

# iNAV-FJI-001-J

## Inertial Navigation System for Advanced Applications

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

- high performance inertial navigation, guidance, control and surveying system for airborne, naval, underwater, surface, railway and advanced laser scanning applications
- FOG technolog with very low angular random walk and high angular resolution
- high bandwidth, fast response
- integrated 2 cm accurate RTK-GPS / GLONASS / GALILEO aiding
- Interfaces: Ethernet TCP/IP, UDP, CAN, RS232 / RS422 UART, ext. DGPS, RTK-GPS, MIL-STD1553B
- **No ITAR, no export restrictions within Europe, Canada, Australia, USA, Japan**

The iNAV-FJI for advanced airborne, naval, AUV, UAV, ROV, surface and railway applications consists of three high precision fiber optic 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/RTK)GNSS, external triggers and external I/Os for e.g. up to 3 odometers, laser altimeter, DVL or camera / antenna platform control. Possible outputs are Ethernet (TCP/IP, UDP), RS232/422 UART, CAN, MIL-STD-1553B or analog as well as internal data storage on solid-state flash-disk. Furthermore application specific interfaces can be realized on request (e.g. ARINC 429).

Data processing (strap-down algorithms, global or local navigation, north-seeking, north keeping or motion monitoring and control) inside of the iNAV-FJI is as well available as data transmission of pure or corrected raw data.

A key feature is its high available data rate of up to 1'000 Hz and its unique resolution (0.02 arcsec = 5.6E-06 degree in roll/pitch/yaw) as well as superior accuracy e.g. for stabilisation tasks and silent operation. As an option special designed algorithms processed in parallel HPST<sup>2</sup> mode allow to output most stable

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angular and position information during definable time windows e.g. for SAR or LIDAR applications (HPST<sup>2</sup> = High Precision Short Time Tracking Mode) also under difficult motion conditions.

No internal shock mounts are used to guarantee highest angular performance regarding to laser scanner integration.

The user software NavCommand allows the user a full control of the system as well as data storing and to perform maintenance activities (e.g. download of stored data). With the software iWP+ furthermore a powerful postprocessing tool is available for advanced surveying applications.

The system iNAV-FJI has autonomous north seeking capability and is **export controlled with simplified EU001 procedure** (but no ITAR restrictions). With iNAV-RQH-1003 a form-fit-function (FFF) compatible system is provided on RLG technology. With iNAV-FMS-E-DA a FFF compatible system with dual-antenna GNSS technology is provided, which **does not require any export license**.



## Technical Data of iNAV-FJI-001-J

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° sec(lat) free inertial; < 0.01° with DGPS, < 0.008° postproc	
Attitude Accuracy:	< 0.02° free inertial (< 0.005° postproc with RTK aiding)	
Position Accuracy:	3 nm/hr (unaided); < 0.3 m DGPS online, 2 cm RTK/INS postproc < 0.1 % distance travelled (with odometer and GPS, applic. depend.) < 0.2 % dist.trav. on underwater vehicles (incl. RDI DVL interface)	
Velocity Accuracy:	10 mm/s (aided with L1/L2 RTK DGPS receiver, < 5 mm/s postproc RTK)	
Alignment Time:	< 10 minutes static, 25 minutes dynamic	
Range:	± 450 °/s (no angle limitation)	±5 g (option 2/5/10/25 g)
	*) The INS shall be switched on while angular rate is < 150 °/s	
Drift (unaided) / Offset:	0.01 °/hr	< 160 µg
Random Walk / Q:	< 0.001 °/√h	< 15 µg/sqrt(Hz)
Resolution:	0.1 µrad (0.02"), < 0.001 °/s	< 1 µg
Scale/Linearity Error:	< 30 ppm / < 10 ppm	< 160 ppm / < 20 µg/g²
Axis Misalignment:	< 100 µrad	< 100 µrad
Data Output Rate:	1...1'000 Hz, bandwidth 400 Hz	
Data Latency:	< 2 ms (sampling accuracy better 1 µs, time-stamped to PPS)	
Data storage:	up to 16 Gbyte on internal flash drive (option)	
Output (options):	RS232/422 UART, Ethernet TCP/IP / UDP, PPT (Pulse per Time), CAN, MIL-STD1553B	
Inputs:	internal/external (RTK)GNSS (standard: GPS/GLONASS/GALILEO integrated) , marker event trigger, 3 x odometer (RS422 level), PPS	
Synchronization:	Input / Output for pulse-per-second [PPS / SYNC]; TRIG_IN/OUT	
Connectors:	MIL-C-38999 III	
Power:	11...34 V DC, < 45 W	
Temperature:	-10...+55 °C (operating, -40...65 °C degraded), -40...+85 °C (not oper.) option: internal heating at low temp. (-40...+55 °C operating)	
Rel. Humidity:	8...100 %, IP67	
Magnetic insensitivity:	< 200 µTesla (2 Gauss)	
MTBF / MTTR:	> 25,000 hrs (estimated for surveying applications) / < 30 minutes	
Shock, Vibration:	25 g, 11 ms ; 60 g, 5 ms (operating); 20...2'000 Hz, 3 g rms	
Qualification:	MIL-STD-810F, MIL-STD-461E, MIL-STD-704D, DO160E	
Weight, Size:	10.2 kg, approx. 360 x 213 x 179 mm (without connectors)	
Software:	internal online Kalman filter, NavCommand, INS/RTK-GPS post-proc (option)	

iMAR is 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.

iMAR use latest and high reliable fiber optic gyro and servo accelerometer technology in its advanced inertial navigation and guidance systems for industrial and defence applications.

iNAV-FJI-001-J is not covered / restricted by ITAR.



iMAR GmbH • Im Reihersbruch 3 • D-66386 St. Ingbert / Germany  
Phone: +49-(0)-6894-9657-0 • Fax: +49-(0)-6894-9657-22  
[www.imar-navigation.de](http://www.imar-navigation.de) • [sales@imar-navigation.de](mailto:sales@imar-navigation.de)