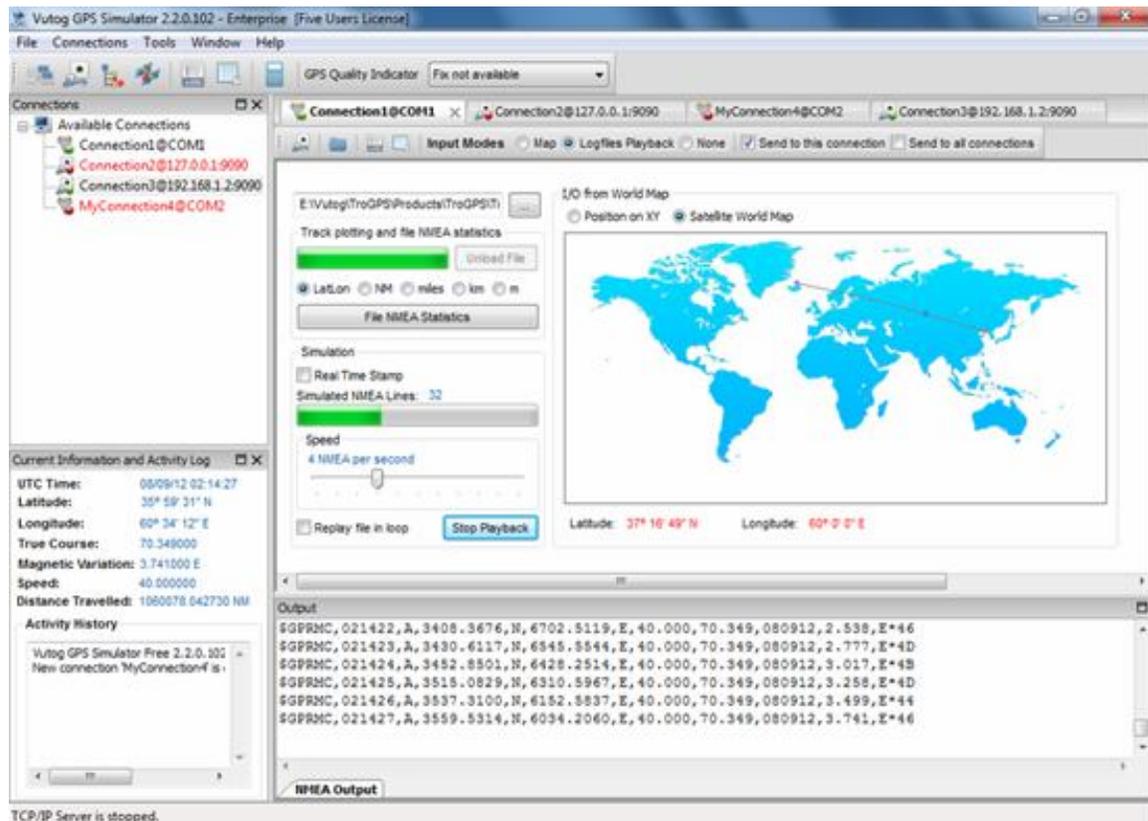


Vutog GPS Simulator White Paper

The **Vutog GPS Simulator** provides a complete suite for all your GPS simulating needs and more. It is designed to **assist in developing, testing and debugging** programs and **equipment** working with the NMEA-0183 protocol. It can also be used for testing navigation applications and equipment indoor when GPS Signal is not available for **best productivity maximization**. In addition to this, this product can also used **to test GPS Device** and its output correctness.



This product can be used with a hardware **null-modem (COM port - RS232) cable or Network for TCP/IP**. Multiple connections together can be created and managed from same workspace. This is very useful which you want to test multiple devices with same or different test scenarios.

