

iCORUS-02

Inertial Measuring System for Navigation, Gravimetric Disturbances and Surveying Applications with Gyro Compassing Capability

iCORUS-02 is a member of iMAR's **iCORUS strap-down airborne gravimeter family**. The system provides gravimetric disturbances measurements, gyro compassing, inertial navigation, surveying, guidance and stabilization. It contains ring laser gyros and covers applications, which require high accuracy, reliability, a flexible interface and easy integration and usage.

- **iCORUS-2:** High accurate airborne gravimetric disturbances acquisition system
- **PostProc software iPosCAL-GRAV** for signal post-processing
- **GUI / FrontEnd software iXCOM-CMD with iCORUS-Plug-In** for easy-to-use operator guidance
- Integrated inertial measurement and surveying capability for airborne, naval and surface applications; gyro compassing.
- RLG technology with specific internal signal processing, low angular random walk and high angular resolution, combined with ultra precise gravimetric disturbance measurement technology. Strapdown setup.
- iCORUS-02/WTS is designed to be used within air-conditioned areas. Version iCORUS-02 includes an integrated temperature stabilization. Option -DA contains dual-antenna GNSS heading support.
- Integrated time synchronization module and GPS / RTK-GNSS / PPP engine with single or dual antenna.
- Internal 32 GByte data storage for black-box operation capability (option 128 GByte or more tbd.)
- High data rate, open interfaces: Ethernet TCP/IP - UDP, CAN, UART RS422/RS232 etc.; PPS, NTP
- Small size, low weight, low power; integrated surveying markers and aiding support points on the enclosure (to support also advanced surveying applications).

The **iCORUS-02** comes with an integrated sophisticated, easy to use temperature management. For operation of iCORUS-02 within well stabilized environment please contact iMAR for light-weight version iCORUS-02-P.

The system contains an all-frequency / all-constellation RTK capable GNSS receiver (GPS, GLONASS, GALILEO, Beidou). Communication I/Os are RS422/232 UART, Ethernet (TCP/IP, UDP), ARINC429 (option), CAN.

Data processing (strapdown navigation, gyro compassing, north keeping or motion monitoring) is performed inside of the iCORUS-02, and also data transmission and storage of pure or corrected raw data is available.

The measurement results like attitude, heading, position, velocity, rates and acceleration as well as the INS and GNSS raw data are available, incl. time stamp with up to 400 Hz. The **iCORUS-02** allows also inertial navigation and autonomous gyro compassing for surveying tasks.

The optional dual-antenna capability (iCORUS-02-DA) allows the system additionally to determine true heading within shortest time, where required.



iCORUS-02 Strapdown Airborne Gravimeter

For surface applications the most sophisticated, wheel sensor supported data fusion provides also highest position accuracy even when the system suffers significant GNSS outages.

The GUI / HMI software iXCOM-CMD provides full control of the system as well as data storing; furthermore, it allows maintenance activities also via network (e.g., download of stored data). Last but not least, the powerful post-processing tool **iPosCAL-GRAV** is available for advanced surveying applications.

The system is only covered by dual-use export control and not by any ITAR regulations. Within the EU the simplified EU001 procedure is applicable, which allows a fast delivery from iMAR to the end-user.



Technical Data of iCORUS-02 (rms values)

