

iTraceRT-MVT

Multi Vehicle Tracking for ADAS Verification Tasks

It is in the focus of vehicle designers and developers of advanced driver assistance systems (ADAS) to know the driven trajectory and the dynamic behaviour of one or between several vehicles to each other with high accuracy. The required task is called “multi vehicle tracking” (MVT) between an EGO vehicle and several ALTER vehicles. Each vehicle contains identical hardware and software.

- MVT accuracy 0.05 ° / 2 mg / 0.001 %/s (under static and dynamic motion condition)
- < 2 cm position accuracy (trajectory accuracy without GPS outages) and 0.2 % of distance travelled (during short GPS outages using optional odometer information)
- interfaces: CAN / Ethernet / USB
- MVT setup supports one, two or more moving vehicles and RTK-GNSS reference station.
- Using iMAR’s well-known iTraceRT

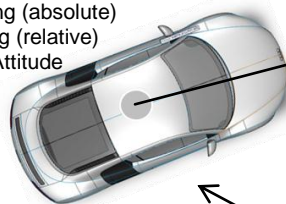
Due to its exceptional time synchronisation hardware, iMAR has prepared its inertial measurement systems of the family iTraceRT to be used for so-called MVT applications. For this the iTraceRT-F400 contains a powerful L1/L2 RTK-GPS receiver with deeply coupled INS/GNSS realtime processing, a speed sensor (usable as an option), a wireless data transmission and as an option a postproc software.

The following sketch shows the three configurations in which the system can be used:

- Both, vehicle A and vehicle B, are under motion and both are carrying an L1/L2 GPS antenna as well as an inertial platform iTraceRT-F400. The GNSS reference station C (iREF-L1L2 or ASCOS/ SAPOS modem) provides correction data to both vehicles. In this configuration the differential relation (distance, bearing, rel. velocity) between both moving vehicles as well as the absolute position is measured. For online result output, a wireless transmission between A, B and C is provided. The software iTraceRT-Command supports measuring and configuration.
- Vehicle B can be used as a local RTK-GPS reference station, if at standstill condition. The L1/L2 antenna is mounted on the roof of the vehicle (or on top of a building), the RTK correction data are transmitted to vehicle A. The moved vehicle A also carries an L1/L2 antenna on its roof and contains an iTraceRT inertial platform. The iREF (C) is not required in this operational mode, as vehicle B acts like this.
- If only the relative position between both, EGO and ALTER vehicle is required without high absolute position

EGO Vehicle (A)

- EGO position
- ALTER position
- Distance
- Heading (absolute)
- Bearing (relative)
- EGO Attitude

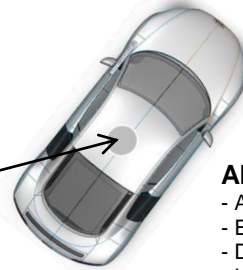


Bearing & Distance

WLAN

ALTER Vehicle (B)

- ALTER position
- EGO position
- Distance
- Heading (absolute)
- Bearing (relative)
- ALTER Attitude



All Data with RTK accuracy *

*) Absolute with external Correction Data, relative without.

GNSS correction data



iREF-L1L2 (C)

need, the GPS receiver inside the iTraceRT of vehicle A or vehicle B can be operated in a so-called "Moving Base Station" mode to provide relative centimeter accuracy to the other vehicle if no GPS outages occur.

With the feature of the "Virtual Measuring Point" on the iTraceRT the position of every point of the vehicle can be calculated and provided in realtime as far as it can be assumed that the vehicle is a rigid body.



Technical Data of iTraceRT-F400 for MVT Applications:

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|------------------------|--|
| Inertial System: | see data sheet of iTraceRT-F400 / iTraceRT-F400Q |
| RTK-GPS accuracy: | 2 cm + 2 ppm of distance between rover and base station (no outages) 0.2 % of distance travelled (during RTK outages, odometer assumed) |
| Data output rate: | 400 Hz (adjustable) |
| Installation aids: | automatic GNSS antenna leverarm calibration procedure; automatic mounting misalignment correction procedure |
| Output: | Ethernet, USB, CAN, RS232, interface for steering and driving robots (Ethernet, RS232) |
| Inputs: | RTK correction data; optional: odometer (A/B), event trigger |
| RTK-GNSS system: | included (L1/L2 receiver); GPS + GLONASS; option: dual GNSS antenna |
| Wireless transmission: | included for online processing |
| Sync. Reference: | UTC time, provided as time stamp |
| Power: | 11...34 V DC, 25 W for iTraceRT-F400 (plus wireless transmission) |
| Temperature: | -25...+55 °C (operating within specification; case temperature) |
| Shock, protection: | 60 g, 11 ms (depends on shock mounts), IP68 |
| Weight: | 3.6 kg iTraceRT-F400, plus Notebook and wireless modem |
| Size: | 188 x 168 x 112 mm (iTraceRT-F400) Ø 85 x 30 mm (GPS antenna) approx.. 140 x 70 x 40 mm (wireless modem; depends on selection) |
| Software packages: | - iTraceRT-Command (online operation and offline visualisation) - iWP+ (INS/RTK-GPS postprocessing) |

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