ST-1612-DG/B Evaluation Kits
Quick Guide

V 1.0

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LOCOSYS

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Part I. Prepare for Evaluation

> **Introduction**

ST-1612-DG/B evaluation kits combine with dead reckoning (DR) GNSS module and OBD-II Cable accomplished the high performance positioning module easy and simple.

> **ST-1612-DG/B Evaluation Board Diagram**

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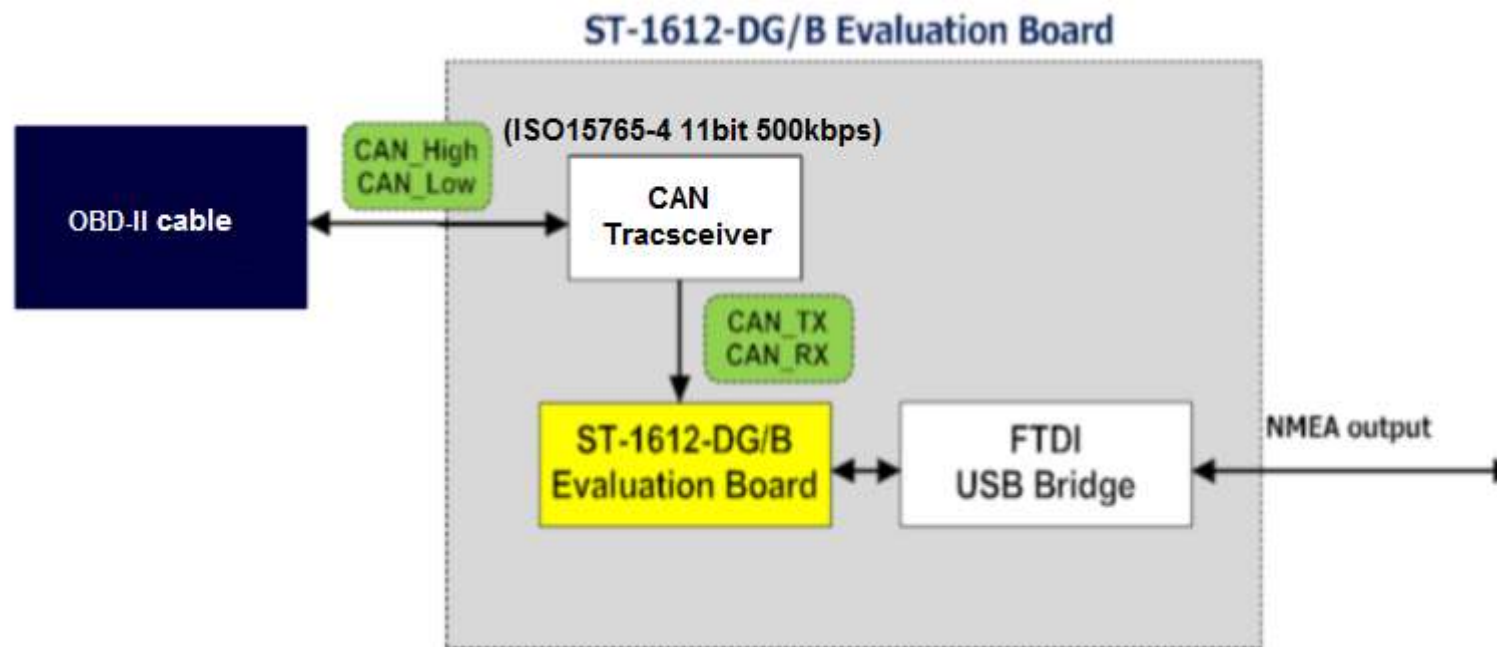
➤ **What you can find in the Evaluation Kits?**

A. Evaluation Board (EVB)

B. USB Cable

C. GNSS Antenna

D. OBD-II Cable

OBD-II supported
- **ISO 15765-4 CAN Bus**
  (500kbps,11bit)

➢ Board Description

5.
PPS LED:
blue light; the LED starts flashing one pulse per second during GNSS module is position fixed.

4.
GNSS Transceiver LED (GTX):
green light

3.
FTDI FT230X USB Bridge:
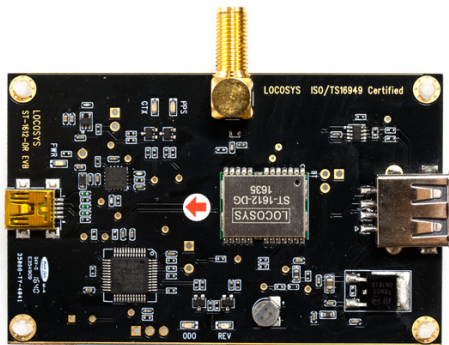the USB driver can be found in Part II.

6.
SMA RF Connector:
to connect GNSS active antenna.

2.
Power LED (PWR):
red light

7.
ST-1612 DG/B Module:
follow the red arrow mark to vehicle forward direction.

1.
Mini USB Connector:
to PC, NMEA output

8.
USB type A Connector:
to OBD-II Cable.

Part II. Installing for USB driver

- **System Requirements:**

You will need…

- A computer running one of the following Microsoft operating systems:

- Windows 7
- Windows Vista
- Windows XP with Service Pack3

- A free USB port on the computer

- Internet access

➢ Install FTDI USB Driver

FTDI USB driver download: http://www.ftdichip/Drivers/VCP.htm

When plugging in module on your laptop, your host pc will pop out a notice and shows "find a new hardware device", get into Device Manager and find "FT230X Basic UART", click right to start update driver software.
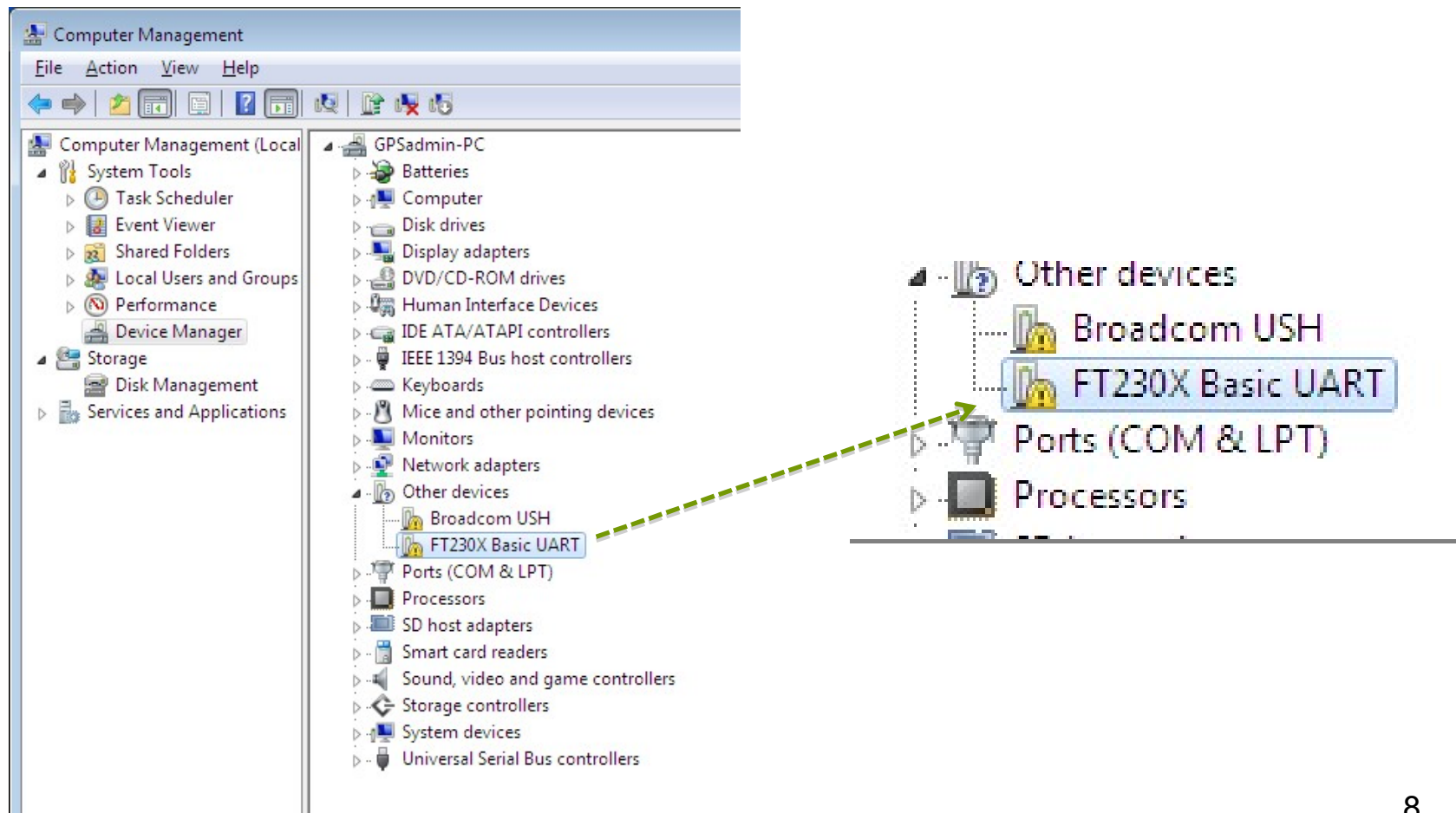
After complete the installation of USB Driver, a new USB comport will be founded as followed.
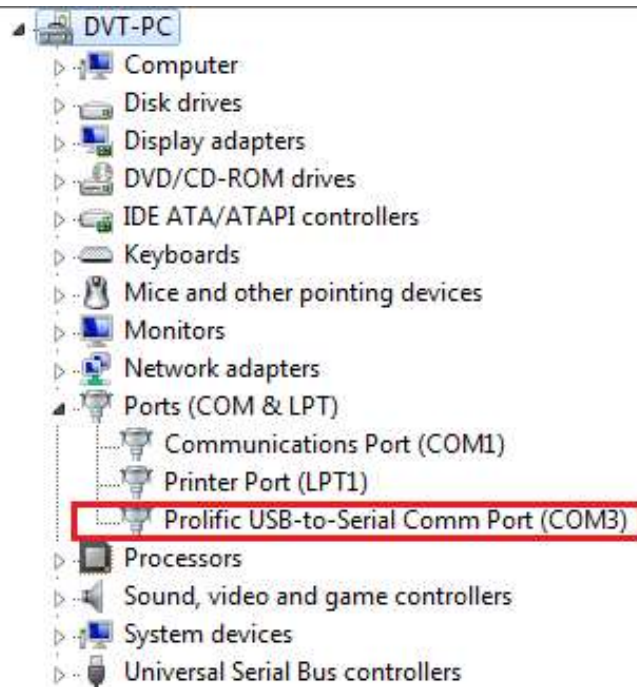
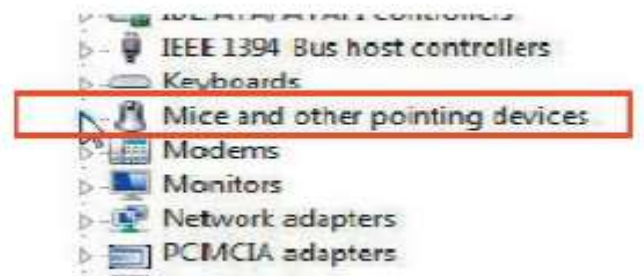# ➢ Disabling the Microsoft serial ballpoint driver