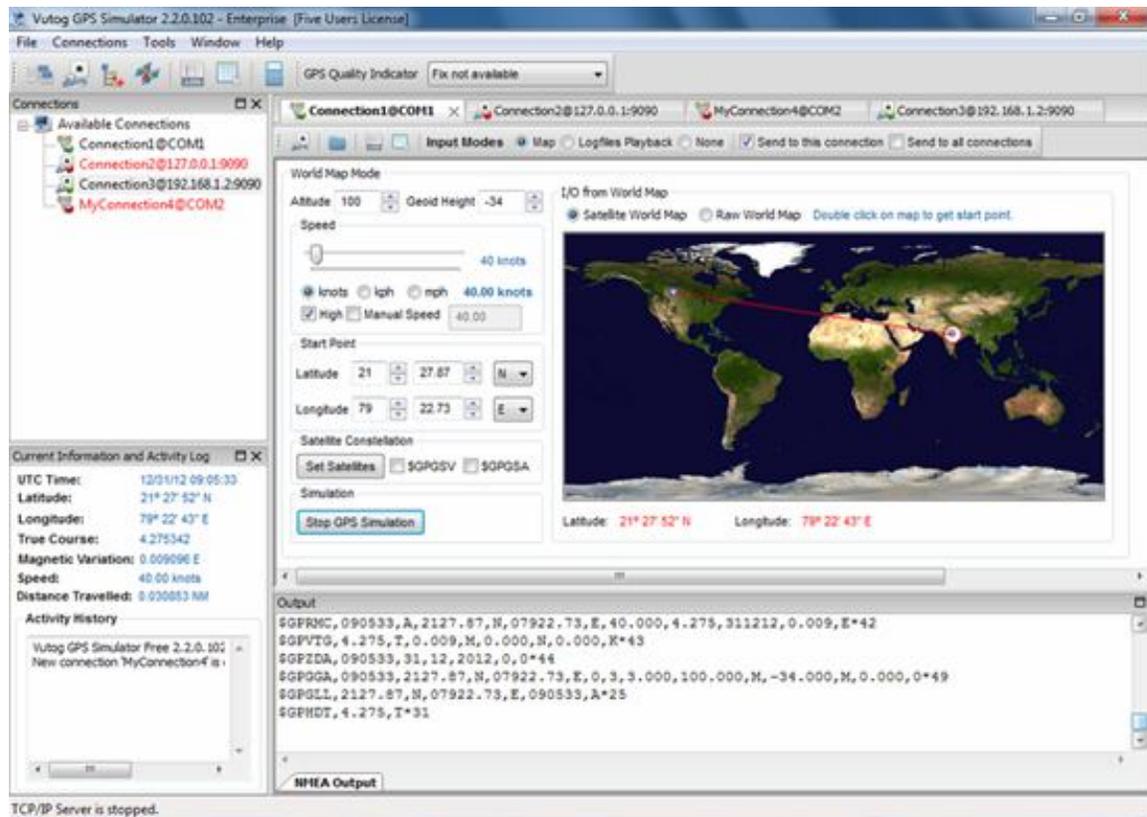
Vutog GPS Simulator acts as a GPS Receiver which works without visible GPS satellites, thus it's much more efficient when used indoors and provides significant productivity. It gives out GPS data (reception quality, speed of relocation, position, satellite constellation and more) based on the **NMEA-0183 protocol** of chosen version. Three different input modes of it provide you the maximum flexibility to

configure NMEA Sentences in the way you want. NMEA Sentences can be selected for GPS Simulation based on your need.

Vutog GPS Simulator supports 3 input modes for GPS Device Simulation –

1. **World Map Input mode**
2. **Log files playback input mode (Advanced NMEA Player)**
3. **None Input mode**

In **World Map Input mode**, it works in **tracking mode**. That is, you just need to select **Start Point** and **End Point** before starting GPS simulation. The Vutog GPS Simulator starts generating NMEA Sentences with all data by **auto calculation** for the **object movement** from Start Point to End Point.



