DOC#:01.13.005602

YDLIDAR TW3 USER MANUAL

Shenzhen EAI Technology Co.,Ltd.

CONTENTS

1 TW3 LIDAR DEVELOPMENT KIT

The development kit of YDLIDAR TW3 lidar (hereinafter referred to as TW3) is an accessory tool provided for performance evaluation and early development of the TW3. Through the TW3 development kit, and with the evaluation software, users can observe point cloud data scanned by TW3 on your environment or development on the SDK.

1.1 Development Kit

TW3development kit has the following components:

TW3 LiDAR　　USB Type-C Cable　　USB Adapter Board

FIG 1 TW3 DEVELOPMENT KIT

CHART 1 TW3 LiDAR DEVELOPMENT KIT DESCRIPTION

Item	Qty.	Description
TW3 Lidar	1	**Standard version of the TW3 Lidar, internal integrated motor drive, can realize motor stall control and motor control**
USB Type-c Cable	1	**Use with USB adapter board to connect TW3 and PC. USB cable is both a power supply cable and a data cable**
USB Adapter Board	1	**Realize USB to UART, convenient for the rapid interconnection of TW3 lidar and PC. In addition, it provides Micro USB power interface (PWR) for auxiliary power supply**

Note: USB Adapter board has two interface: USB_DATA、USB_PWR.
USB_DATA: Data powered interface. In most cases, this interface can be used to meet power and communication requirements.
USB_PWR: Auxiliary power supply interface. The USB interface of some development platforms has weak current drive capability. At this time, auxiliary power supply can be used.

2 OPERATION UNDER WINDOW

2.1 Device Connection

When TW3 is evaluated and developed under windows, TW3 and PC need to be interconnected. The specific process is as follows:

