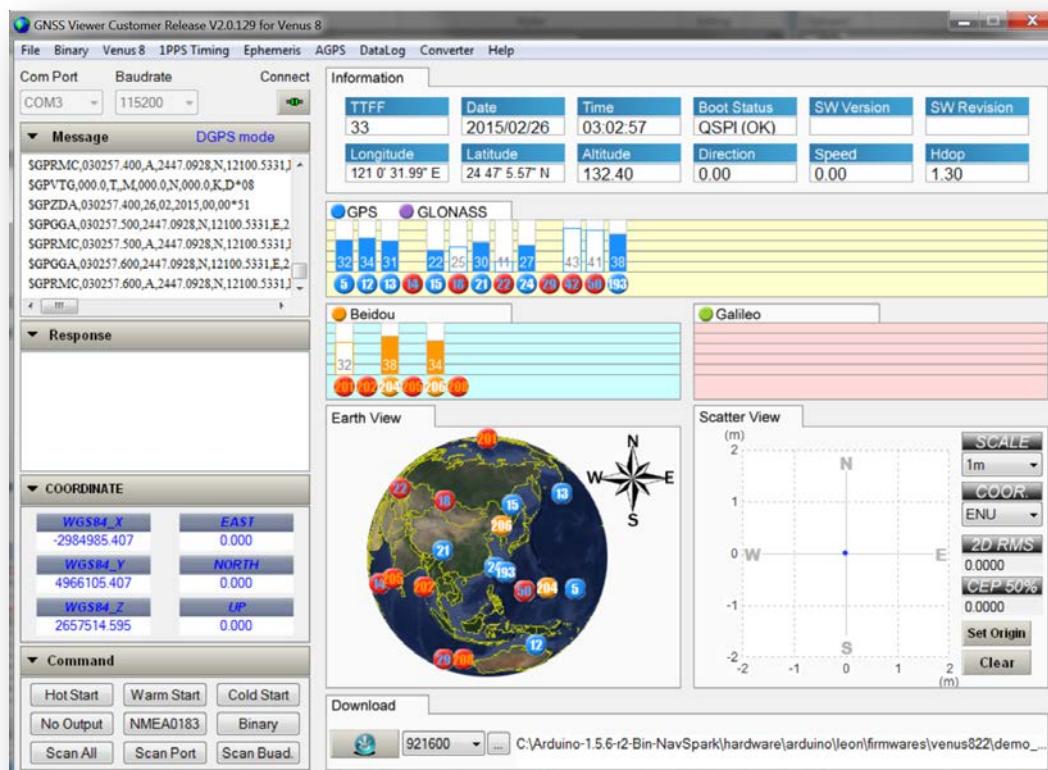


GNSS Viewer for Venus 8

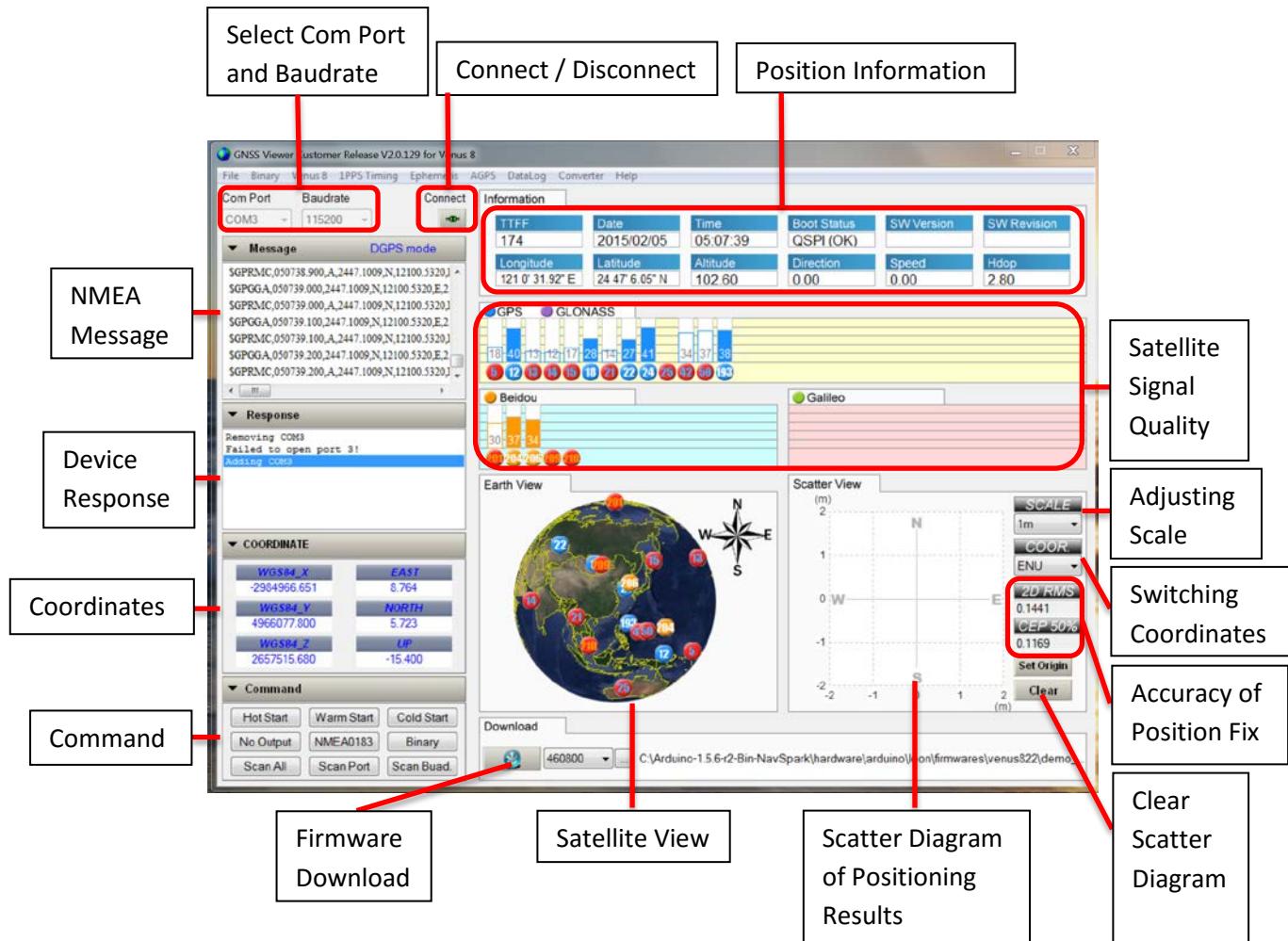
User Guide



Rev. 0.2
December 21, 2015

SkyTraq GNSS Viewer is easy to use and its clear interface of real-time monitoring can help you efficiently complete testing of GPS/GLONASS/BD device. You can start the GNSS Viewer without installation.

Display and Function



Satellite Color	Meaning
<input checked="" type="checkbox"/> Solid blue bar	GPS signal used for position fix
<input type="checkbox"/> Empty blue bar	GPS signal tracked but not used for position fix
<input checked="" type="checkbox"/> Solid orange bar	Beidou signal used for position fix
<input type="checkbox"/> Empty orange bar	Beidou signal tracked but not used for position fix
<input checked="" type="checkbox"/> Solid purple bar	GLONASS signal used for position fix
<input type="checkbox"/> Empty purple bar	GLONASS signal tracked but not used for position fix

Contents

Before Use.....	5
Connect GNSS Device to PC	5
Using GNSS Viewer	6
Hot / Warm / Cold Start and TTFF	7
Adjusting Scale	8
Switching Coordinates	8
Set Origin.....	9
Clear Scatter Diagram	9
Download Firmware.....	10
NMEA 0183	11
File – Save NMEA	11
File – Clean NMEA.....	12
File – Exit.....	13
Binary – System Restart	14
Binary – Show Binary Data.....	14
Binary – Set Factory Default	15
Binary – Query Software Version.....	15
Binary – Query CRC Checksum.....	16
Binary – Query SHA1 String.....	16
Binary – Query and Configure NMEA Message Interval	16
Binary – Query and Configure Position Update Rate.....	20
Binary – Query and Configure Datum.....	21
Binary – Query and Configure Position Pinning.....	22
Binary – Query and Configure GPS Measurement Mode	23
Binary – Query and configure Power Mod	24
Binary – Query and Configure DOP Mask	25
Binary – Query and Configure Elevation and CNR Mask	26
Binary – Query GLONASS K-Number, Slot, CNR.....	27
Binary – Query and Configure NMEA Talker ID	28

Binary – Configure Serial Port.....	29
Binary – Configure Message Type.....	30
Binary – Configure Binary Message Interval.....	31
Binary – Configure NMEA Output Comport.....	32
Venus8 – GNSS ROM Boot Status	33
Venus8 – SUP800 User Data Storage	34
Venus8 – Query and Configure RTK Mode	36
Venus8 – Query and Configure SBAS	38
Venus8 – Query and Configure SAEE	40
Venus8 – Query and Configure QZSS.....	41
Venus8 – Query and Configure Navigation Mode	42
Venus8 – Query and Configure GNSS Constellation Type	43
1PPS Timing – Query and Configure Timing	44
1PPS Timing – Query and Configure Cable Delay	46
1PPS Timing – Monitoring 1PPS.....	47
1PPS Timing – Query and Configure 1PPS Pulse Width.....	48
1PPS Timing – Query and Configure PPS Output Mode	49
Ephemeris – Get and Set Ephemeris.....	50
Ephemeris – Get and Set Almanac.....	51
Ephemeris – Get and Set GLONASS Time Corrections.....	52
AGPS – ROM AGPS Download.....	53
DataLog – Log Status.....	54
DataLog – Log Configure	55
DataLog – Log Clear.....	57
DataLog – Log Decompress.....	58
DataLog – Log Read.....	59
Converter – KML	60

Before Use

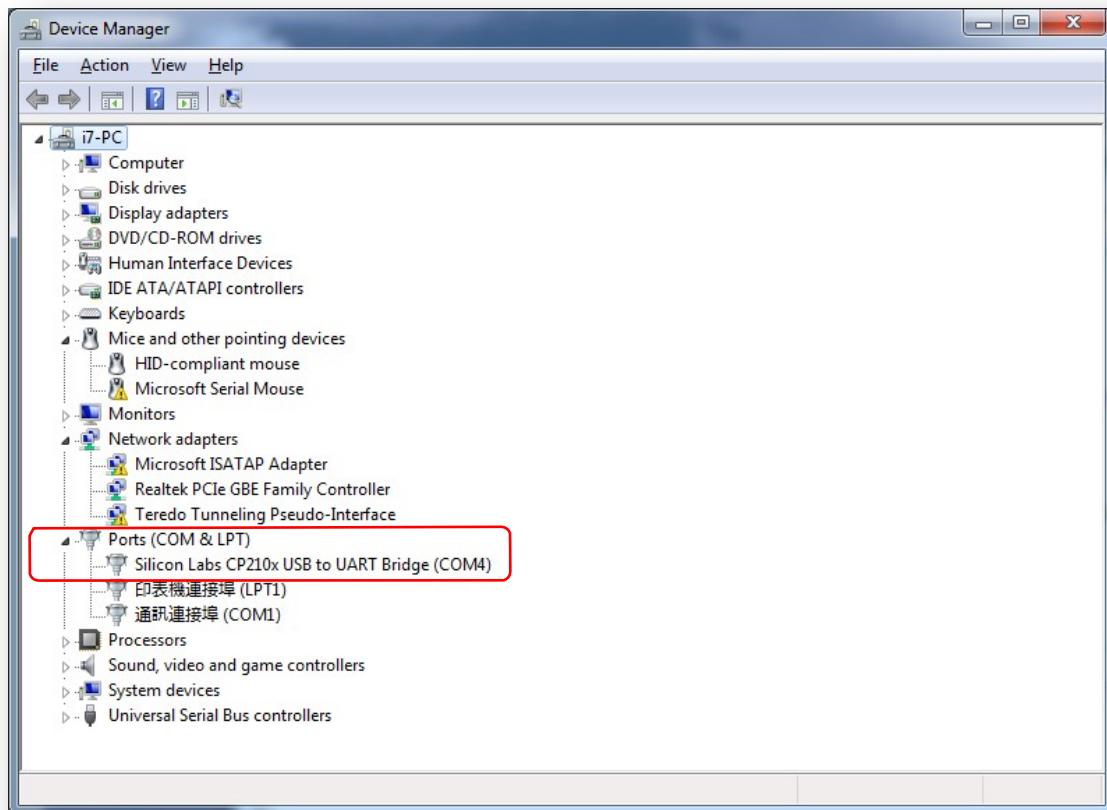
Driver Installation

If USB is used to connect the GNSS device to the PC, USB driver will need to be installed.

Currently Silicon Lab CP2012 is used in SkyTraq GNSS evaluation kits. The Silicon Lab USB driver can be downloaded from

<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx>.

After USB driver installation and connecting the GNSS device to PC using USB cable, the created virtual COM port number can be seen from the Device Manager.



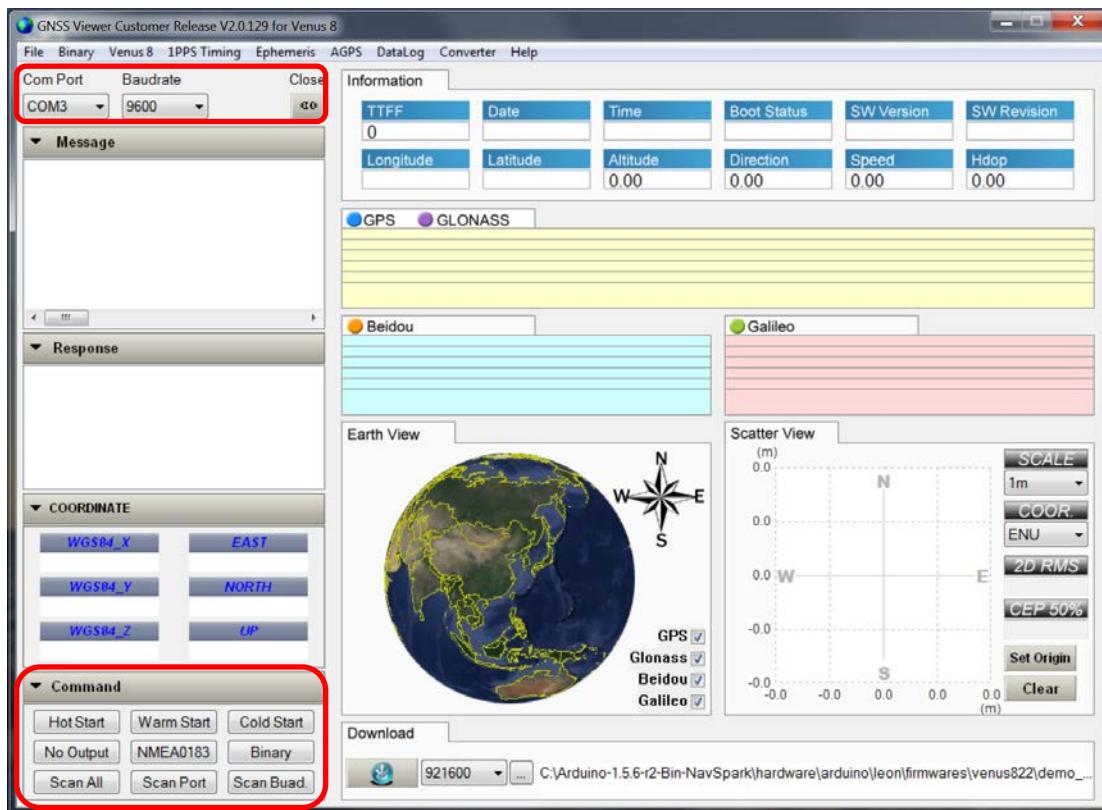
Connect GNSS Device to PC

1. Connect your GNSS device to PC by USB cable or other connecting means.
2. Make sure antenna port of the GNSS device has a clear view sky signal.
3. Turn on the GNSS device.

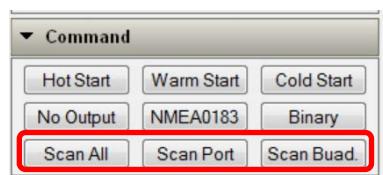
Using GNSS Viewer

Select Com Port and Baud Rate to operate

1. Com Port and Baud Rate can be selected by clicking the pull-down menu, then click on “connect/disconnect” button.

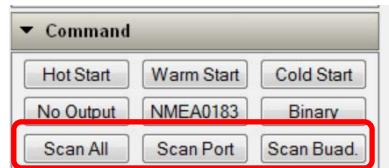


2. If unsure of the Com Port and Baud Rate for the GNSS device, “Scan All” can be selected to allow the program to search for correct values automatically.
3. If Com Port is known, but unsure of the correct Baud Rate, then try searching Baud Rate automatically by clicking “Scan Baud”.
4. If Baud Rate is known, but unsure of the correct Com Port, then try searching Com Port automatically by clicking “Scan Port”.

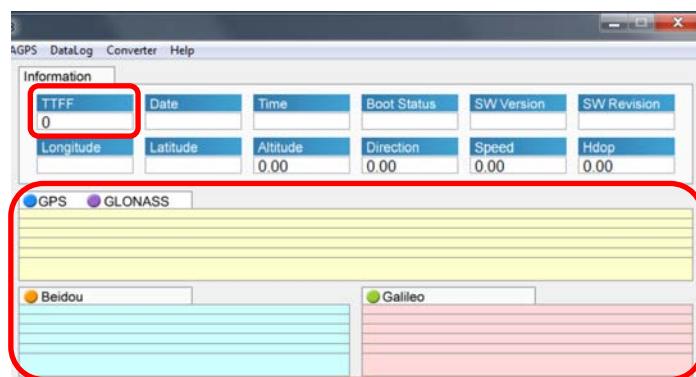


Hot / Warm / Cold Start and TTFF

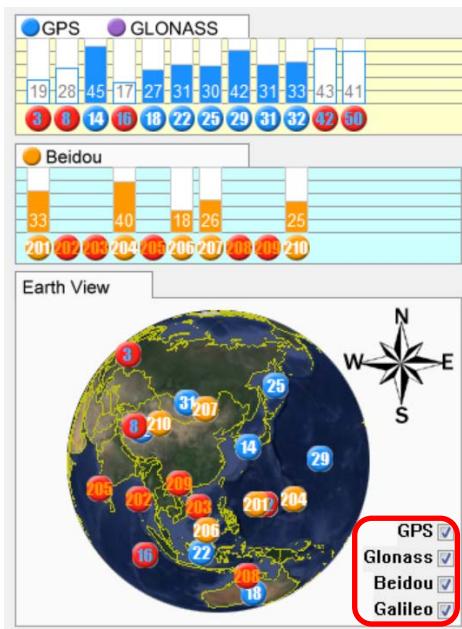
1. Time-to-First-Fix (TTFF) can be tested by simply clicking on “Hot Start”, “Warm Start”, “Cold Start”.



