



GlobalTop Technology Inc.

# GPS Viewer Operation Manual

Revision: 0.1.3

Technical Document

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No. 16, Nan-Ke 9th Road, Science-Based Industrial Park, Tainan, 741, Taiwan, R.O.C.

Tel: +886-65051268 / Fax: +886-6-5053381 / Email: [sales@gtop-tech.com](mailto:sales@gtop-tech.com) / Web: [www.gtop-tech.com](http://www.gtop-tech.com)



## Version History

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**Title:** GlobalTop GPS Viewer Operation Manual  
**Subtitle:** For GlobalTop Modules  
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Revision	Date	Author	Description
0.1.0	2012/08/27	Winson	First Release
0.1.1	2012/12/04	Winson	Software upgrade
0.1.2	2013/04/03	Winson	CEP calculate function added
0.1.3	2013/08/28	Winson	Beidou system supported



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## 1. Introduction

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The Smart GPS Viewer is a graphic user interface (GUI) to be used with evaluation kit provided. This GUI is designed to provide user to control and execute commands to the evaluation kit so that the user may use it to adjust settings for the listed features.

## 2. Requirements

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- Microsoft Windows OS (XP, Vista, 7)
- Framework 3.5

## 3. Operation

### 3.1 Main Screen

When Smart GPS software is open in the PC, a screen similar to Figure 3.1 will open.

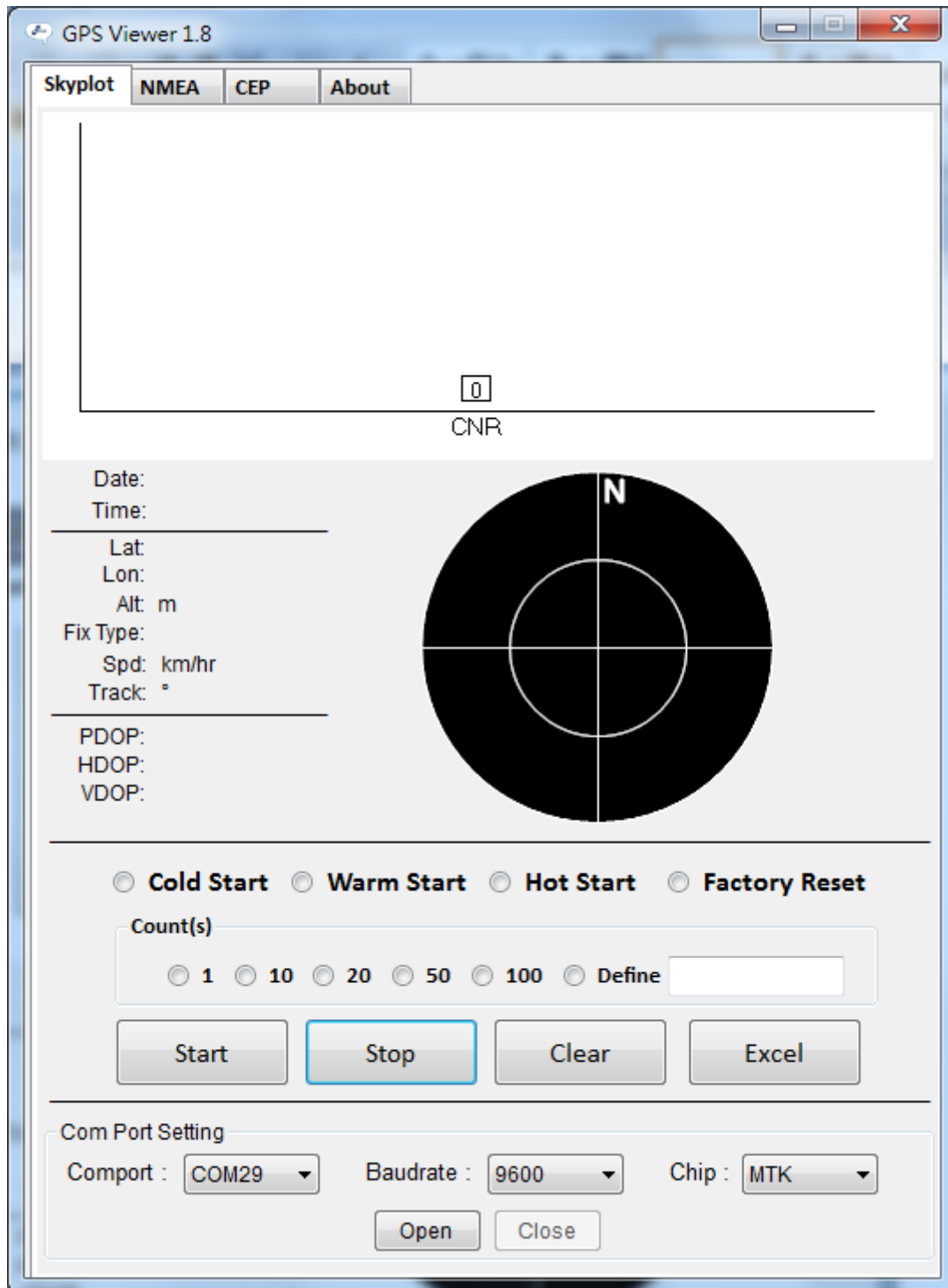


Figure 3.1: Main program screen

### COM Port Setting:

Please choose the correct **COM Port**, **Baud rate** and **Chip maker** then click **Open** button. If there were issues with the connection, an error box similar to Figure 3.2 will pop up.



Figure 3.2: Com Port error message

After connection is successfully established, the main screen will show values, i.e. Date, Time, and Latitude, Longitude, Fix type and CNR. Refer to Figure 3.3.

Depends on which satellite system receiver purchased, the bars displays in color to distinguish different satellite system. Bars in **Blue** color shows GPS satellite, **Green** for GLONASS and Beidou in **Red**.

From GPS Viewer version 1.8 onwards, satellite system bar counts are abbreviated in “**G**” for GPS; “**S**” for SBAS; “**Q**” for QZSS; “**R**” for GLONASS; “**B**” for Beidou.

Software and firmware version are shown on the title bar at the most left top of the screen. In this example as in Figure 3.3, GPS Viewer is “v1.8” and firmware version of the receiver module is “AXN\_3.60\_3333\_13072600 8060”.

