iTraceRT-MVT-300/TLD

Accurate Real-Time Multi Vehicle Tracking with integrated Dynamic Mesh Communication Features for all automotive Localization & Control Applications

The latest applications in multi vehicle testing require INS/GNSS solutions with high performance, minimum latency and advanced timing features, combined with a robust local and global communication network support, to provide most reliable surveying and trajectory control capability.

iTraceRT-MVT-M300, equipped with iMAR's QNX^{RT} based real-time signal processing, is the successor of the well-known traditional automotive motion reference system iTraceRT-MVT-M200.

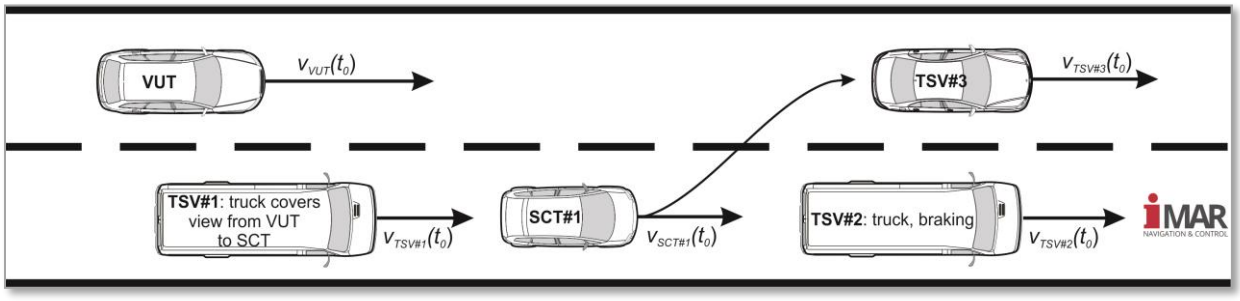
- most rugged MEMS gyro based system.
- output of angular rate, acceleration, attitude, true heading, course over ground, velocity and position as well as all standard deviations via Ethernet, UART, CAN, USB.
- active mesh network communication support.
- class leading accuracy: < 2 cm, 0.05 °
- latency < 2 ms plus jitter < 1 ms for tasks in advanced vehicle control & testing applications.
- integrated all-constellations / all-frequencies GNSS engine, advanced interference rejection.
- odometer aiding for best performance even during longer GNSS outages.
- 32 GByte internal online data storage with "black-box" capability (option: 128 Gbyte).
- NTRIP caster capability to be operated as GNSS reference station (i.e. to supply other vehicles with RTK corrections).
- dual-antenna capability (allows determination of heading at standstill, without any initial motion)
- available also with gyro compassing capability with initial 0.3° heading (iTraceRT-MVT-510).
- robust, compact, lightweight, advanced EMI/EMC protection.

The iTraceRT-MVT incorporates both, more than iMAR's 30 years of experience in most accurate vehicle trajectory surveying and sensor technology, as well as the latest interface and GUI design rules including related data exchange protocols to support both, the traditional highly skilled operators as well as the modern plug & play users.

Besides the iXCOM easy-to-use interface protocol on UART, USB and Ethernet, the powerful GUI allows to be configured according to the skills of the operator, from the professional engineer down to the briefly trained technician or safety driver. A dedicated operation wizard guides the operator step by step through the configuration process in the vehicle to assure a fast, easy, accurate and straight forward system setup.

The system provides all kinematic measurements and standard deviations of the target vehicle in real-time, with a data update rate of up to 500 Hz with an unbeatable low latency and jitter.

The iTraceRT-MVT-300/TLN and /TLD systems are fully interface compatible to iMAR's iNAT Navigation & Timing system series iNAT-M300.



Technical Data: iTraceRT-MVT-300/TLD (rms)