2. Satellites and signal bars will be cleaned, and TTFF start to count from zero.

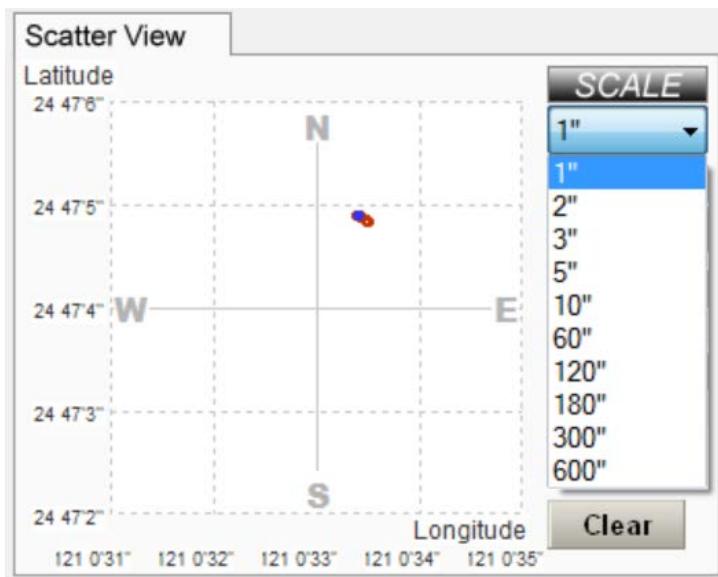


3. When signals are acquired, it is first shown in empty bar. After ephemeris is collected and the satellite signal is used for position fix, the signal will turn into a solid bar. Satellites displayed in Earth View can be shown or hidden by ticking GPS/GLONASS/Beidou/Galileo in the corner.



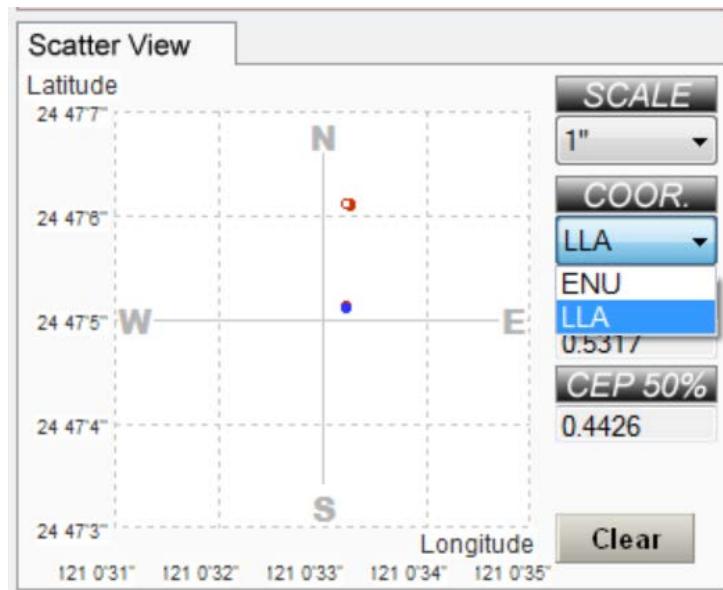
Adjusting Scale

Adjust the unit of the scatter diagram by clicking the pull-down menu. If larger unit is selected, you can see the diagram on a bigger scale.



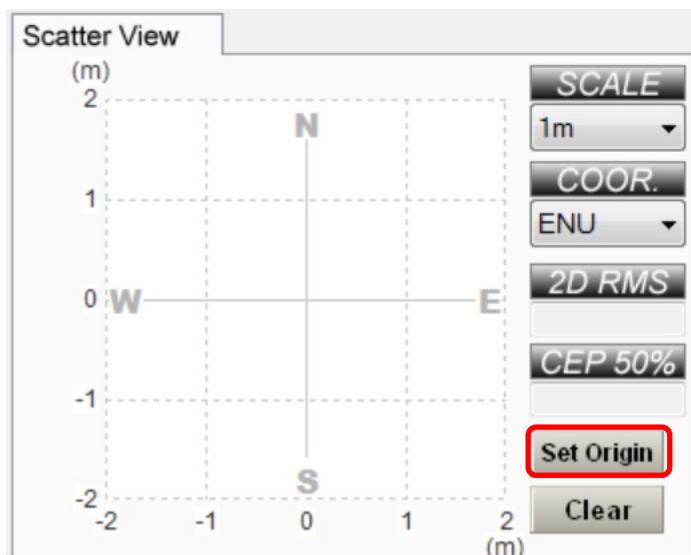
Switching Coordinates

The coordinate system can be changed between ENU (Local East, North, Up coordinates) and LLA (Longitude, Latitude, Altitude coordinates) by clicking the pull-down menu.



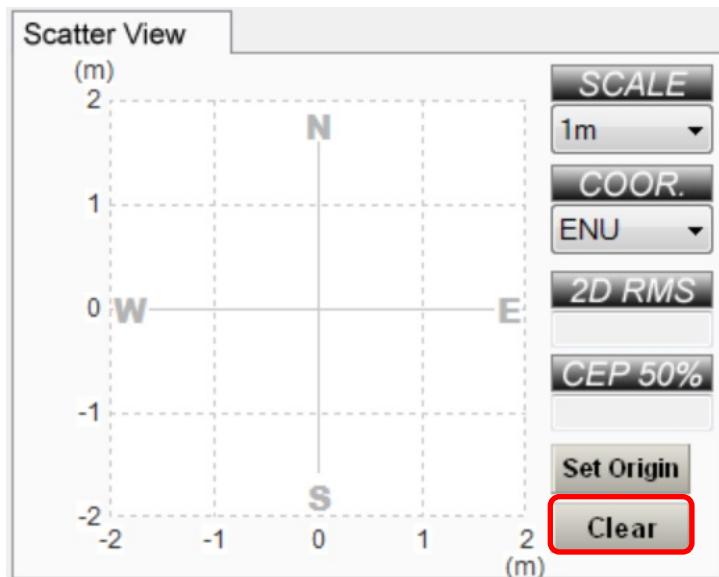
Set Origin

Set the latest position fix as the origin point by clicking on “Set Origin”.



Clear Scatter Diagram

Clear Scatter Diagram by clicking on “Clear”.

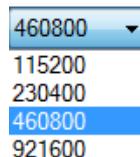


Download Firmware

1. The downloaded firmware to the device can be selected by clicking "File Path".

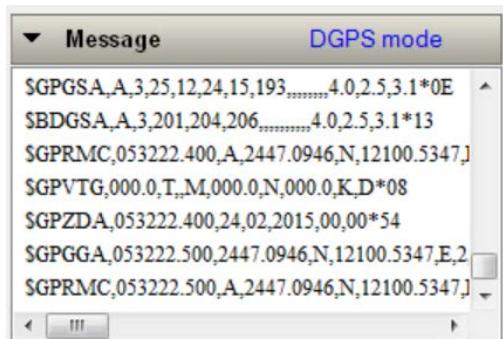


2. The firmware can be downloaded to the GNSS device by clicking "Download".
3. Download speed can be adjusted by clicking the pull-down menu, and the fastest download speed can be chosen by selecting "921600".



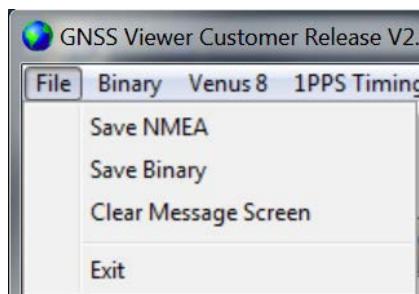
NMEA 0183

1. To stop displaying NMEA sentence in the Message window, click the “No Output” button.
2. To start displaying new NMEA in message window, click on “NMEA 0183” button.

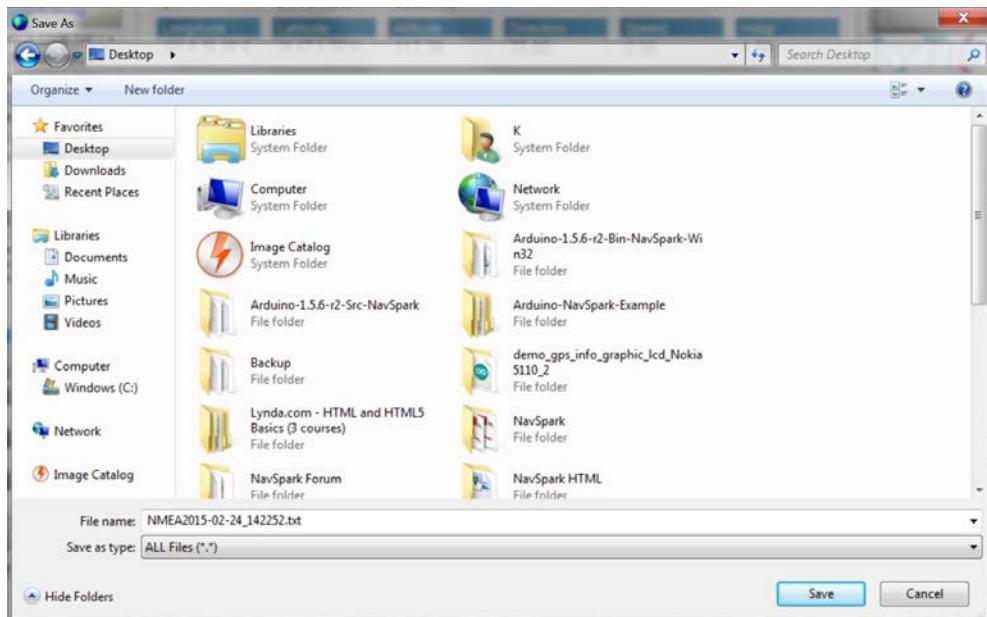


File – Save NMEA

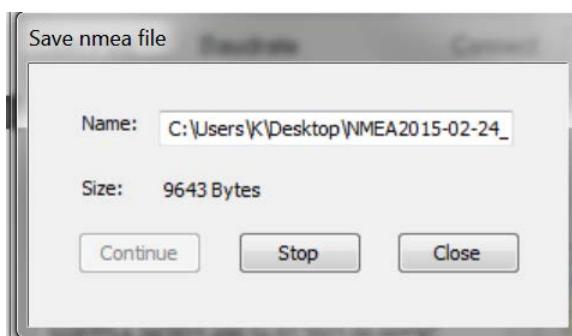
1. Save NMEA to a file by clicking on “Save NMEA”.



2. Select a folder for your NMEA file.



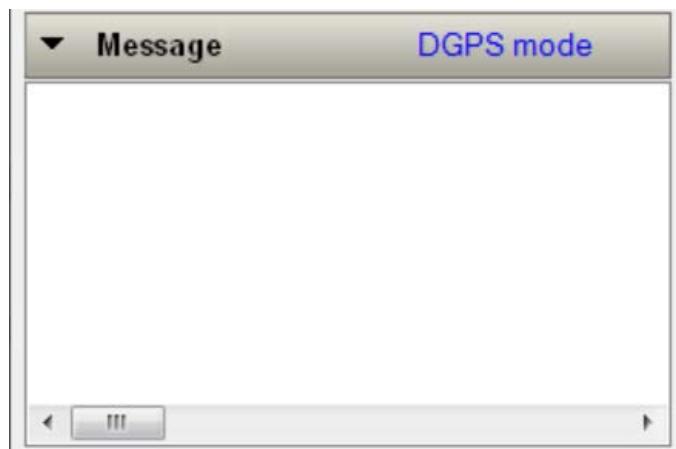
3. The size of the file will increase continuously.



4. To stop saving NMEA to the file, click on the "Stop" button.

File – Clean NMEA

1. Clean NMEA records by clicking on “Clear Message Screen”.
2. You can see the Message window is clean.
3. Clear Message Screen button can help you eliminate old NMEA records.

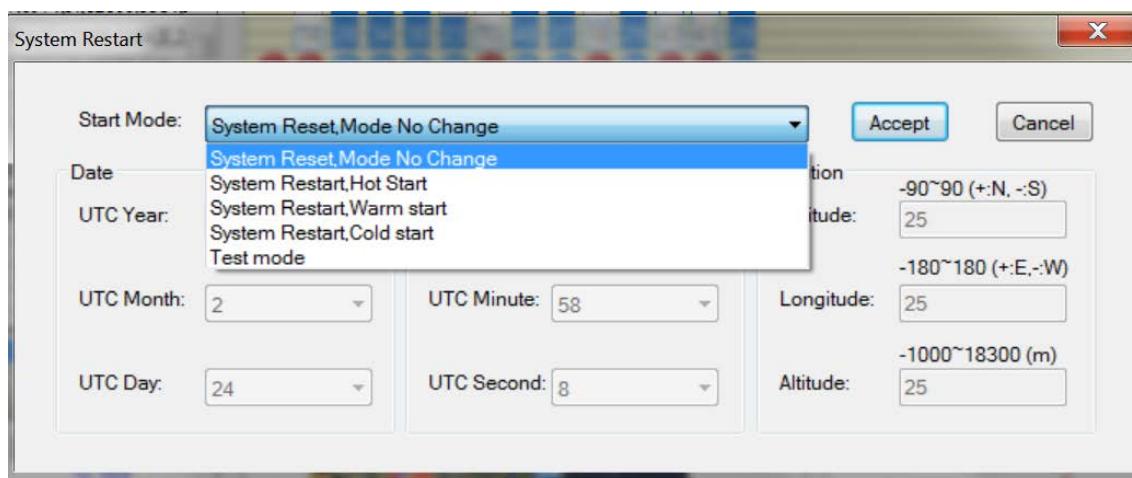
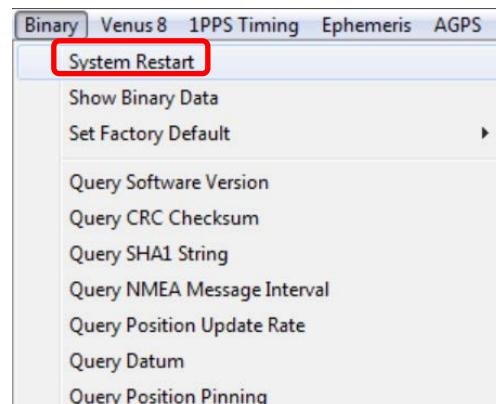


File – Exit

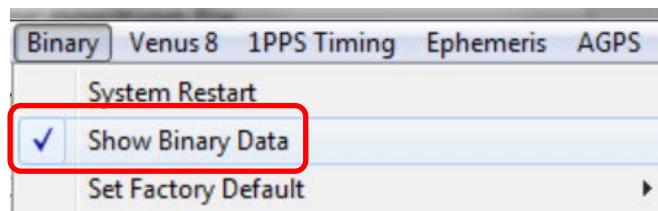
Close the GNSS Viewer by clicking on “Exit” button

Binary – System Restart

1. Click on “System Restart” for advanced system restart.
2. Set different date, time, or position to test TTFF of your GNSS device.



Binary – Show Binary Data



Displays data in binary

```
In : a0 a1 00 02 02 01 03 0d 0a
Ack: a0 a1 00 02 83 02 81 0d 0a
Out: a0 a1 00 0e 80 01 00 02 00 18 00
Query Version Successful...
SkyTraq Kernel Version 2.0.24
SkyTraq Version 1.8.27
SkyTraq Revision 2013.8.1
```

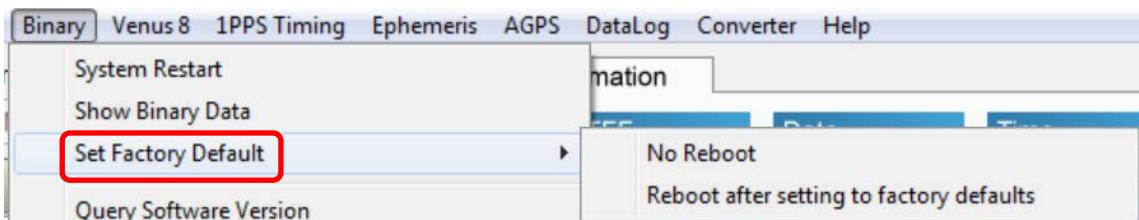
Enable “Show Binary Data”

```
Query Version Successful...
SkyTraq Kernel Version 2.0.24
SkyTraq Version 1.8.27
SkyTraq Revision 2013.8.1
```

Disable “Show Binary Data”

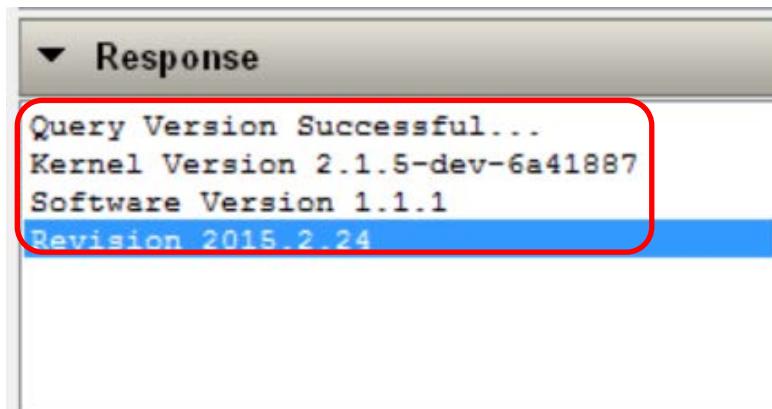
Binary – Set Factory Default

1. Restore the GNSS device to original settings clicking on “Set Factory Default”.
2. Choose No reboot or Reboot after setting to factory defaults. Please note “Reboot after setting to factory defaults” is recommended.



Binary – Query Software Version

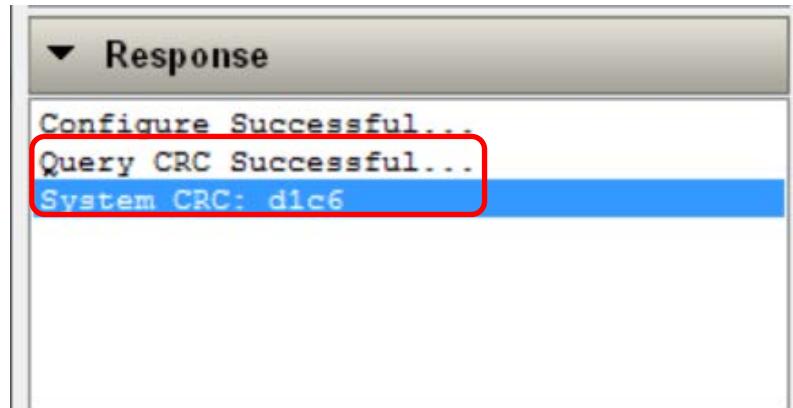
1. Query current software version by clicking on “Query Software Version”.
2. Kernel Version, Version, and Revision date will be displayed.