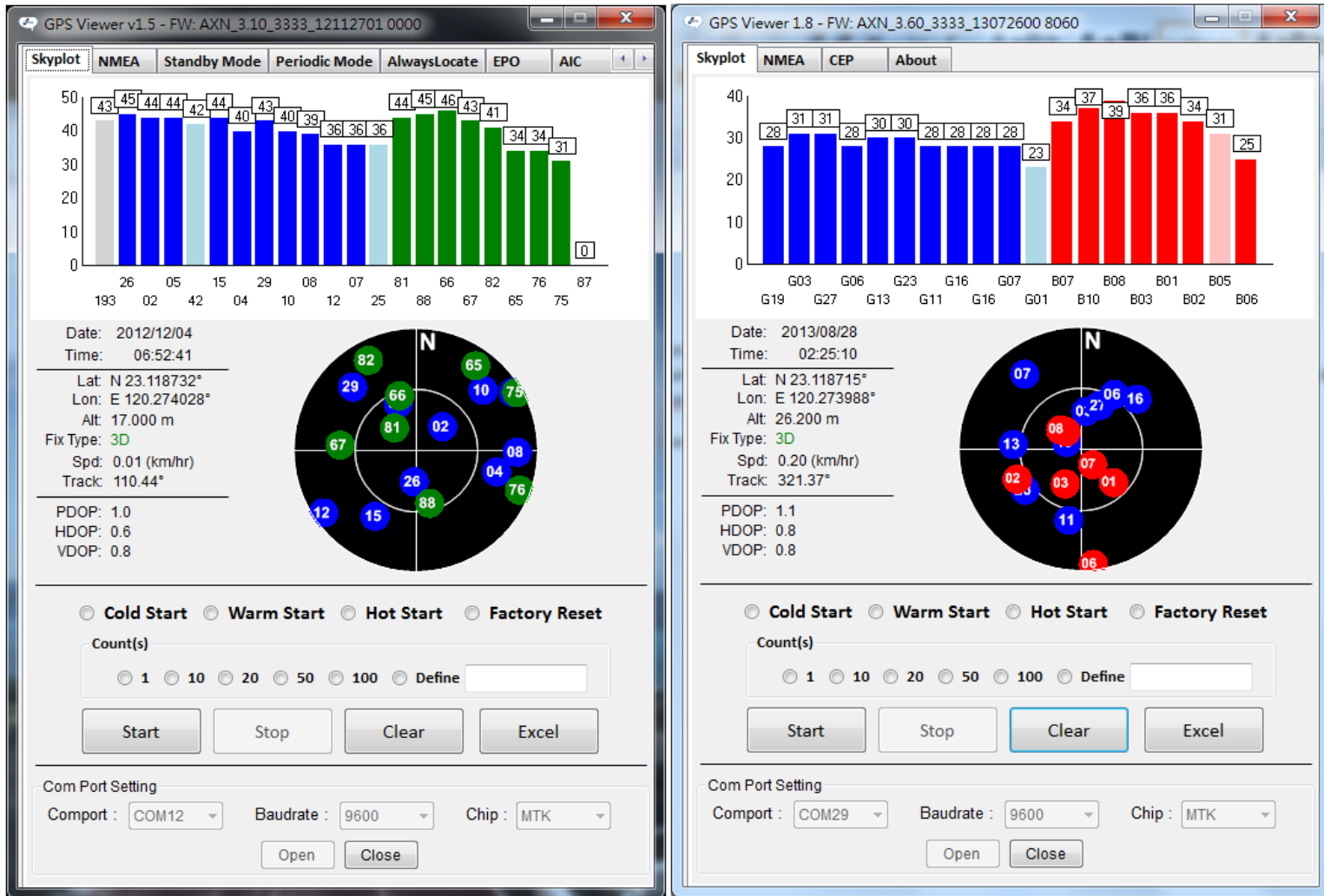


Figure 3.3: After connection is successfully established screen

### 3.2 Time to First Fix

To run time to first fix (TTFF) tests, in the red box in Figure 3.4. Select start type (i.e. Cold start, Warm star... etc.) and count(s) as in number of times.

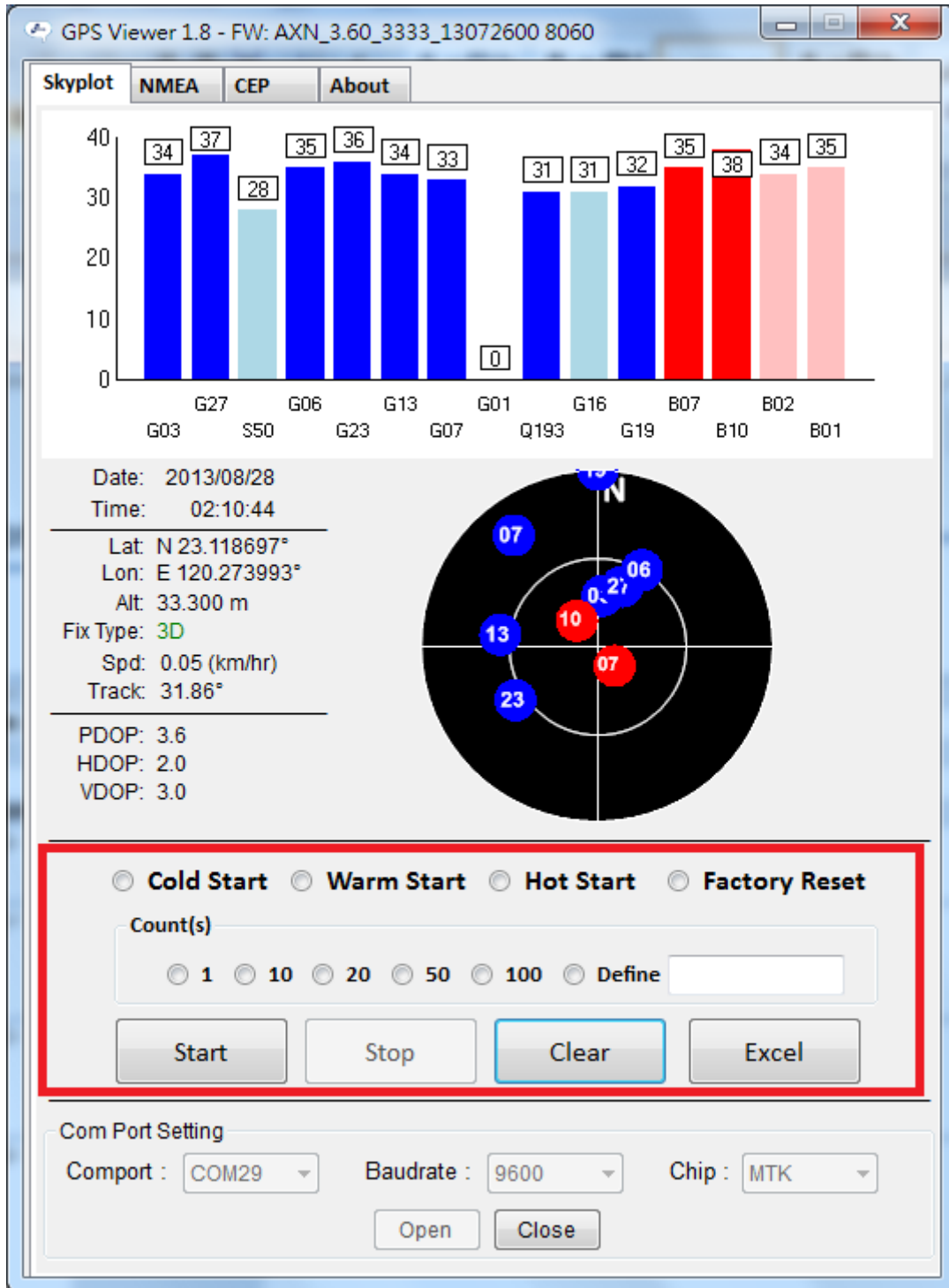


Figure 3.4: Time to First Fix



When done, click the **Start** button to start running TTFF tests. The test results will show on the right of the screen. Click on **Excel** button to export result to an Excel file. Click on **Clear** button to clear the display results. Refer to Figure 3.5.