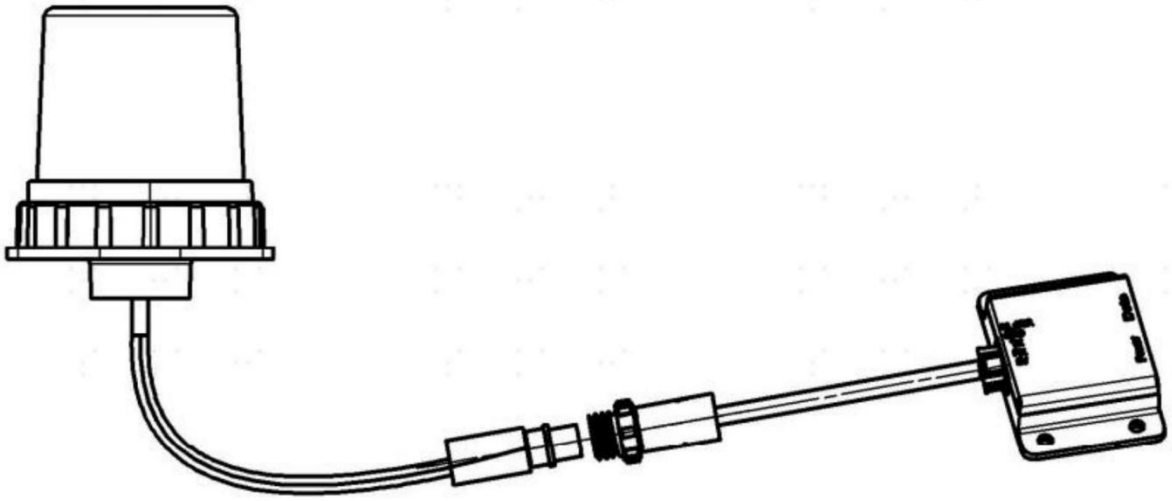


FIG 2 TW3 DEVICE CONNECTION STEP 1

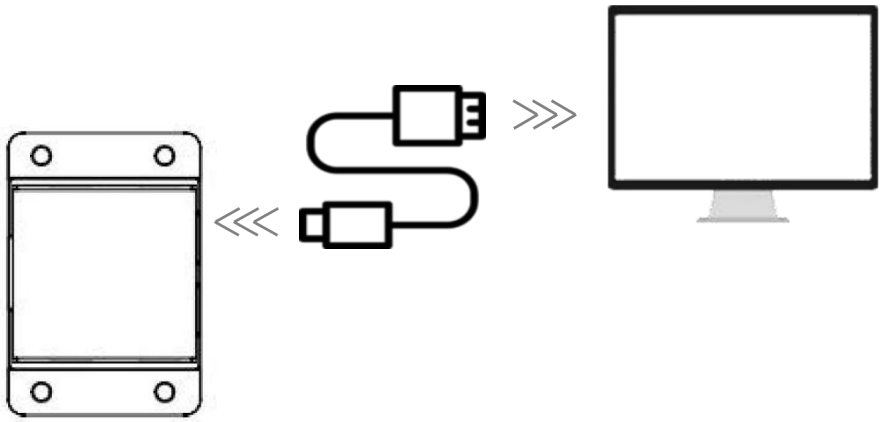


FIG 3 YDLIDAR TW3 DEVICE CONNECTION STEP 2

Connect the adapter board with TW3 first, then connect the USB cable to the USB port of the adapter board and the PC. Note that the Type-C interface of the USB cable is connected to the USB_DATA of the USB interface board, and the idle mode is used after TW3 is powered on. The motor does not rotate.

The drive current of USB interface of some development platforms or PC is not sufficient. TW3 need to be connected to the auxiliary power supply of +5V, otherwise the lidar will be abnormal.

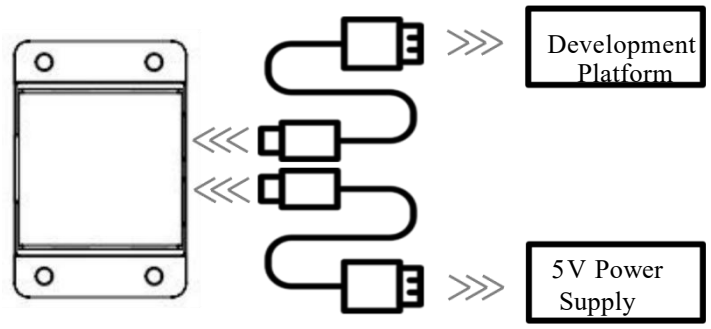


FIG 4 YDLIDAR TW3 AUXILIARY POWER SUPPLY

2.2 Driver Installation

To evaluate and develop the TW3 under Windows, you need to install the serial port driver of the USB adapter board. The USB adapter board of this kit adopts CP2102 chip to realize serial port (UART) to USB signal conversion. Its driver can be downloaded from our official website. https://www.ydlidar.com/download/category/lidar-sensor

After unzipping the driver package, run the CP2102's Windows driver installation file (exe file under CP210x_VCP_Windows). Please select the 32-bit version (x86) or 64-bit version (x64) installation program according to the version of the windows operating system.

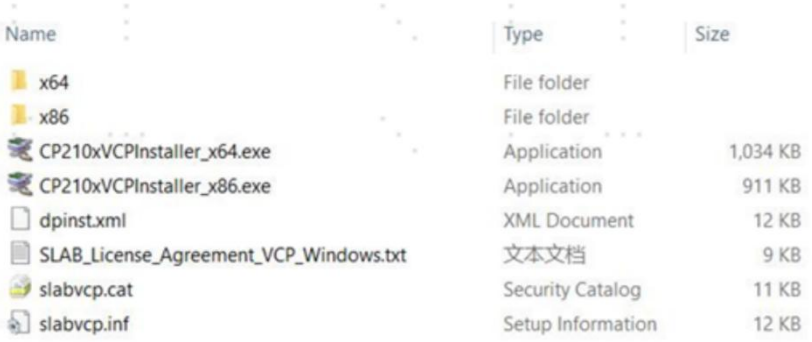


FIG 5 TW3DRIVER VERSION SELECTION

Double-click the exe file and follow the prompts to install it.