Binary – Query CRC Checksum

1. Query CRC Checksum by clicking on “Query CRC Checksum”.
2. It will display Software CRC checksum

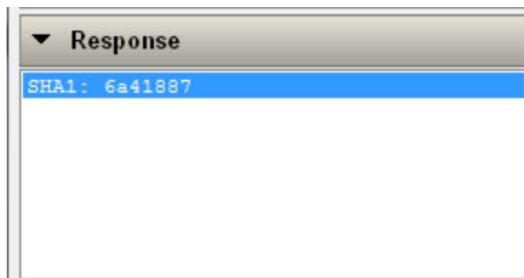
CRC (Cyclic Redundancy Check) – Error detecting code used in storage devices to detect accidental changes of raw data.



Binary – Query SHA1 String

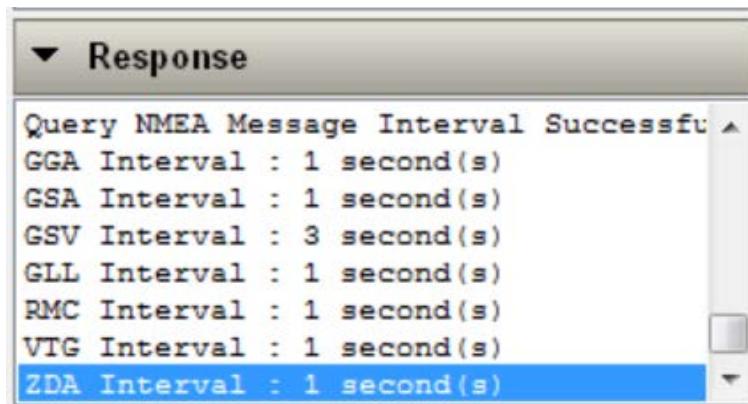
Query SHA1 string by clicking on the “Query SHA1 String” button.

SHA1 – Cryptographic hash function, 160 bit (20 bit)

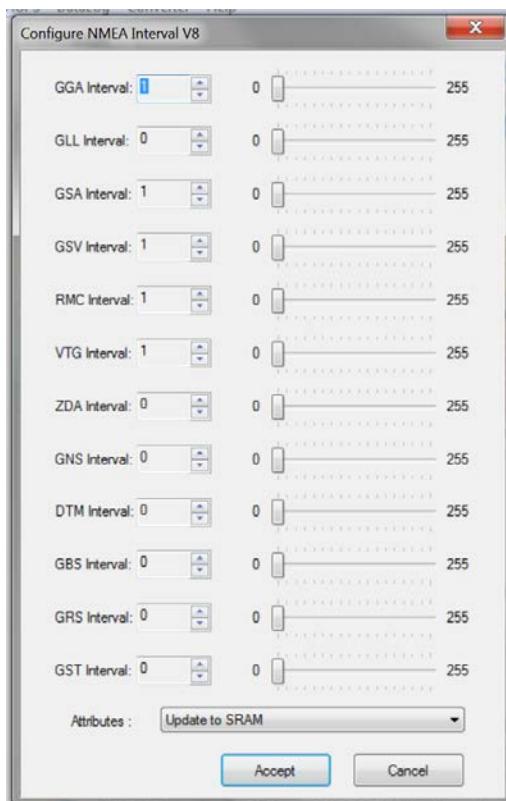


Binary – Query and Configure NMEA Message Interval

1. Output interval of navigation message can be checked by clicking “Query NMEA Message Interval”.



2. Interval of GGA, GLL, GSA, GSV, RMC, VTG, ZDA, GNS, DTM, GBS, GRS and/or GST can be adjusted between 0 and 255 after clicking “Configure NMEA Message Interval.” Output of each message can be disabled by setting the interval to “0.”



- **GGA – Global Positioning System Fix Data**

Time, position and fix related data for a GPS receiver.

- **GLL – Geographic position – Latitude/Longitude**

Latitude and Longitude of vessel position, time of position fix and status.

- **GSA – GNSS DOP and Active Satellites**

GNSS receiver in operating mode, Satellite used in the navigation solution reported by the GGA or GNS sentence and DOP values.

- **GSV – GNSS Satellites In View**

The GSV sentence provides the number of satellites (SV) in view, satellite ID numbers, elevation, azimuth, and SNR value. The GSV sentence contains four satellites maximum per transmission. The total number of sentences being transmitted and the sentence number being transmitted are indicated in the first two fields.

- **RMC – Recommended Minimum Specific GNSS Data**

Time, date, position, course and speed data provided by a GNSS navigation receiver. This sentence is transmitted at intervals not exceeding 2-seconds and is always accompanied by RMB when a destination waypoint is active.

- **VTG – Course Over Ground & Ground Speed**

The actual course and speed relative to the ground.

- **ZDA – Time & Date**

UTC, day, month, year and local time zone.

- **GNS – GNSS Fix Data**

Fix data for single or combined satellite navigation systems (GNSS). This sentence provides fix data for GPS, GLONASS, possible future satellite systems, and systems

combining these. This sentence could be used with thee talker identification of GP for GPS, GL for GLONASS, GA for Galileo, GN for GNSS combined systems, as well as future identifiers. Some fields may be null fields for certain applications.

- **DTM – Datum Reference**

Local geodetic datum and datum offsets from a reference datum. This sentence is used to define the datum to which a position location, and geographic locations in subsequent sentences, is referenced. Latitude, longitude and altitude offsets from the reference datum, and the selection of reference datum, are also provided

- **GBS – GNSS Satellite Fault Detection**

This sentence is used to support Receiver Autonomous Integrity Monitoring (RAIM). Given that a GNSS receiver is tracking enough satellites to perform integrity checks of the positioning quality of the position solution a sentence is needed to report the output of this process to other systems to advise the system user. With the RAIM in the GNSS receiver, the receiver can isolate faults to individual satellites and not use them in its position and velocity calculations. Also, the GNSS receiver can still track the satellite and easily judge when it is back within tolerance. This sentence shall be used for reporting this RAIM information. To perform this integrity function, the GNSS receiver must have at least two observables in addition to the minimum required for navigation. Normally there observables take the form of additional redundant satellites.

- **GRS – GNSS Range Residuals**

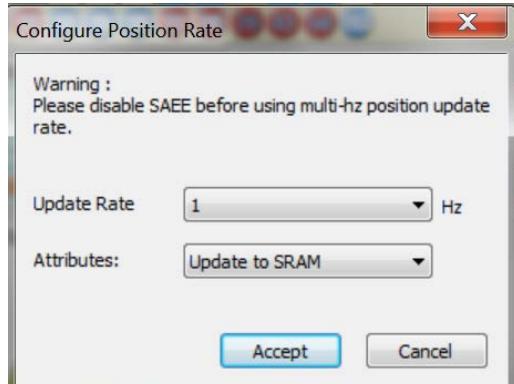
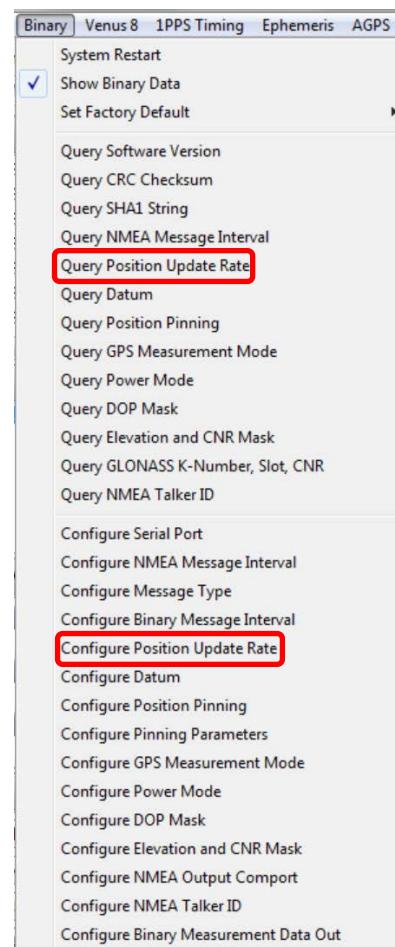
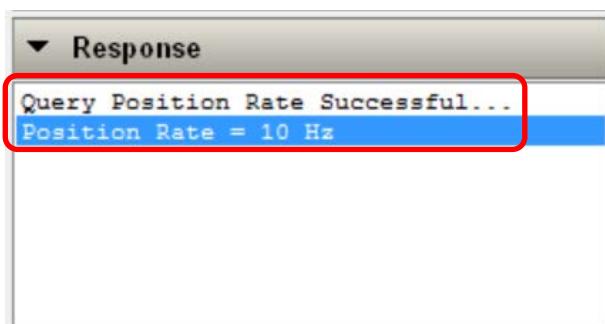
This sentence is used to support Receiver Autonomous Integrity Monitoring (RAIM). Range residuals can be computed in two ways for this process. The basic measurement integration cycle of most navigation filters generates a set of residuals and uses there to update the position state of the receiver.

- **GST – GNSS Pseudorange Error Statistics**

This sentence is used to support Receiver Autonomous Integrity Monitoring (RAIM). Pseudorange measurement error statistic can be translated in the position domain in order to give statistical measures of quality of the position solution.

Binary – Query and Configure Position Update Rate

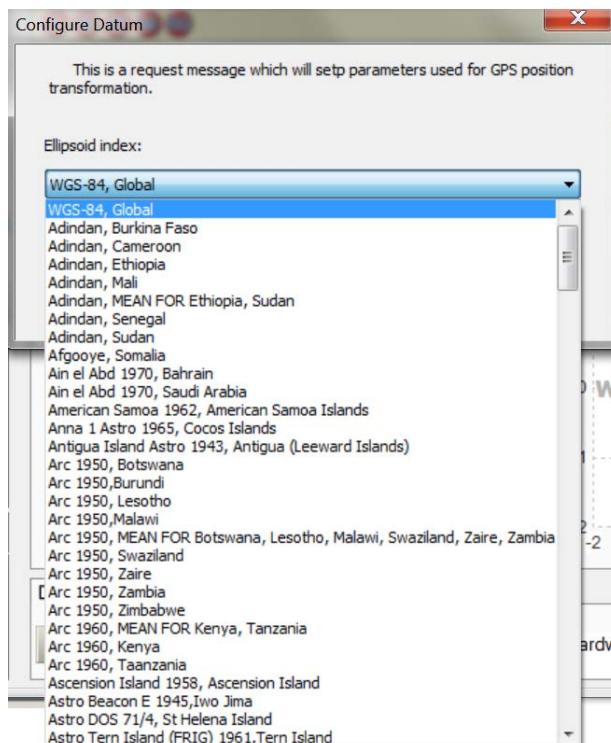
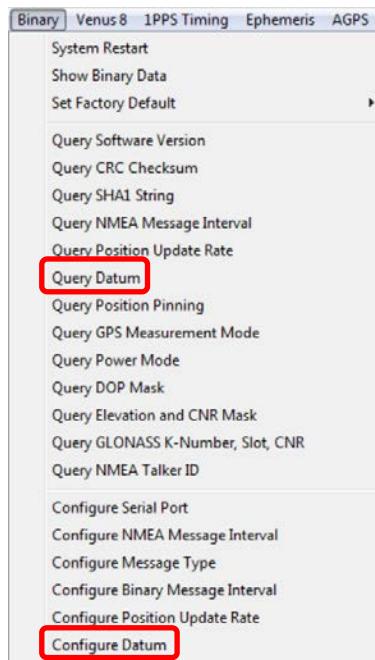
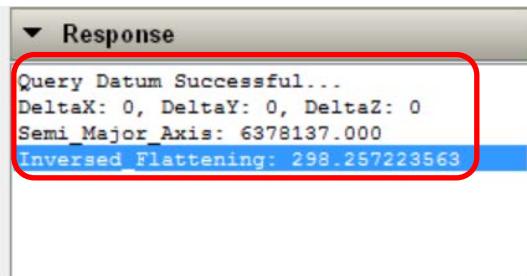
1. Query position update rate by clicking on “Query Position Update Rate”.
2. Configure Position Update Rate by clicking on “Configure Position Update”.
3. Adjust Update Rate and attributes.



Binary – Query and Configure Datum

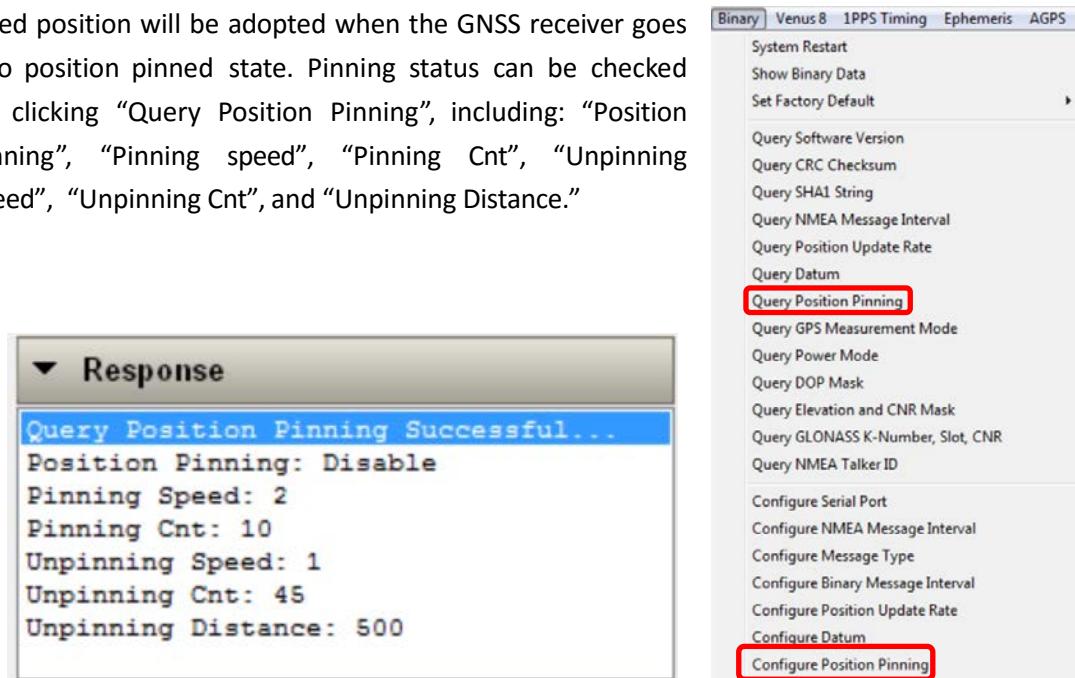
1. Query Datum by clicking on “Query Datum”.
2. DeltaX, DeltaY, DeltaZ, Semi_Major_Axis, and Inversed_Flattening will be displayed.
3. Various “Ellipsoid Index” can be selected by clicking “Configure Datum”.

Datum – A coordinate system, and a set of reference points, used to locate places on the Earth.



Binary – Query and Configure Position Pinning

1. Fixed position will be adopted when the GNSS receiver goes into position pinned state. Pinning status can be checked by clicking “Query Position Pinning”, including: “Position Pinning”, “Pinning speed”, “Pinning Cnt”, “Unpinning speed”, “Unpinning Cnt”, and “Unpinning Distance.”



Pinning Speed – Km/h

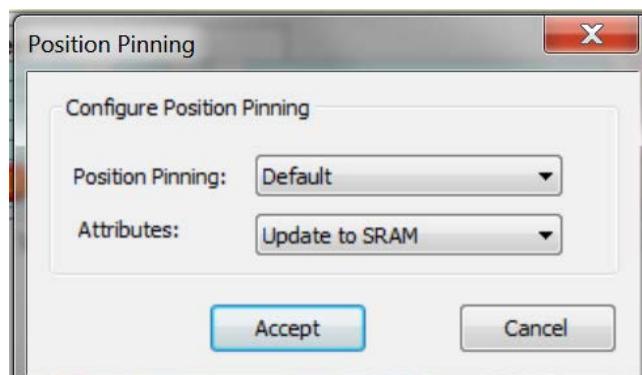
Pinning cnt – Seconds

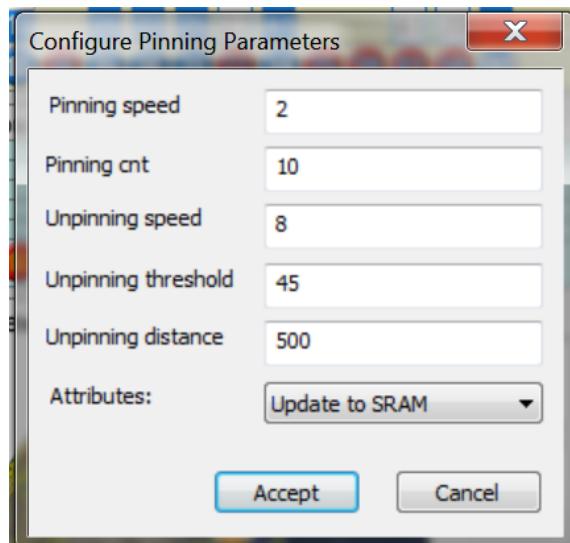
Unpinning speed – Km/h

Unpinning threshold – Seconds

Unpinning distance - Meters

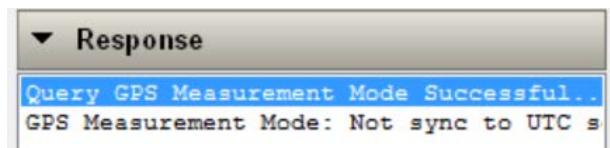
2. Position Pinning can be enabled or disabled by clicking “Configure Position Pinning”.