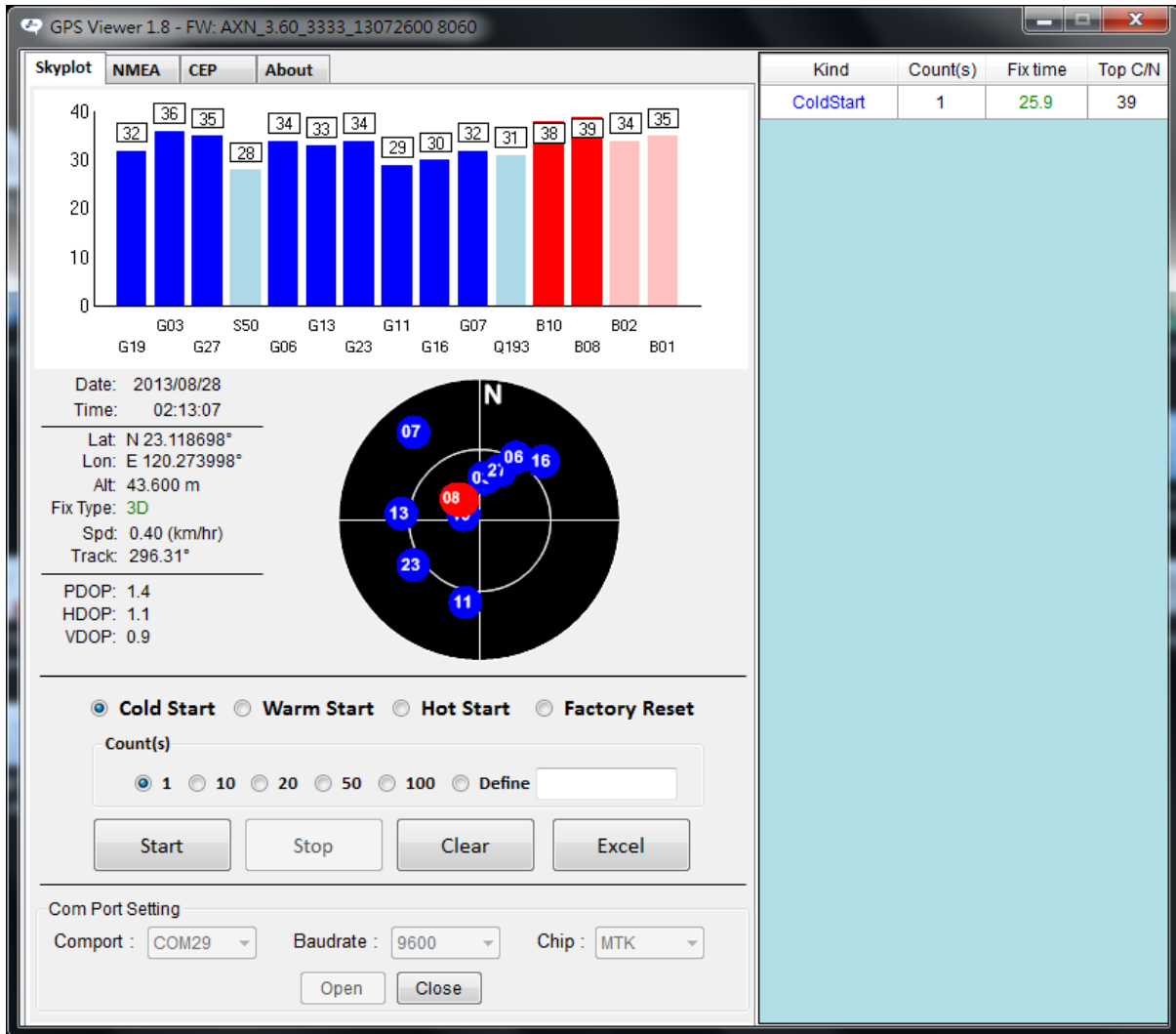


Figure 3.5: result shown at right side table

### 3.3 NMEA

NMEA output sentence settings could be found in NMEA tab, shown in Figure 3.6. Also you could click **Log NMEA** button to record all sentences. Log is saved in a TXT format in your PC. When **Log NMEA** button is clicked the button would change similar to Figure 3.7.