FIG 6 YDLIDAR TW3 DRIVER INSTALLING

After the installation is complete,you can right-click on[My Computer]and select, [Properties]. On the open [System] screen, select[Device Manager] from the left menu to access the Device Manager. Expand [Port] to see the serial port name corresponding to the identified USB adapter, that is, the driver installation is successful.The following figure shows COM3.(Note that the port must be checked in case of TW3 and PC interconnection)

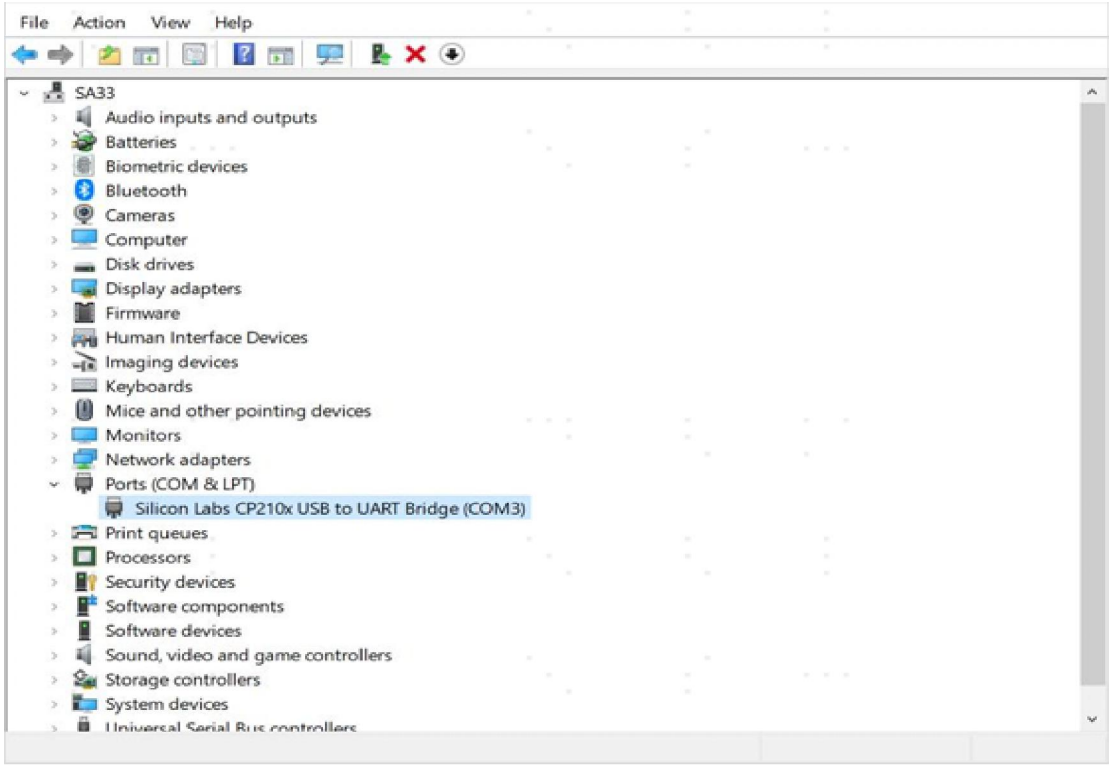


FIG 7 YDLIDAR TW3 DRIVER INSTALLATION CH

2.3 How to Use Lidar Client software

YDLIDAR provides EaiLidar Test, a point cloud data Lidar Client software for TW3 real-time scanning.Users can use this software to visually observe the TW3 scanning map: YDLIDAR provides TW3 real-time point cloud data and real-time scanning frequency. At the same time, the scanned data can be saved offline to an external file for further analysis. Lidar Client software download link:

https://www.ydlidar.com/download/category/lidar-sensor

Before using the YDLIDAR software, make sure that the TW3 USB adapter board serial port driver is installed successfully, and interconnect the TW3 with the USB port of the PC.

Run the Lidar Client software: Eai Lidar Test.exe, by default, it will automatically log in and enter the main interface, as below image shown:

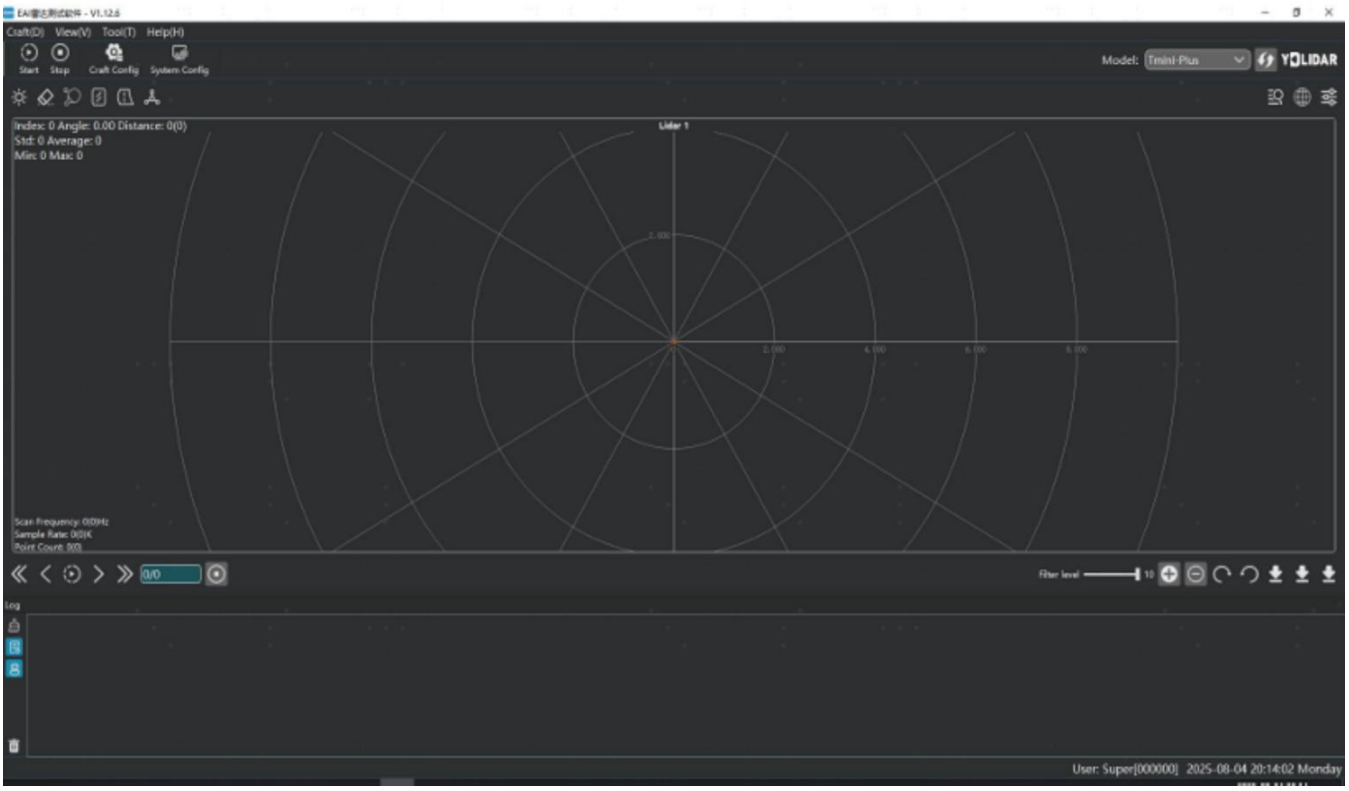
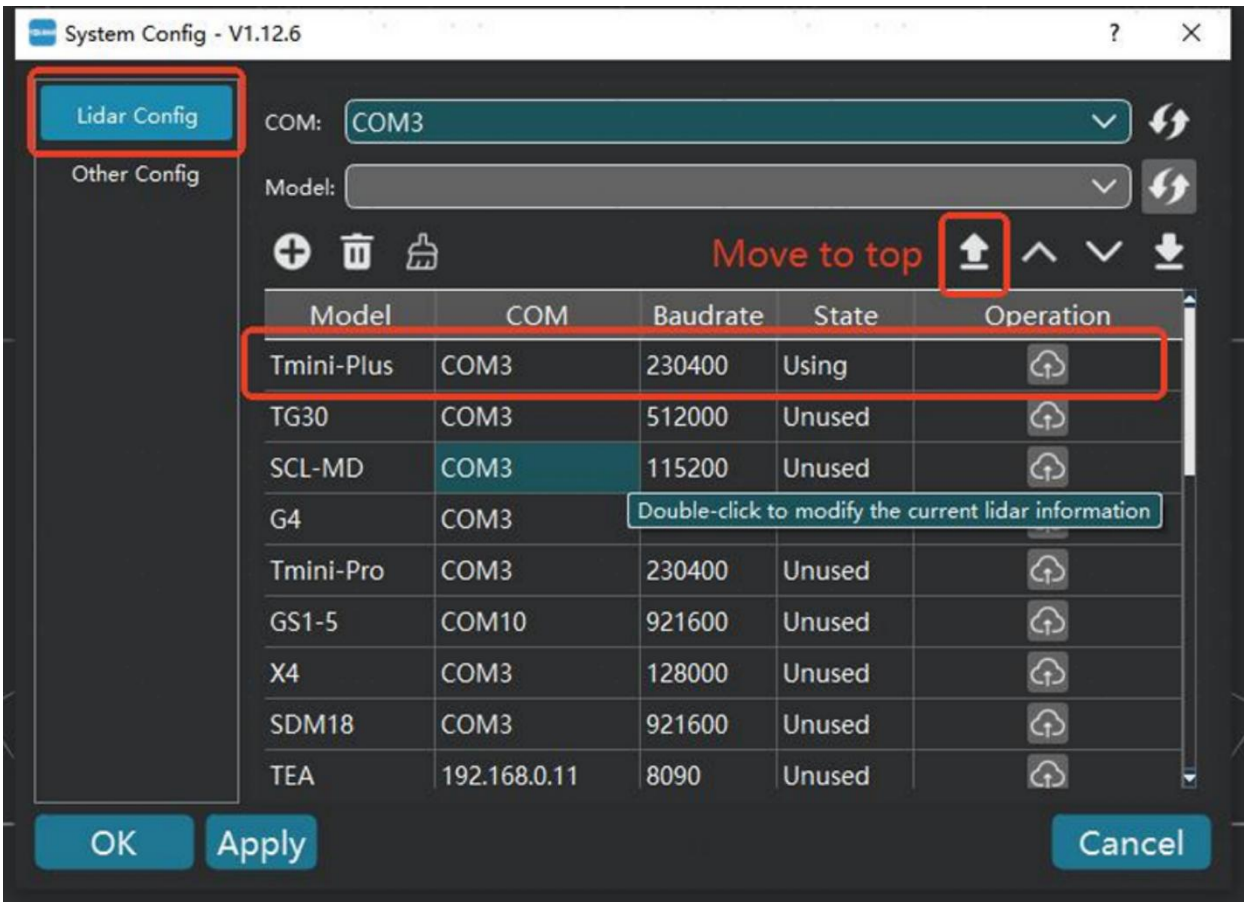