If the mouse pointer jumps around on the screen, check the system tray to see if the Microsoft serial ballpoint (mouse pointer) device has been enabled. If this is the case, do The following to disable it:

1. Unplugging USB connector on your laptop to stop the pointer jumping.
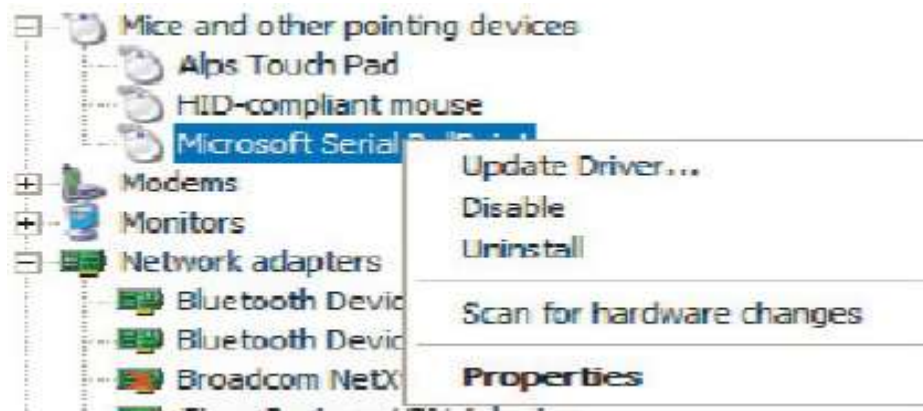
2. On the computer, open the Device Manager:
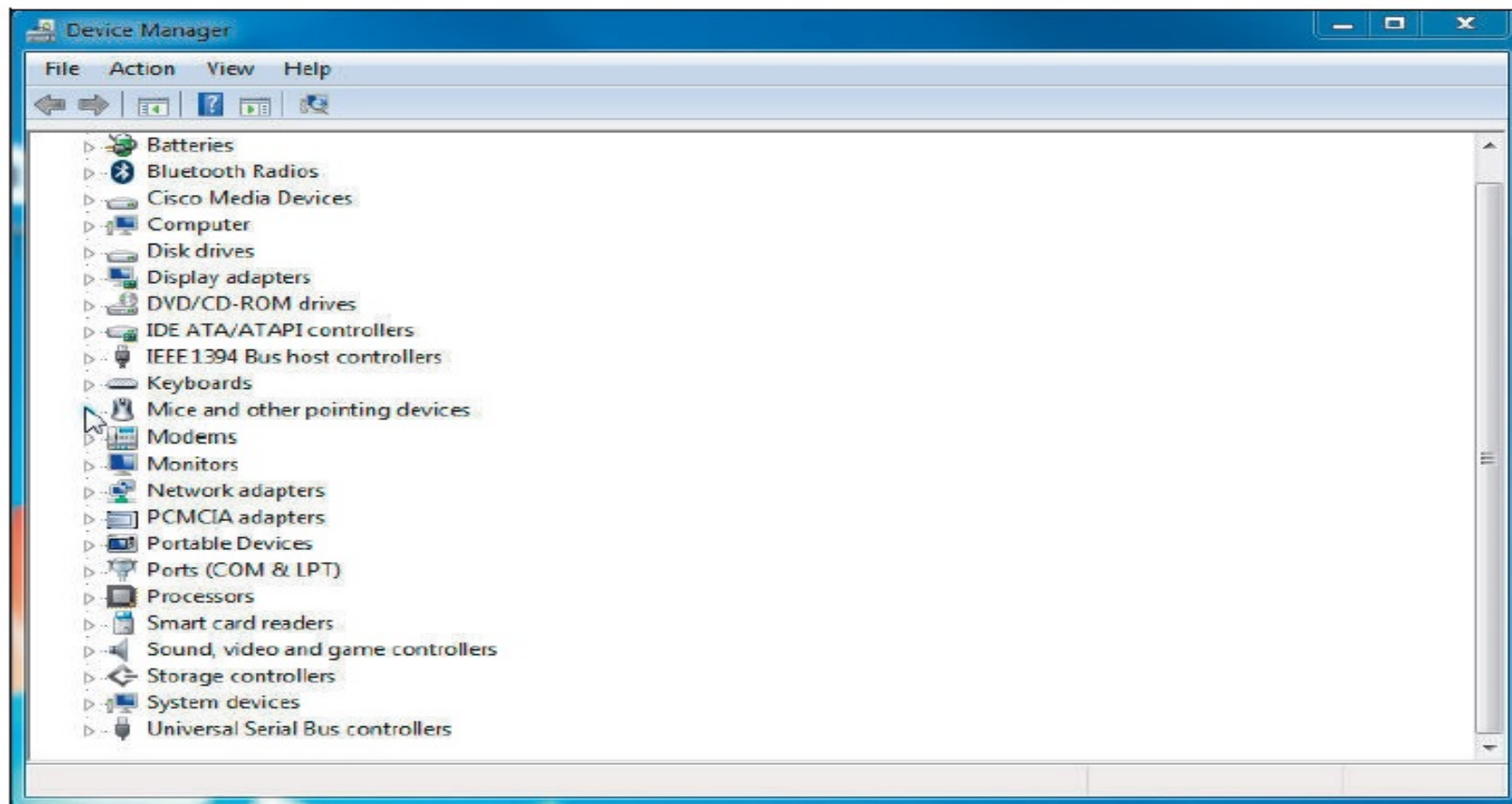
(Note: In the Windows 7 Start menu,enter Device Manager in the Search field and then select it from the results list under the Control Panel heading.)

3. Expand the Mice and other pointing devices node.

4. If Microsoft Serial BallPoint is listed,right-click it and then select Disable.

5. plugging USB connector on your laptop again.

Part III. Demonstrate the EVK on Vehicle

To fulfilled calibration of ST-1612-DG/B Evaluation Kit,

we advise you to meet demonstration requirements

- ➢ **Required environment: Open Sky**
- ➢ **Type of Advised Testing Vehicle: Sedan**

(In this quick guide, we drive Nissan Cefiro & TOYOTA Camry for demonstration)

Step 1. Place EVB on the center of Console

Horizontally place the Evaluation Board (EVB) on the center of Console.

To avoid the EVB displacement or rotation, stick a foam tape can make it stably.

IMPORTANT

1. The red arrow " ⬆ " which can be found on the EVB, should be pointed to the vehicle front.

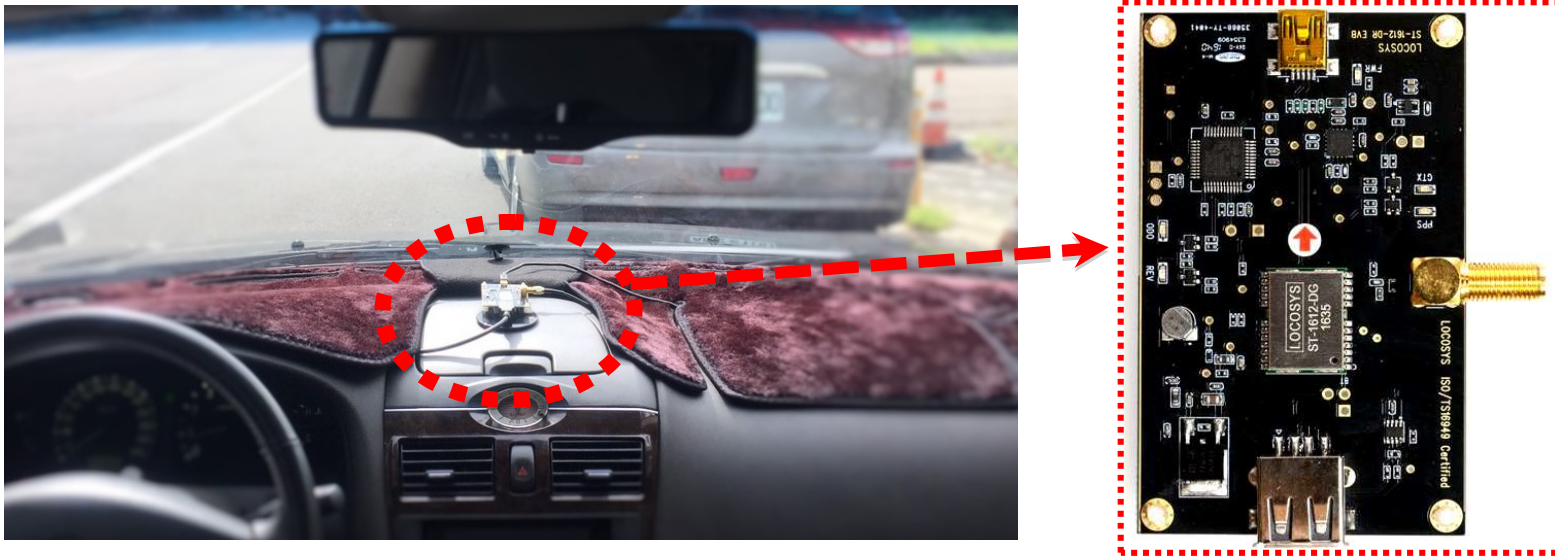2. In the real situation, the module is equipped inside the dashboard.

Figure 1. Place EVB on the center of Console

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➢ Step 2. Connect to EVB

(Warning: To plug out the OBDII reader, the engine MUST be turn off. If the engine is on, it may cause the EVB to work not properly.)