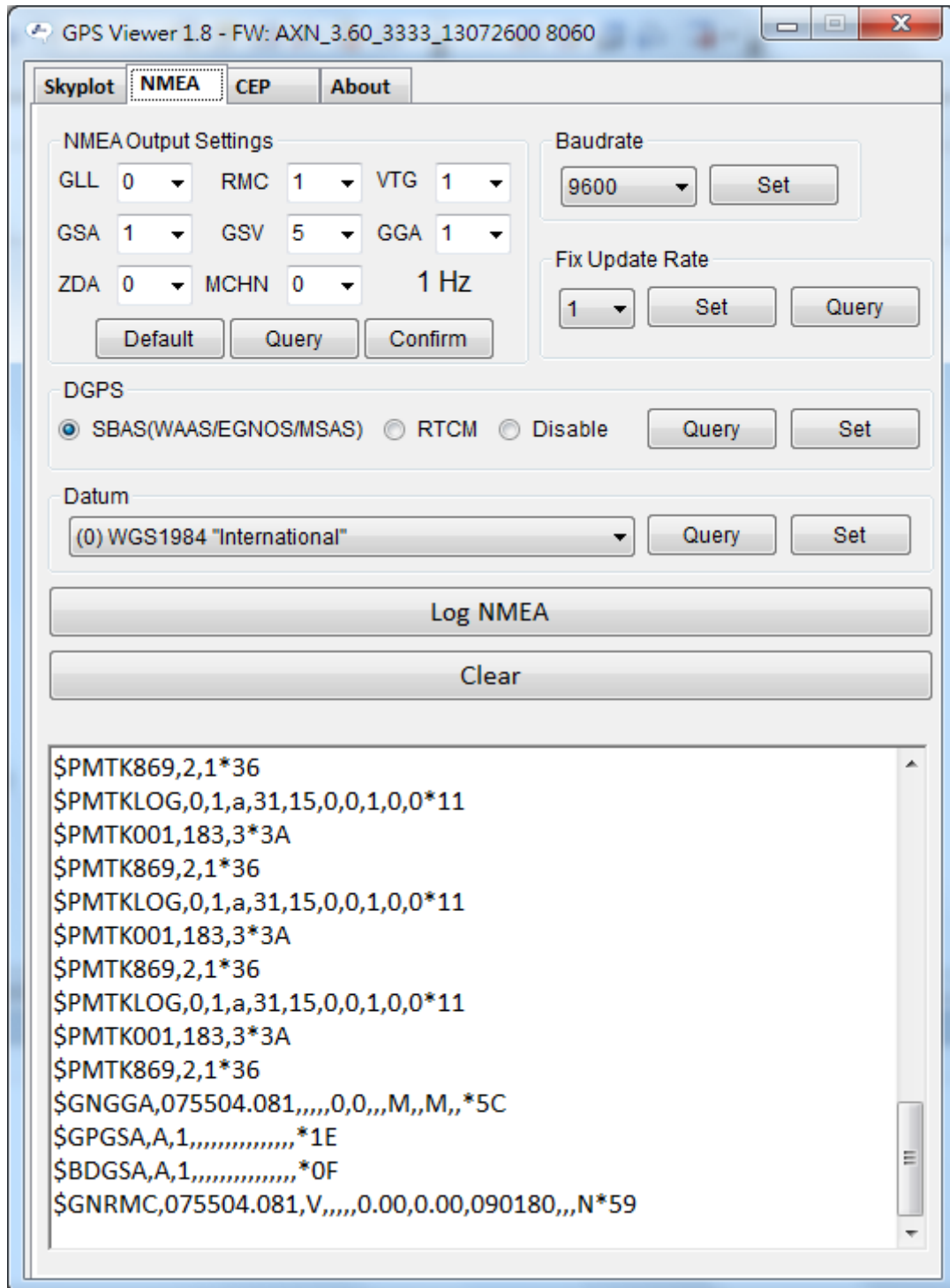


Figure 3.6: NMEA tab screen

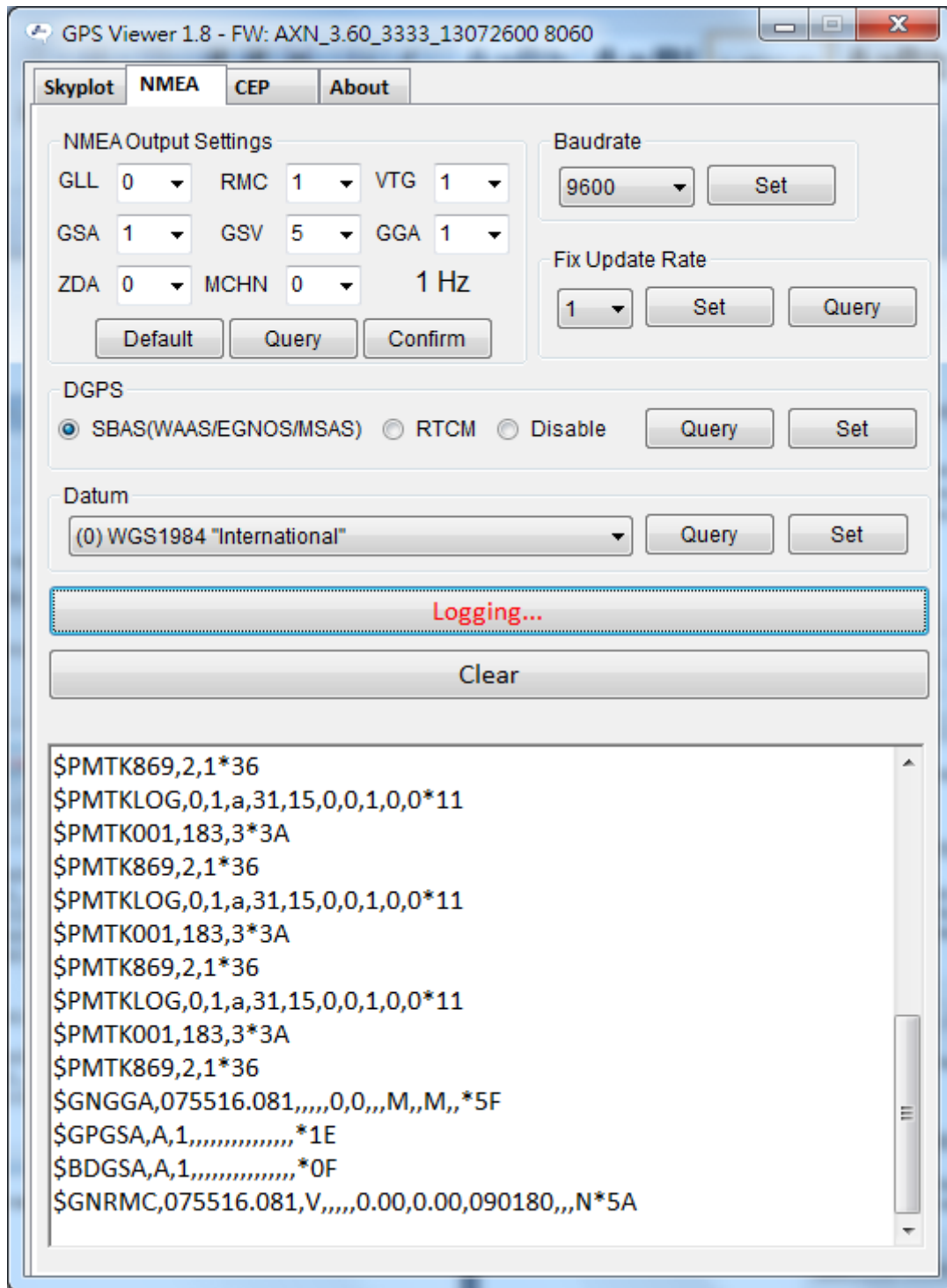


Figure 3.7: NMEA tab logging NMEA screen

### 3.3.1 NMEA Message Type (supports only MTK GNSS chipset)

There are 8 NMEA sentences could be set. All of them are standard sentences of NMEA 0183. The number beside NMEA type is the output frequency. If the value is larger, the frequency becomes slower. For example, under the setting of 1 Hz fix update rate, 1 means outputting once per second. 5 means output 1 once every 5 seconds.

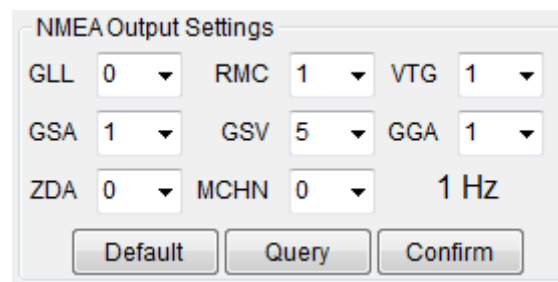


Figure 3.8: NMEA Message Type

### 3.3.2 Fix Update Rate (supports only MTK GNSS chipset)

By factory default, GPS receiver outputs NMEA sentences once per second. In some cases user may need to have a higher output rate, i.e. car racing. GPS Viewer allows you to manipulate the factory default **fix update rate**. The maximum rate is 10Hz. It means the receiver module will output NMEA sentences once every 100 millisecond.

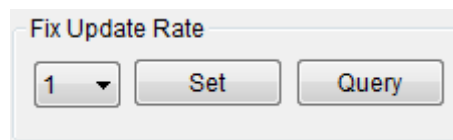


Figure 3.9: Fix Update Rate setting

### 3.3.3 Baud rate (supports only MTK GNSS chipset)

If the throughput of NMEA sentences is over the RS232 bandwidth, users could increase the baud rate speed. It is possible to decrease the speed of baud rate.



Figure 3.10: Baud rate setting

### 3.3.4 DGPS (supports only MTK GNSS chipset)

GPS receiver could collect the correction data from SBAS satellites or from some aiding sources. Users could enable DGPS function to obtain more accurate positioning. Take SBAS for example, after enabling SBAS function, users could see a SV whose PRN number is larger than 32 provided that the receiver acquired the signal from SBAS satellite. In normal operation, GPS receiver will acquire the SBAS satellite after fix.

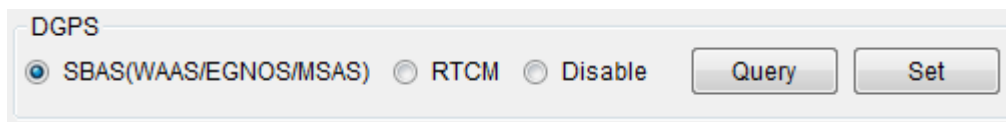


Figure 3.11: DGPS setting

### 3.3.5 Datum (supports only MTK GNSS chipset)

The GPS chip of MTK supports more than 200 Datum. User could choose a preferred coordinate system from the drop down list.

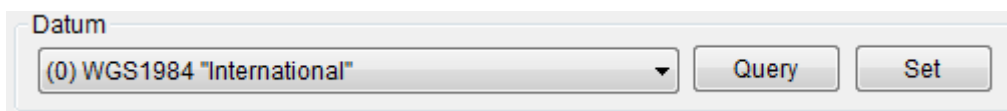


Figure 3.12: Datum setting

### 3.3.6 CEP calculate function

Circular Error Probable (CEP) is defined as the radius of a circle, centered about the mean, whose boundary is expected to include the landing points of 50% of the rounds.

To estimate CEP of a given NMEA file, in the CEP tab, click on **Import NMEA** button and select a NMEA file to import.