	Rate	Acceleration	Attit./Heading	Position	Velocity	Remarks
Range:	± 500 °/s	± 8 g	unlimited	unlimited	515 m/s	> 515 ms on request
Bias day-to-day:	0.2 °/s	2 mg	pure INS, unaided, day-to-day, over temperature range			
Bias instability:	< 2.5 °/h	0.1 mg	AllanVariance values @ constant temperature			
Bias (filtered)	< 5 °/h	< 1 mg	after 5 minutes RTK-GNSS aiding under suffic. dynamics			
Angles:			0.05° RP, 0.15° Y[1]			(INS/RTK-GNSS)
			0.07° RP, 0.17° Y			(after 10 sec RTK-GNSS loss)
			0.15° RP, 0.25° Y			(after 60 sec GNSS outage)
			0.15° Side slip angle			(for v > 10 m/s, RTK)[2]
Position (horizontal / vertical):				± 2 cm / 5 cm + 2 ppm[1]		(INS/RTK-GNSS) [1]
				± 0.1 m / 0.1 m		(INS, 5 s GNSS outage) [1]
				± 0.5 m / 0.4 m		(INS, 10 s GNSS outage) [1]
				0.2 % DT (CEP)		(INS/ODO during GNSS outages)
				± 1.8 m		(pure GNSS; CEP50)
				± 1 cm / 2.5 cm		(post-proc, INS/RTK) [1]
Velocity:			.....		0.05 m/s	(INS/GNSS) [1]
					0.02 m/s	(INS/RTK-GNSS) [1]
					0.1 m/s	(INS/ODO, 10 s GNSS outage) [1]
Noise:	< 0.15 °/√h	< 23 µg/√Hz	0.02 °	< 10 mm	< 0.01 m/s	
Resolution:	< 0.000'1 °/s	< 20 µg	0.001 °	< 1 mm	< 0.001 m/s	
Scale error (filt'd):	< 0.1 %	< 0.07 %	< 0.1 %			
Linearity error:	< 0.2 %	< 0.5 %	< 0.2 %			

Integrated GNSS engine:	all-frequency / all -constellation GNSS engine with full RTK support (GPS, GALILEO, GLONASS, BeiDou)
Data fusion (INS/GNSS):	integrated advanced 42+ state INS/GNSS/+ extended Kalman filter based data fusion
Data Rate / Latency / Jitter:	500 Hz / < 2 ms / < 1 ms
Output:	USB Host, UART RS232/RS422 (max. 921.6 kBd), CAN (max. 1 MBd), TCP/IP/UDP (max. 1 GBd) Option: iTraceRT-MVT can be operated also as NTRIP caster (like a GNSS reference station); NTP time server
Inputs:	RTK-Base corrections (RS232 or NTRIP); odometer (A or A/B at RS422 level)
Synchronization:	PPS output (RS422 level), PPS timing accuracy better 25 ns; with each PPS a time sync message can be sent via CAN bus.
Graphical User Interface:	MS Windows or LINUX based software iXCOM-CMD incl. supported features, like integration support wizard (I/F setup, mechanical setup calibration etc.)
Power Supply:	10...34 V DC, approx. 10 W
Temperature, Shock:	-40...+71°C (outer case temperature); 100 g / 11 ms, 5 g rms (20-2'000 Hz) endurance
Mass, Size, Protection:	approx. 0.85 kg , approx. 102 x 65 x 111.5 mm (WxHxD) plus connector; IP67
Environmental Qualif.:	MIL-STD-810G, MIL-STD-461G, MIL-STD-704F (full military robustness proven)
Deliverables:	- MEMS based INS with integrated multi-frequency-RTK-GNSS - MS Windows based GUI software iXCOM-CMD, incl. integrated Configuration Wizard - Drivers for ROS-2, Python, SDK for C++
PartNumber:	single antenna version: P/N 00193-06004-0516 iTraceRT-MVT-300/TLD dual-antenna version: P/N 00193-06004-0517 iTraceRT-MVT-300/TLD-DA
Options:	- GNSS antenna(s) and GNSS reference station iREF-GNSS - Dual-antenna configuration iTraceRT-MVT-M200/TLD-DA for heading aiding at initial standstill (not required, if "stored heading" feature is used together with odometer or initial supervised motion is feasible) (0.2 deg initial accuracy at 1 m dual-antenna baseline, resp. 0.1 deg at 2 m baseline) - odometer for aiding during longer GNSS outages (significant advantage for urban canyons) - interface to iMAR Dynamic Mesh Communication System - LTE, GSM or GPRS or based wireless modem iNetGo for internet based correction data - compatibility to postproc software InertialExplorer - fully compatible to the **Proving Ground Automation** **iSWACO-ARGUS,** interface to ABD driving robot

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[1] assumes sufficient GNSS conditions and sufficient motion conditions for filtering state observability; values depend on trajectory
[2] The side slip angle is the angle between course over ground (CoG) and true heading. It is calculated based on the longitudinal and transversal velocity of the vehicle. It's accuracy therefore increases with increasing velocity. At standstill, the side slip angle cannot be defined.

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