



# LabSat

## GNSS Simulator

RECORDS Real world GNSS signals

REPLAYS GPS, Galileo, GLONASS, BeiDou, SBAS & QZSS RF data

SIMULATES User defined scenarios anywhere

## The most affordable, portable, and versatile multi-constellation Global Navigation Satellite Simulator on the market.

If you are selling, testing or developing products incorporating satellite navigation chipsets, then you'll find **LabSat 3** makes your job easier, quicker and more cost effective.

### Why use a Simulator?

**LabSat 3** records and replays real world data, allowing realistic and repeatable testing to be carried out under controlled conditions. Signal artefacts including multipath, ionospheric effects and signal dropouts are reproduced and there are no limits to the number of satellites used in the test.

Conventional testing usually requires driving the same route multiple times, where conditions vary and satellite constellations change between tests. This can make it very challenging to reproduce and fault find software errors or reception issues with the device under test. Using **LabSat 3** saves many hours of work, allowing you to quickly pinpoint errors and verify 'corner cases' without leaving the test bench.

A very useful feature is the ability to record and replay additional streams of data using the high speed digital port(s) on **LabSat 3**. In this way, CAN bus data, RS232 signals or digital event triggers can be fully synchronised during playback, bringing a whole new level of realism to your bench simulations.



### How does it work?

**LabSat 3** receives the signal from a standard satellite antenna, but instead of processing each of the received signals to calculate a position fix, **LabSat 3** digitises and stores the original satellite signals at a very high bandwidth onto a removable SD card or USB disk.

The RF output of the **LabSat 3** is then connected to the antenna input of the device under test and the recorded data is replayed back as an RF signal. The device under test will then start to track the satellites as though it was travelling along the same path taken by the **LabSat 3** during the original recording.

### How easy is it to use?

One touch record/replay makes **LabSat 3** extremely simple to operate. With its rugged construction, built in battery and clear display, it is very easy to use the **LabSat 3** in the same environment as your product will experience in everyday use, with little or no training.

A free library of pre-recorded and simulated files from around the world is included to get you up and running as quickly as possible.

### What constellations can I record?

Each LabSat can be tuned to one of 3 user selectable frequencies:

1. 1575.420 MHz – GPS L1, Galileo E1, SBAS, QZSS
2. 1602.000 MHz - GLONASS L1
3. 1561.098 MHz - BeiDou B1

**RLLS03-1P** – Single constellation Replay only

**RLLS03-1RP** – Single constellation Record/Replay

**RLLS03-2P** – Dual constellation Replay only

**RLLS03-2RP** – Dual constellation Record/Replay

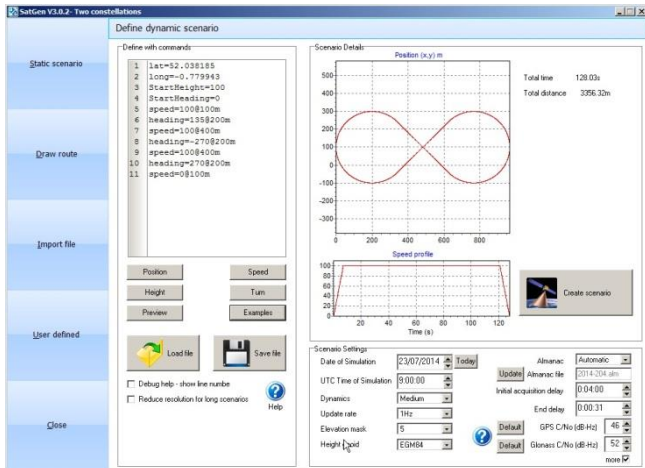
**RLLS03-3P** – Triple constellation Replay only

**RLLS03-3RP** – Triple constellation Record/Replay

## Can I generate my own test scenarios?

If you want to create your own custom test scenario using artificial signals, SatGen software allows you to quickly draw a route using Google maps, and then automatically creates an RF file which can then be transferred to an SD card and replayed on a **LabSat 3**.

Multiple satellites and multiple constellations can be simulated, and the user can also have precise control over velocity, heading and height profiles.



A suitable almanac can be automatically downloaded, or defined by the user. **SatGen** can also import KML files and NMEA files, and the time, date and dynamics are fully user definable.

A 30 day demo version of **SatGen**, limited to 2 minutes scenarios, available for download from the LabSat website.

## What else can I record at the same time?

You can log a variety of other information such as CAN, serial or digital data alongside the satellite signals. When the file is replayed, the embedded data is reproduced at the same time, synchronized to within 60nS. You can also embed a 1PPS signal using the internal GPS receiver.



## Additional features

- USB, RS232 and Ethernet port for remote control
- External 10 MHz reference input
- Digital inputs/outputs for synchronisation
- Host USB port for USB sticks/hard drives\*
- 1PPS digital output

## How much data can I store on an SD card?

Each constellation uses ~14GBytes per hour, and the largest SD card which can be used is 128Gb\*. Therefore you can record just over 9 hours with a single constellation, 4.5 hours with two constellations and 3 hours with three constellations.

\*Storage devices >32Gb in size need to be formatted in FAT32 using the PC utility provided.

## Technical Specifications

	LabSat 3 Single Channel	LabSat 3 Dual Channel	LabSat 3 Three Channel
<b>Constellation</b>	1 of GPS, Galileo, SBAS, QZSS, GLONASS, or BeiDou	2 of GPS, Galileo, SBAS, QZSS, GLONASS, or BeiDou	3 of GPS, Galileo, SBAS, QZSS, GLONASS, or BeiDou
<b>Output Signal Level</b>	Adjustable -83dBm to -115dBm	Adjustable -83dBm to -115dBm	Adjustable -83dBm to -115dBm
<b>RF Channels</b>	1	2	3
<b>RF Channel 1 Centre Frequency</b>	1561.098/ 1575.4/1602.00 MHz		
<b>RF Channel 2/3 Centre Frequency</b>	-	1561.098/ 1575.4/1602.00 MHz	
<b>Number of Satellites Observed</b>	All in view		
<b>Sampling Frequency</b>	16.368 MHz		
<b>Bandwidth</b>	9.66 MHz		
<b>Quantisation</b>	1 or 2-bit	2xchannels at 1-bit or 1xchannel at 2-bit	3xchannels at 1-bit or 1xchannel at 2-bit
<b>Data Format</b>	I & Q		
<b>Additional logging</b>	-	2 channels of CAN, RS232 or Digital	2 channels of CAN, RS232 or Digital
<b>Removable Battery Pack</b>	Record & Replay version only	Both versions	Both versions
<b>Media Storage Included</b>	32GB SD card & 1TB USB HDD		
<b>Active Antenna Voltage Supply</b>	2.85 v		
<b>Reference Oscillator</b>	16.368 MHz Temperature controlled +/- 2.5 ppm or OCXO option +/- 0.3 ppm		
<b>Operating voltage</b>	8v to 30VDC		
<b>Size</b>	167mm x 128mm x 43mm		
<b>Weight</b>	960g with Battery (910g without Battery)		

**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.