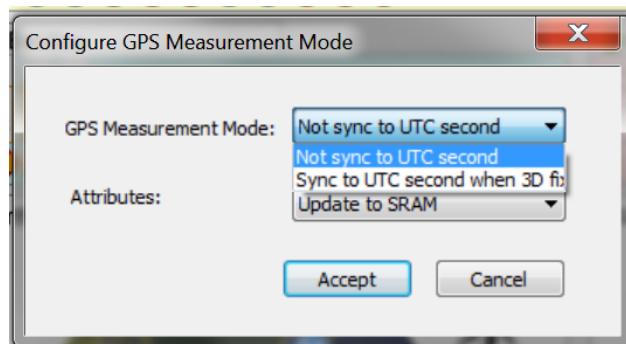


Binary – Query and Configure GPS Measurement Mode

1. Query GPS Measurement Mode by clicking on GPS Measurement Mode.



2. Configure GPS Measurement Mode by clicking on "GPS Measurement Mode".
3. Adjust GPS Measurement Mode and attributes.



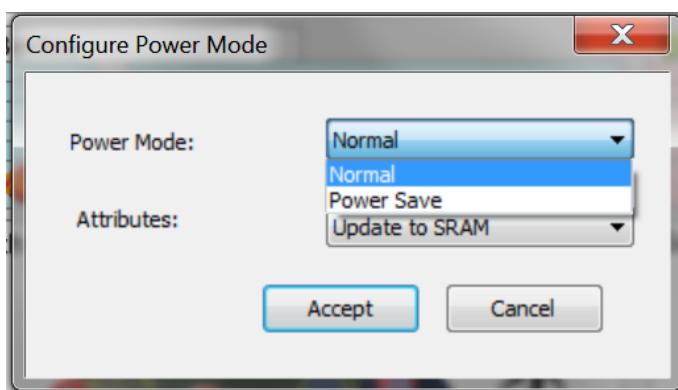
Binary	Venus 8	1PPS Timing	Ephemeris	AGPS
System Restart				
Show Binary Data				
Set Factory Default				
Query Software Version				
Query CRC Checksum				
Query SHA1 String				
Query NMEA Message Interval				
Query Position Update Rate				
Query Datum				
Query Position Pinning				
Query GPS Measurement Mode				
Query Power Mode				
Query DOP Mask				
Query Elevation and CNR Mask				
Query GLONASS K-Number, Slot, CNR				
Query NMEA Talker ID				
Configure Serial Port				
Configure NMEA Message Interval				
Configure Message Type				
Configure Binary Message Interval				
Configure Position Update Rate				
Configure Datum				
Configure Position Pinning				
Configure Pinning Parameters				
Configure GPS Measurement Mode				
Configure Power Mode				
Configure DOP Mask				
Configure Elevation and CNR Mask				
Configure NMEA Output Comport				
Configure NMEA Talker ID				
Configure Binary Measurement Data Out				

Not Sync to UTC second – Not syncing with UTC second

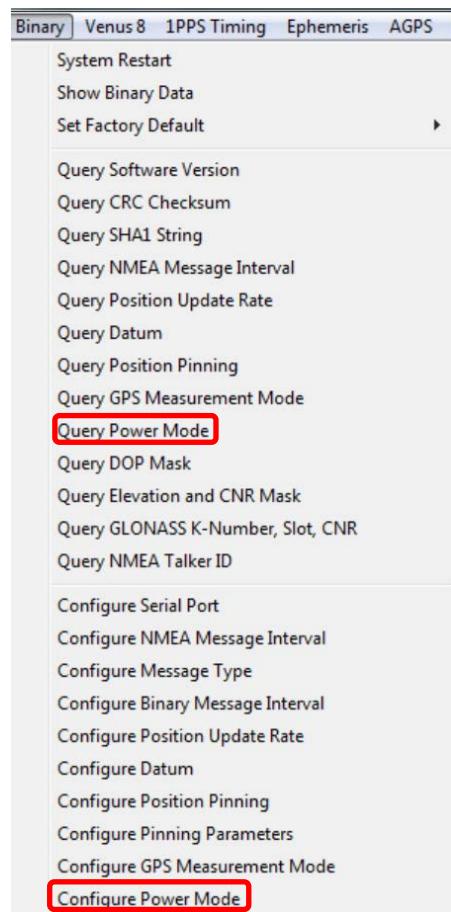
Sync to UTC second when 3D fix – Sync UTC second

Binary – Query and configure Power Mode

1. Query Power Mode by clicking on “Query Power Mode”.
2. “Power Save” or “Normal” can be selected by clicking “Configure Power Mode”.

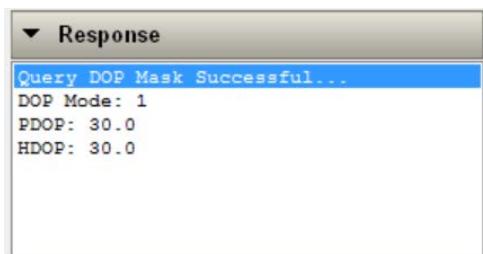


Engaging power save will shut down non-crucial circuits.

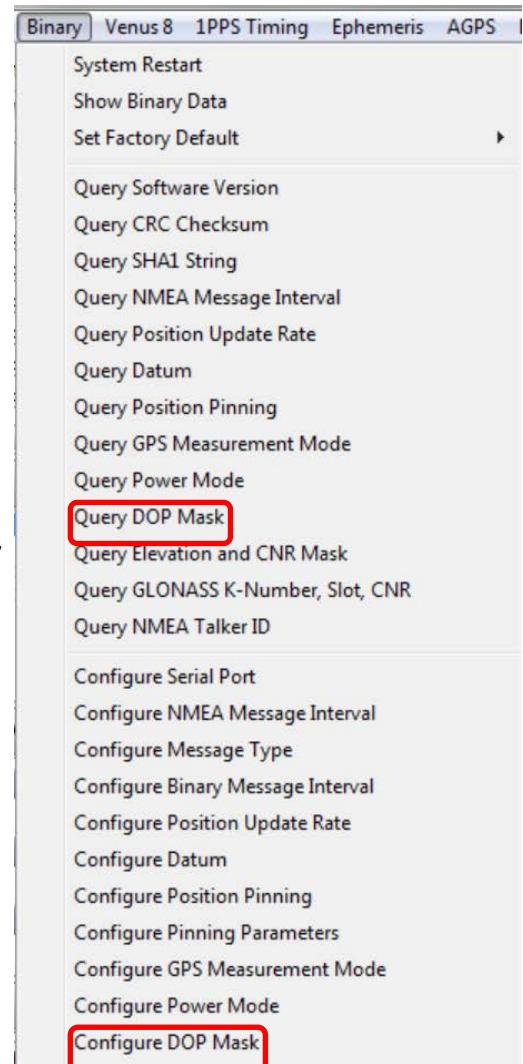
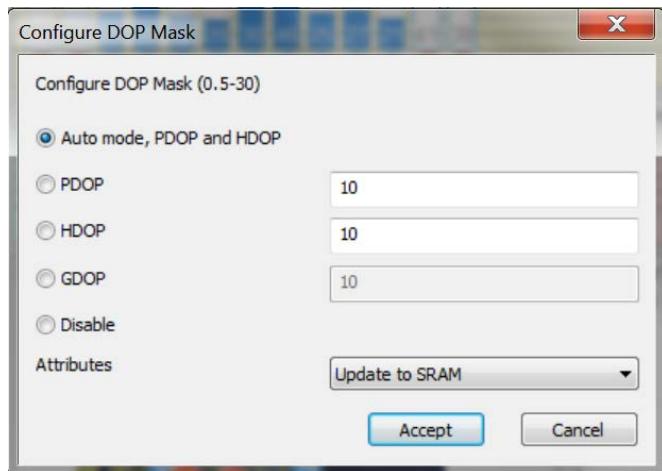


Binary – Query and Configure DOP Mask

1. Query DOP mask by clicking on “DOP Mask”



2. Configure DOP mask by clicking on “Configure DOP Mask”



Dilution of Precision – Additional multiplicative effect of navigation satellite geometry on positional measurement precision.

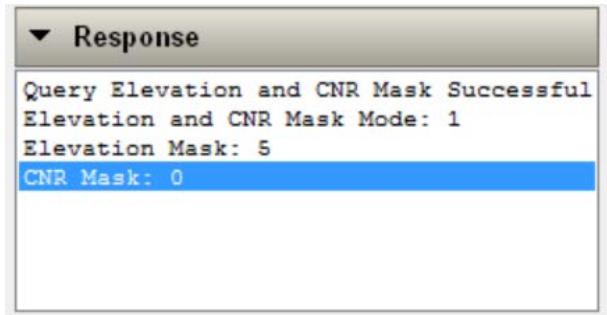
PDOP – Position Dilution of Precision

HDOP – Horizontal Dilution of Precision

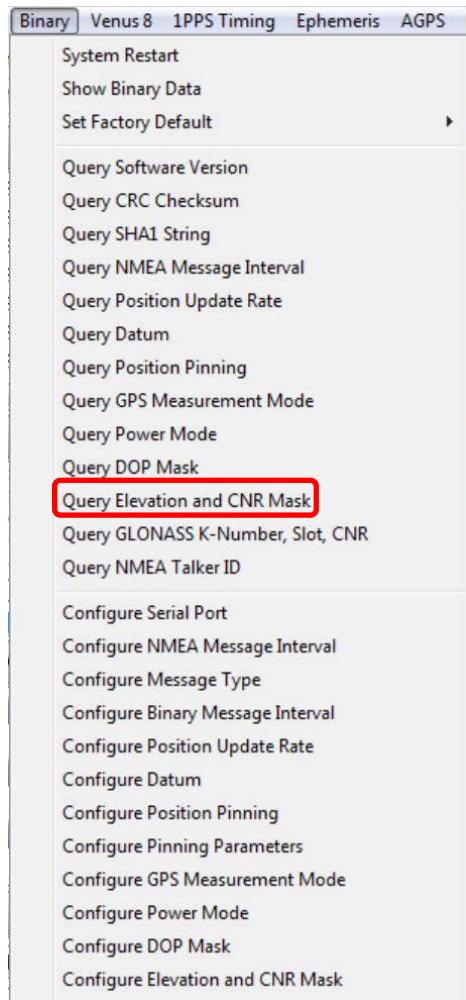
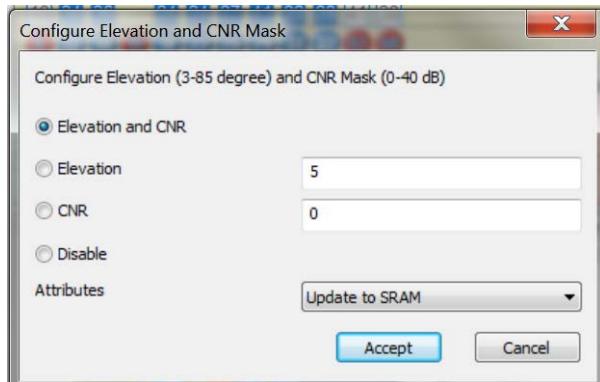
GDOP – Geometric Dilution of Precision

Binary – Query and Configure Elevation and CNR Mask

1. Query Elevation and CNR Mask by clicking on Elevation and CNR Mask button.



2. Configure Elevation by selecting Configure Elevation and CNR Mask.

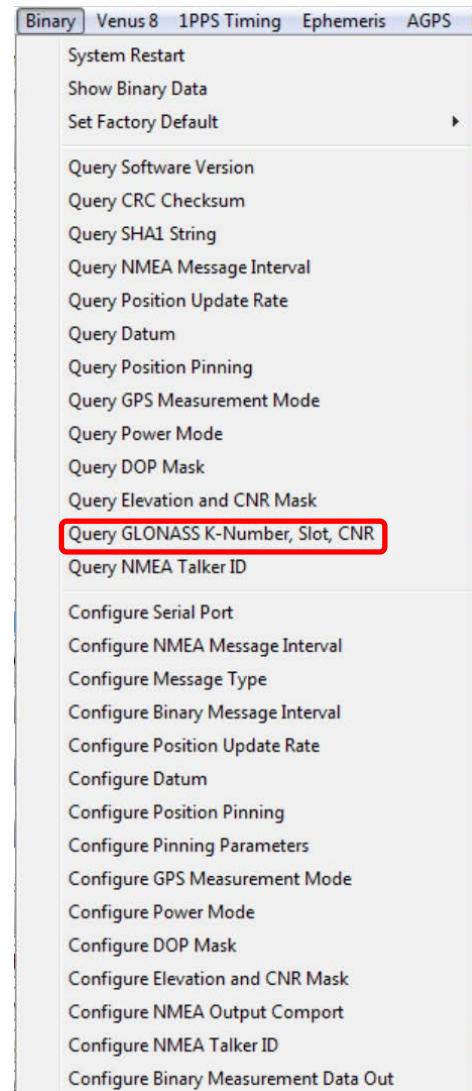


CNR – Carrier-to-noise-ratio – the Signal-to-noise ratio (SNR) of a modulated signal.

Binary – Query GLONASS K-Number, Slot, CNR

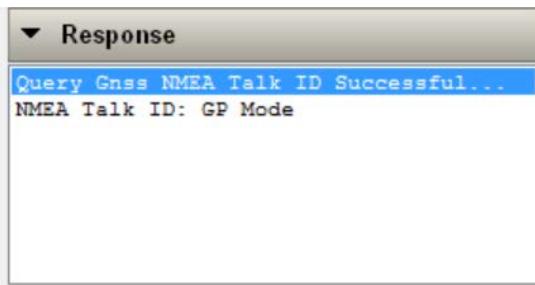
1. Query GLONASS K-Number, Slot, CNR by clicking on "Query GLONASS K-Number, Slot, CNR".
2. GLONASS K-Number, Slot, and CNR will be displayed.

```
Query GLONASS K-Num, Slot, CNR Successf
K-Num=-4, Slot=2, CNR=29
K-Num=-1, Slot=16, CNR=27
K-Num=-3, Slot=18, CNR=26
```

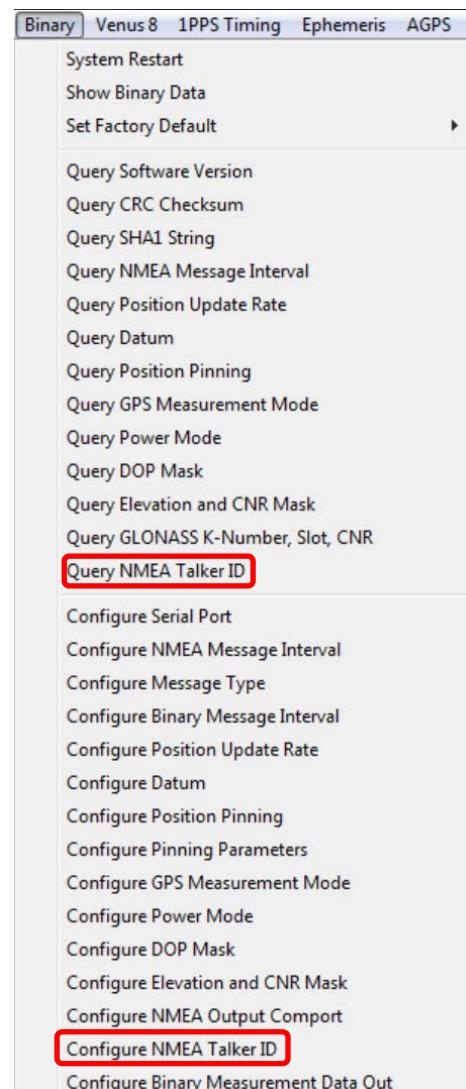
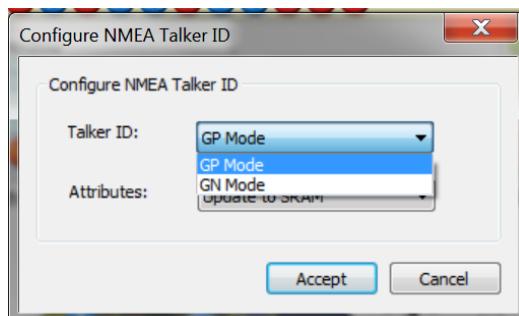


Binary – Query and Configure NMEA Talker ID

1. Query NMEA Talker ID by clicking on “Query NMEA Talker ID”.



2. “GP Mode” or “GN Mode” can be selected by clicking “Configure NMEA Talker ID”.



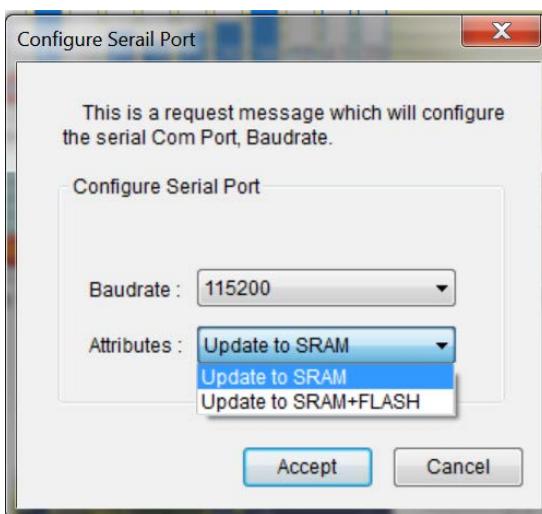
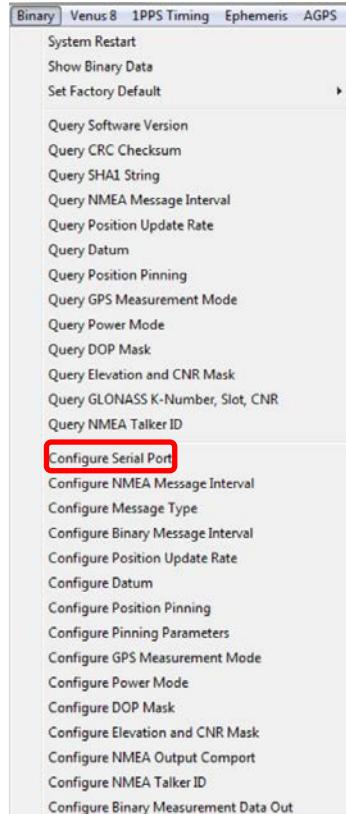
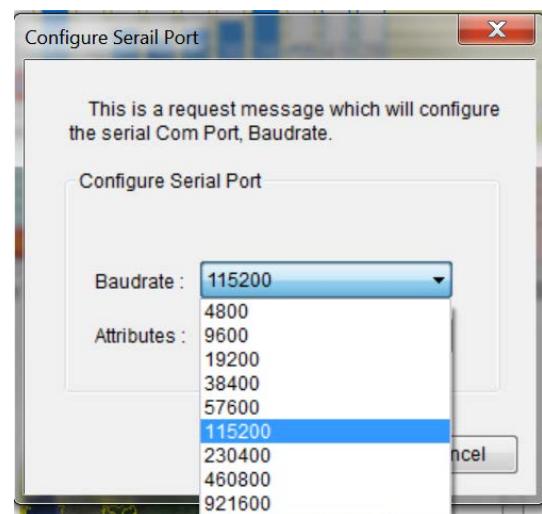
Mode 1 Talker ID GN (default)		Mode 2 Talker ID GP	
\$GNGGA	Time, position, and fix related data of the receiver.	\$GPGLL	Time, position, and fix related data of the receiver.
\$GNGLL	Position, time and fix status.	\$GPGLL	Position, time and fix status.
\$GNGSA \$GPGSA \$GLGSA	Used to represent the ID's of satellites which are used for position fix. When both GPS and GLONASS satellites are used in position solution, a \$GNGSA sentence is used for GPS satellites and another \$GNGSA sentence is used for GLONASS satellites. When only GPS satellites are used for position fix, a single \$GPGLL sentence is output. When only GLONASS satellites are used, a single \$GLGSA sentence is output.	\$GPGLS \$GLGSA	Used to represent the ID's of satellites which are used for position fix. When GPS satellites are used for position fix, \$GPGLL sentence is output. When GLONASS satellites are used for position fix, \$GLGSA sentence is output.
\$GPGSV \$GLGSV	Satellite information about elevation, azimuth and CNR. \$GPGSV is used for GPS satellites, while \$GLGSV is used for GLONASS satellites	\$GPGLS \$GLGSA	Satellite information about elevation, azimuth and CNR. \$GPGLS is used for GPS satellites, while \$GLGSA is used for GLONASS satellites
\$GNRMC	Time, date, position, course and speed data.	\$GPGLM	Time, date, position, course and speed data.
\$GNVTG	Course and speed relative to the ground.	\$GPVTG	Course and speed relative to the ground.
\$GNZDA	UTC, day, month and year and time zone.	\$GPZDA	UTC, day, month and year and time zone.