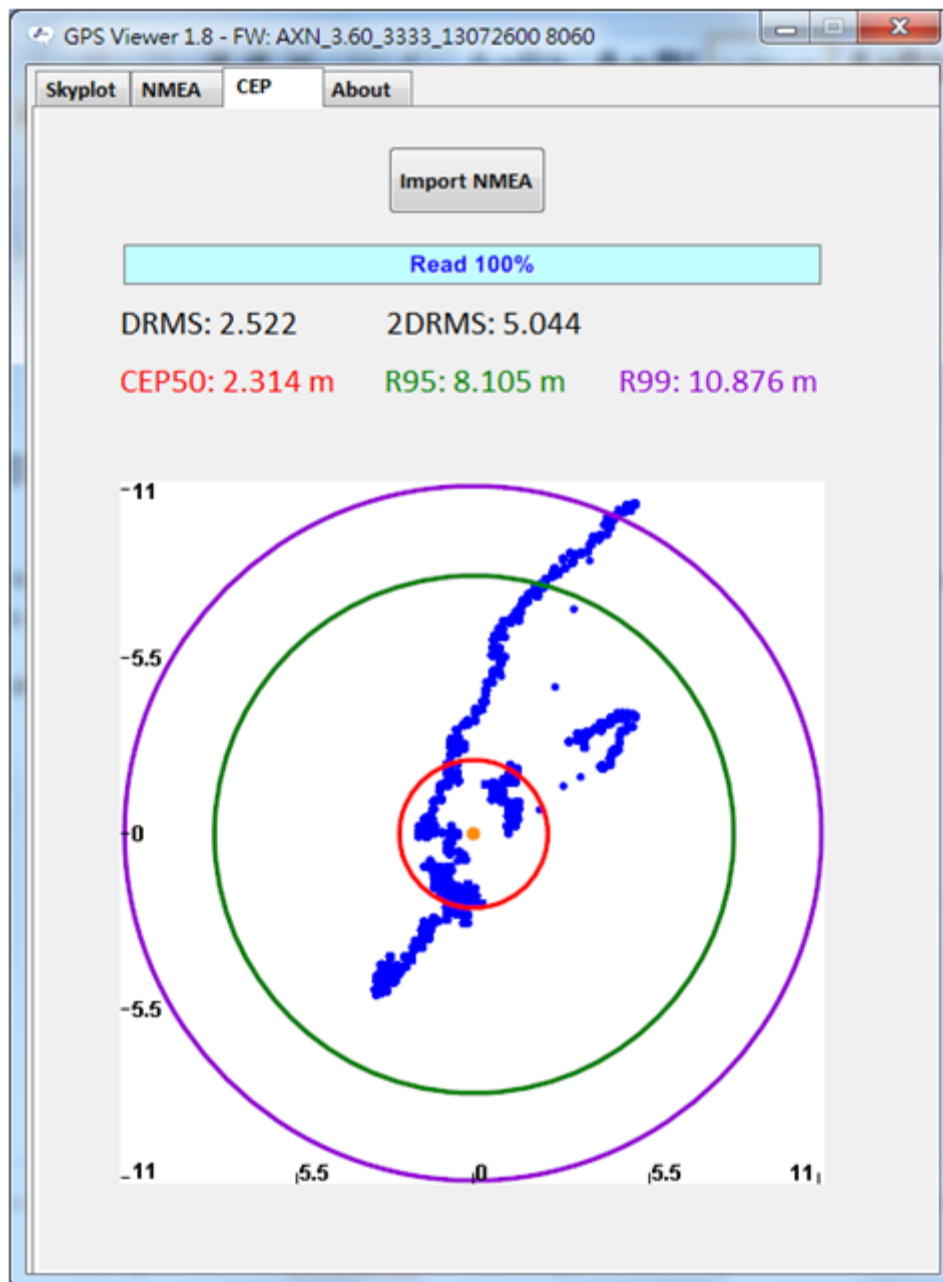


Figure 3.13: CEP calculate function

### 3.4 Advanced functions (MT3333 and MT3339 GPS chip supports only)

There are more features to the GPS Viewer which provides advanced test functions for MT3333 and MT3339 –the MTK GPS chipset.

On the keyboard press **ctrl + alt + s** keys at the same time, advanced tabs will be expanded as show in Figure 3.14.

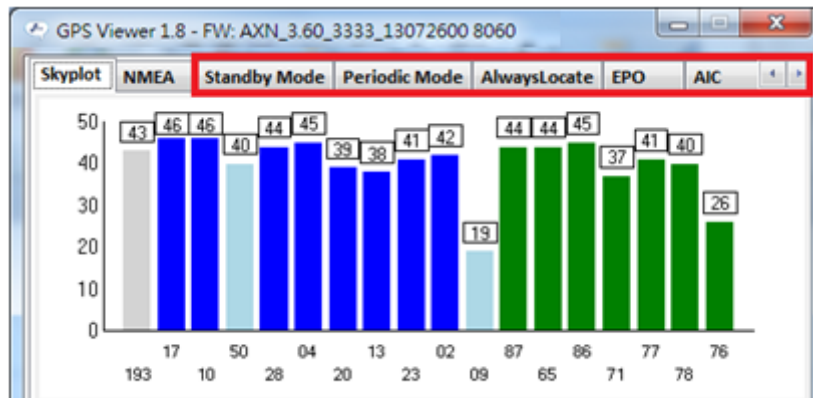


Figure 3.14: Advanced tabs

### 3.4.1 Standby Mode

Standby mode is one of power saving modes of the receiver module. The graph displays power on/off status.

To force the receiver module to enter standby mode, press the **Set Standby Mode** button or press again the same button to exit standby mode (Figure 3.15).

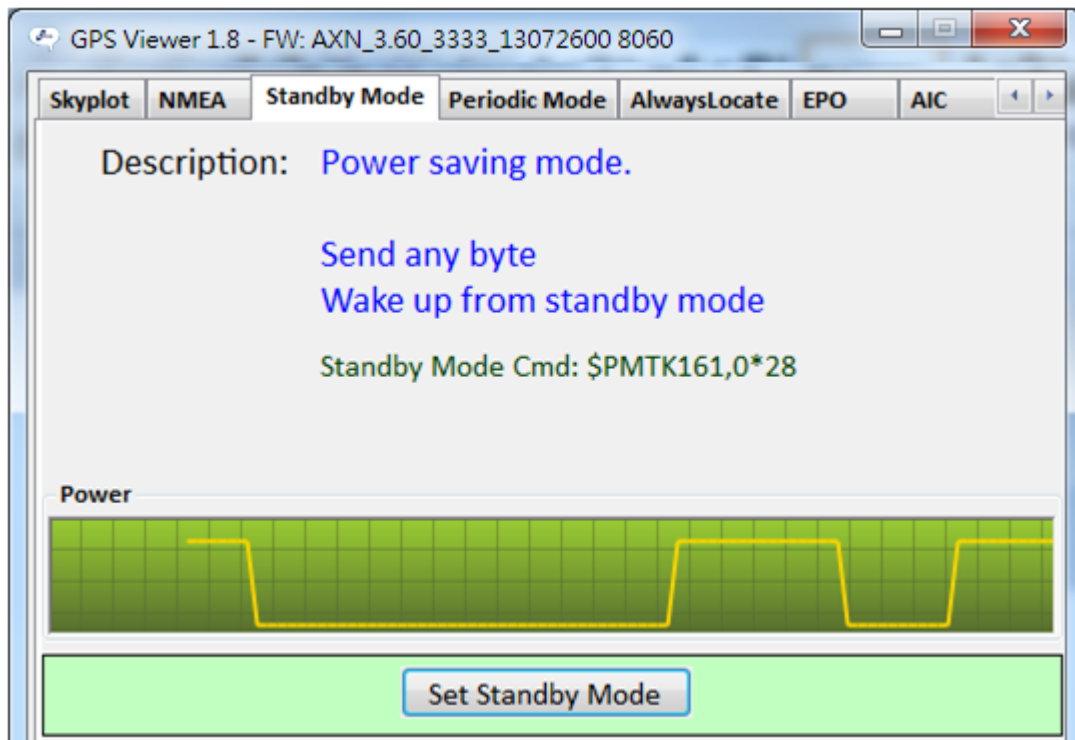


Figure 3.15: Standby Mode



### 3.4.2 Periodic Mode

Periodic Mode enable GPS receiver module to enter and exit sleep state to archive maximum power saving.

After setting the preferred time parameters, click on the **Set Periodic Mode** button to configure and run the periodic mode. The **Set EPH Receiver** button allows GPS module extending the time of receiving ephemeris data (Figure 3.14).

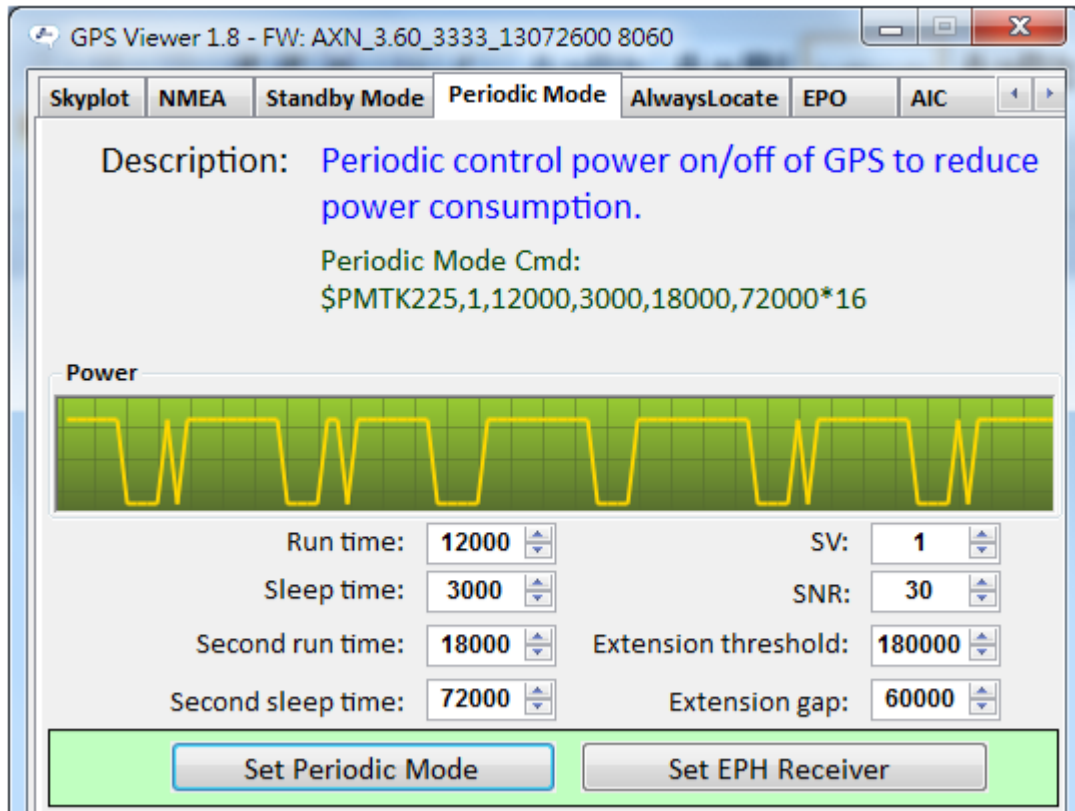


Figure 3.16: Periodic Mode

### 3.4.3 AlwaysLocate Mode

AlwaysLocate is an intelligent controller of the periodic mode. Depending on the environment and motion conditions, the receiver module adapts to adjust the on/off time to achieve balance positioning accuracy and power consumption.