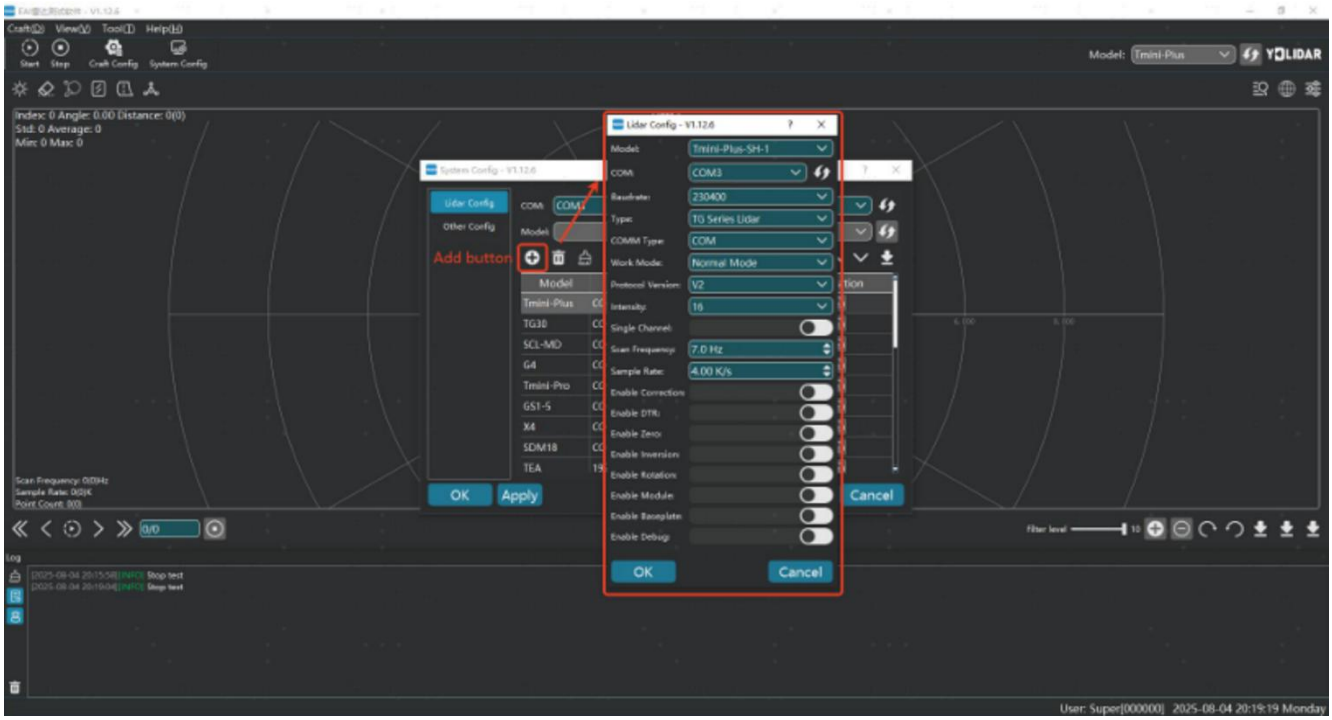
FIG 8 YDLIDAR TW3 LIDARCLIENT SOFTWARE INTERFACE

