

# iTraceRT-M200-SDN

## Precise Real Time Vehicle's Trajectory and Dynamics Surveying Deeply Coupled INS/GNSS Filtering

iTraceRT-M200 is one of the smallest INS/GNSS MEMS based inertial navigation, measurement, surveying and control systems on the market for applications on the surface (land/sea) and in the air. It provides all kinematic measurements like acceleration, angular rate, attitude, true heading, velocity and position of the target vehicle in real-time with a data update rate of 200 Hz.

- robust, compact, light weight system
- based on medium grade MEMS Gyro, Accel technology and GPS/GLONASS L1/L2 GNSS
- Galileo and Beidou ready
- output of angular rate, acceleration, attitude, heading, CoG, velocity and position in realtime with up to 200 Hz (adjustable)
- **iTraceRT-M200-SDN**: 0.02 m position accuracy (RTK) with deeply coupled INS/GNSS filter, 0.02° roll/pitch, 0.06° heading, 0.05 m/s velocity accuracy with L1L2 RTK, shortest re-acquisition time after loss of GNSS due to **deeply coupled INS/GNSS**
- optional with external communication modules such as **GSM/GPRS/UMTS/LTE, WLAN, 403 – 473 MHz Radio**
- Interfaces: USB/RS422/CAN/Ethernet for real-time data, RS232 for DGPS/RTK correction data input
- **2 GByte** internal memory and separate internal 32 GByte **memory**
- Available with several inertial MEMS sensor grades, dependent on user application

In urban canyons often the number of observable satellites is quite limited and therefore not only the GNSS data is used to aid the inertial data signal processing but also the GNSS engine inside of the iTraceRT-M200-SDN is supplied with the MEMS IMU data providing a deeply coupled INS/GNSS solution. This allows the GNSS engine to operate with less than 4 satellites and this also allows a better detection of multi-path and therefore provides a significant better position result compared to a standard L1 or L1L2 GNSS solution.

For land vehicles additionally an odometer aiding capability is available as an option.



Loosly coupled INS/GNSS



**iTraceRT-M200-SDN:**  
deeply coupled INS/GNSS

The iTraceRT-M200 provides system performance and system reliability which is required in standard tasks of vehicle motion dynamics testing, trajectory surveying and platform control tasks (car / truck / naval vessel / civil and military aircraft). The iTraceRT-M200 is not EASA/FAA certified.



The iTraceRT-M200 is delivered with a Windows based configuration software. All output data can be displayed and stored online on the user's notebook or process computer. With iREF-GNSS iMAR also provides a GNSS reference station to provide RTK or DGPS corrections on demand.

A powerful postproc software is available to allow post-mission processing including a multi station GNSS correction data solution, and a direct visualisation in Google Earth™.



## Technical Data iTraceRT-M200-SDN:

	Rate	Acceleration	Attit./Heading	Position	Velocity	Height
Range:	± 400 °/s	± 10 g	unlimited	unlimited	515 m/s	18'288 m
Bias Stability <sup>1</sup> :	< 0.5 °/h	0.3 mg				
Angles:			0.02° / 0.06° RP/Y <sup>2</sup> 0.03° / 0.06° RP/Y		(INS / DGPS) (after 10s GNSS outage)	
Position:					+/- 0.02 m CEP (INS/GNSS RTK) <sup>3</sup> +/- 0.05 m CEP (INS/RTK [only -SDB]) +/- 0.4 m CEP (INS/DGNSS)	
Velocity:					0.05 m/s (INS/GNSS)	
Noise:	0.2 °/sqrt(hr)	200 µg/√Hz	0.03 °	< 0.05 m	< 0.05 m/s	
Resolution:	< 0.01 °	< 150 µg	0.01 °	< 0.01 m	< 0.05 m/s	
Linearity error:	< 0.1 %	< 0.2 %	< 0.2 %			
Scale factor error:	< 0.1 %	< 0.3 %	< 0.3 %			
Initial Alignment:	automatically with integrated INS/GNSS Kalman filter					
Data Processing Rate:	200 Hz; PPS timing accuracy better 10 ns					
Data Output Rate:	1...200 Hz; all data available in real time (RT = RealTime)					
Synchronisation:	PPS output, Trigger output, Marker input (RS422 level)					
Output:	USB, CAN (up to 1 MBd), UART RS422 (up to 921.6 kBd), Ethernet					
Inputs:	DGNSS/RTK correction data from base, if available (via RS232); odometer (A or A/B at RS422 level)					
Graphical User Interface:	MS Windows based software iTraceRT-CMD for configuration and data readout					
Power Supply:	9...34 V DC, approx. 8 W (depends on options)					
Temperature and shock:	-40...+71 °C (outer case temperature); 60 g, 11 ms					
Mass, size:	approx 750 g , approx. 102 x 138 x 65 mm					
Deliverables:	<ul style="list-style-type: none"> <li>- MEMS based INS with integrated L1L2 GNSS receiver, GNSS antenna</li> <li>- Windows based GUI software iTraceRT-CMD</li> </ul>					
Options:	<ul style="list-style-type: none"> <li>- SW-Development Kit with API (Application Programmers Interface)</li> <li>- Optional SD-Card to expand the internal data storage (32 GByte)</li> <li>- Odometer interface for velocity aiding during longer GPS outages (position error then limited to approx. 0.2 % of longitudinal distance travelled)</li> <li>- Interface for ABD-Driving-Robot (via Ethernet)</li> </ul>					

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<sup>1</sup> after algorithm converging under motion with GPS aiding (minimum of AllanVariance curve)

<sup>2</sup> RPY = Roll / Pitch / Yaw (azimuth = -yaw)

<sup>3</sup> dependent on trajectory and satellite constellation