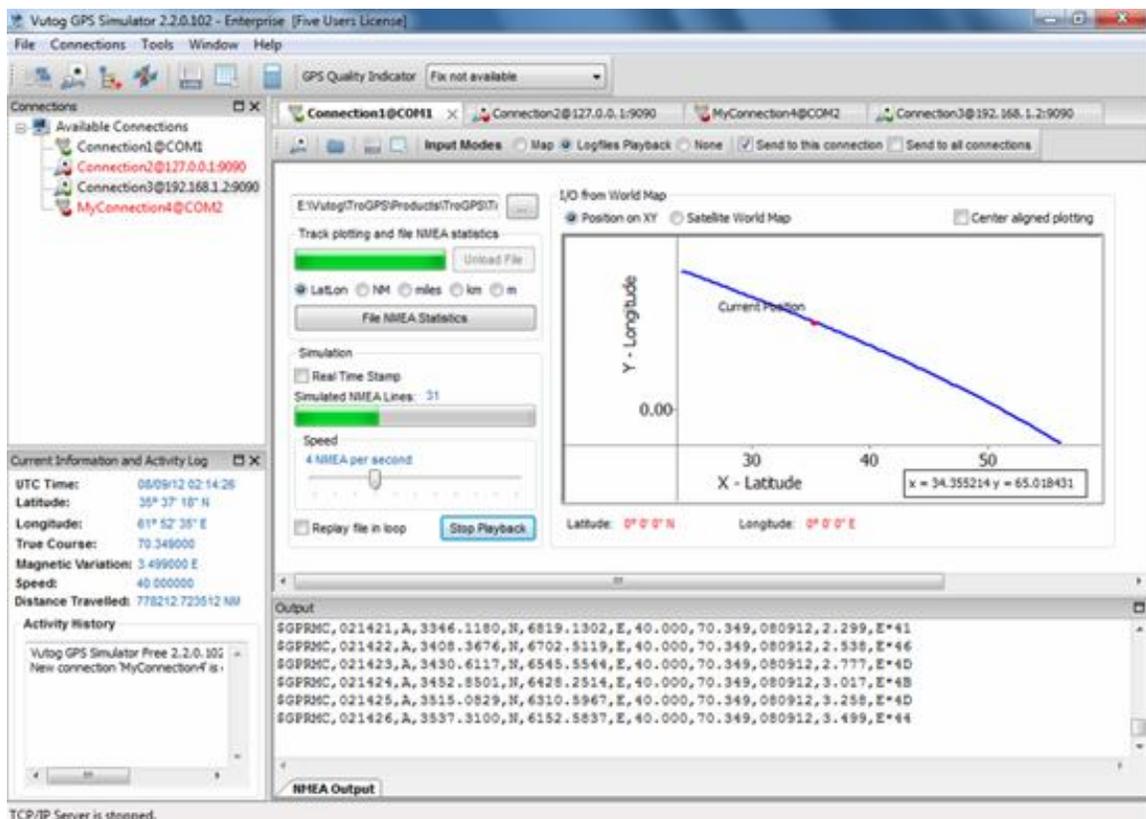
For example, for \$GPRMC sentence, it auto calculates:

- ✓ the **True Course** based on Start Point and End Points selections
- ✓ **UTC Time** based on system time
- ✓ the **distance travelled** based on speed selected per hour
- ✓ the **latitude and longitude** for **current point** after travelled distance
- ✓ **magnetic variation** of same latitude and longitude

- ✓ **depicts** it on map
- ✓ And generates the \$GPRMC.

The output NMEA Sentences can be saved to **.NMEA/.TXT** file or **transmitted via COM port or/and TCP/IP**. Any program or equipment that works with the NMEA protocol will recognize transmitted messages, created by the Vutog GPS Simulator, as data from a real GPS receiver. A certain amount of parity errors (CRC) can be introduced in the generated protocol for testing consistency of operation in navigation programs.