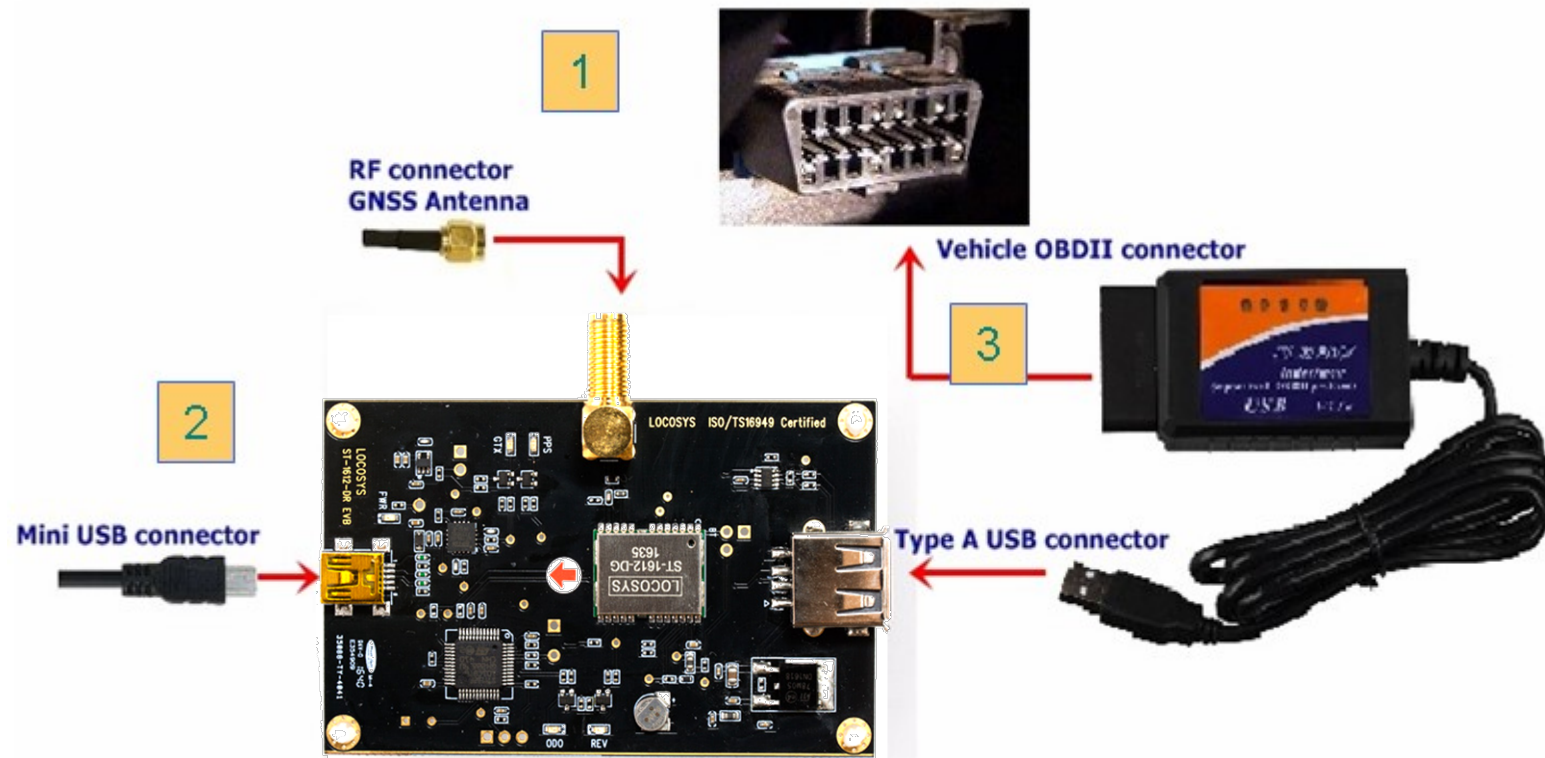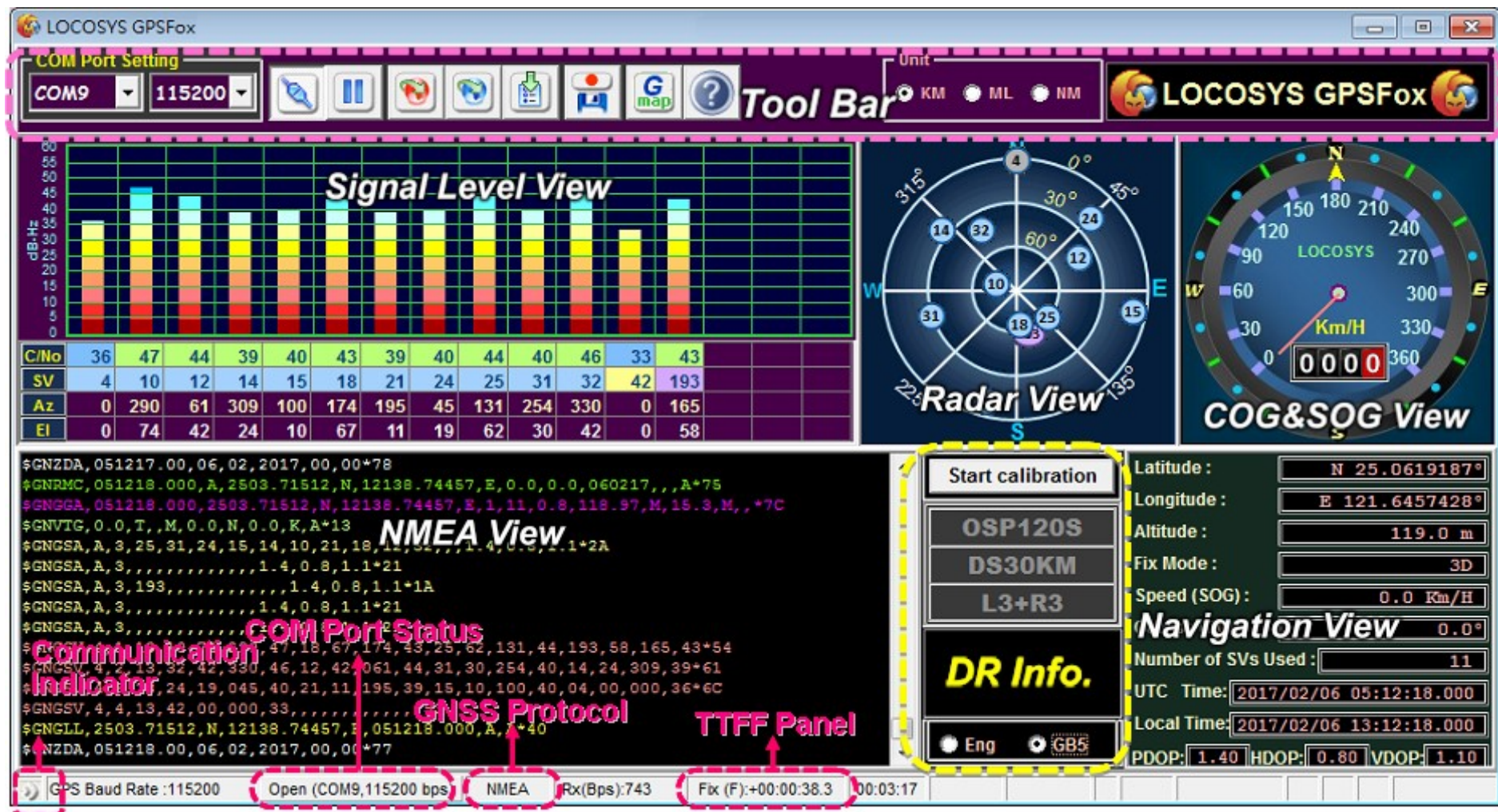➢ Connect to 1.<u>GNSS Antenna</u>,   2. <u>USB Cable</u>,   3.<u>OBD-II Cable</u>
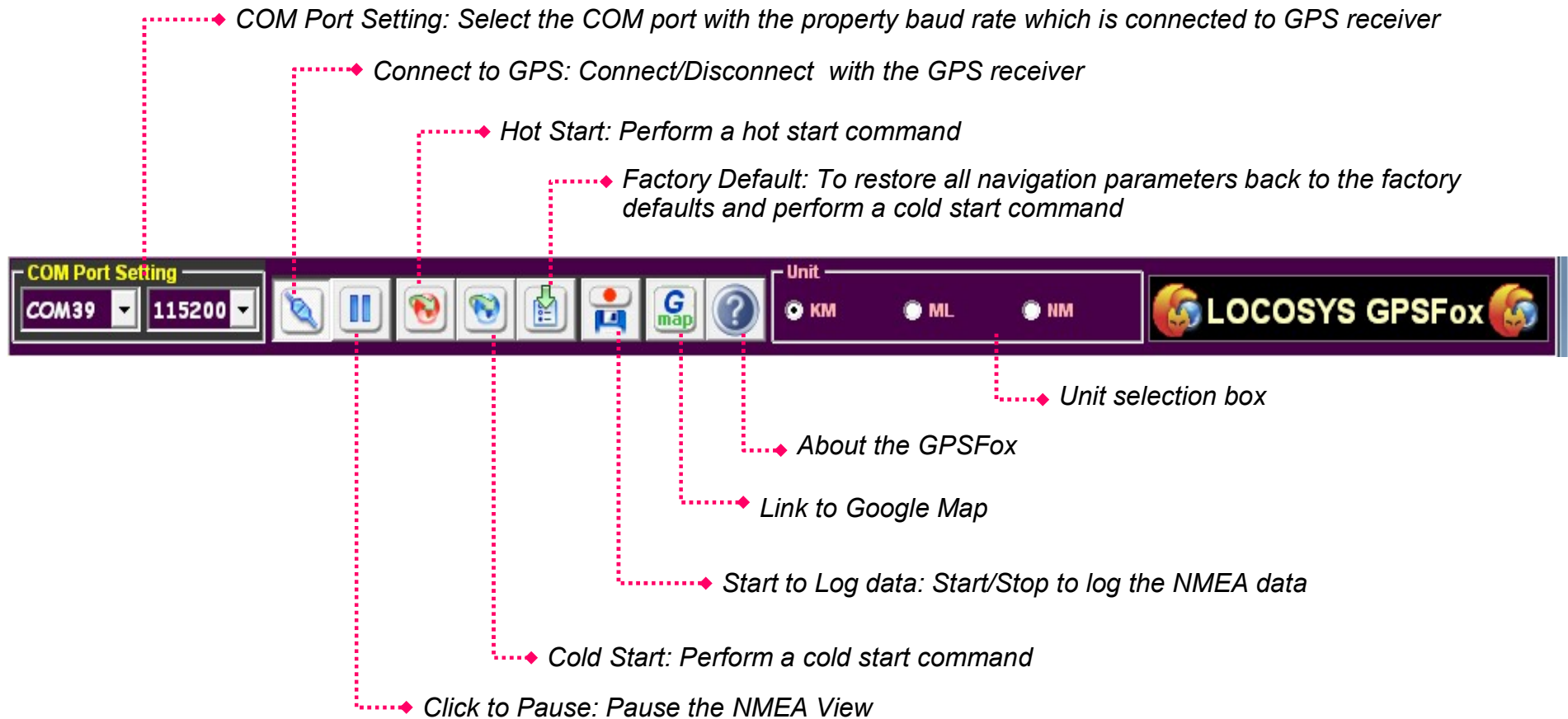
Figure 2. EVB & 3 connectors

After placing EVB on the console, start the LOCOSYS GPSFox.