A TALKER is any device that sends data to other devices within this standard. The type of TALKER is identified by a 2-character mnemonic.

GN Mode is GNSS mode, and GN Mode is GPS mode.

Binary – Configure Serial Port

1. Baudrate can be adjusted between 4800 and 921600 by clicking “Configure Serial Port”.
2. Adjust the baudrate and attributes.

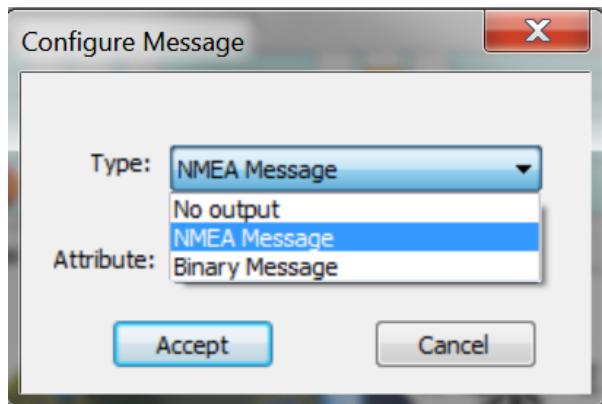


Update to SRAM – update to static random-access memory (the data is volatile – the data will be lost if not powered)

Update to SRAM+FLASH – update to static random-access memory and flash. The data will be preserved by updating to the flash memory.

Binary – Configure Message Type

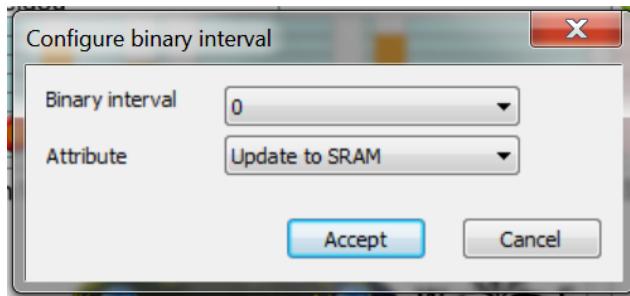
Configure Message Type configures the message type from NMEA, Binary to no output.



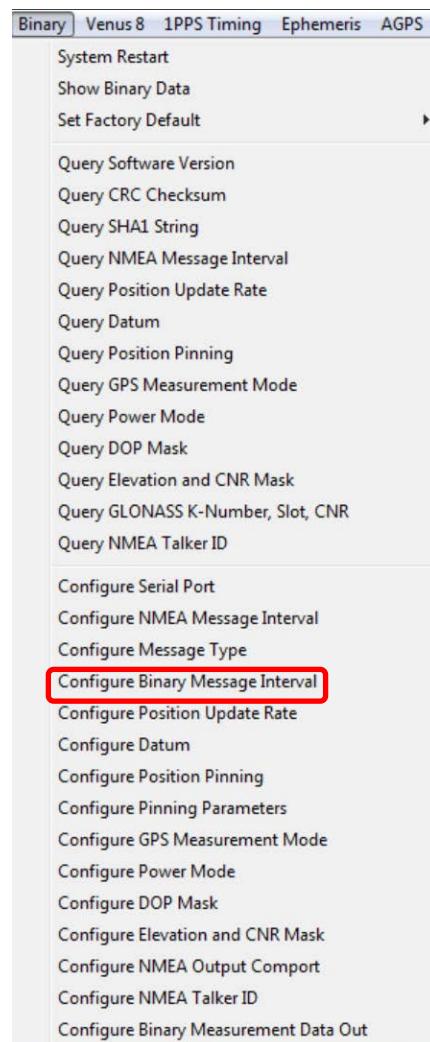
Binary	Venus 8	1PPS Timing	Ephemeris	AGPS
System Restart				
Show Binary Data				
Set Factory Default				
Query Software Version				
Query CRC Checksum				
Query SHA1 String				
Query NMEA Message Interval				
Query Position Update Rate				
Query Datum				
Query Position Pinning				
Query GPS Measurement Mode				
Query Power Mode				
Query DOP Mask				
Query Elevation and CNR Mask				
Query GLONASS K-Number, Slot, CNR				
Query NMEA Talker ID				
Configure Serial Port				
Configure NMEA Message Interval				
Configure Message Type				

Binary – Configure Binary Message Interval

1. Binary Interval can be adjusted between 0 and 255 by clicking “Configure Binary Message Interval”.
2. Set binary interval and attribute.



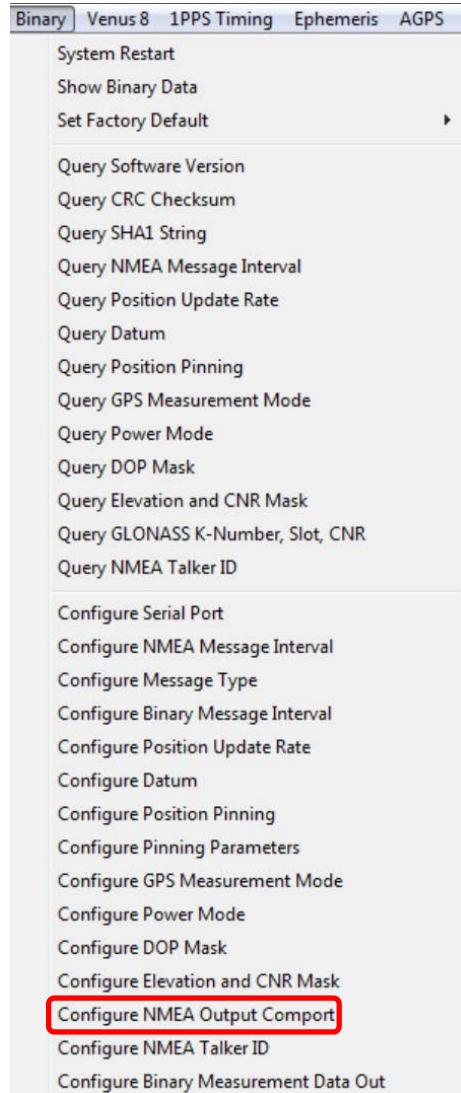
Binary Interval unit = seconds



Binary – Configure NMEA Output Comport

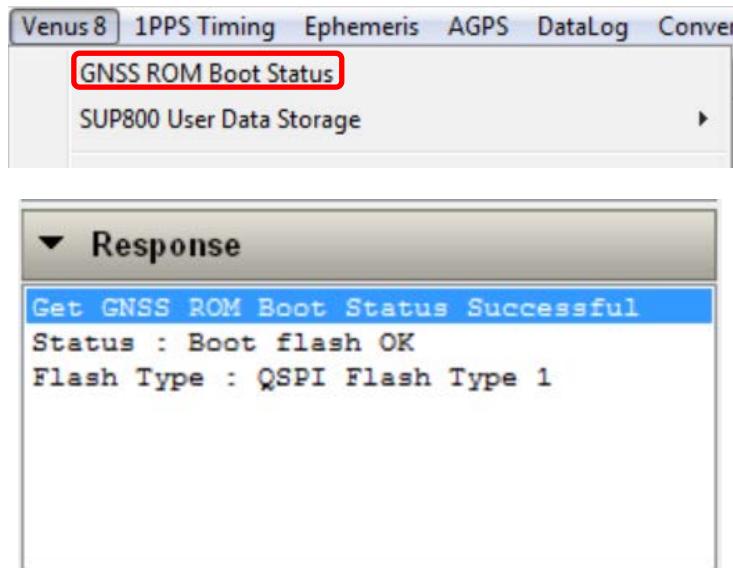
1. “COM0” or “COM1” can be selected to output NMEA by clicking “Configure NMEA Output Comport.”

Warning: Wrong configuration will cause NO RESPONSE of the GNSS receiver!

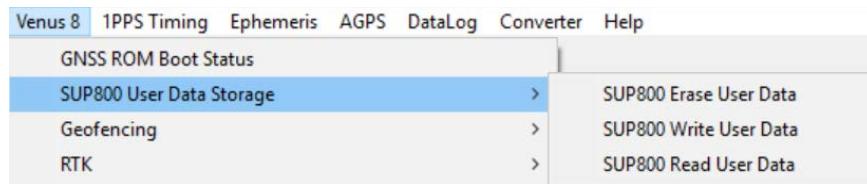


Venus8 – GNSS ROM Boot Status

ROM boot status can be checked by clicking “GNSS ROM Boot Status,” including “Status” and “Flash Type”.

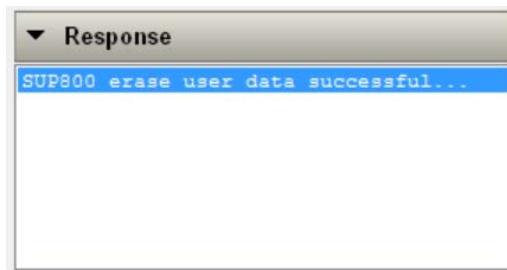


Venus8 – SUP800 User Data Storage



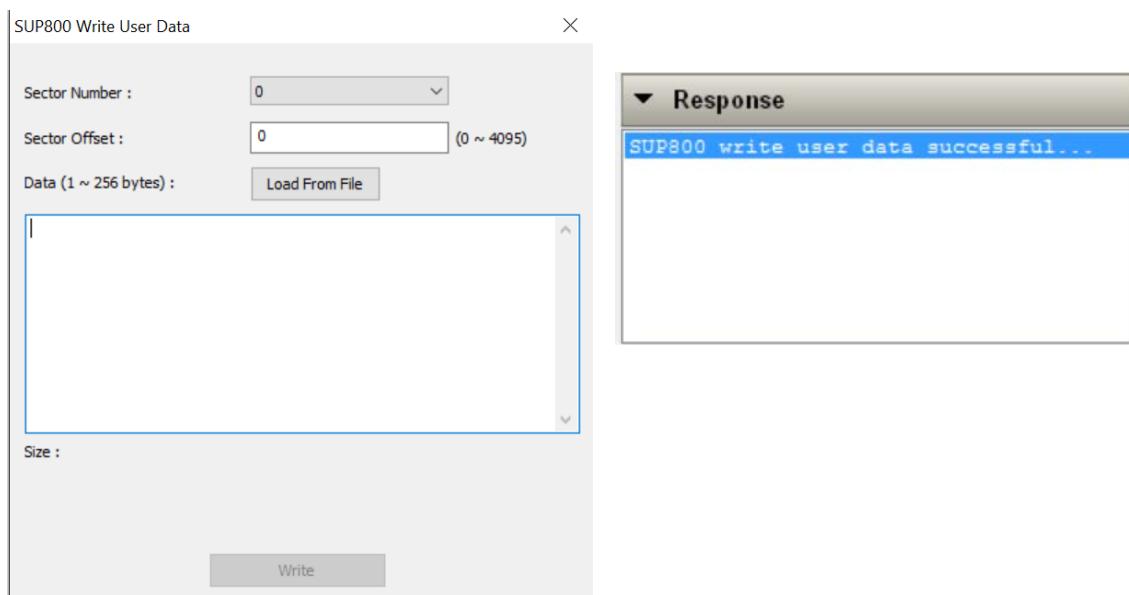
SUP800 Erase User Data

This is a request message which will erase SPI flash sector of SUP800. This command is issued from the host to GNSS receiver and GNSS receiver should respond with an ACK or NACK.



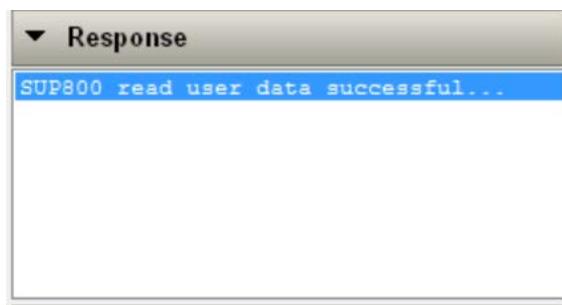
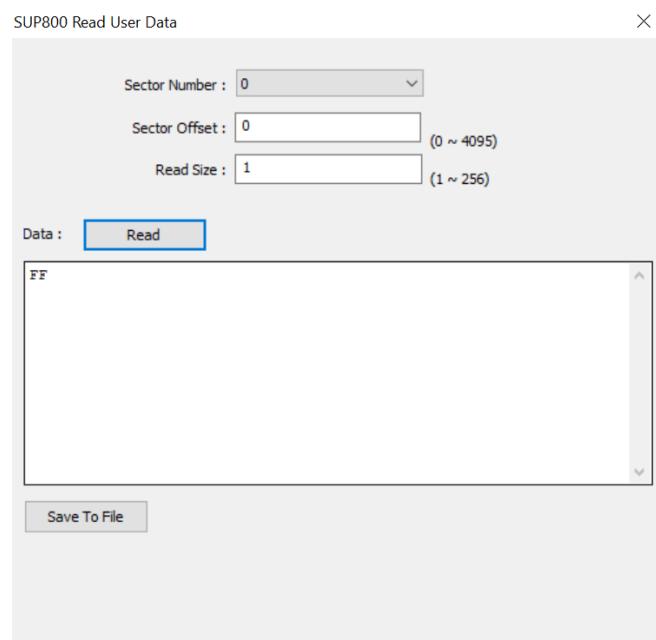
SUP800 Write User Data

This is a request message which will write user data to SPI flash of SUP800. This command is issued from the host to GNSS receiver and GNSS receiver should respond with an ACK or NACK. If the data area is not empty before write, the respond will be a NACK. The user has to provide the sector number, offset and number of bytes to write to the input command.

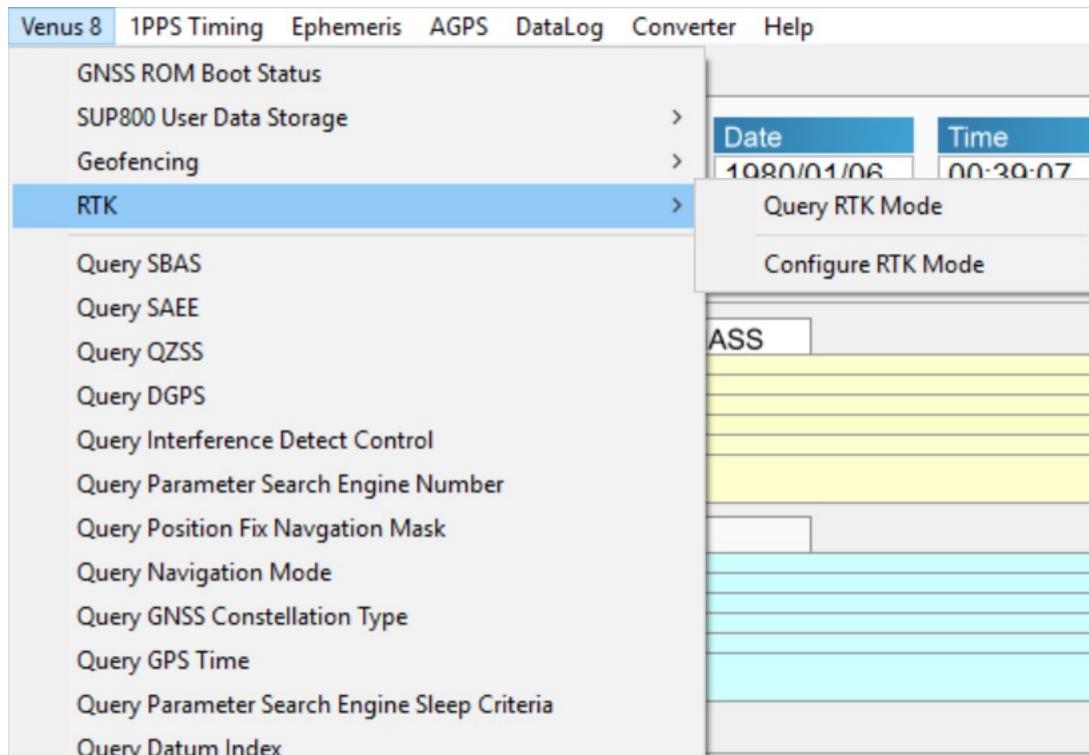


SUP800 Read User Data

This is a request message which will read user data from SPI flash of SUP800. This command is issued from the host to GNSS receiver and the GNSS receiver should respond with an ACK when succeeded and should respond with an NACK when failed.



Venus8 – Query and Configure RTK Mode



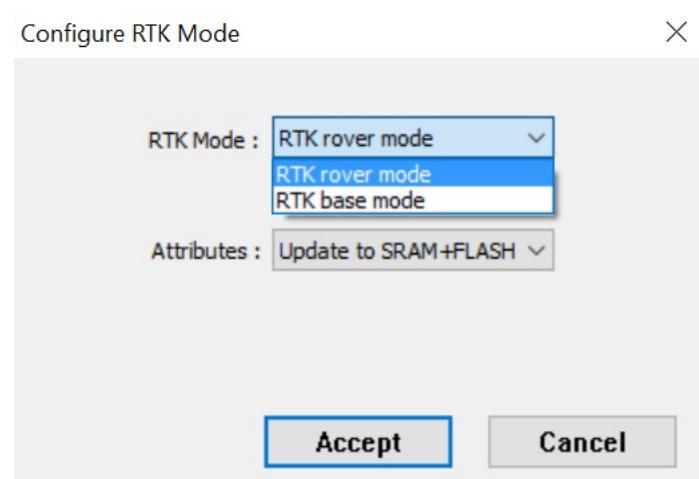
1. Query RTK Mode

RTK base mode or RTK rover mode

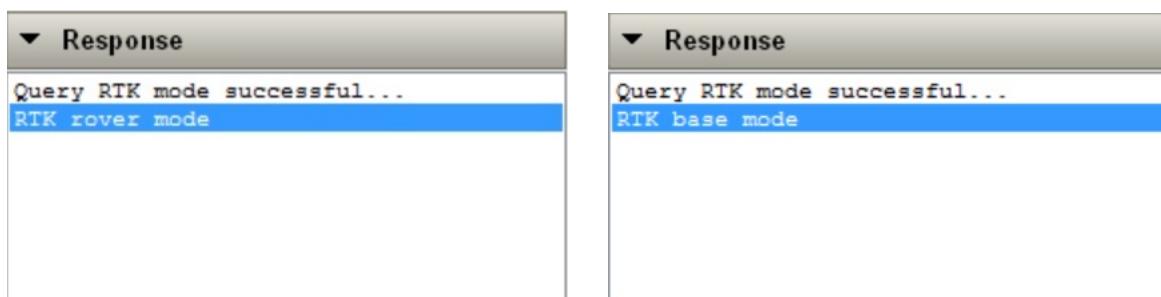
This is a request message which is issued from the host to GNSS receiver to query Real Time Kinematic mode.

