True Heading:	< 0.05 deg sec(lat) (< 0.01 deg sec (lat) with RTK GPS under motion)	
Attitude Accuracy:	< 0.01 [0.02] deg; < 0.002 [0.004] deg with DGPS aiding	
Position Accuracy:	0.03...0.8 [2] nm/hr (unaided); 7 mtr/hr (aided with DVL with 0.2% error and velocity assumed to be 1 m/s)	
Alignment Time:	< 15 minutes (at sea), < 10 minutes (dockside)	
Range:	± 500 ^{*)} deg/s (no angle limitation)	± 10 g (other as option)
Drift stability / Offset:	< 0.003 deg/h (const temp.)	< 5 μ g (const. temp.)
	< 0.01 deg/h (OTR)	< 60 [100] μ g (OTR)
Random Walk:	0.001 deg/ \sqrt{h}	< 8 [100] μ g/ \sqrt{Hz}
Resolution:	< 0.1 μ rad (0.02"), < 0.001 deg/s	< 1 μ g
Nonlinearity / Scalef.:	< 10 ppm (30 ppm scale factor error)	< 20 μ g/g ² (60 [100] ppm)
Data Output Rate:	1...1000 Hz	
Data Output Latency:	< 2 ms (sampling accuracy better 1 μ s, synchronised to PPS)	
Output (options):	RS232/422, Ethernet TCP/IP / UDP, NTDS, HDLC, coarse/fine synchro or customer specific	
Inputs:	(D)GPS, DVL / EM-Log, APS, event trigger (option)	
Synchronization:	Input for pulse-per-second [PPS] (if available)	
Power:	11...34 V DC, < 30 W	
Connectors:	according to MIL-C-38999-III	
Temperature:	-5...+55 °C (operating, standard temp. range)	
	-40...+55 °C (oper. with selected option of internal heating at low temp.)	
	-40...+71 °C (operating with slightly degraded specification)	
	-40...+85 °C (storage)	
rel. Humidity:	8...100 %, IP67	
MTBF / MTTR:	> 25,000 hrs (estimated for surveying environment) / < 30 minutes	
Shock:	25 g, 11 ms ; 60 g, 5 ms (operating)	
Weight:	approx. 10.5 kg (depends on housing; light weight version on request)	
Size:	IMU: approx. 370 x 213 x 180 mm (other on request)	
	external IPC or data distribution system (if required): 19" rack	

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-FJI inertial navigation and guidance systems iMAR uses advanced European FOG technology. The



version with reduced accel. spec. (see [...]) requires only an European export license for the total system, the version with advanced QA-2000/3000 accelerometers requires an US export license for the accelerometers. Please do not hesitate to contact us for further information or for a demonstration.

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