iAG²VC

INS/GNSS/LOC/ODO Solution for Localization, Guidance & Control for Automated Gyro Guided Vehicles

It is in the focus of the highly automated or even autonomous operation of vehicles like straddle carriers, fork lifters or other vehicles in a harbor or factory or hospital environment, to provide highest reliability of positioning and dynamic guidance using a redundant system architecture.

- roll/pitch accuracy 0.1° (for proper GPS/GNSS antenna lever arm compensation)
- position resolution depends on odometer resolution (typically better 1 cm)
- position accuracy with RTK availability, also during mid-term outages, better 5 cm (CEP); GNSS and Locata positioning supported
- External marker / transponder update capability as option (RFID, magnets, WLAN…)
- automatic odometer scale factor estimation
- Using iMAR's well-known iNAT-M200 and iNAT-U200 hardware
- Using the iDMN WLAN mesh network for communication to the central station or/and between the vehicles

The iAG²VC design with a sophisticated inertial/GNSS/Locata/odometer data fusion addresses out-door, indoor and mixed applications, i.e. also areas are covered, where pure GNSS solutions are not feasible. An odometer (wheel sensor) is used for speed measurement updates too (impacts due to changing wheel diameter under payload influence as well as temporarily slippage are estimated automatically).

The system can also expanded by Locata positioning or / and to use position updates, if available, by marker information, like magnets of RFID devices, provided in the floor, when the vehicle passes them. The exceptional time synchronization requirements are met by iMAR's INS/GNSS systems of type iNAT-M200, iNAT-U200, iNAT-FSSG-1 and iNAT-FSLG-01.

The technology used for iAG²VC is similar to those used by iMAR for testing autonomous vehicles (iVCTRL forcars and trucks) on proving grounds for the verification of and guidance of unmanned vehicles (iSWACO-ARGUS).

Figures: iNAT-M200 and iNAT-4C INS/GNSS systems with Vehicle Control Interface
             and optional Communication

Technical Data of iAG²VC (depending on used hardware and software options):

Gyro System:	see data sheet of i iNAT-M200/SLC or iNAT-M200/SLN, iNAT-U200 or iNAT-FSLG; the selection of the IMU technology depends on the environmental conditions, aiding sensor performance and required system accuracy.
RTK-GNSS accuracy:	2 cm + 1 ppm of distance between rover and base station (no outages) 0.1 … 0.5 % of distance travelled (during absence of GNSS)
Data output rate:	adjustable; internal data rate 500 Hz
Data latency and jitter:	latency < 2 ms, jitter < 1 ms
Output (options):	UART RS422, CAN, Ethernet (TCP/IP and UDP); PPS (RS422 level)
Inputs (options):	odometer (A/B), event trigger
RTK-GNSS positioning:	L1/L2 receiver, 1 or 2 antennas, GPS / GLONASS / Beidou etc. (option)
LOCATA positioning:	Support of LOCATA™ positioning system for localization capability (option) independently from GNSS
Heading accuracy:	0.1 deg on the move or with dual antenna (5 m base as example) (option)
Local position updates:	magnets or RFID transponders in the floor (option)
Wireless transmission:	dynamic mesh network (option)
Sync. Reference:	GPS/UTC time
Internal data storage:	32 GByte in iNAT as Blackbox feature
Power supply:	10...34 V DC; the hardware is EMI/EMC protected / qualified
Temperature:	-30...+63 °C case temperature (operating within specification; other on request)
Shock:	30 g, 11 ms
Weight, Size, IP:	depends on selected hardware; IP67
Software:	Online Solution (42+ state INS/GNSS/LOC/ODO data fusion), GUI software iXCOM-CMD for configuration / visualization under MS Windows™ and LINUX available; SDK available

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