The technique is based on the use of carrier measurements and the transmission of corrections from the base station, to the rover, so that the main errors that drive the stand-alone positioning cancel out. A RTK base station covers a service area spreading about 10 kilometers, and a real time communication channel is needed connecting base and rover.

2. Configure RTK Mode

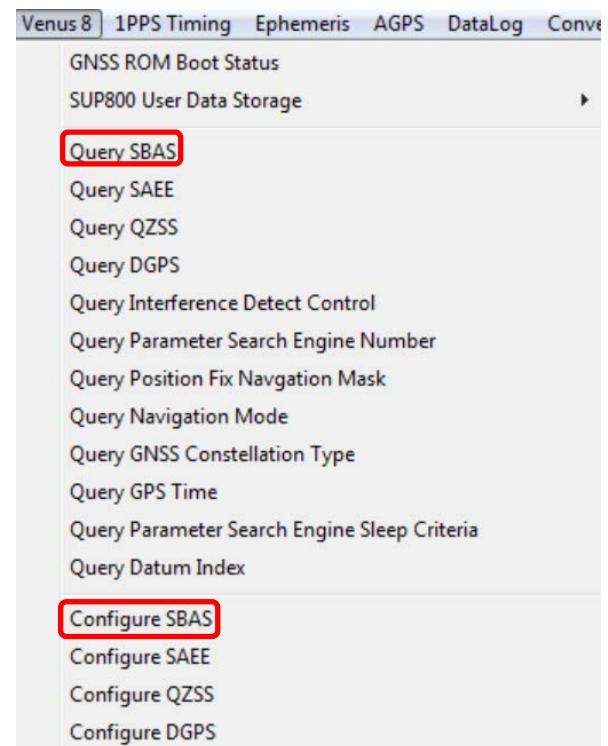
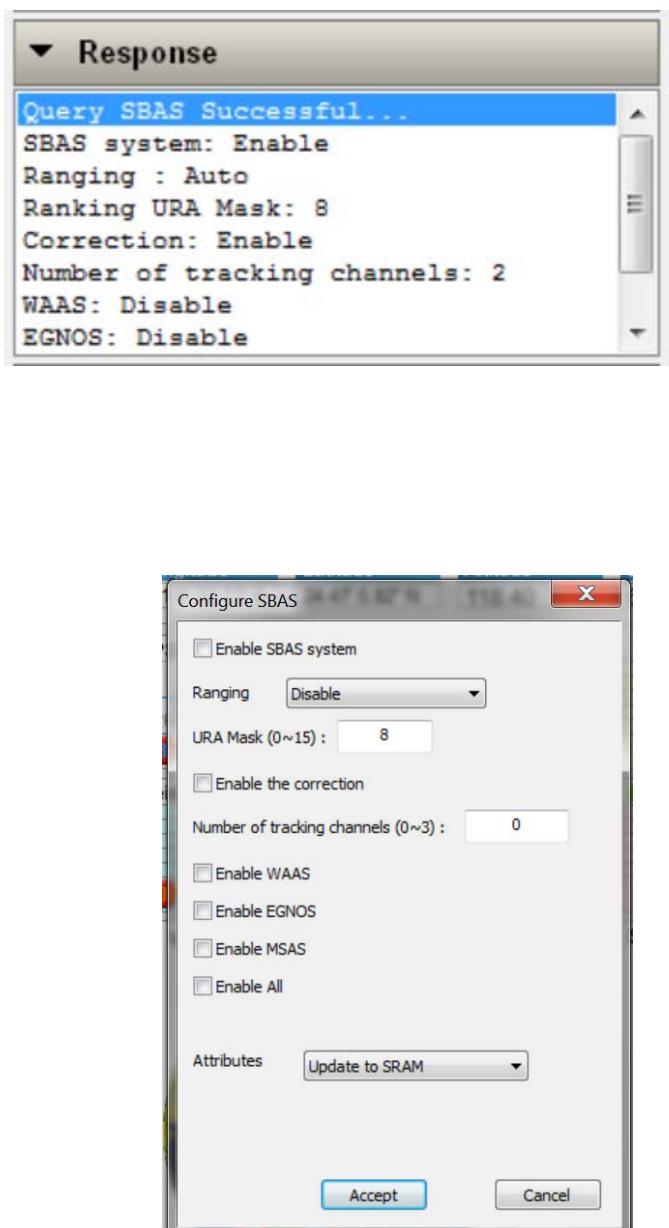


This is a request message which will Real Time Kinematic mode to the GNSS receiver. This command is issued from the host to GNSS receiver.



Venus8 – Query and Configure SBAS

1. Status of Satellite-based augmentation system (SBAS) can be checked by clicking “Query SBAS”, comprising of: “SBAS system”, “Using SBAS satellite for nav.”, “Ranking URA Mask”, “Correction”, “Number of tracking channels”, “WAAS”, “EGNOS”, and “MSAS”.



2. SBAS parameters can be adjusted by clicking “Configure SBAS.”

- **Using SBAS satellite for navigation**

SBAS satellites can be used for position fix by selecting “Using SBAS satellite for navigation.”

- **URA Mask (User Range Accuracy)**

Each SBAS satellite provides User Range Accuracy (URA) to show accuracy of its ephemeris. When URA is 0, the accuracy of the ephemeris is very good. If URA Mask is set to 8, only the SBAS satellites with accuracy of ephemeris better than 8 or equal 8 will be used for position fix, and this means “0 < URA <= 8” in this case.

- **Enable the correction**

Important corrections from SBAS satellites can be used by selecting “Enable the correction”, including ionosphere errors and orbit parameters.

- **Number of tracking channels**

Up to 3 tracking channels can be dedicated to track SBAS satellites.

- **WAAS**

Wide Area Augmentation System (WAAS) is developed by United States to cover North America area.

- **EGNOS**

European Geostationary Navigation Overlay Service (EGNOS) is developed by European Union to cover Europe and part of Africa/America area.

- **MSAS**

Multi-functional Satellite Augmentation System (MSAS) is developed by Japan to cover part of Asia-Pacific area.

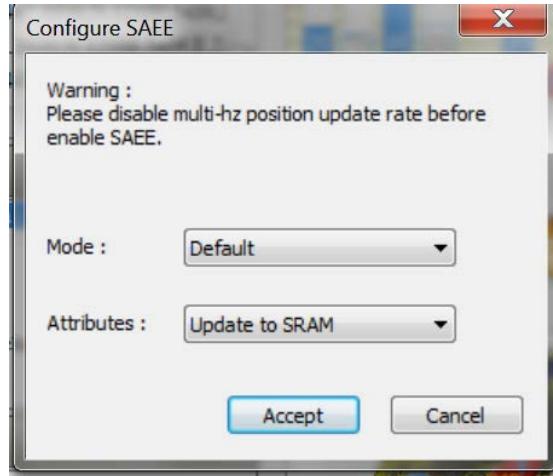
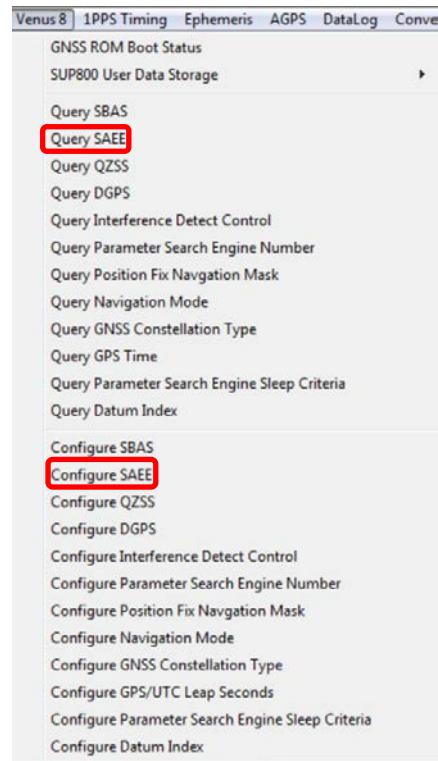
Venus8 – Query and Configure SAEE

1. Status of SAEE (Self-Aided Ephemeris Estimation) can be checked by clicking “Query SAEE.”

Query SAEE Successful...
SAEE System: Disable

2. “Default”, “Enable” or “Disable” can be selected by clicking “Configure SAEE”, and Default mode will properly configure the GNSS receiver.

Warning: Please disable multi-Hz position update rate before enabling SAEE.

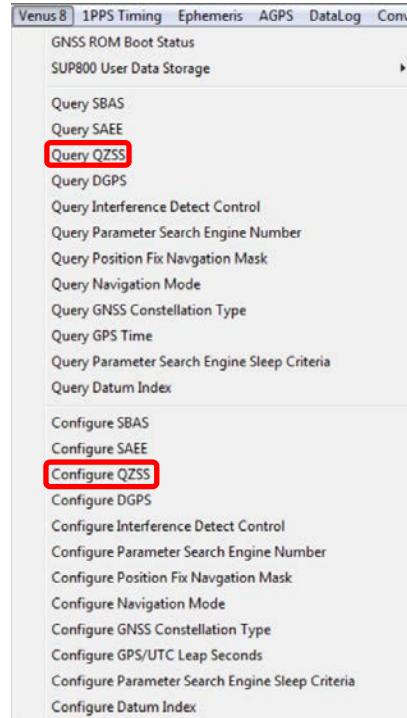
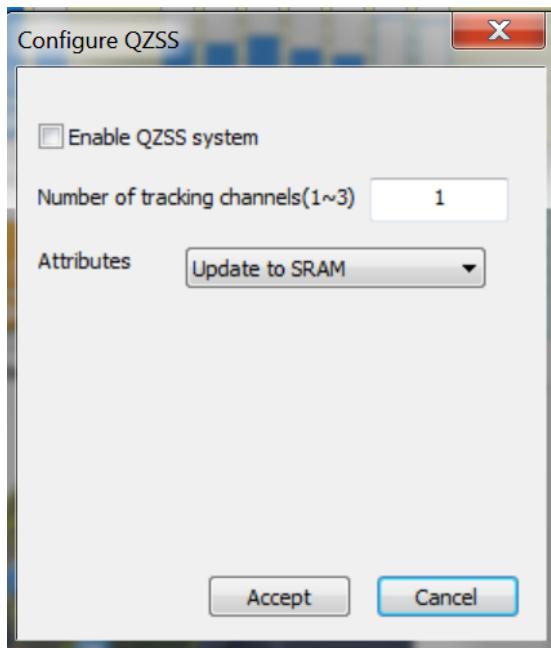


Venus8 – Query and Configure QZSS

1. Status of QZSS can be checked by clicking “Query QZSS.”

Query QZSS Successful...
QZSS System: Enable
Number of Tracking Channels: 1

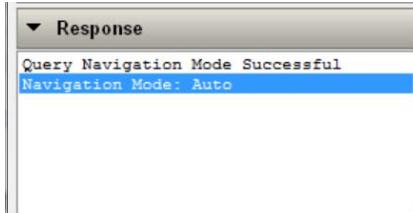
2. “Enable QZSS system” and/or “Number of tracking channels(1~3)” can be adjusted by clicking on “Configure QZSS.”



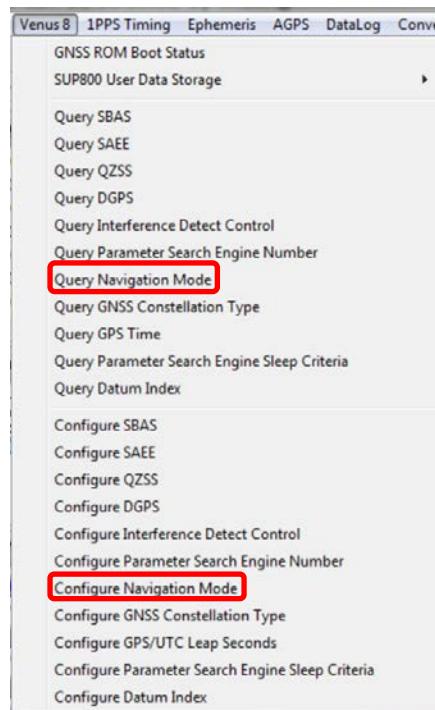
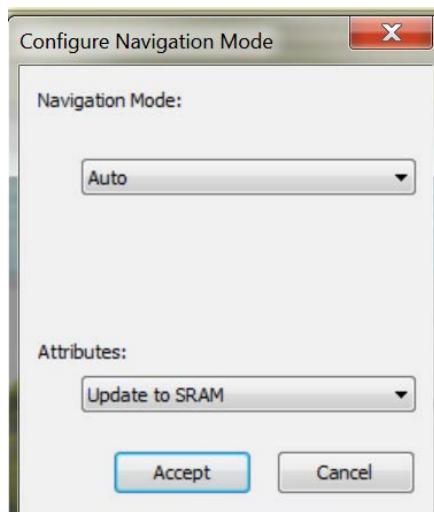
QZSS - Quazi-Zenith Satellite System - SBAS GPS receivable in Japan.

Venus8 – Query and Configure Navigation Mode

1. Navigation Mode can be checked by clicking “Query Navigation Mode”.

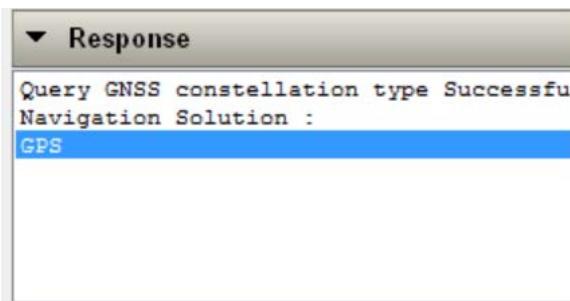


2. Auto, Pedestrian, Car, Marine, Balloon, or Airborne can be selected by clicking “Configure Navigation Mode”, and Auto mode is recommended for general use.

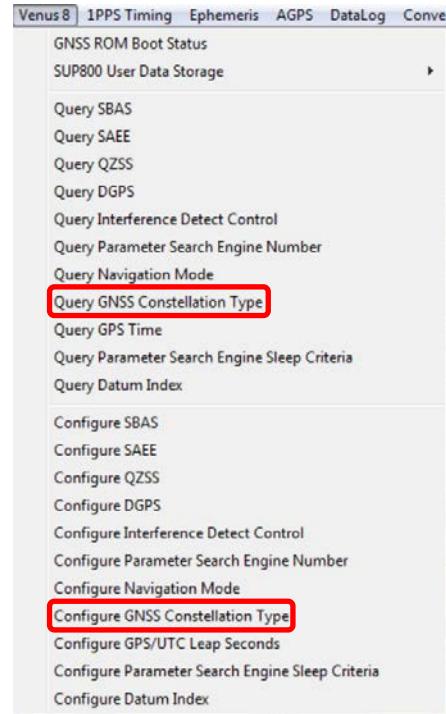
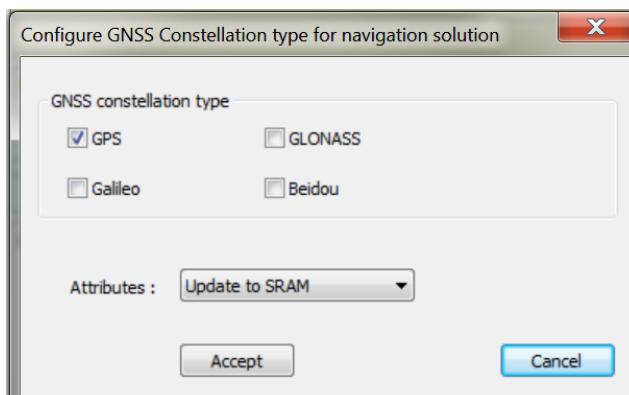


Venus8 – Query and Configure GNSS Constellation Type

1. GNSS Constellation Type for navigation solution can be checked by clicking “Query GNSS Constellation Type”.



2. GPS, GLONASS, Beidou, and/or Galileo can be selected by clicking “Configure GNSS Constellation Type”.

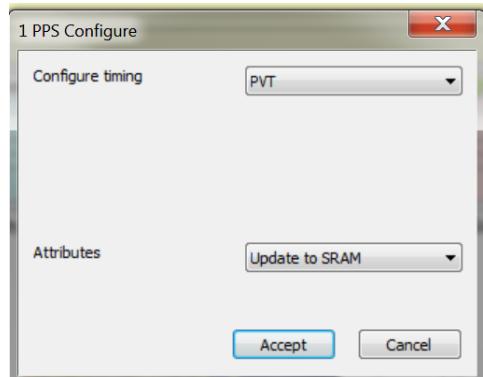


1PPS Timing – Query and Configure Timing

1. Status of Timing can be checked by clicking “Query Timing”, including: “Timing Mode”, “Survey Length”, “Standard deviation”, “Run-time Timing Mode”, and “Run-time Survey Length.”

```
Query Timing Successful...
Timing Mode: Survey Mode
Survey Length: 2000
Standard deviation: 30
Run-time Timing Mode: Survey Mode
Run-time Survey Length: 2000
```

2. PVT, Survey, or Static can be selected by clicking “Configure Timing”.



1PPS Timing Ephemeris AGPS DataLog C
Query Timing
Query Cable Delay
Monitoring 1PPS
Query 1PPS Pulse Width
Query PPS Output Mode
Query 1PPS Frequency Output
Configure Timing
Configure Cable Delay
Configure Proprietary NMEA
Configure 1PPS Pulse Width
Configure 1PPS Output Mode
On Line Assistance
Configure 1PPS Frequency Output

- ***Survey mode***

The GNSS antenna is assumed to stay in a fixed location in Survey mode, and precise position coordinates of the antenna is calculated by averaging the coordinates over specified number of position fixes.

- ***Static mode***

The coordinates of GNSS antenna is provided by a user and assumed to stay in a fixed location in Static mode, and the PPS pulse is output as soon as one satellite position has been determined and at least one satellite is visible.

