



LabSat Turntable System by RACELOGIC is an effective and affordable GNSS Navigation Dead Reckoning (DR) Simulator

Turntable System

If you are selling, testing or developing dead reckoning (DR) products incorporating GPS, GLONASS or BeiDou receivers, the LabSat Turntable System makes your job easier, faster, and more effective.

Why use a turntable?

To cover for the losses in satellite visibility that occur in urban canyons, tunnels, and under bridges, most OEM navigation systems have a dead reckoning (DR) capability that utilises vehicle wheel speed data and turn rate information. If the dead reckoning signals are not present during bench testing, the navigation systems can not function correctly. This problem is overcome when using our full navigation testing solution comprising of a LabSat GNSS simulator, Video VBOX data logger, turntable, and yaw rate sensor.

How does it work?

The turntable system uses GPS, GLONASS, and BeiDou satellite signals recorded simultaneously with vehicle yaw rate and wheel speed.

The combined information is replayed in perfect alignment so that the turntable will simulate the movements required to activate the DR in the navigation system under test. The wheel speed and satellite RF data will activate the navigation system, and in combination with video, provide an on-the-bench replica of the driven route.



RECORD real world GNSS signals, vehicle dynamics and live video
REPLAY GNSS signals synchronised with vehicle dynamics and video
SIMULATE live vehicle data into a navigation system

Record:

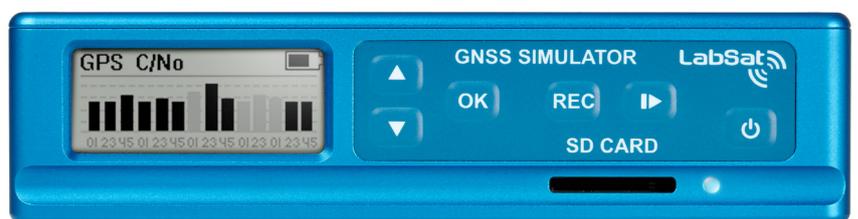
- LabSat records live-sky satellite signals from GPS, GLONASS and BeiDou
- Wheel speed signals are taken from vehicle CAN or digital speed pulse
- Video VBOX records video as well as rate of turn from a VBOX IMU

Replay:

- LabSat streams satellite navigation signals into the device under test
- Live-sky replay is totally realistic, incorporating multipath and obscuration
- Satellite-Based Augmentation Signals (SBAS) such as WAAS, EGNOS, and QZSS, are also reproduced

Results:

- The turntable revolves in simulation of original vehicle turns, activating the DR under test
- Navigation/ DR system then replicates the original recorded route
- DR systems will operate as if it were on a road - maintaining navigation whilst satellite signals are lost
- Total repeatability of your navigation system in use, without having to road test



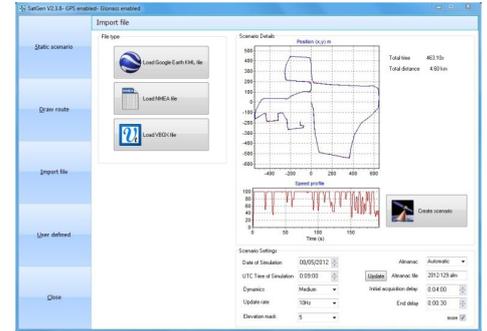
Simulation

It is possible to test your navigation device as if it was located anywhere in the world by using the **SatGen v3** simulation software to recreate artificial profiles, instead of using live-sky record and replay signals. As well as simulating GNSS data, the **LabSat** Turntable System can reproduce wheel speed and rate of turn information.

SatGen simulation software

- Create a route and output artificial satellite RF data files
- Create complex routes via NMEA or Google Maps interface
- Simulated signal data replay generates the yaw rate and wheel speed data to operate the turntable and the navigation unit being tested

SatGen v3 software showing a Google kml route file upload



Why use a video replay?

LabSat Turntable Software has the ability to replay a Video VBOX video recording in synchronisation with the live recorded satellite data file allowing you to compare the visual position with the test performance. This is particularly useful in assessing the navigation system in and out of tunnels and in areas of poor satellite reception. All the replay data is managed by the **LabSat** software which has the flexibility to repeat the replay continuously to allow for accurate comparison and analysis.



Video features

- User customisable graphical overlay: logos, headers, receiver and yaw rate data among many other parameters
- Picture within picture feature can record the real time navigation screen
- Up to four camera inputs are available
- Perfect for the performance validation of a device under test
- Record the physical test environment to assess signal loss (e.g. tunnel entry/ exit)

LabSat extension software replaying synchronised video

Technical Specifications

Turntable Equipment	LabSat Record	LabSat Replay	SatGen Simulation
LabSat (GPS, Galileo, GLONASS, BeiDou*)	✓	✓	✓
SatGen (GPS, GLONASS, BeiDou*) software	—	✓	✓
VIDEO VBOX - video system	✓	✓	—
IMU04 - yaw rate sensor	✓	✓	—
Wheel Speed (CAN or Speed Pulse) data	✓	✓	✓
Turntable and Controller System	—	✓	✓

*Single, dual or triple constellation systems are available

LabSat is designed and manufactured by **RACELOGIC** Ltd., experts in the field of GPS Testing and Data Logging, based in the UK with offices in Germany and the USA. **RACELOGIC** is an ISO 9001 company that supplies specialised GPS based test equipment to major OEMs in over 90 countries around the world. **RACELOGIC** has recently won three Queen's Awards for Enterprise and was founded in 1992.