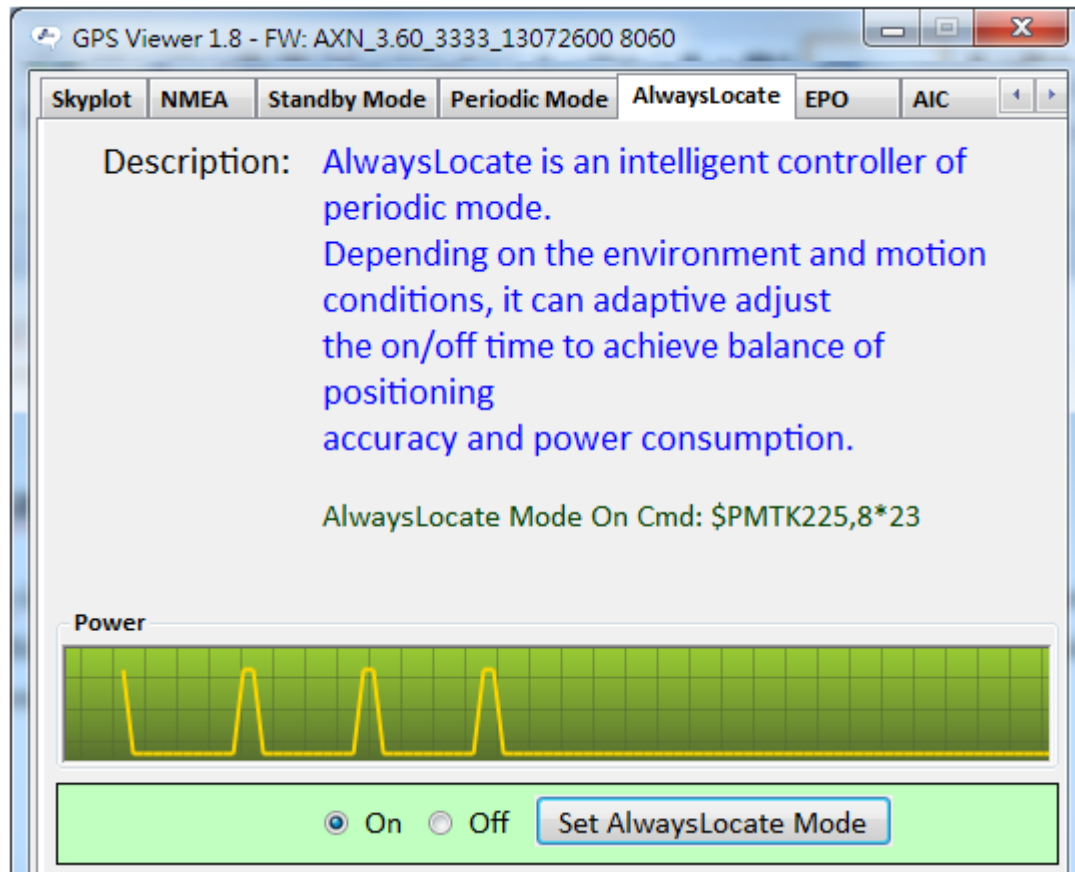


Figure 3.17: AlwaysLocate Mode

### 3.4.4 EPO in Flash

EPO (Extended Prediction Orbit) data service World leading technology for supporting 7/14-days orbit predictions to customers.

Choose 7days or 14days radio button then press **Download** button. Smart GPS Viewer will be downloading the EPO data and automatically runs update to the GPS receiver module. (Figure 3.18)

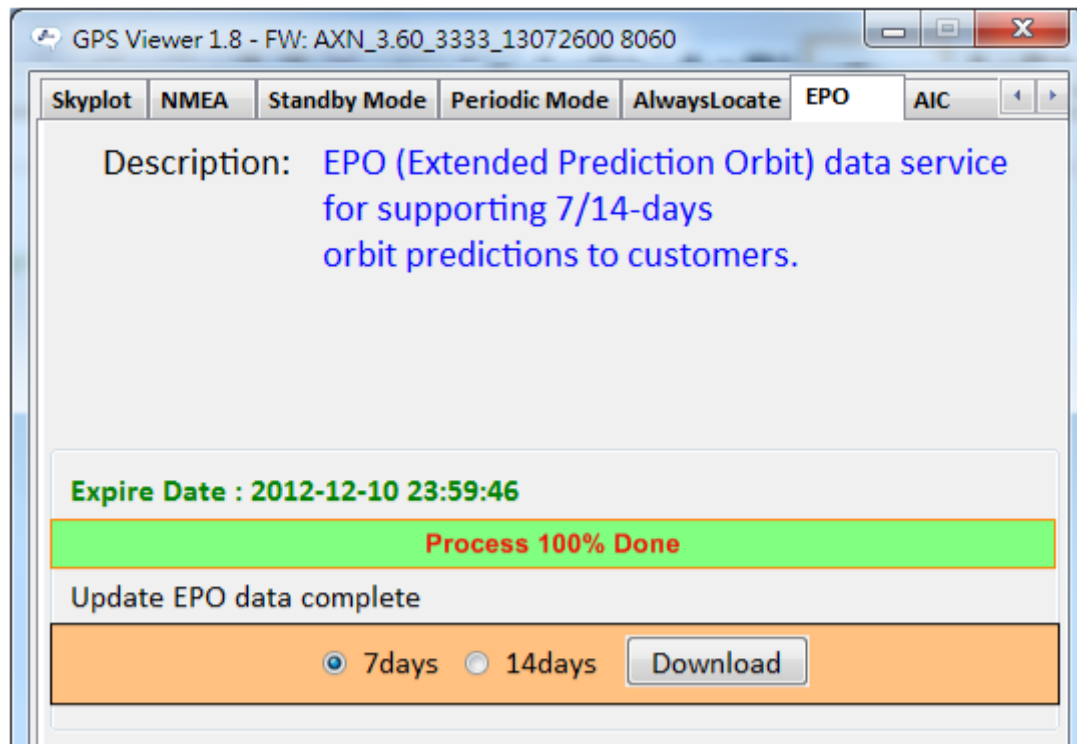


Figure 3.18: EPO update complete screen

### 3.4.5 Active Interference Cancellation

Active Interference Cancellation (AIC) feature provides effective narrow-band interference and jamming elimination. With AIC the GPS signal can be recovered automatically from the jammed signal for better navigation quality.

To enable or disable AIC, select Enable or Disable radio button then click **Set AIC** button. The graph here shows the current GPS fix status.