- **PVT mode**

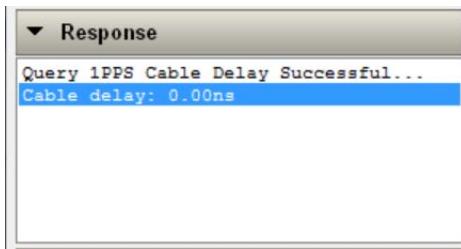
The GNSS antenna coordinate is determined from the latest position fix alone, thus the antenna may have moved during PPS operation to generate worse precision than Static or Survey modes. When the antenna is in motion, the PVT mode requires enough satellites for a valid position fix in order to keep the precision.

- **Modes Switching**

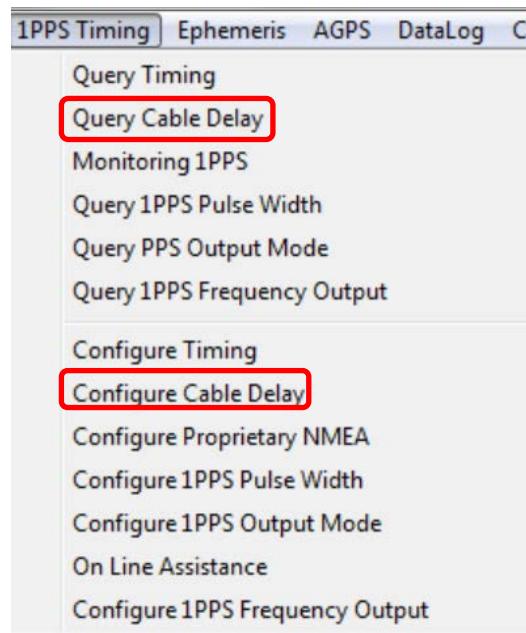
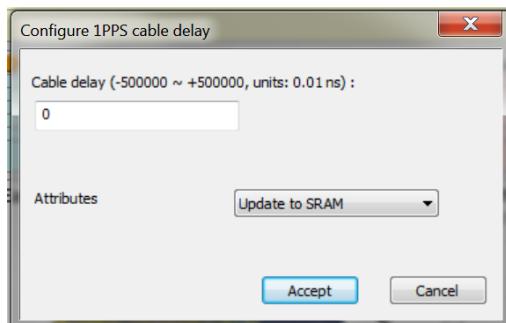
When using Survey Mode, survey length need to be given, the receiver will survey its location for specified number of position fixes, and then change to Static Mode, such that precision 1PPS will still be generated with 1 satellite in view. However, if standard deviation user configured is larger than standard deviation after survey time, the 1PPS timing mode will remain at survey mode.

1PPS Timing – Query and Configure Cable Delay

1. Cable Delay can be checked by clicking “Query Cable Delay”.



2. Cable Delay can be adjusted between -500000 and +500000 (unit: 0.01ns) by clicking “Configure Cable Delay”.

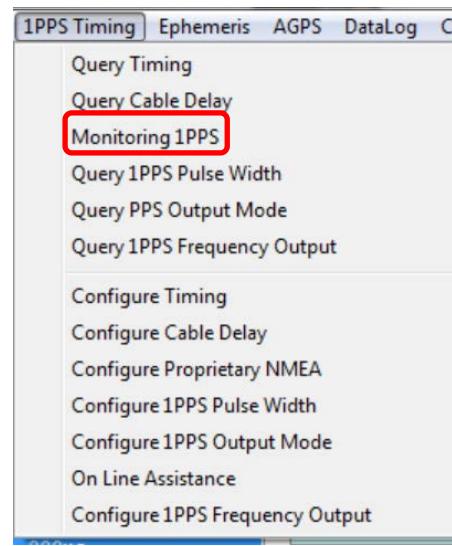
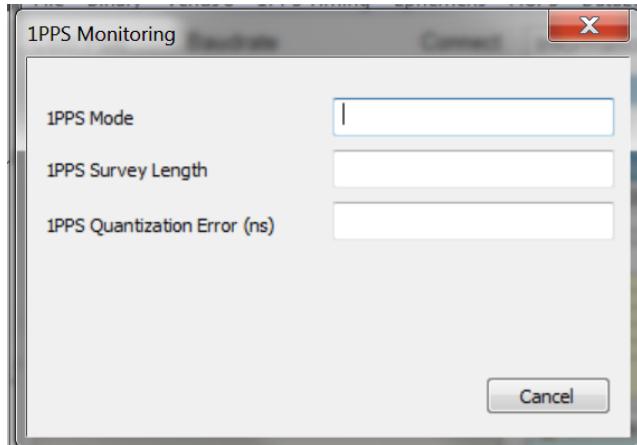


- **Cable Delay**

1PPS signal delay due to the cable between antenna and receiver. For example, the GNSS receiver can output the PPS pulse 50 ns earlier than usual, corresponding to a 10 meters long antenna cable.

1PPS Timing – Monitoring 1PPS

Status of 1PPS can be checked by clicking “Monitoring 1PPS”, including: “1PPS Mode”, “1PPS Survey Length”, and “1PPS Quantization Error (ns)”.

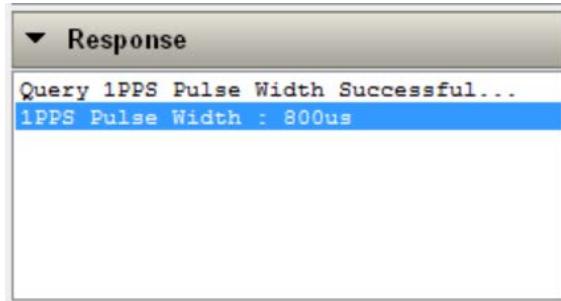


- **1PPS Quantization Error (ns)**

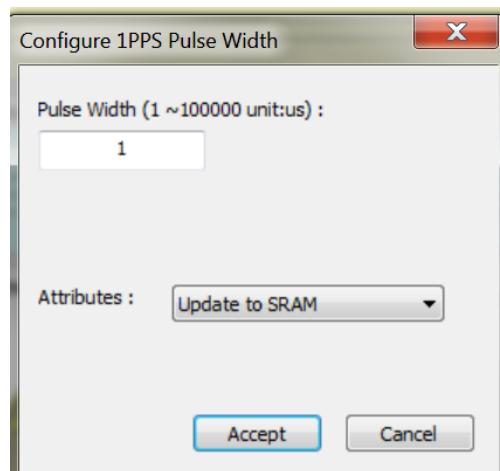
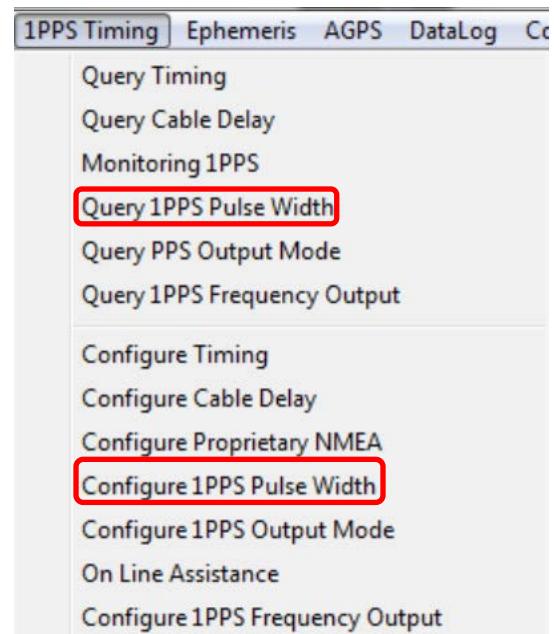
By steering 1PPS output rising edge closest to UTC second, there remains a quantization error of half clock period, such as +/-8nsec, and this information can be used to reduce the effective amount of jitter on 1PPS output.

1PPS Timing – Query and Configure 1PPS Pulse Width

1. 1PPS Pulse Width can be checked by clicking “Query 1PPS Pulse Width”.



2. 1PPS Pulse Width can be adjusted between 1 ~ 100000 (unit: us) by clicking “Configure 1PPS Pulse Width”.



- **Pulse Width**

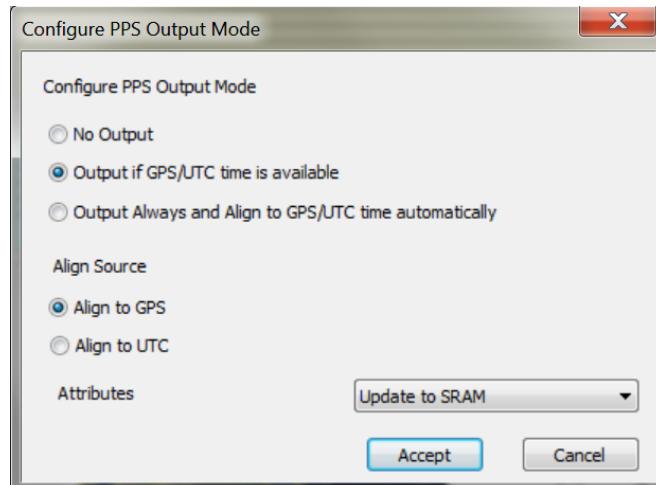
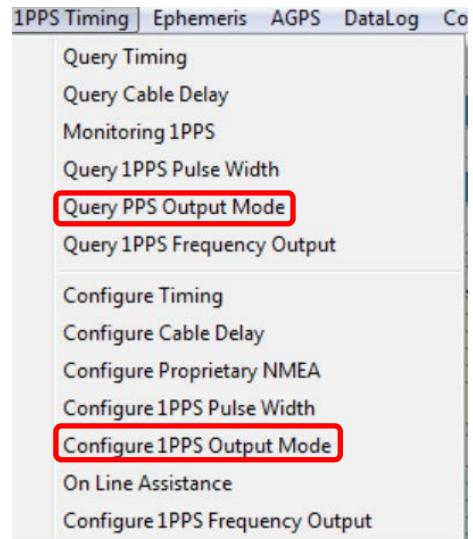
Duration of the time pulse is 1PPS pulse width (time period between rising and falling edge).

1PPS Timing – Query and Configure PPS Output Mode

1. Status of PPS Output Mode can be checked by clicking “Query PPS Output Mode”, including: “PPS Output If GPS/UTC time is available” and “Align to GPS time”

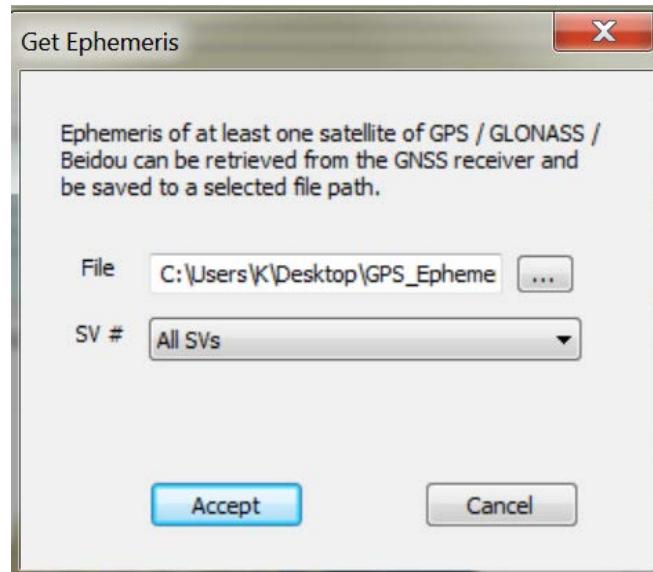
```
Query 1PPS Output Successful...
PPS Output if GPS/UTC time is available
Align to GPS time
```

2. “No Output”, “Output If GPS/UTC time is available”, “Output Always and Align to GPS/UTC time automatically”, “Align to GPS”, or “Align to UTC” can be selected by clicking “Configure PPS Output Mode”.



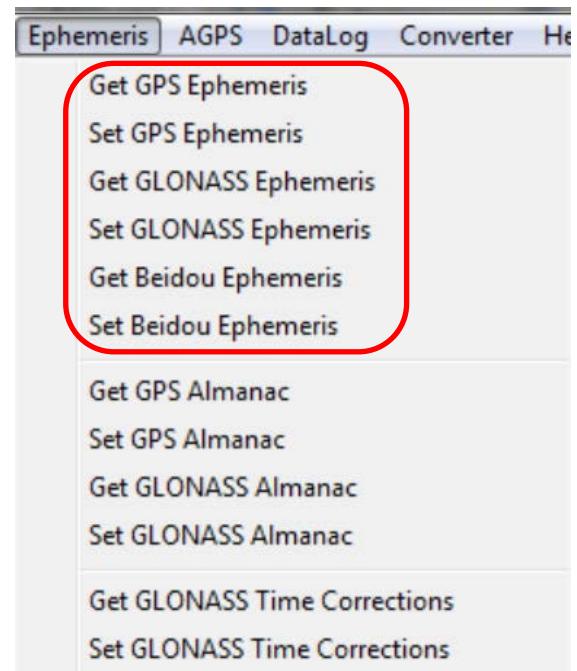
Ephemeris – Get and Set Ephemeris

1. Ephemeris of at least one satellite of GPS/GLONASS/Beidou can be retrieved from the GNSS receiver and be saved to a selected file path by clicking “Get GPS/GLONASS/Beidou Ephemeris.”



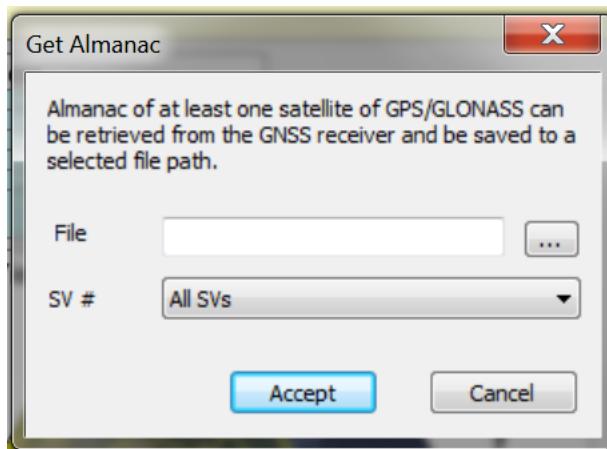
2. Selected ephemeris with .log suffix can be set onto the GNSS receiver by clicking “Set GPS/GLONASS/Beidou Ephemeris”. Please note ephemeris of different satellite systems is not compatible.

Ephemeris – Gives the positions of naturally occurring astronomical objects as well as artificial satellites in the sky at a given time or times.



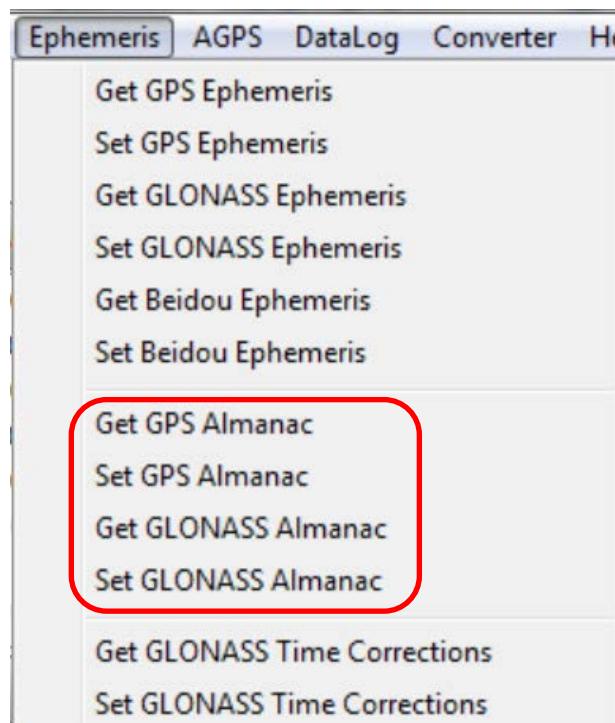
Ephemeris – Get and Set Almanac

1. Almanac of at least one satellite of GPS/GLONASS can be retrieved from the GNSS receiver and be saved to a selected file path by clicking “Get GPS/GLONASS Almanac”.



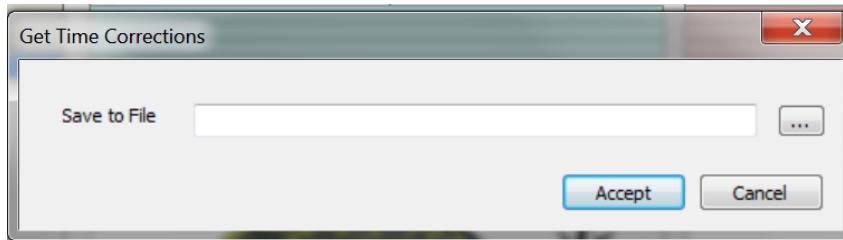
2. Selected almanac with .log suffix can be set onto the GNSS receiver by clicking “Set GPS/GLONASS Almanac”. Please note almanac of different satellite systems is not compatible.

Almanac – Consists of coarse orbit and status info for each satellite in the constellation.

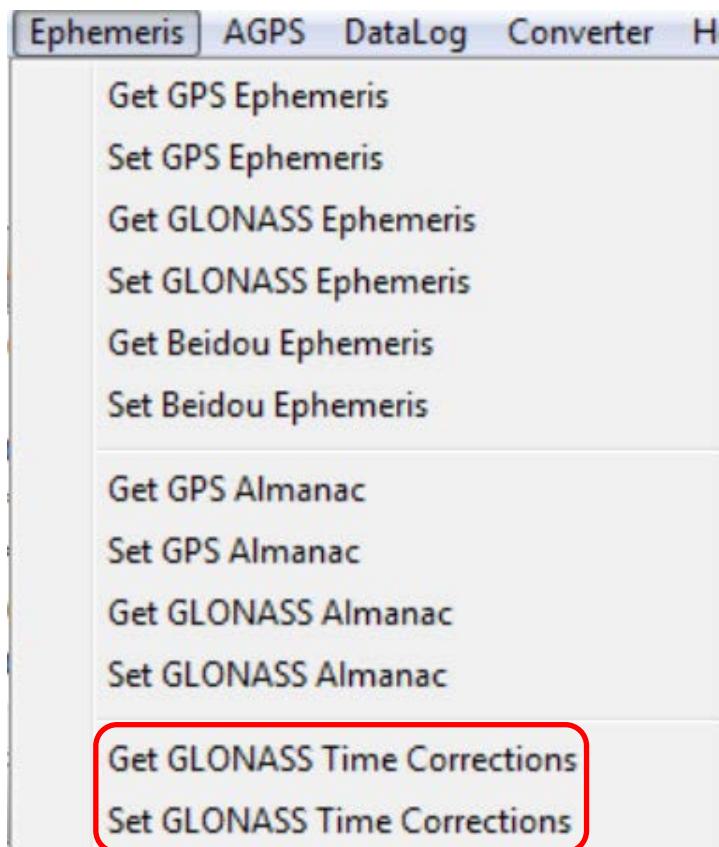


Ephemeris – Get and Set GLONASS Time Corrections

1. GLONASS Time Corrections for faster TTFF can be retrieved from the GNSS receiver and be saved to a selected file path by clicking “Get GLONASS Time Corrections”.