> **LOCOSYS GPSFox – Screen**

➢ LOCOSYS GPSFox - Tool Bar

- Icon description

COM Port Setting: Select the COM port with the property baud rate which is connected to GPS receiver

Connect to GPS: Connect/Disconnect with the GPS receiver

Hot Start: Perform a hot start command

Factory Default: To restore all navigation parameters back to the factory defaults and perform a cold start command

Unit selection box

About the GPSFox

Link to Google Map

Start to Log data: Start/Stop to log the NMEA data

Cold Start: Perform a cold start command

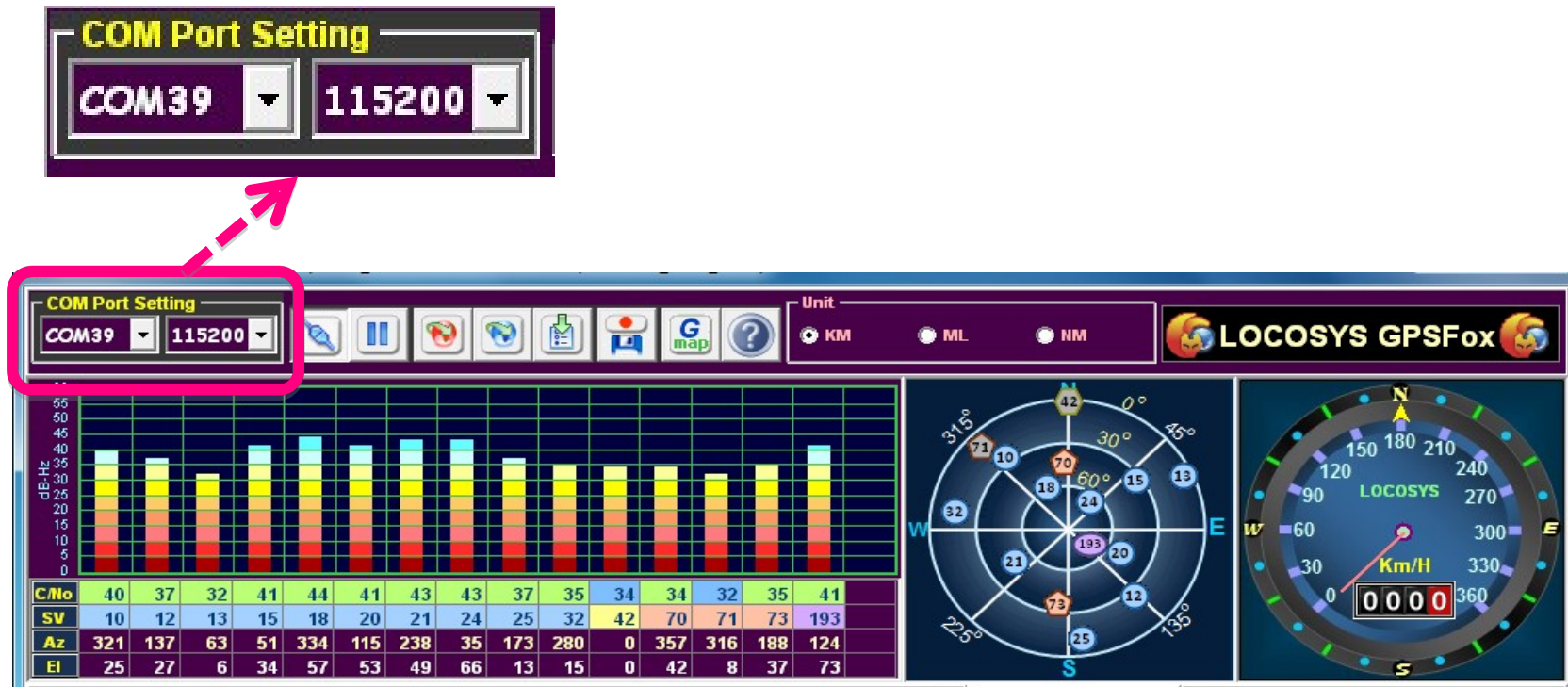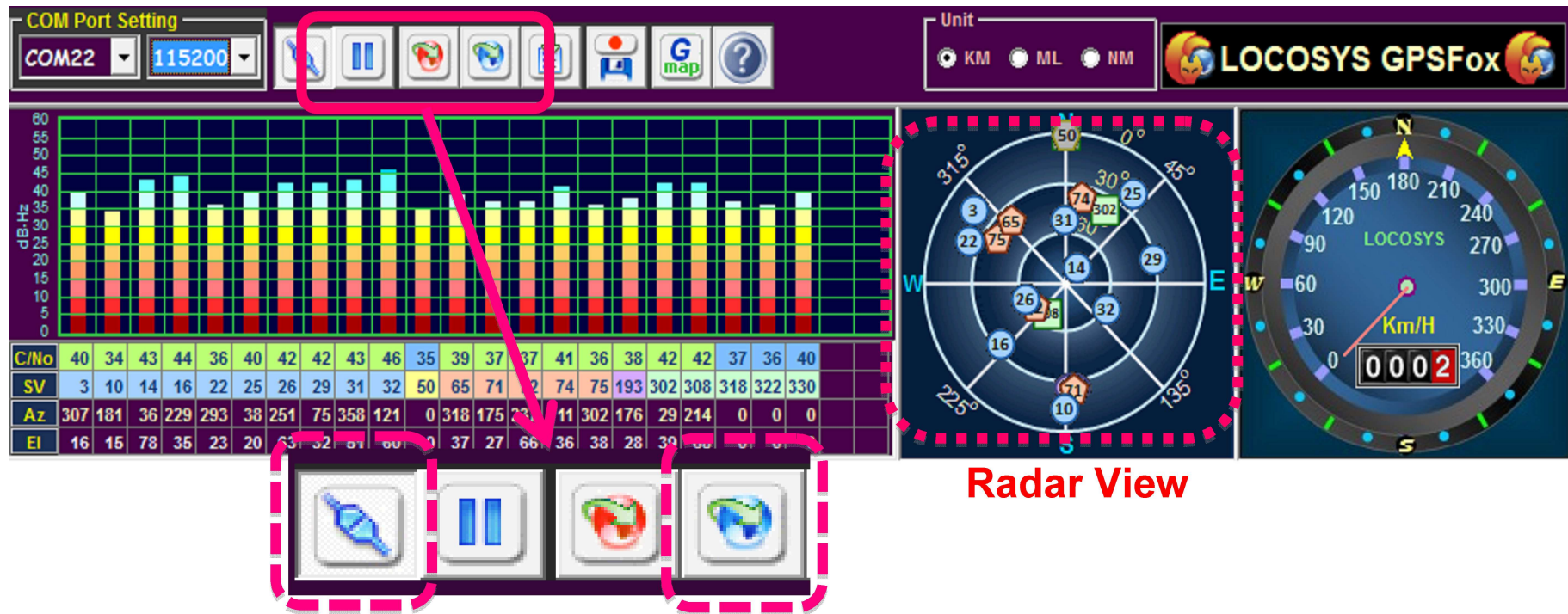Click to Pause: Pause the NMEA View

➢ Step 1. Check USB Comport

check USB COM Port if it is **auto-detected**.

➢ Step 2. Select Baud Rate

select **115200 bps** for Baud Rate setting.

Radar View

> ## Step 3. Connect to GPS

Click ![connect icon] (connect to GPS) to ![connect icon] start connection.

When the **Radar View** appear, click ![cold start icon] (Cold Start) to cold start, and

then wait for position fixed to start calibration.

➢ Step 4. Start the Calibration

Click **Start calibration** to initiate Calibration Mode, shown as below
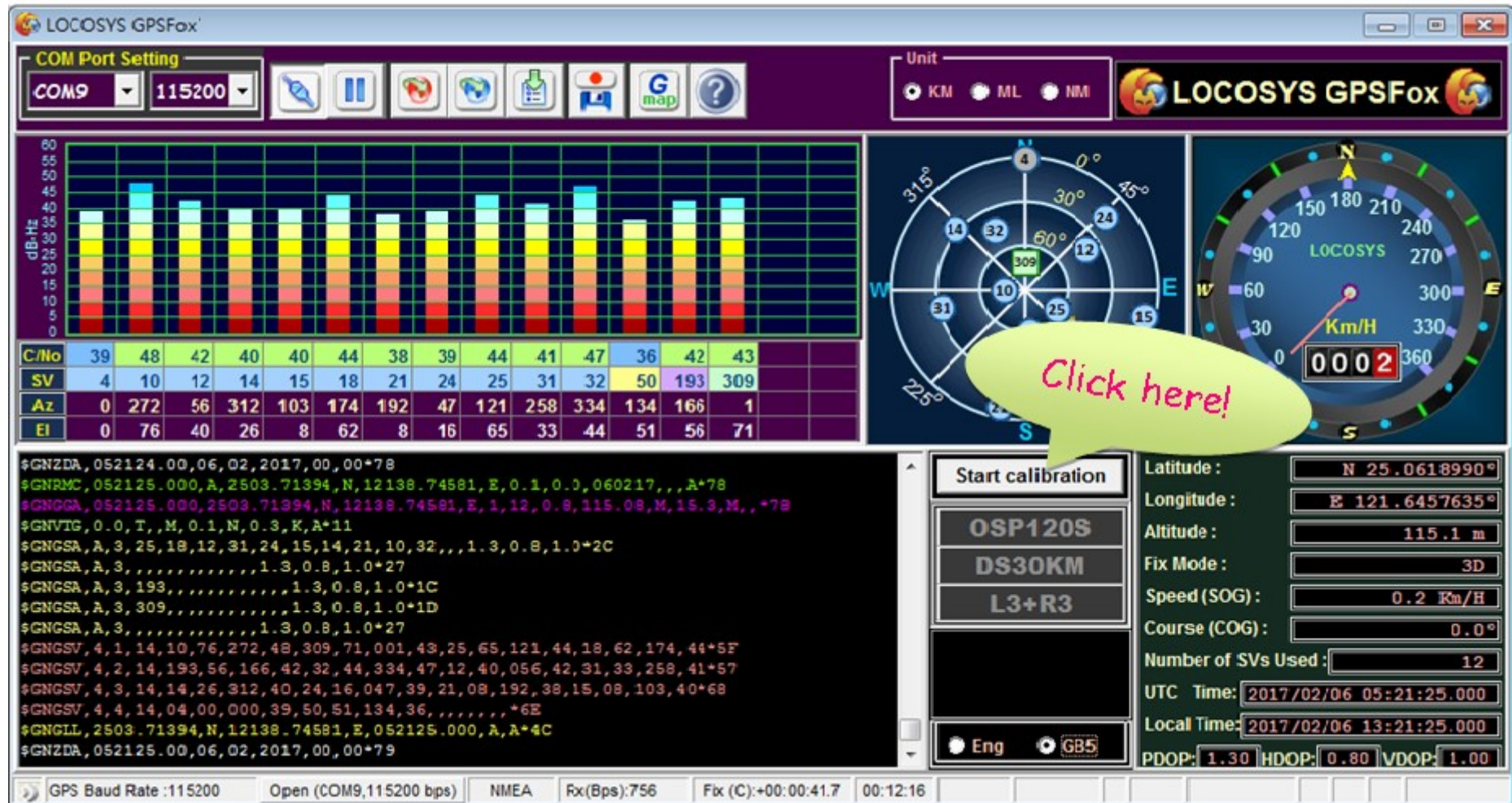
➤ Step 5. Confirm to do Calibration

After click **Start calibration**, you will see a message to have a calibration.