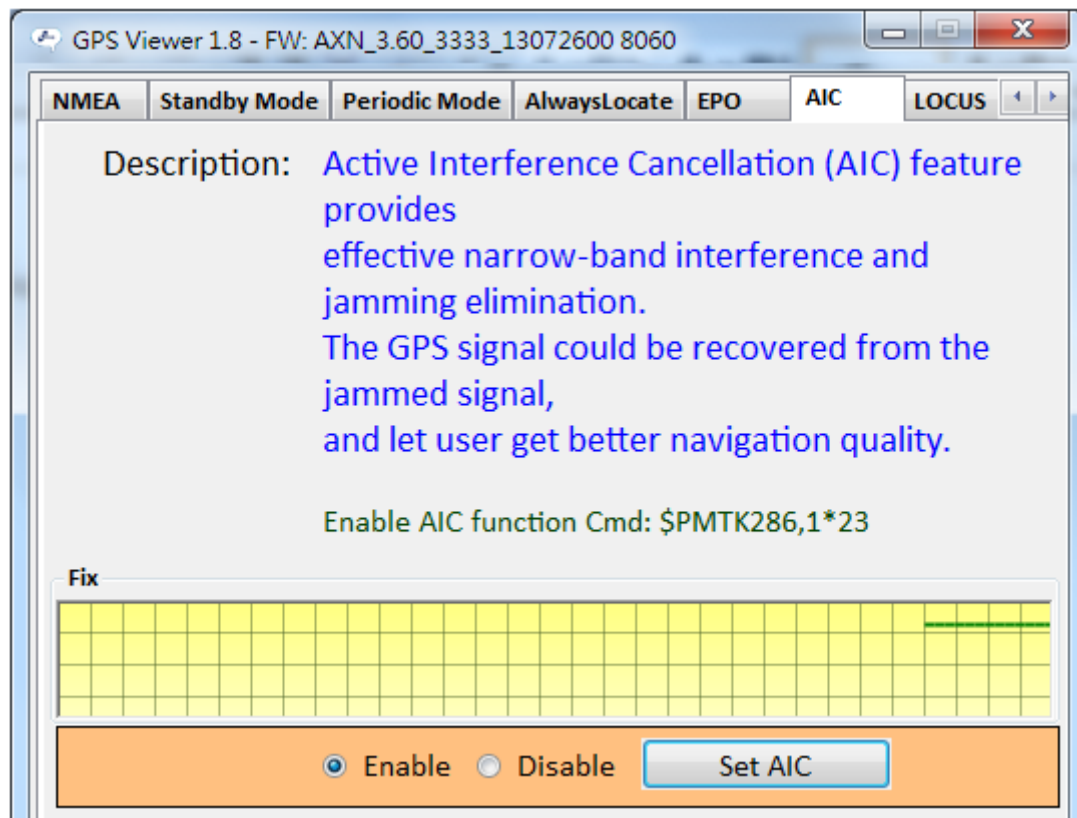


Figure 3.19: AIC

### 3.4.6 LOCUS

LOCUS is the name given to innate logger solution.

#### **Logging information (figure 3.20):**

Serial#: logging serial number.

Type: logging type - Overlap, FullStop.

Interval: logging interval setting (valid when Interval mode selected).

Distance: logging distance setting (valid when Distance mode selected).

Speed: logging speed setting (valid when Speed mode selected).

Status: logging status – Stop logging, Start logging.

Number: Logging number of data record. Progress bar is shown logging used percentage.

Mode:

- AlwaysLocate TM mode: logging with AlwaysLocate TM.
- Fix only mode: logging when 3D-fix only.
- Normal mode: logging per positioning (e.g. 1 second).
- Interval mode: logging per interval (e.g. 15 seconds).
- Distance mode: logging by distance (e.g. 75 meters).
- Speed mode: logging mode by speed (e.g. 15 m/s).

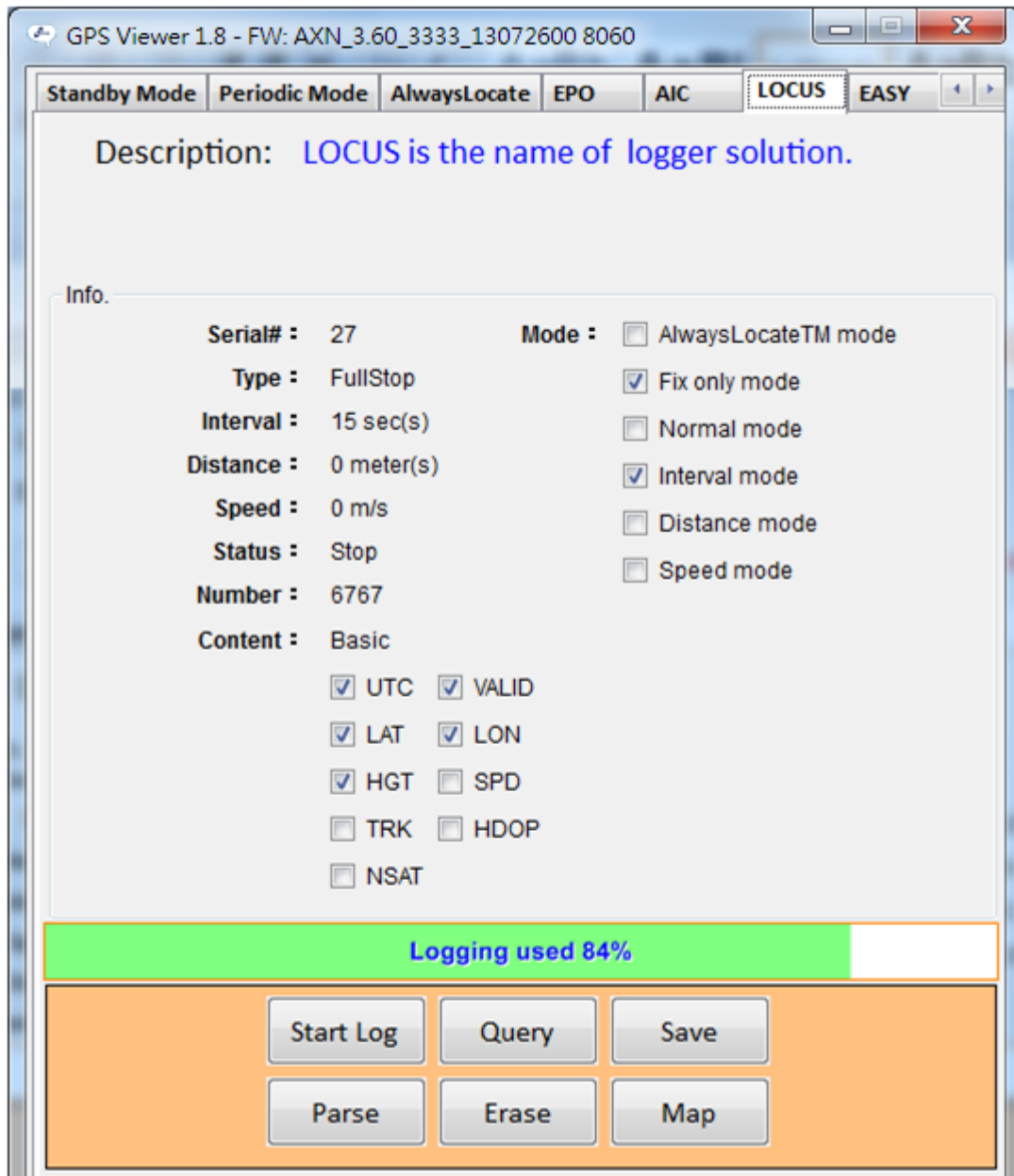


Figure 3.20: LOCUS

Table 3.1: Details for logging content

Naming	Size (bytes)	UTC (4)	Fix Type (1)	Lat (4)	Lon (4)	Height (2)	Speed (2)	Track (2)	SatNo (1)	Checksum (1)
Basic	16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>
Racing	20	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>
Search	19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>
Saving	13	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>					<input type="radio"/>
All	23	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Content (table 3.1):

- UTC: record timing (clock) information.
- VALID: record GPS fix data information.
- LAT: record position data information.
- LON: record position data information.
- HGT: record height information.
- SPD: record speed information.
- TRK: record direction information.
- HDOP: record Horizontal DOP information.
- NSAT: record the information on the number of satellites in used.

**Logging function button:**

Status: Stop or Start logging.

Query: query LOCUS data logger status.

Save: export record data stored in the memory.

Parse: parse bin file to XML and NMA file.

Erase: clears all data stored in the memory.