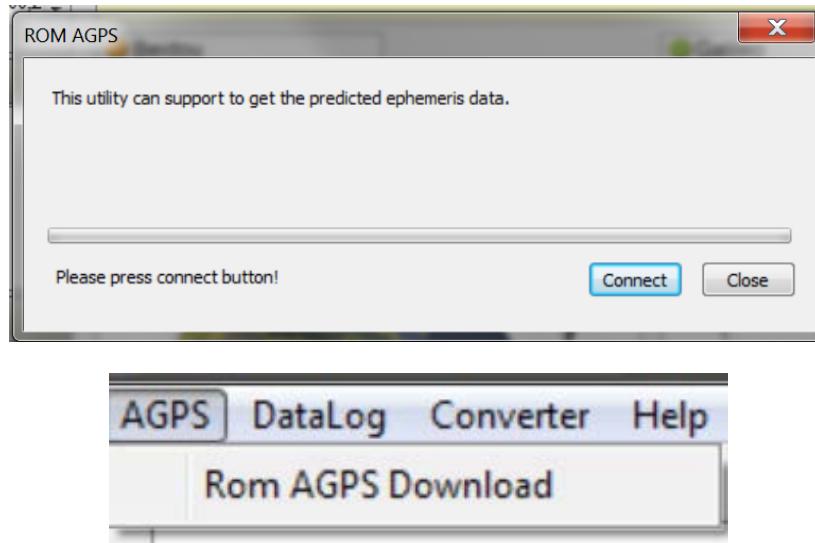


2. Selected GLONASS Time Corrections can be set into the GNSS receiver by clicking “Set GLONASS Time Corrections”.



AGPS – ROM AGPS Download

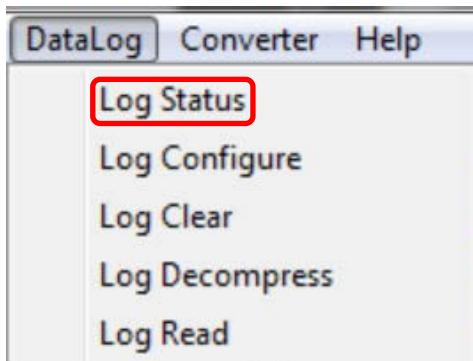
1. Current 4-hour ephemeris can be obtained from SkyTraq FTP server and be set to the GNSS receiver to speed up position fix by clicking “ROM AGPS Download.” Current time, date, longitude and latitude will be used for the requested ephemeris.



DataLog – Log Status

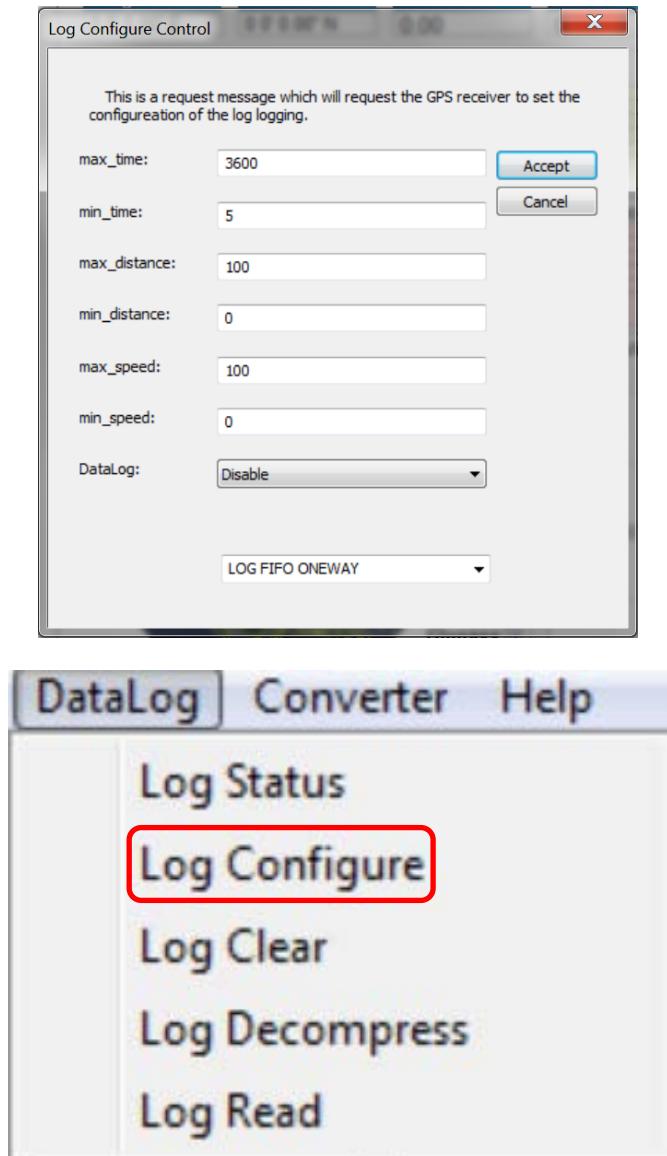
Log Status can be checked by clicking “Log Status”, including: “Sector left”, “max T”, “max D”, and “max V”.

```
Get Log Status Successful...
----- Log Status -----
Sector left: 429 / 509
max T: 3600, min T: 5
max D: 100, min D: 0
max V: 100, min V: 0
Datalog: Enable
```



DataLog – Log Configure

1. Max_time, min_time, max_distance, min_distance, max_speed, and/or min_speed can be adjusted by clicking “Log Configure”.



- **Sector left**

Available storage space in the GNSS receiver can be used for logging data.

- **Time difference**

The difference between time of current fix and time of last stored position fix is Time difference.

- **Distance difference**

The difference between current fix and last stored position fix in ECEF is Distance difference.

- **max_time (max T)**

The GNSS receiver will log current fix if Time difference exceeds max_time threshold.

- **max_distance (max D)**

The GNSS receiver will log current fix if distance difference exceeds max_distance threshold.

- **max_speed (max V)**

The GNSS receiver will log current fix if current speed exceeds max_speed threshold.

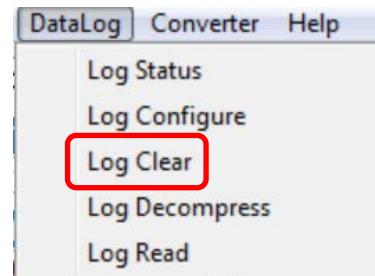
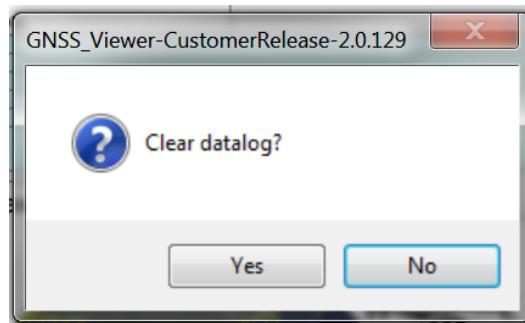
- **min_time (min T), min_distance (min D), min_speed (min V)**

The GNSS receiver will log current fix when Time difference exceeds min_time

threshold, Distance difference exceeds>equals min_distance threshold, and current speed exceeds>equals min_speed threshold

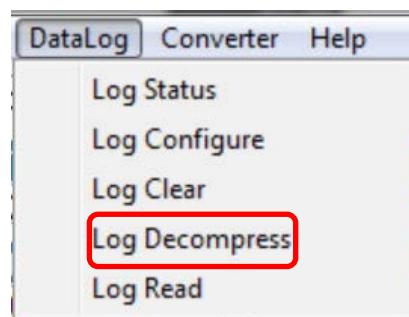
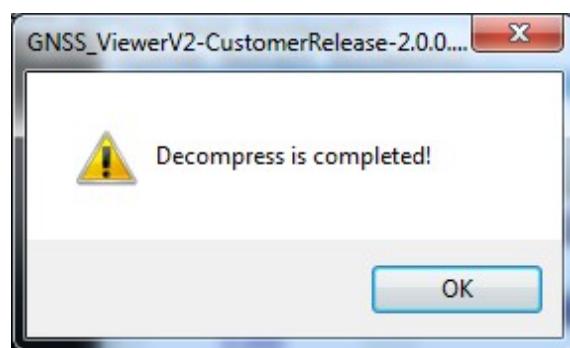
DataLog – Log Clear

Log data can be deleted by clicking “Log Clear”.



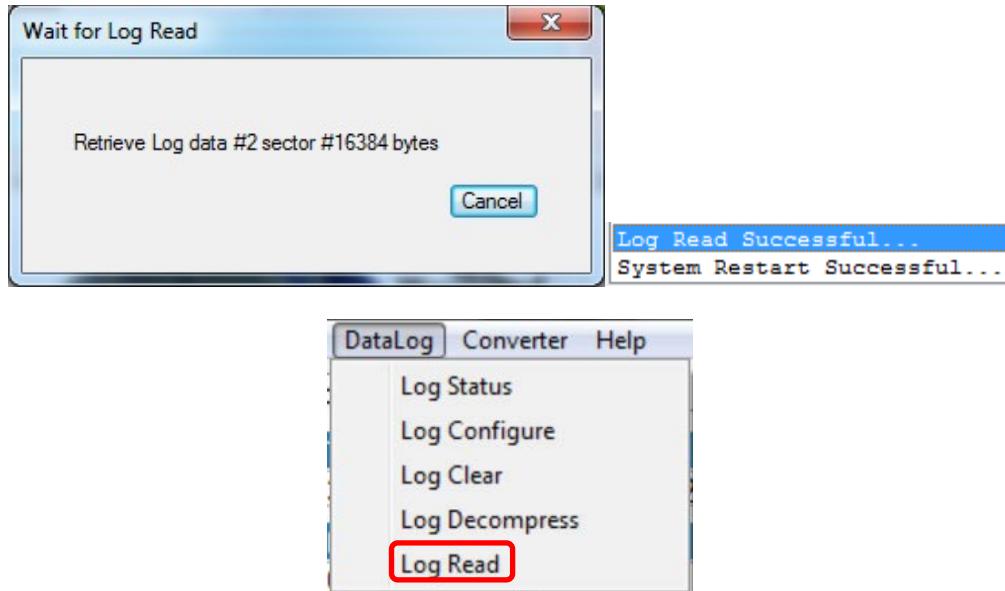
DataLog – Log Decompress

1. Log data file with .log suffix can be converted to .kml and .logg format by clicking “Log Decompress.” If log points exceed 65000, at least two .kml file will be generated, such as *0.kml, *1.kml, and *2.kml.
2. .log is a binary format, .kml can be opened by Google Earth, and .logg can be opened by Notepad.



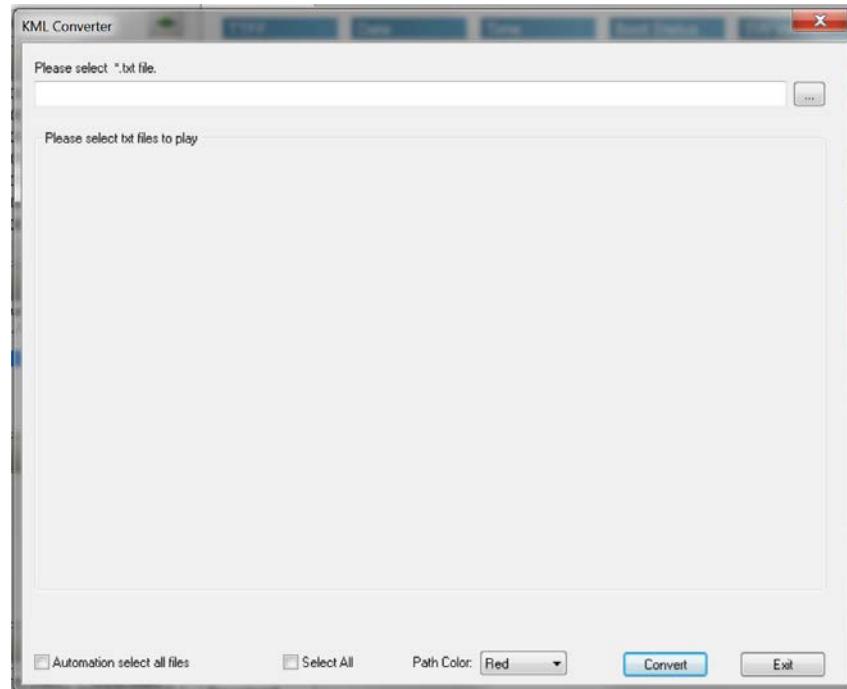
DataLog – Log Read

Log data can be retrieved from the GNSS receiver and be saved with .log suffix in binary format by clicking “Log Read”.

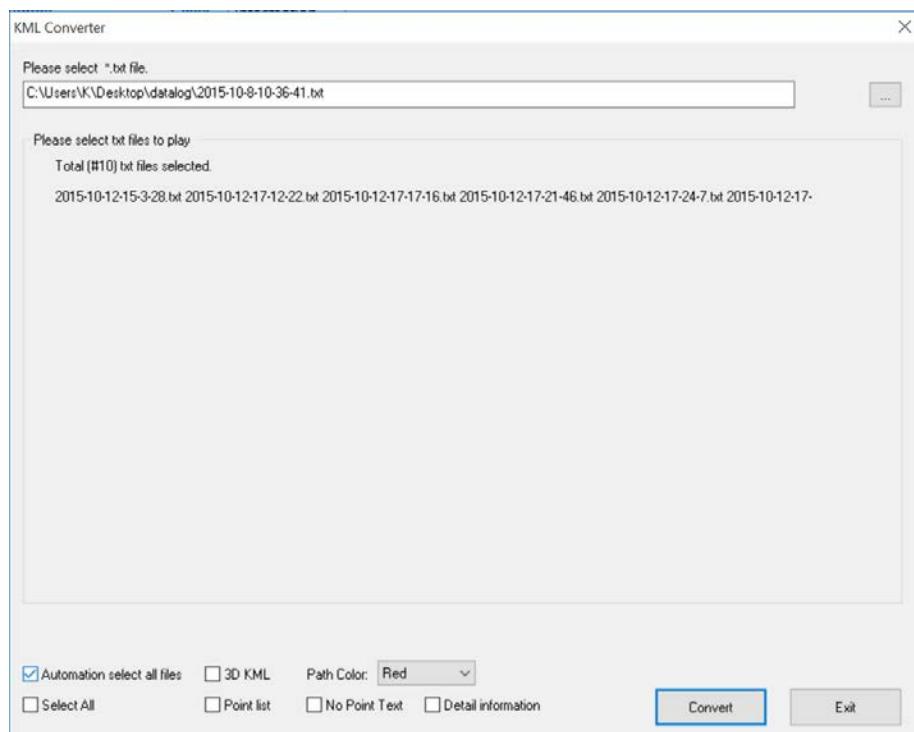


Converter – KML

A NMEA file in *.txt format can be converted to *.kml format by clicking “KML”.



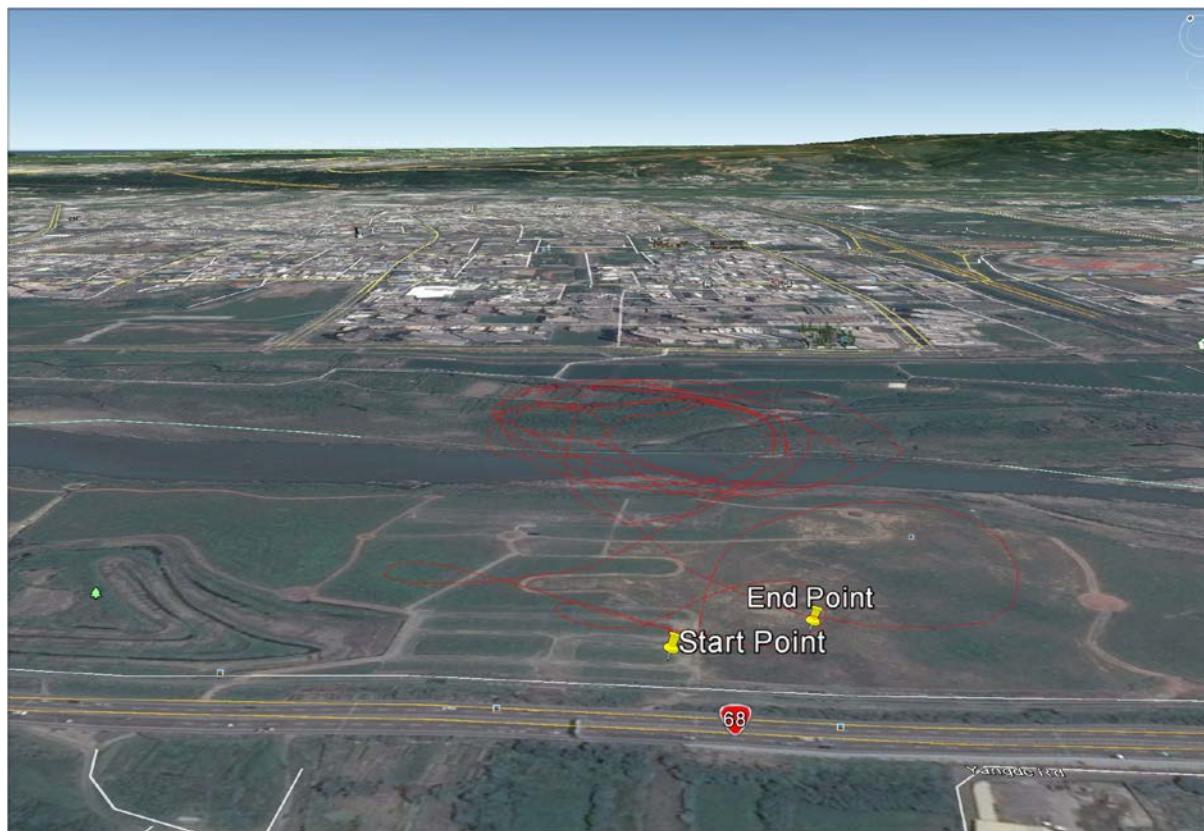
Automation select all files>Select All – Select all files



Without 3D KML



With 3D KML



Without point list



With point list



Without no point text



With no point text



With detailed information



Change Log

Version 0.2, December 23, 2015

Added Venus 8 – Query and Configure RTK Mode

Added Venus 8 – SUP800 User Data Storage

Added KML options

Version 0.1, March 19, 2015

Initial Release

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