If you confirm to do it, please click ✔ OK If don't, click ✘ Cancel

After confirm the calibration, GPSFox software will automatically tell if the OBD–II Cable is from CAN Bus (ISO 15765-4 11-bit 500kpbs) protocol.
(Note: If the protocol is not supported by the vehicle, the DR testing will not be available.)
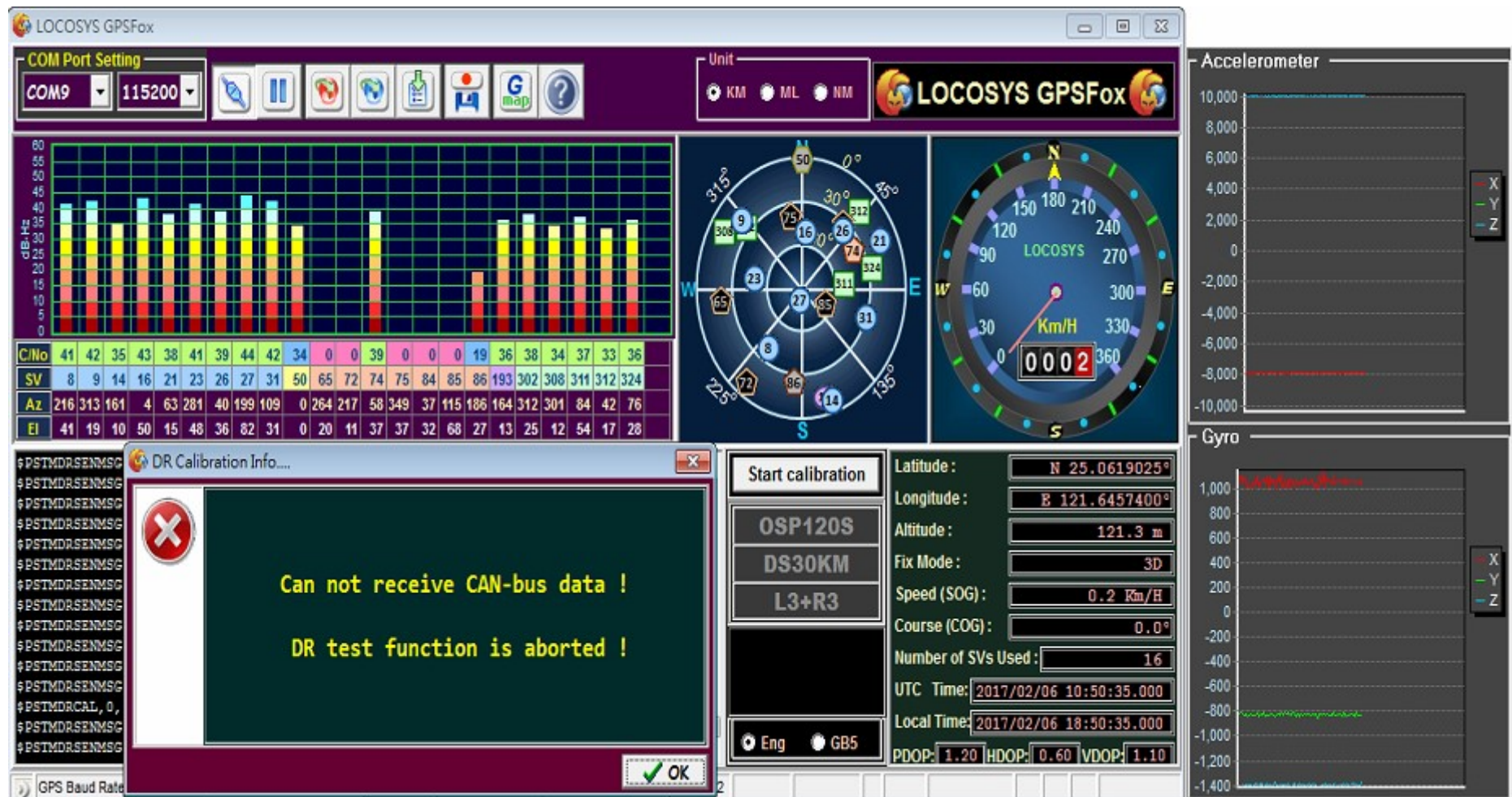
➢ Step 6. Accelerometer and Gyro output data

Click [Start calibration] , there will be the information of X, Y ,and Z axial information of Accelerometer and Gyro by the GPSFox

(Note: The information is Raw data 10Hz output)
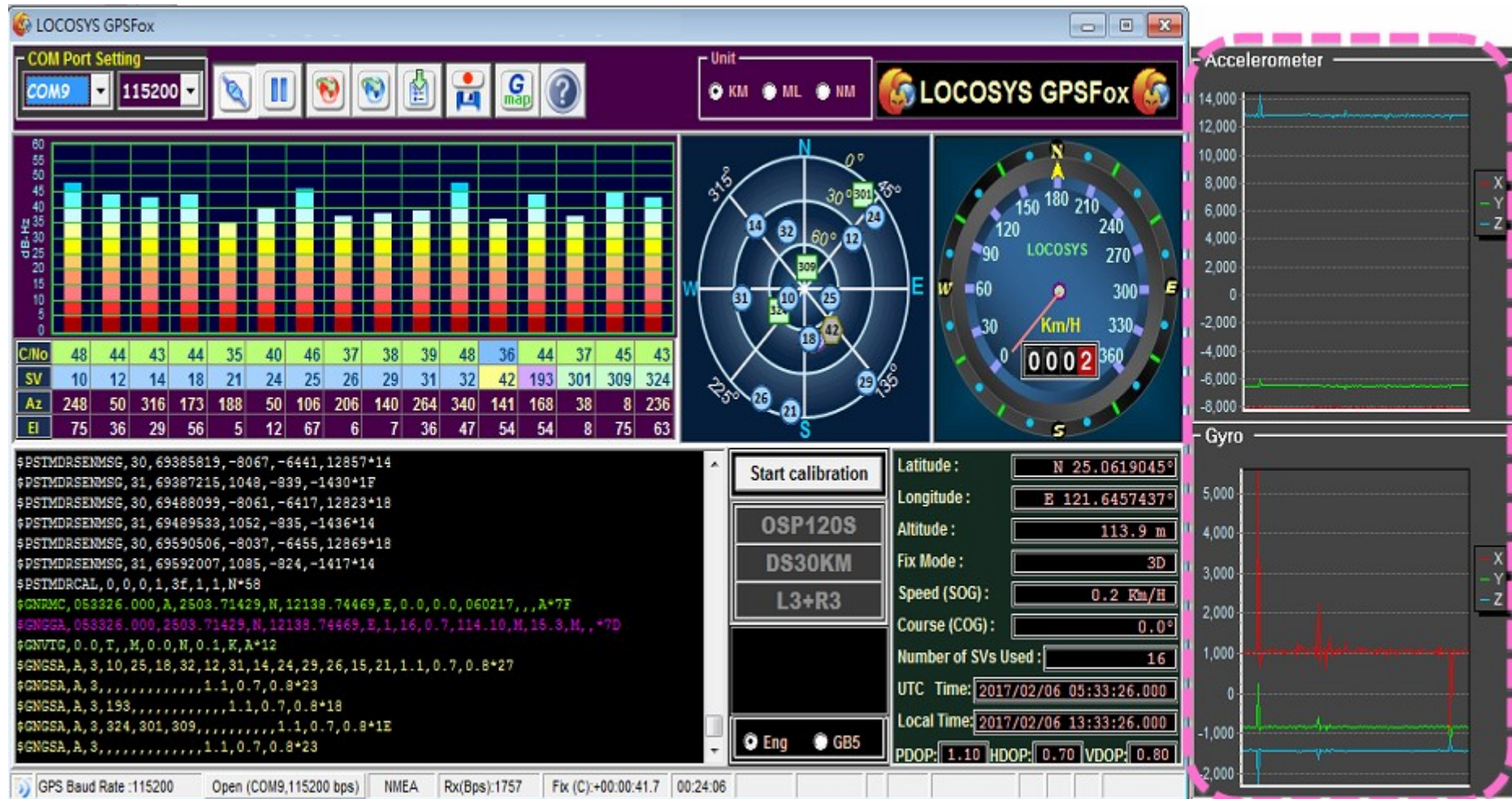
$PSTMDRSENMSG,30 → for Accelerometer

```
$PSTMDRSENMSG,30,69385819,-8067,-6441,12857*14
$PSTMDRSENMSG,31,69387215,1048,839,-1430*1F
$PSTMDRSENMSG,30,69488099,-8061,-6417,12823*18
$PSTMDRSENMSG,31,69489533,1052,-835,
$PSTMDRSENMSG,30,69590506,-8037,-6455,12869*18
$PSTMDRSENMSG,31,69592007,1085,-824,
$PSTMDRCAL,0,0,0,1,3f,1,1,N*58
$GNRMC,053326.000,A,2503.71429,N,12138.74469,E,0.0,0.0,060217,,,A*7F
$GNGGA,053326.000,2503.71429,N,12138.74469,E,1,16,0.7,114.10,M,15.3,M,,*7D
$GNVTG,0.0,T,,M,0.0,N,0.1,K,A*12
$GNGSA,A,3,10,25,18,32,12,31,14,24,29,26,15,21,1.1,0.7,0.8*27
$GNGSA,A,3,,,,,,,,,,,,,1.1,0.7,0.8*23
$GNGSA,A,3,193,,,,,,,,,,,,1.1,0.7,0.8*18
$GNGSA,A,3,324,301,309,,,,,,,,,1.1,0.7,0.8*1E
$GNGSA,A,3,,,,,,,,,,,,,1.1,0.7,0.8*23
```