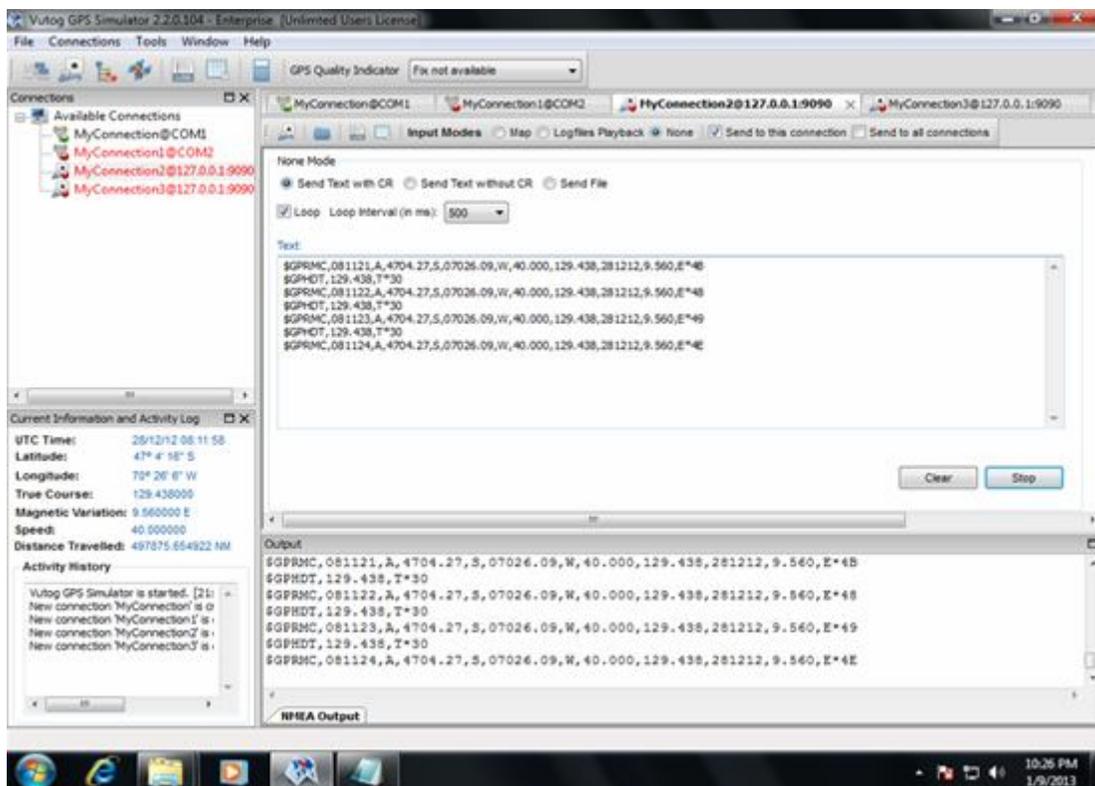
The **Log files playback input mode** provides a lots of high end capabilities to replay the stored log files. You can view analyze the **tracking path (the path of object moved) on XY Plot Graph and World Map**. The **latitude & longitude** can be viewed and plotted into **Nautical Miles (NM), miles, kilometer and meter** on XY axis. You can see the **NMEA File (replay log file) statistics** like total number of NMEA sentences, total number of \$GPRMC, total number of \$GPGSA etc.



