iSULONA-V

Dead Reckoning Nav System for Tactical Grade Position Determination

Dead Reckoning is the way to make (D)GPS more accurate and reliable when tracking or steering vehicles or when surveying their trajectories, e.g. in defense applications. iSULONA is a hybrid INS/GPS system, complemented by vehicle motion sensor input. It provides reliable information of position and heading also during GNSS outages.

- Used to provide orientation & position of support, supply and logistics vehicles
- Robust, compact, light
- MEMS gyro technology
- L1 GNSS (GPS+GLONASS +BEIDOU+QZSS); SBAS capability
- Output of all navigation data, like position, heading, attitude and many more, also during GNSS outages
- Position accuracy typ. 2 m
- Interfaces: UART RS232 & 422 / CAN / Ethernet / USB for real-time data output and RS232 for DGPS correction input; NMEA183 / iXCOM
- 32 GByte internal memory

All iSULONA navigation systems contain a full triade of gyros and three accelerometers and an integrated (D)GNSS receiver to detect position, velocity, true heading, roll and pitch. An interface to odometer / VMS is available to measure the vehicle velocity.

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iSULONA continues to provide positions with high data rate also during GNSS signal blockages or disturbances, such as in tunnels, in urban canyons as well as in case of GNSS loss due to temporary jamming, if an odometer is connected (automatic dead-reckoning mode).

By optimal fusion of all sensor data inside the powerful signal processor of iSULONA, the current vehicle position can be calculated with higher accuracy, even when GPS or DGPS signals are blocked for a certain time. The fusion is based on a 42+ state extended Kalman filter, including automatic odometer scale factor estimation, misalignment estimation and on-the-fly alignment without any need to perform any "calibration drives". **iSULONA provides an automatic initialization, calibration and operation.**

Besides using its internal GNSS receiver, iSULONA-V can be made operable with nearly all common available (D)GPS receivers like Javad, NovAtel, Trimble, Ashtec, Rockwell, Garmin, NavStar etc. as long as they provide position, velocity, standard deviations, time stamp and PPS for synchronization with reasonable accuracy.

The "stored heading / stored position" feature is a standard feature in the iSULONA and allows a fast start-up even if GNSS is not available during power-up. The iSULONA is delivered with the MS Windows™ based configuration software iXCOM-CMD, which is also available under Linux and MacOS. All output data can be displayed and stored online on the user's notebook, tablet or process computer.

iSULONA can also be used without odometer aiding for UAV applications.

Versions with higher grade (iSILONA-IV, iSULONA-II, iCOMBANA, iPRENA) are also available (with compatible data interface).

The iSULONA is free of any export control and not affected by any ITAR regulation.

Technical Data iSULONA-V/M, iSULONA-V/S-DA (RMS)

System performance:	Heading accuracy:	● iSULONA-V/M: < 9 mil / 0.5 deg [RMS] on the move with integrated L1 GNSS receiver [1] ● 4 mil / L[m] [RMS] with integrated dual-antenna GNSS engine (L = antenna baseline in [m]; i.e. 2 mil at 2 m baseline (for iSULONA-V/S-DA version)
	Attitude accuracy:	● < 5 mil / 0.3 deg [RMS] [1]
	Position accuracy:	● < 2 m CEP (typical value with GPS (S/A off) ● < 3 % DT, during short GNSS outages [2]
	Altitude accuracy:	● < 3 m RMS (typical value with GPS (S/A off) ● < 4 % DT, during short GNSS outages [2]

Roll, pitch, azimuth rate: Acceleration:	±250 °/s (options: ±500 °/s, ±1'000 °/s) ±4 g all axes (options: ±8 g, ±16 g)
Integrated GNSS receiver:	iSULONA-V/M: L1 GPS+GLONASS+GALILEO (+Beidou) / SBAS; iSULONA-V/S-DA: L1L2 GPS, GLONASS, GALILEO (+ others) – dual antenna, for heading determination even at standstill condition
Odometer Interface / VMS:	A/B lines for odometer counts (RS422 level); mode (e.g. usage of forward/backward signal) selectable by software this interface is not provided when the system is used for UAV applications
Communication Interfaces:	Ethernet (TCP/IP, UDP), 2 x UART RS422/232, 2 x CAN, PPS (RS422 level), 2 x SYNC-IN, SYNC-OUT, USB, UART RS232 for GNSS correction data input
Environment:	MIL-STD-810G (vibration, shock, humidity) MIL-STD-461G (EMI/EMC)
Temperature range:	-40°C to +71°C (operating, case temperature); -56...+85 °C (storage)
Shock; Vibration:	20 g, 11 ms half-sine saw-tooth; 10 to 2'000 Hz 2 g rms (operation) 10 g rms (endurance)
Power Supply:	9...34 V DC / approx. 6 W @34 V, reverse voltage protection
MTBF / MTTR:	35'000 hrs (estimated) / 5 min.
Built-In-Test:	Power up PBIT, initiated IBIT and continuous CBIT
Dimensions, Weight:	~ 102 x 112 x 65 mm^3 (WxLxH) w/o conn.; ~ 600 grams (metal housing)
Additional Features: Software / GUI:	Stored Heading & Position after Power-Off/On etc. iXCOM-CMD user software incl. moving-map capability; open iXCOM protocol; intenal 42+ state Extended Kalman Filter

[1] under sufficient motion dynamics and GNSS aiding
[2] only applicable, if the system is aided with odometer (wheel sensor)