$PSTMDRSENMSG,31 → for Gyro

```
$PSTMDRSENMSG,30,69385819,-8067,-6441,12857*14
$PSTMDRSENMSG,31,6938721,1048,839,-1430*1F
$PSTMDRSENMSG,30,69488099,-8061,-6417,12823*18
$PSTMDRSENMSG,31,69489533,105,-835,-1436*14
$PSTMDRSENMSG,30,69590506,-8037,-6455,12869*18
$PSTMDRSENMSG,31,69592007,1085,-824,-1417*14
$PSTMDRCAL,0,0,0,1,3f,1,1,N*58
$GNRMC,053326.000,A,2503.71429,N,12138.74469,E,0.0,0.0,060217,,,A*7F
$GNGGA,053326.000,2503.71429,N,12138.74469,E,1,16,0.7,114.10,M,15.3,M,,*7D
$GNVTG,0.0,T,,M,0.0,N,0.1,K,A*12
$GNGSA,A,3,10,25,18,32,12,31,14,24,29,26,15,21,1.1,0.7,0.8*27
$GNGSA,A,3,,,,,,,,,,,,,1.1,0.7,0.8*23
$GNGSA,A,3,193,,,,,,,,,,,,1.1,0.7,0.8*18
$GNGSA,A,3,324,301,309,,,,,,,,,1.1,0.7,0.8*1E
$GNGSA,A,3,,,,,,,,,,,,,1.1,0.7,0.8*23
```
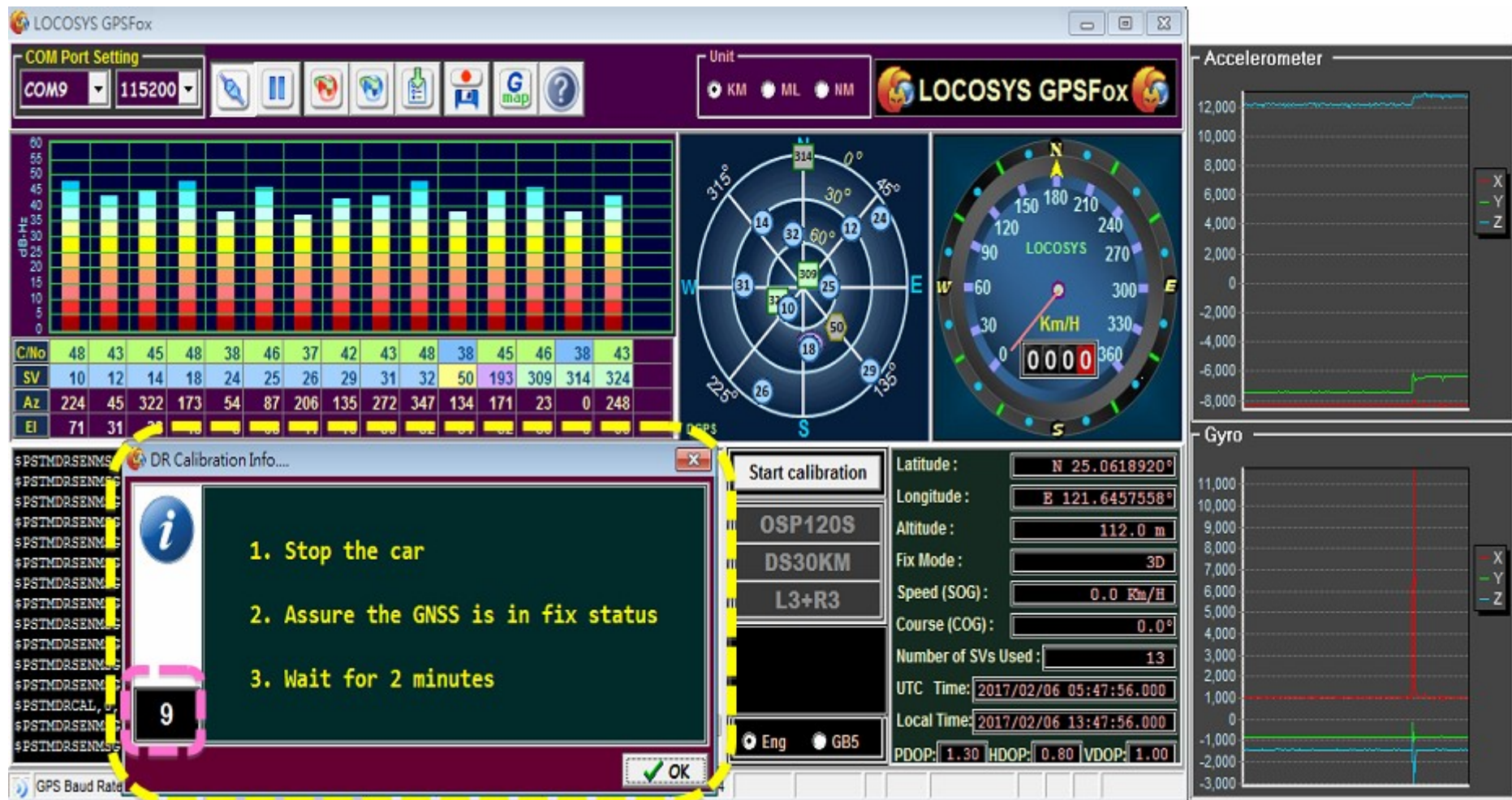

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➢ Step 7. DR Calibration Info

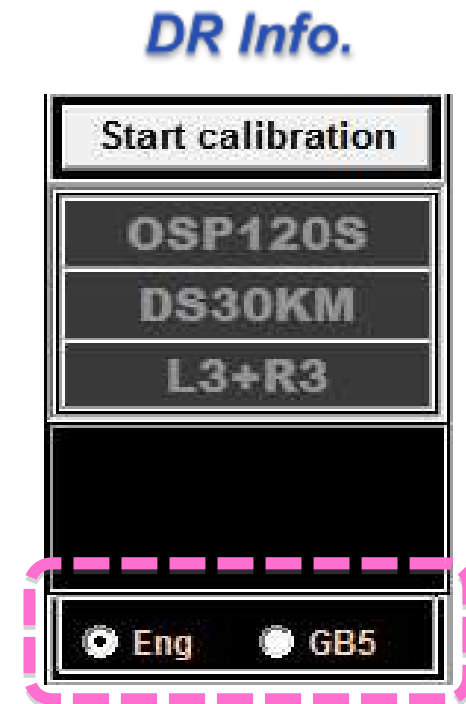When the cursor move to `OSP120S` , `DS30KM` , `L3+R3` the pop-up **DR calibration info** will provide you the instructions.

(Note: The information only show in 10 seconds. To read it again, please move the cursor to the calibration item.)

➢ Step 8. Choose Language of DR Calibration info

In DR Info., there are two languages for users to choose, **English (Eng)** and **Simplified Chinese (GB5)**.
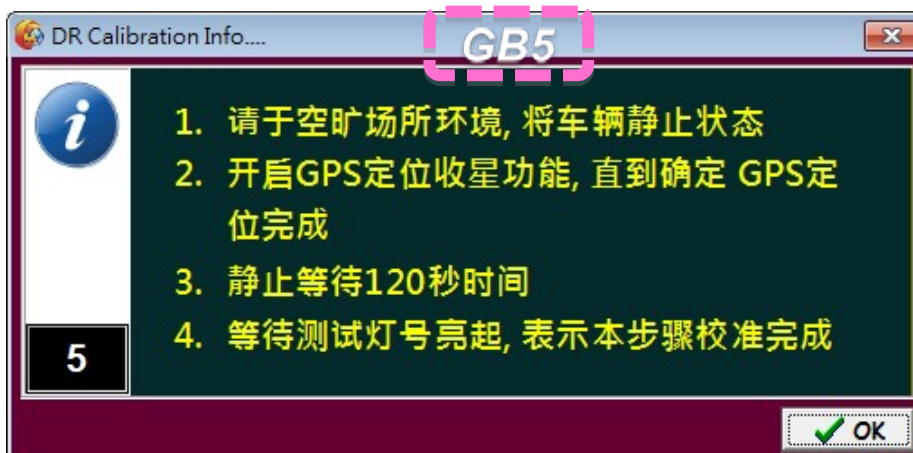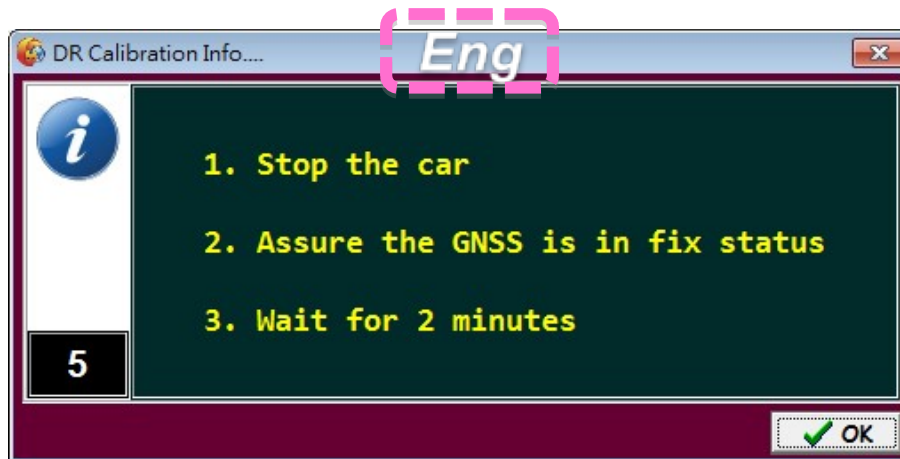
➤ Step 9. Timer and Status of DR Info.

In DR info., you will see the timer and status while doing each calibration item.

Item	Description
OSP120S	Doing calibration
DS30KM	Calibration not done
OSP120S	Calibration done
120 300 OK	• **120, 300**: Countdown on 120, 300 seconds. • **OK**: Calibration is done
DR Ready !	All calibrations are completed.

Calibration Flow Chart

Step 1

vehicle speed = 0 Km/h
wait GNSS position fixed
time >= 2 min

▼

Step 2

vehicle speed >= 30 Km/h
drive in straight road sections
time >= 5 min

▼

Step 3

vehicle speed >= 30 Km/h
drive in circular route
counterclockwise*3
clockwise*3

radius > 35 m
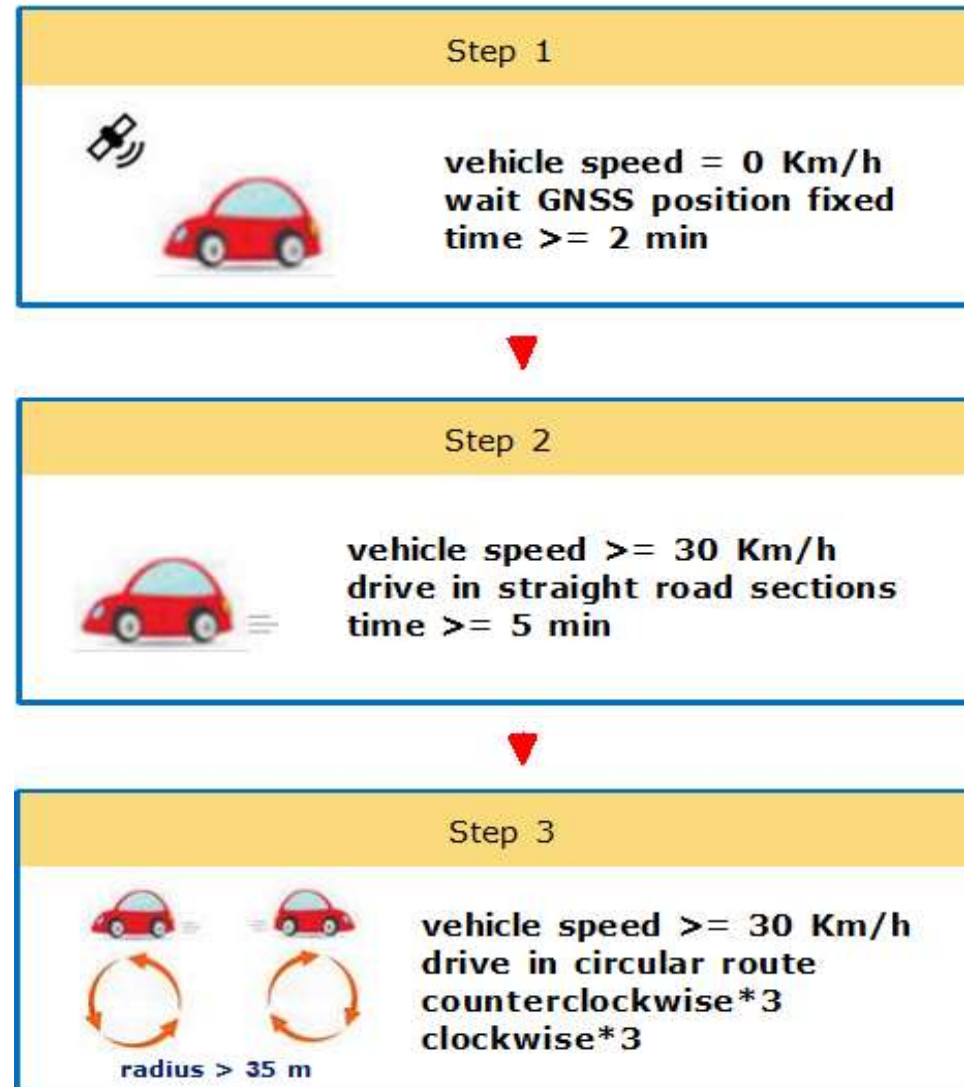
➢ Step 1. Calibration for OSP120S