Data Output:	Raw data for gravimetric disturb. postproc. Heading, Roll, Pitch, Angular Velocity, Velocity (Body and World), Position, Raw Data of INS / GNSS / VMS incl. time-stamp, internal status information		
Global Performance:	Gravimetric Disturbances: (at 50 s resolution)	< 1.2 mGal	under sufficient GNSS observations, reasonable motion conditions and with an appropriate post-processing (i.e. relative to an initial, externally surveyed, gravity reference point) (performance without linewise bias removal: < 2 mGal) typical performance under proper flight conditions
	True Heading:	0.8 – 1.0 mGal < 0.02°	with at least single antenna GNSS (data fusion) and under sufficient motion dynamics (no dual antenna required) post-proc with RTK corrections gyro compassing (no GNSS support required)
		< 0.01° < 0.1° sec lat	
	Position accuracy:	1...2 m 0.6 m 0.02 m 3 nm/hr [CEP]	with GNSS, S/A off with SBAS with RTK corrections online or with RTK post-proc free inertial navigation after sufficient GNSS aiding
	Velocity:	0.02 m/s	with GNSS; < 0.005 m/s with RTK post-proc
	Altitude:	< 1...4 m 0.06 m	with GNSS, S/A off with RTK corrections online or with RTK post-proc
	Roll/Pitch Accuracy:	0.01°	with GPS, S/A off; < 0.005° with RTK post-proc
Alignment Time:	< 2 min. GNSS cold start, < 1 min. GNSS warm start; < 30 sec with stored heading < 8 min. to achieve 0.1° sec lat, < 2 min. to achieve 0.5° sec lat (rms) with Gyro Compassing		
Inertial Sensor Performance:	Gyroscopes	Accelerometers	
Range:	± 350 °/s (no angle limitation)	± 20 g	
Linearity / Scalefactor:	< 15 ppm / < 10 ppm	< 100 ppm / < 30 µg/g ²	
Bias Stability (AV):	< 0.001 °/hr	< 1.0 µg < 1.0 mGal	
Resolution of Raw Data:	< 0.001 µrad / LSB	< 0.5 µg / LSB < 0.5 mGal / LSB	
Axis Misalignment:	< 30 µrad	< 50 µrad	
GNSS Receiver (integrated):	all-frequencies / all-constellations GPS+GLONASS+GALILEO+BEIDOU, RTK/PPP, L-Band		
Input Interfaces (options):	external GNSS receiver (standard: integrated GNSS receiver); event trigger (PPS / SYNC, RS422 level), odometer (opto-coupler input up to 32 V, A/B quadrature or counts & direction, RS422 level compliant)		
Output Interfaces (options):	UART RS232/422, Ethernet TCP/IP / UDP, CAN, ARINC429, ARINC825, HDLC/SDLC, PPT (Pulse Per Time), PPS, SYNC; NTP on Ethernet as option; NTRIP caster as option; Pulse-per Distance 1...400 Hz, internal data rate > 3 kHz		
Data Output Rate:	< 5.3 ms (sampling accuracy better 1 µs, time-stamped according to PPS; jitter < 1 ms)		
Data Latency and Jitter:	up to 128 GByte on internal non-volatile memory (standard: 32 GByte)		
Data storage:	MIL-C-38999 Series III for signals and power, TNC for antenna		
Connectors:	< 500 µTesla (5 Gauss) for operation within spec.		
Magnetic. insensitivity:	> 50,000 hrs (estimated for surveying applications) / < 30 minutes		
MTBF / MTTR:	6 g / 20 ms operational and 40 g / 15 ms non-operational; 60'000 ft 6.3 g rms (operating); 60,000 ft		
Shock, Vibration, Altitude:	MIL-STD-810G, MIL-STD-461G, MIL-STD-704F, DO160G; 8...100%; IP67		
Qualification:	-30...+45°C operating (case), if environment. temp.change < ±15 K during mission		
Temperature:	-30...+65°C storage		
Power:	iCORUS-02: < 250 W; 16...34 V DC; iCORUS-02-P: < 25 W; 16...34 V DC Power interruption hold up time according to DO160		
Weight / Size:	iCORUS-02: approx. 18.5 kg / 260 x 240 x 380 mm ³ (WxHxL), w/o connectors; iCORUS-02-P: approx. 8 kg / 187 x 130 x 330 mm ³ (WxHxL), w/o connectors		
Installation:	Installation in all arbitrary orientations allowed		
Software:	iXCOM-CMD GUI software under MS Windows and Linux available; integrated real-time Kalman filter (42+ states); iXCOM communication protocol iPosCAL-GRAY : iMAR's advanced gravimetry post-processing software		

iMAR Navigation manufactures and designs inertial navigation, surveying, guidance, control and stabilization systems for defence, airborne, industrial, gravimetry, automotive, agriculture, mining, drilling, surveying and many other applications. All systems are manufactured, maintained and designed by iMAR Navigation GmbH in Europe / Germany.

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