

# LabSat

## Turtable System

**RECORDS** Real world GNSS signals, vehicle dynamics and live video  
**REPLAYS** GNSS signals synchronised with vehicle dynamic data and video  
**SIMULATES** live vehicle data into a navigation system



**LabSat 3** Turtable System by **RACELOGIC** is an effective and affordable GNSS Navigation Dead Reckoning (DR) Simulator.

If you are selling, testing or developing dead reckoning (DR) products incorporating GPS / GLONASS / Beidou engines, then you'll find the LabSat 3 Turtable System makes your job easier, quicker and more effective.

### Why use a turntable?

To cover for losses in satellite visibility, which can 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. When it comes to testing these systems on the bench, if the dead reckoning signals are not present, the navigation systems will not function correctly. To overcome this, we have developed a full navigation system testing solution comprising of a **LabSat 3** GPS simulator, Video VBOX data logger, turntable, yaw rate sensor and wheel speed generation unit.

The turntable system uses GPS/GLONASS/BDS satellite constellations data to record live drive data combined with vehicle yaw rate and wheel speed information.



Video VBOX replay of an onboard navigation screen

All of this data is replayed in perfect alignment so that the turntable will simulate the physical turning 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 a realistic replay of the driven route.

### How does it work?

Firstly the **LabSat 3** records the Global Navigation Satellite System (GNSS) data.

The **LabSat 3** then streams the previously recorded file containing GPS L1 signals and/or GLONASS L1 signals back to the device under test - faithfully reproducing the satellite signals from all of the satellites which were present during the recording.

Any Satellite Based Augmentation Signals (SBAS) WAAS/EGNOS signals present are also reproduced.

At the same time the **LabSat 3** software also replays the video, turntable and wheel speed data in sync with the satellite signal recording.

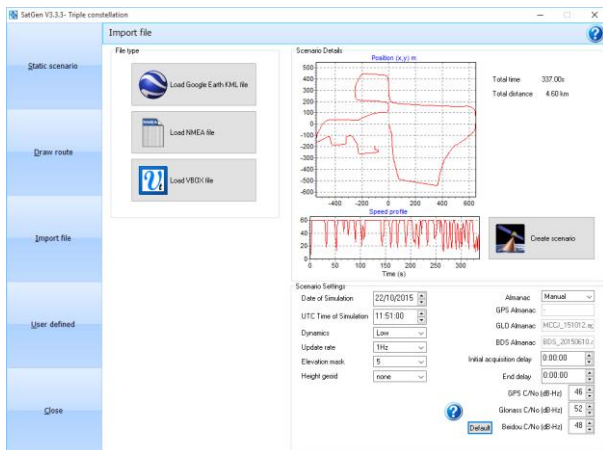
The turntable will turn to simulate the rate of turn (yaw) of the original vehicle turning. This results in a full replay of the actual route taken and will stimulate the dead reckoning (DR) system to activate.

As it is based on a real recording the data will replicate the satellite signal loss experienced in city centres and tunnels and maintain the DR solution until the signals are regained, just like the live drive. This makes the replay repeatable time and again to save you significant testing costs.

The **LabSat 3** turntable system can also simulate profiles anywhere in the world.

## Testing around the globe?

SatGen simulation software can easily create a route and output artificial satellite RF data files. By uploading NMEA or KML files or by using the Google Maps interface a complex route can be defined and recorded. When this simulated signal data is replayed the system generates the yaw rate and wheel speed data required to operate the turntable and the navigation unit being tested. By removing the Satellite data feed GNSS signal loss can easily be replicated in the navigation system whilst the DR function remains active.



SatGen v3 software showing a Google kml route file

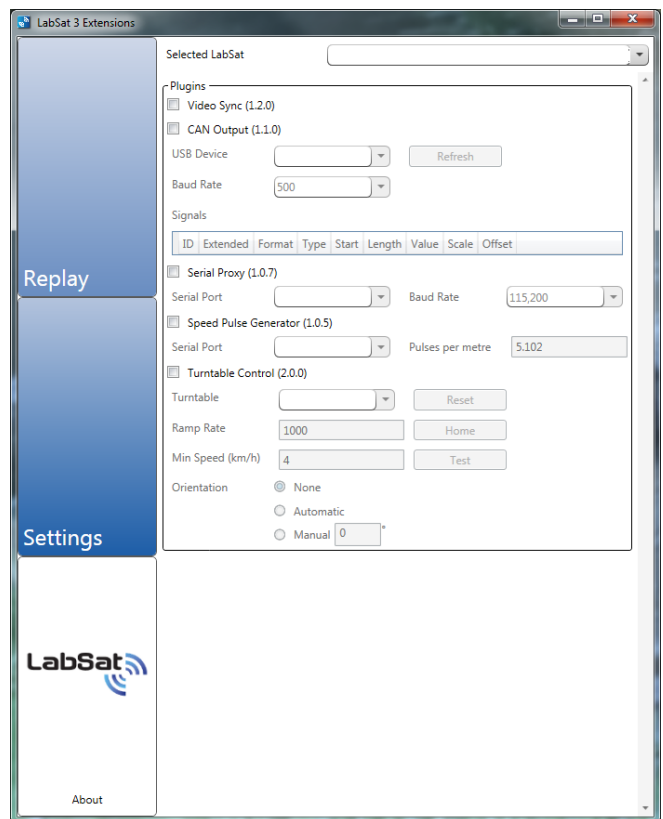
## Why use a video replay?

LabSat 3 turntable software has the ability to replay a Video VBOX video recording in synchronisation with the live recorded satellite data file. This will allow 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 3 software which has the flexibility to repeat the replay continuously to allow for accurate comparison and analysis.

The Video VBOX system can also create a custom scene in which a range of user defined data can be displayed on the video replay. This includes logos, headers, receiver data and information from the IMU. The picture within picture feature can also record the real time navigation screen data in a test vehicle, as well as the forward facing camera picture.

## LabSat turntable software

The turntable system is supplied with full windows PC management software. All the data can be managed by this software to allow for simple and accurate testing. The video replay screen shown below can easily be expanded to a full computer screen display size.



LabSat 3 PC Extensions Software

## Technical Specifications

Turntable equipment	LabSat 3 Turntable Record	LabSat 3 Replay / Simulation System
LabSat 3 GPS, GLONASS, BDS*	✓	✓
SatGen v3 GPS, GLONASS & BDS software	-	✓
Video VBOX System	✓	-
Racelogic IMU	✓	-
Wheel Speed Data	✓	✓
Turntable and Controller	-	✓

\* BDS –Beidou Constellation.

LabSat is designed and manufactured by **RACELOGIC** Ltd., experts in the field of GPS Testing and Data Logging. Based in the UK with additional offices in Germany, **Racelogic** is an ISO 9001 company that supplies specialised GPS based test equipment in over 80 countries around the world.