Step 1
🛰️ 🚗 vehicle speed = 0 Km/h wait GNSS position fixed time >= 2 min
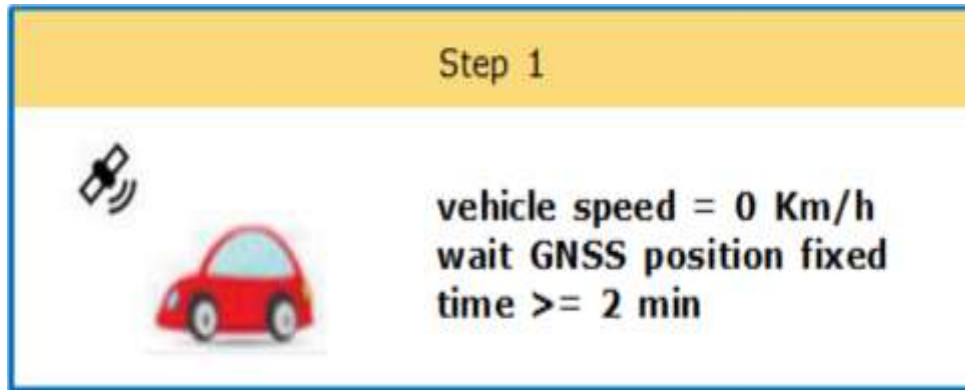
Turn vehicle on and stay stopped in a flat section of road with good sky view, wait GNSS position fixed for 2 minutes at least.

Start calibration

OSP120S

DS30KM

L3+R3

120

Eng   GB5

- **Stop the vehicle and wait for the GNSS position being done.**
- **The timer will start to countdown from 120 seconds to 0 seconds.**

  (Note: In this process, if the vehicle is moved or the GNSS position is failed, the countdown process will start over again.)

Start calibration

OSP120S

DS30KM

L3+R3

OK

Eng   GB5

- **As OSP120S is done, it will show in green, and "OK" in the status.**

- **The instruction of DS30KM will pop-up to guide you.**

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➤ Step 2. Calibration for DS30KM

Step 2

vehicle speed >= 30 Km/h
drive in straight road sections
time >= 5 min
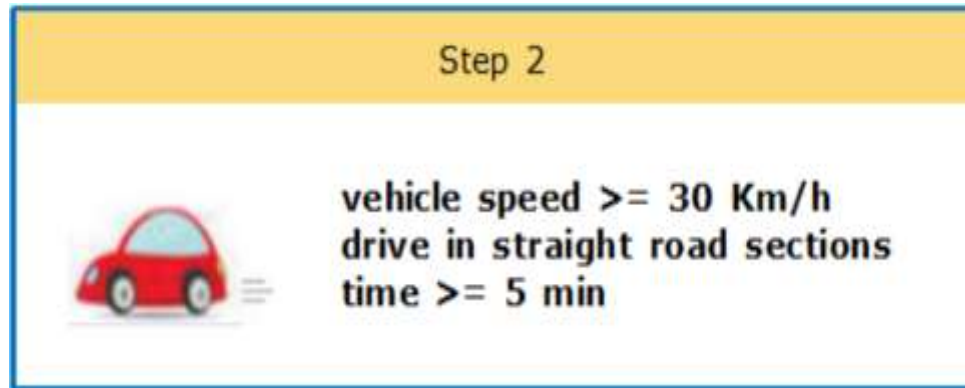
Drive in straight road sections with vehicle speed 30 km/h for 5 minutes at least .
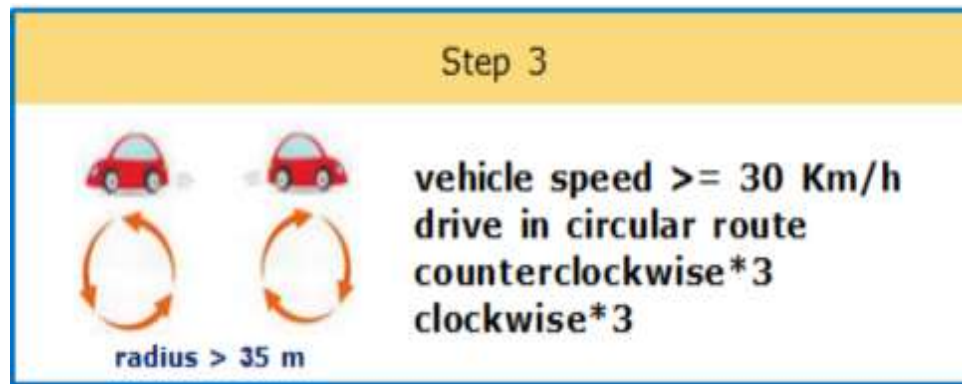

- **When driving speed is over 30 Km/h, the timer will start countdown from 300 seconds to 0 seconds.**

   (Note: In the process, if the driving speed is lower than 30 Km/h, the countdown will stop or pause.)

- **As DS30KM is done, it will show in green, and "OK" in the status.**

- **The instruction of L3+R3 will pop-up to guide you.**

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➢ Step 3. Calibration for L3+R3

Drive in circular route with its radius over 35 m, take counterclockwise and clockwise circles for three or more times with driving speed over 30 Km/h

Note:

- **You may have the condition that "L3+R3" calibration to be processed for many times and still fail to complete. If this happened, please do the Step 2 again, drive straightly for 5 to 10 minutes. And then do the Step 3.**

- **Driving in circular routes (counterclockwise and clockwise) for more times will benefit the DR precision.**

You will see in DR Info.

- **When driving speed is over 30 Km/h and making 3 or more circular routes, the calibration of L3+R3 will be completed, and you will see "OK" in the status.**
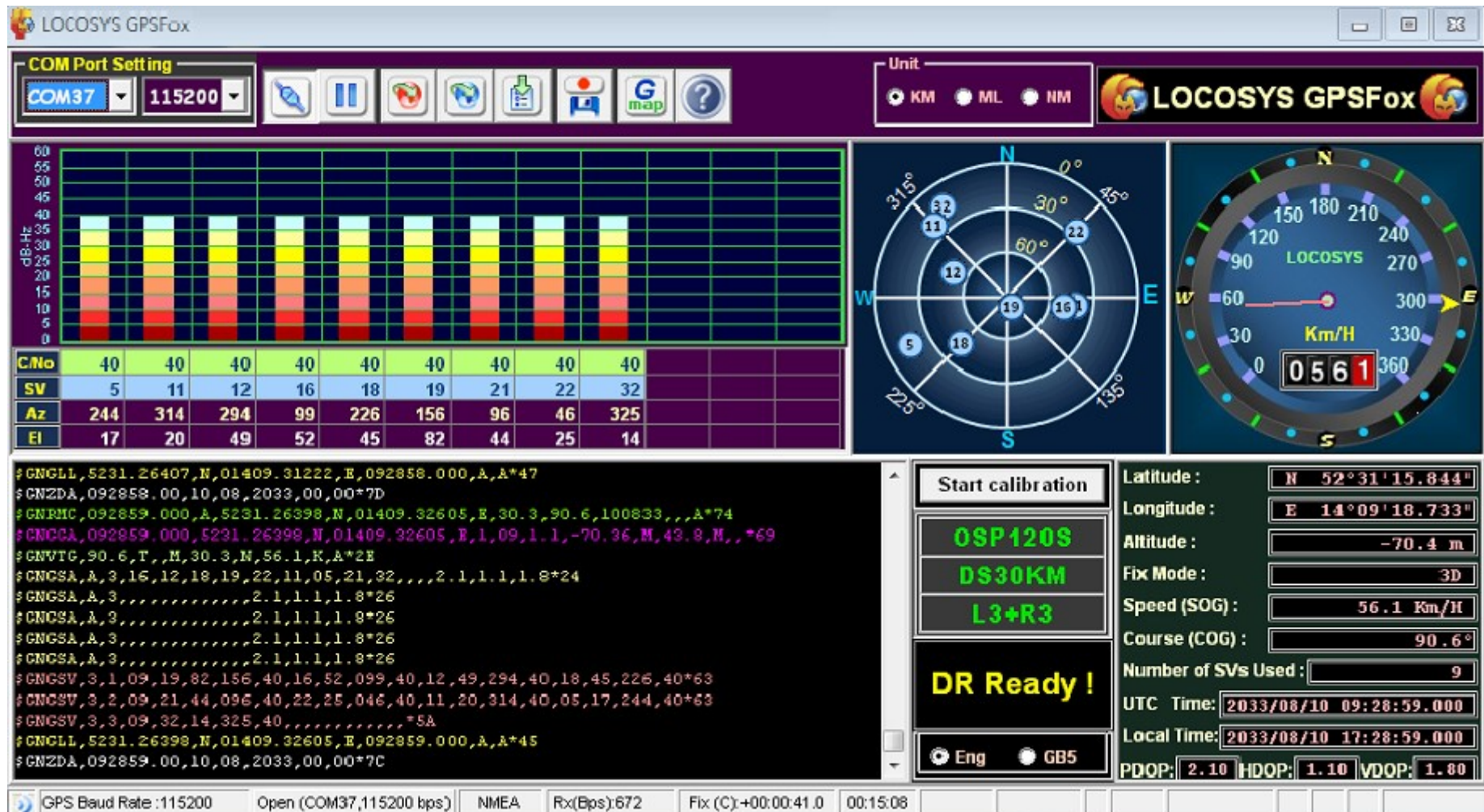
(Note: If the speed is lower than 30 Km/h, the calibration will be failed.)