Map: login the website to use Google Map™ open the XML file and show track

*\*This tool is for display only. All configurations need pre-setting by firmware.*

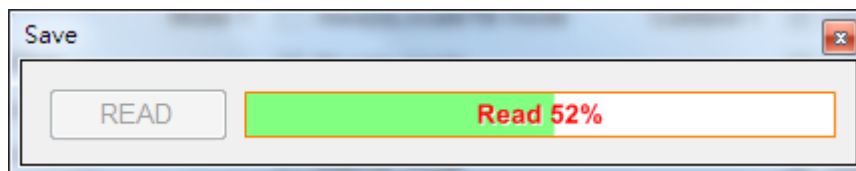


Figure 3.21: LOCUS export record data screen



```
<?xml version="1.0"?>↓
<dataset2 xmlns="xsdbooks">↓
  <Count Data="1">↓
    <UTC>2012-09-28,06:08:12</UTC>↓
    <FixType>3D-fix</FixType>↓
    <Lat>23.118675</Lat>↓
    <Lon>120.274063</Lon>↓
    <HGT>35</HGT>↓
  </Count>↓
  <Count Data="2">↓
    <UTC>2012-09-28,06:08:41</UTC>↓
    <FixType>3D-fix</FixType>↓
    <Lat>23.118679</Lat>↓
    <Lon>120.274063</Lon>↓
    <HGT>36</HGT>↓
  </Count>↓
  <Count Data="3">↓
    <UTC>2012-09-28,06:08:56</UTC>↓
    <FixType>3D-fix</FixType>↓
    <Lat>23.118706</Lat>↓
    <Lon>120.274063</Lon>↓
    <HGT>37</HGT>↓
  </Count>↓
  <Count Data="4">↓
    <UTC>2012-09-28,06:09:11</UTC>↓
    <FixType>3D-fix</FixType>↓
    <Lat>23.118717</Lat>↓
    <Lon>120.274071</Lon>↓
    <HGT>37</HGT>↓
  </Count>↓
```

Figure 3.22: LOCUS XML file format



Figure 3.23: LOCUS track on Google Map™ screen

### 3.4.7 EASY

EASY is the abbreviation of **E**MBEDDED **A**SSIST **S**YSTEM.

- EASY to TTFF: EASY works as embedded software which can accelerate TTFF by predicting satellite navigation messages from received ephemeris.
- EASY to calculate: No additional computing interval for EASY task. EASY was efficiently scheduled and computed in the free time of every second after GPS navigation solution.
- EASY to design-in: World leading technology with no additional design-in efforts.

To enable or disable EASY, select Enable or Disable radio button then click **Set EASY** button.

To check for EASY status, press **Query** button.

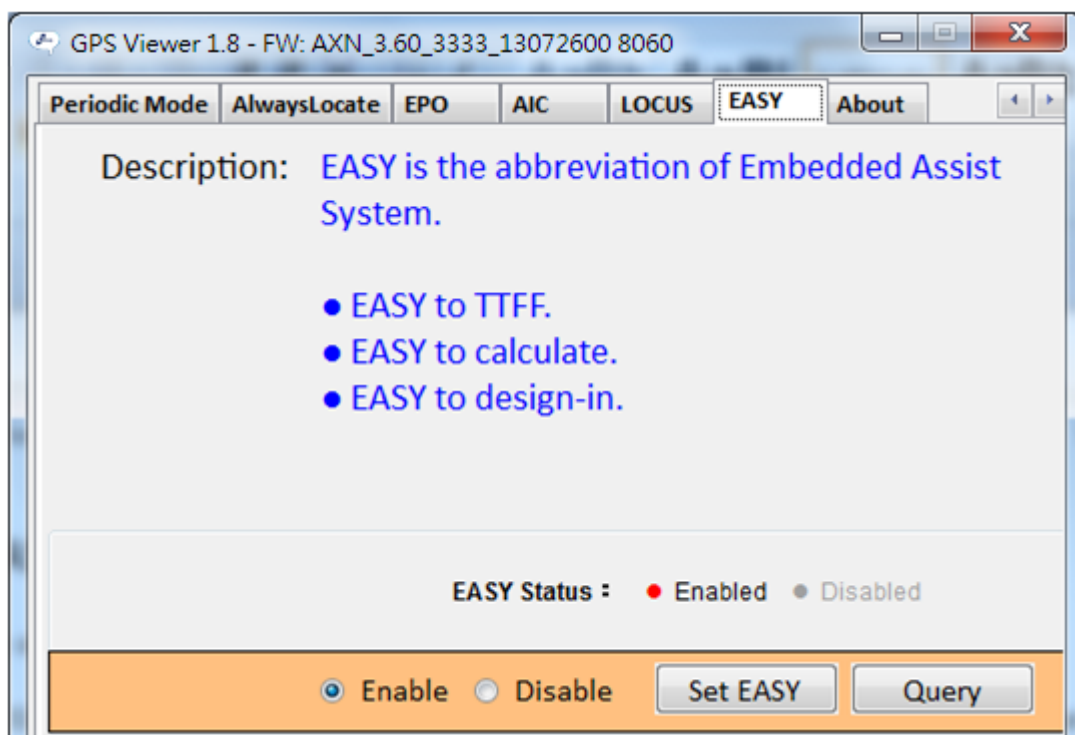


Figure 3.24: EASY

## 3.5 About

For Smart GPS Viewer version, go to **About** tab as Figure 3.25

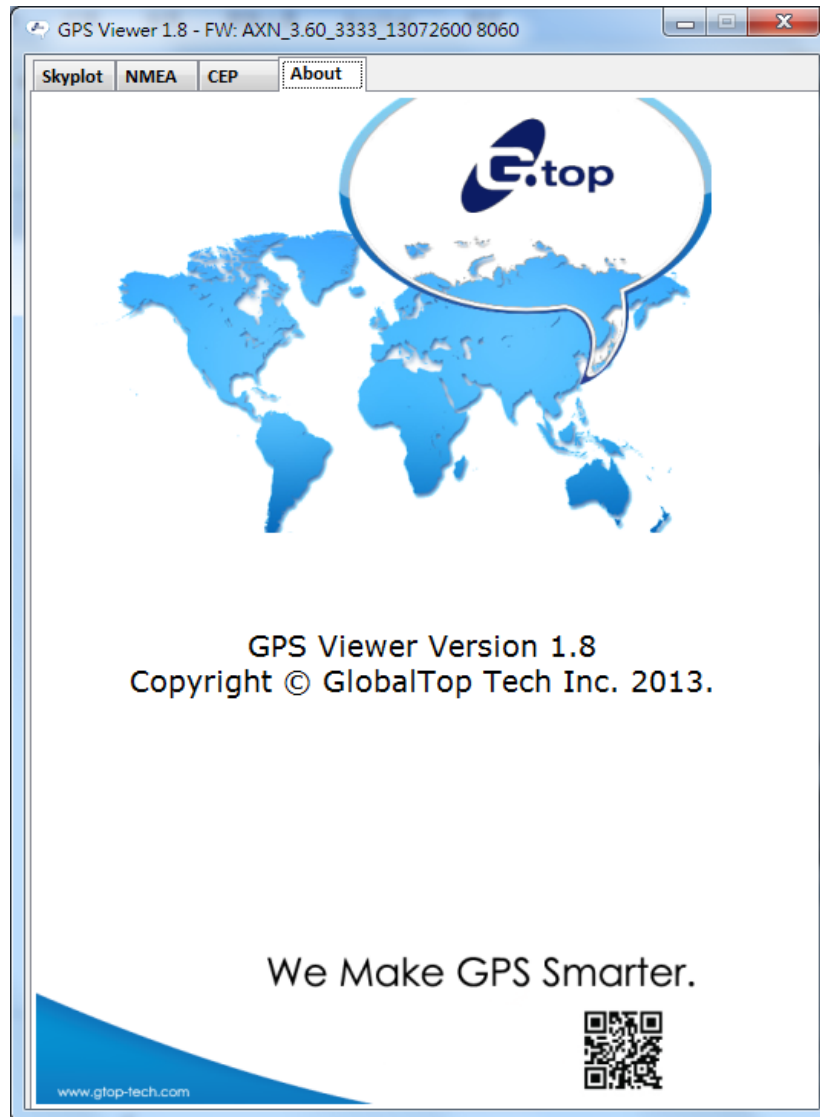


Figure 3.25: About GlobalTop