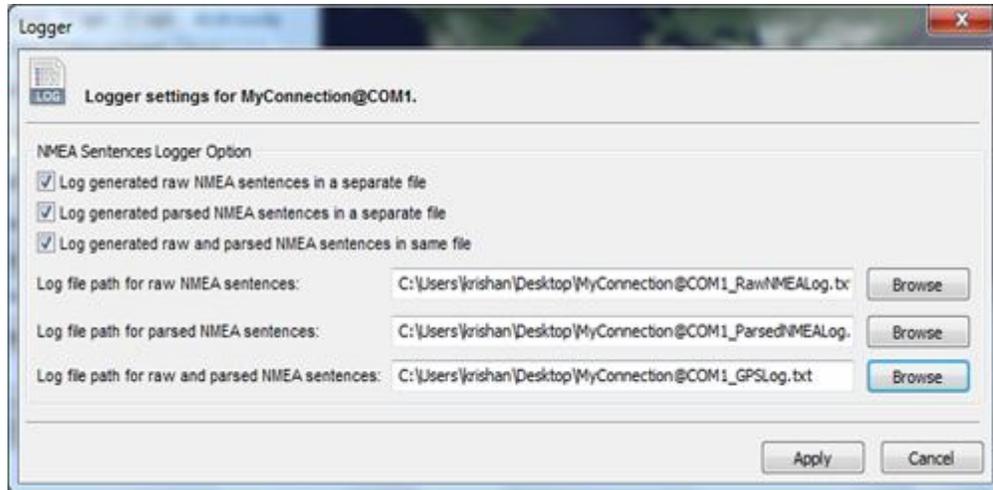
Replay speed controller gives high flexibility to control the **speed of NMEA replay** just like a MP3 player - like 1 NMEA per Sec, 10 NMEA Per Sec or maximum speed.

This capability of saved file **re-playing** provides an opportunity for creating repeatable test scenarios (for example, for regression testing), which would be difficult to do with an actual GPS receiver. Also, the **track of any object movement** stored in a standard NMEA file can be seen on **XY Graph Plot and Map**.

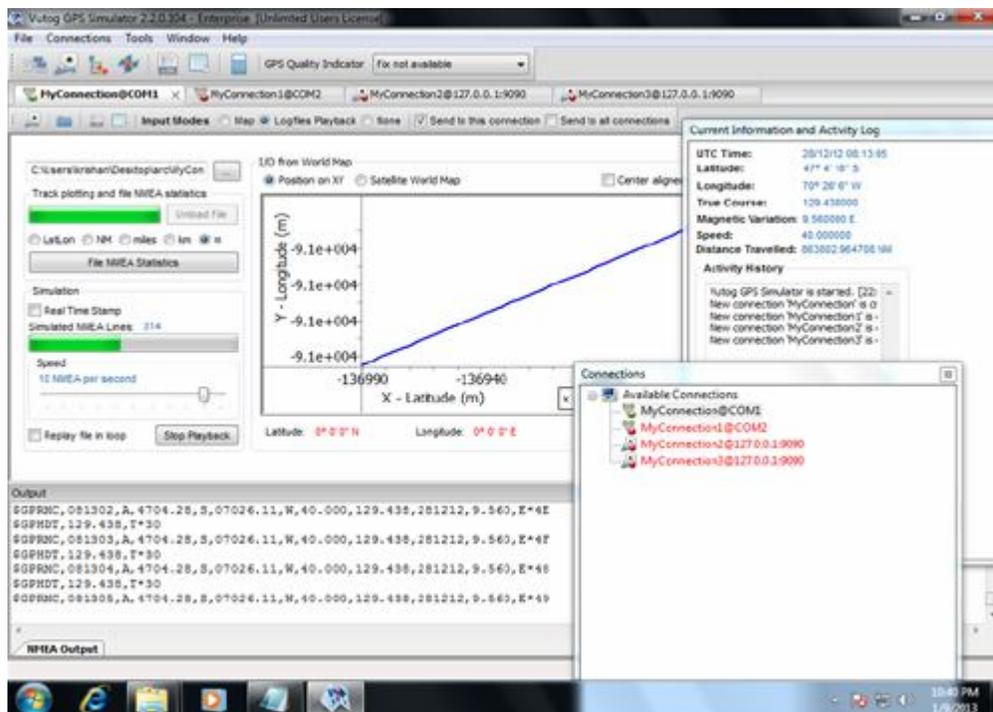
The None Mode provides lots of capabilities to play with NMEA sentences. You can **type, load and send** the NMEA to TCP/IP and COM Port. You can select **loop** for a repetitive replay. You can also mention the **delay in milliseconds** among all replay passes.