- **Good job! All the calibrations are completed.**
- **You will see "DR Ready!" in the status.**
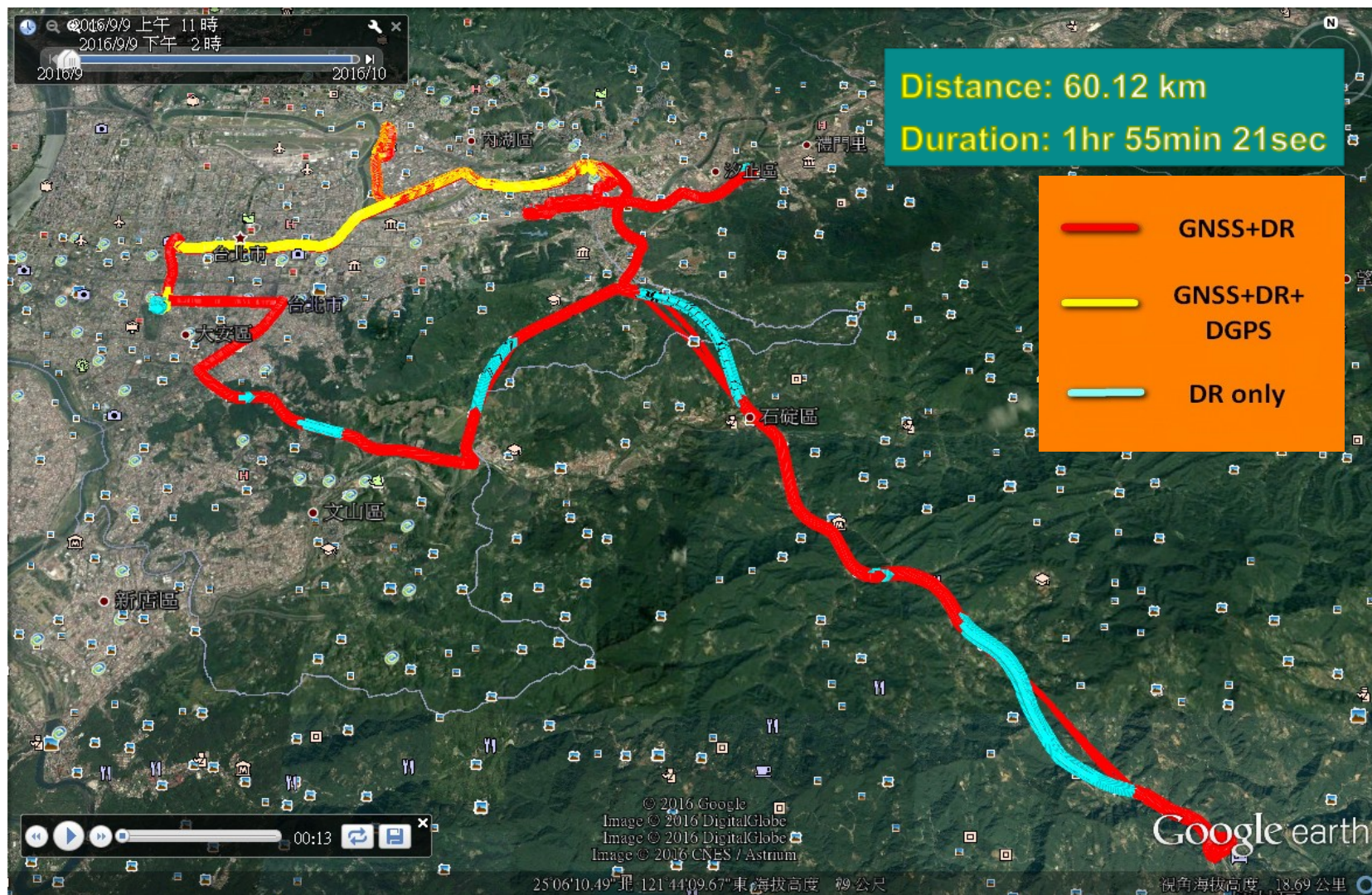- **Now it is ready to do the DR function test.**

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➢ Step 4. Turn Off DR Info. and Start DR Function Test

When completing all the calibrations, GPSFox will turn to NMEA mode. Now you can start to do the DR function test.
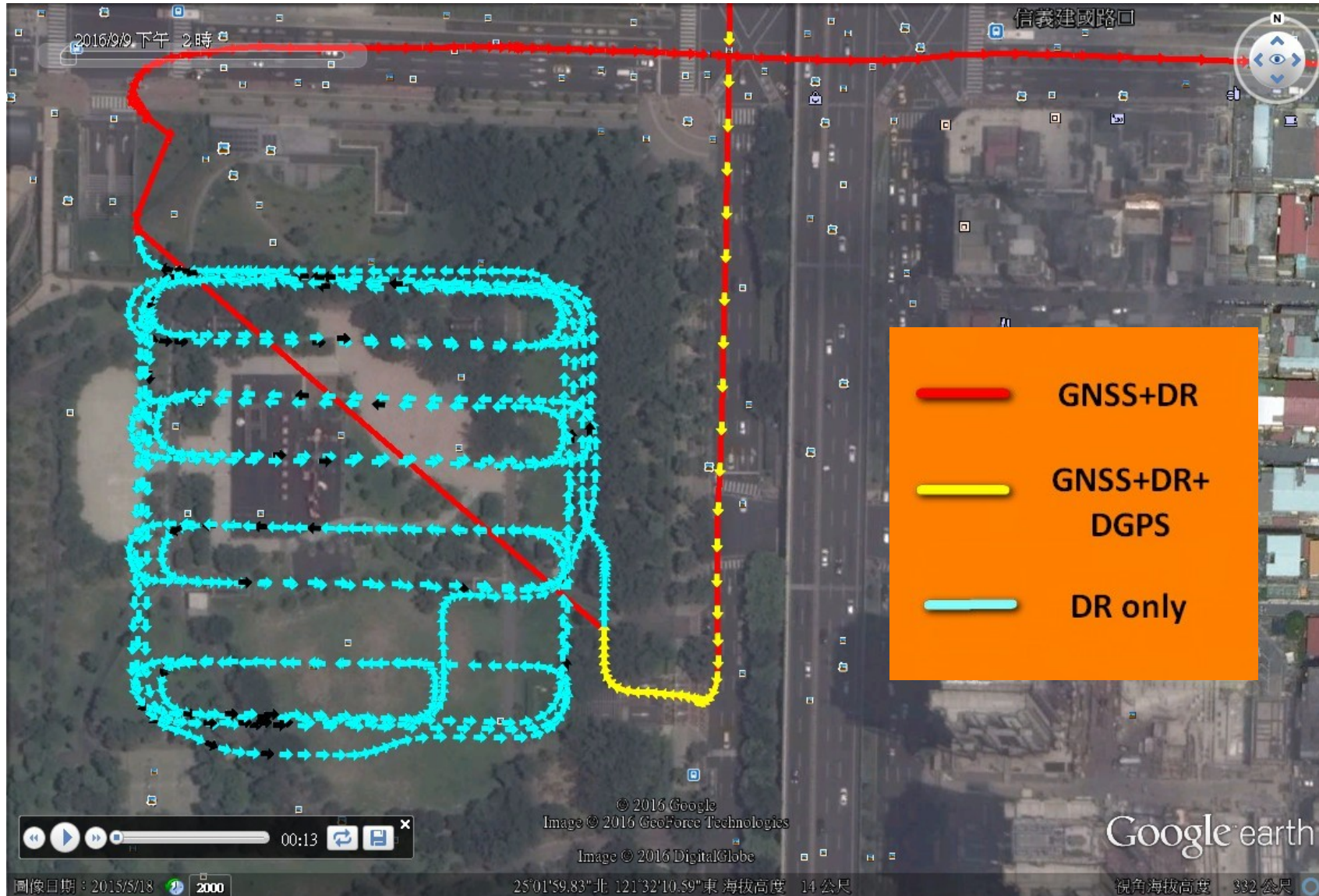
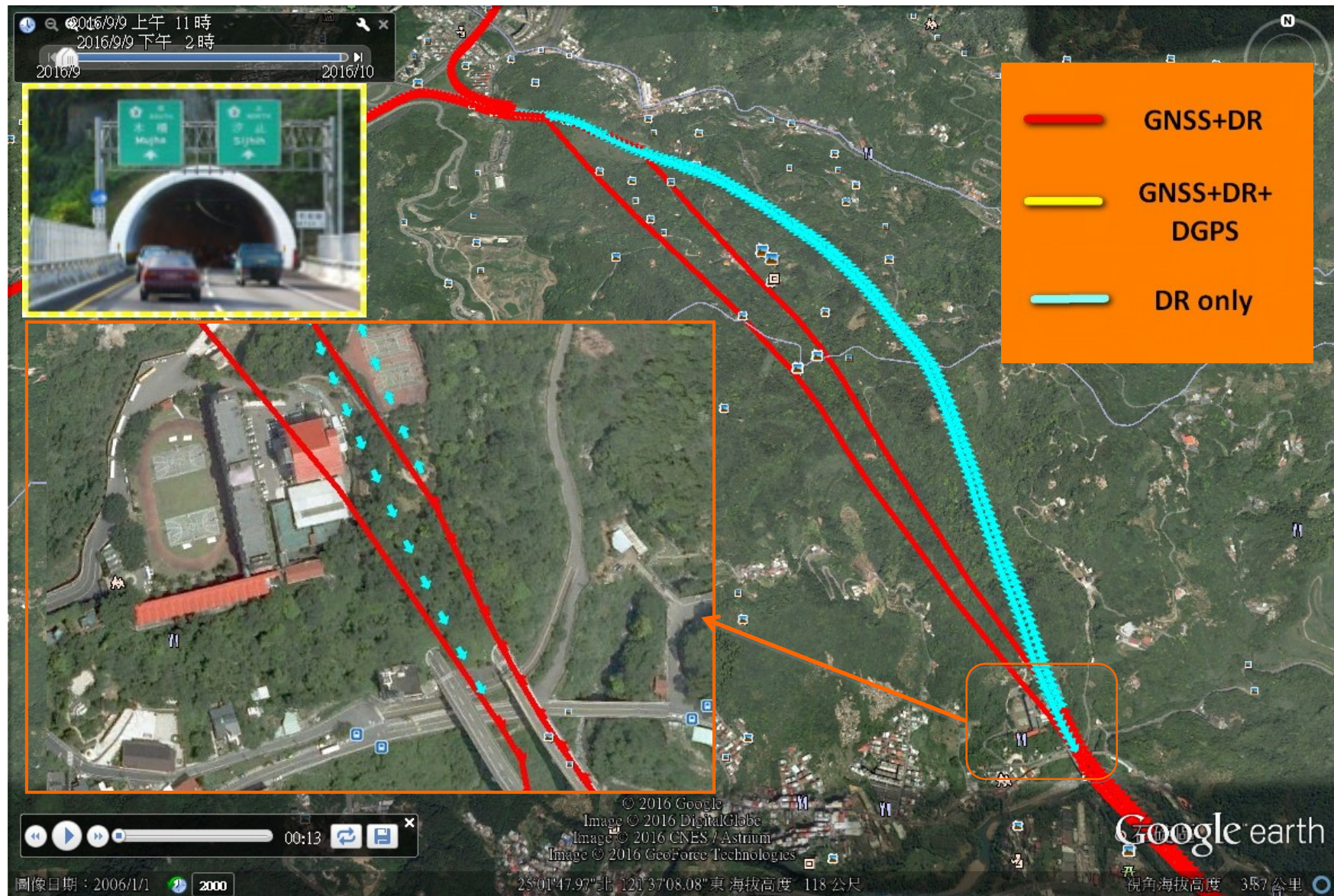➢ **LOCOSYS Demonstration: Path of Field test**

Distance: 60.12 km

Duration: 1hr 55min 21sec

───	GNSS+DR
───	GNSS+DR+ DGPS
───	DR only

Field Test: Parking Garage (Basement)

Field Test: Shih-Ting Tunnel (Length: 2,720m)

WITH ANY QUESTIONS,

LOCOSYS **IS ALWAYS HERE FOR YOU!**

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