Apart from this, it also provides certain utilities like **CRC calculator**, **NMEA Sentence Selector** and **Logger**. These are very useful while doing any GPS related development and testing work.



Advanced Docking GUI and Multithreaded environment of Vutog GPS Simulator provides a full control over GPS debugging and Testing. **N number of connections** can be configured from **a single Vutog GPS Simulator** and **broadcasts the same NMEA to all connections** or each connection can work separately to provide **simulation to different GPS Devices** at same time.



Vutog GPS Simulator provides a powerful feature list to fulfill your all GPS Simulation needs. A quick highlights for all **features** are below –

1 Core Features

- Current position information display during simulation
- Multithreaded and Advanced Docking GUI for flexible and easy usage
- Tree View workspace for configured communication channels
- Tab based workspace for each connection
- Advanced NMEA File Player with track display on XY Plot and world map
- Continuous generation of NMEA sentences on world map same as a GPS Device
- NMEA Simulation & broadcasting via multiple different communication channels (TCP/IP and COM Port) from single GPS Simulator at one time
- NMEA Generation for \$GPGGA, \$GPGSA, \$GPRMC, \$GPGLL, \$GPVTG, \$GPHDT, \$GPGSV and \$GPZDA

2 Input Modes for GPS Simulation

2.1. NMEA Generation by Log Files Playback Input Mode

- Turbo speed in loading NMEA log file
- XY Track plotting based on NMEA log file
- Flexible center aligned or auto adjusted XY plotting
- Latitude and Longitude conversion and plot display in Nautical Miles (NM), miles, kilometer and meter
- Location and Track plotting on World Map
- NMEA file statistics view
- Ability to parse and simulate NMEA Sentences from Log File
- Replay speed controller like N NMEA per second or at maximum speed
- Replay status view
- Real Time Stamping for sentences from NMEA Log File
- File Replay in Loop

2.2. NMEA Generation by World Map Input Mode

- Latitude & Longitude generation by location selection
- View and choose position with Mouse Movement
- Auto-moving Map for simulation
- True Course and Magnetic Variation auto-calculation
- Speed configuration in KPH, MPH and KNOTS
- UTC time calculation based on current system time
- Satellites constellation (PRN, azimuth, elevation, SNR)
- Start and End positions selection by mouse
- Dilution of precision factors (PDOP, HDOP, VDOP) inputs

- Altitude and Geoid Height values inputs
- 2D/3D selection mode (manual/automatic) inputs
- Position fix mode (2d/3d/not defined) selection

2.3. None Input Mode

- Send text (NMEA) to communication channel by typing without CR
- Send in Loop with its interval setting
- Send text (NMEA) to communication channel by typing with CR
- Send raw file to communication channel

3 Logger (Tool to log file) for generated NMEA sentences

- Connection wise Logger
- Logger for raw NMEA Sentences
- Logger for parsed NMEA Sentences
- Log raw NMEA and same NMEA parsed in one file

4 NMEA Sentence selector

- Connection wise NMEA Sentence selector
- Select the needed sentences for generation

5 Communication channels (connection options) for GPS Simulation

2.1. Serial Port

- Unlimited Serial Port connections
- NMEA Simulation through COM Port
- File sending through COM Port

2.2. Network (TCP/IP)

- Unlimited TCP/IP connection
- NMEA Simulation through TCP/IP
- File sending through TCP/IP

6 Utilities

- CRC Calculator
- History Manager for performed activities
- Logger
- NMEA Sentence selector

7 Technologies

- Turbo speed
- Advanced docking GUI
- Multithreaded capability to simulate N number of devices
- Small compact binary developed in C, C++
- Minimal use of Registry
- Non-cluttered look and feel, ability to show/hide panes

For more information on Vutog GPS Simulator, please write to us at –
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Regards,
Vutog Team