2.3.1 Start Scanning

Click "System Config" button, then click "Lidar Config" to find out if there is LiDAR model you need . If so, click the "move to the top button " to the top, and select the corresponding serial port. If can not find out serial port accordingly, click the "Refresh Serial Port" button on the right and then select the serial port . After the configuration is completed,click the "OK" button in the lower right corner to save and close the system configuration window. As shown in the figure below



If can not find out LiDAR model you need,you need to manually add the configuration items for the model.Click"+"button and fill in the corresponding parameters in the pop-up interface, as shown below . If you do not know how to fill in the parameters, please contact YDLIDAR after-sales team for help directly by support@ydlidar.com.



Click "Start" button to start scanning. If the startup is successful, the point cloud of the current LiDAR will be displayed in real time in the polar coordinate diagram on the main interface, as shown in the figure below.

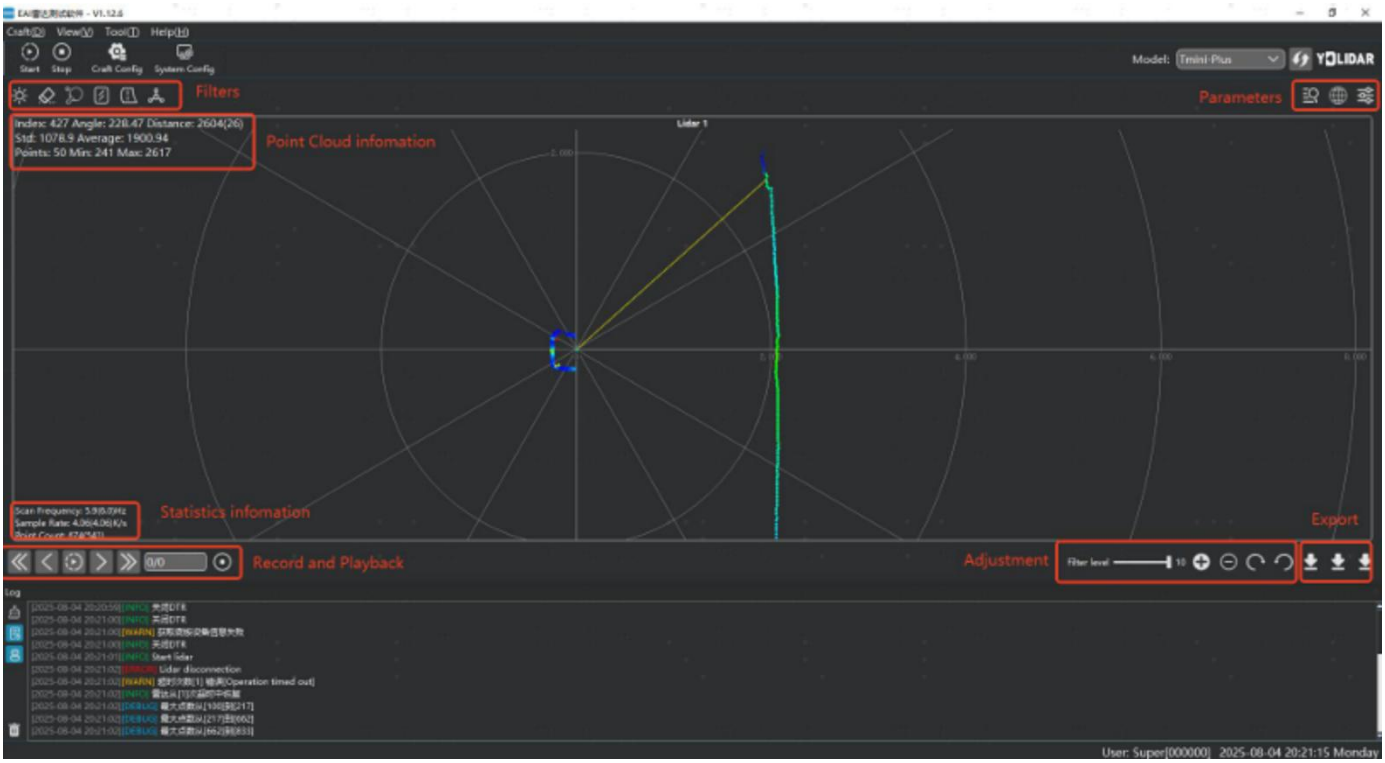


FIG 9 LIDAR SCANNING POINT CLOUD DISPLAY

2.3.2 Data Storage

During lidar scanning, click [File] in the main menu, select [Export to CSV], and save point cloud data according to the prompts. Then the system will save the point cloud information scanned in a circle in CSV format.

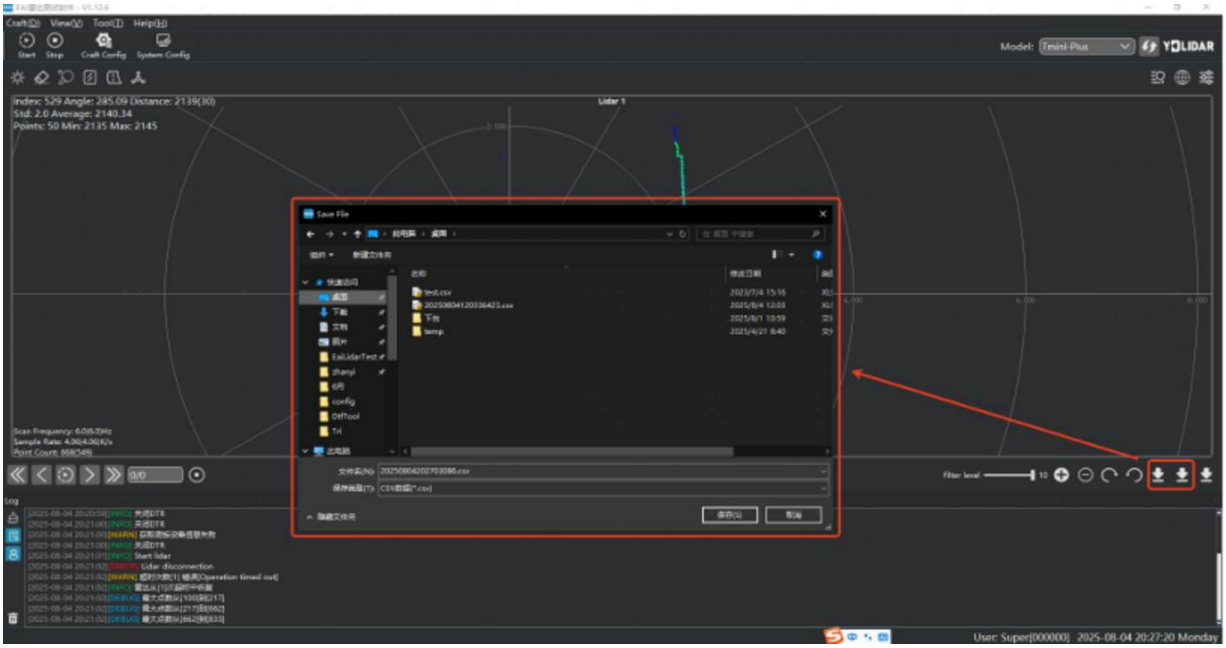


FIG 10 SAVE DATA

2.3.3 Show Intensity Graph

Right-click the mouse and select "Show Intensity Graph" in the pop-up menu to display the intensity values of a total of 50 points on the left and right of the mouse lock position., as shown below.

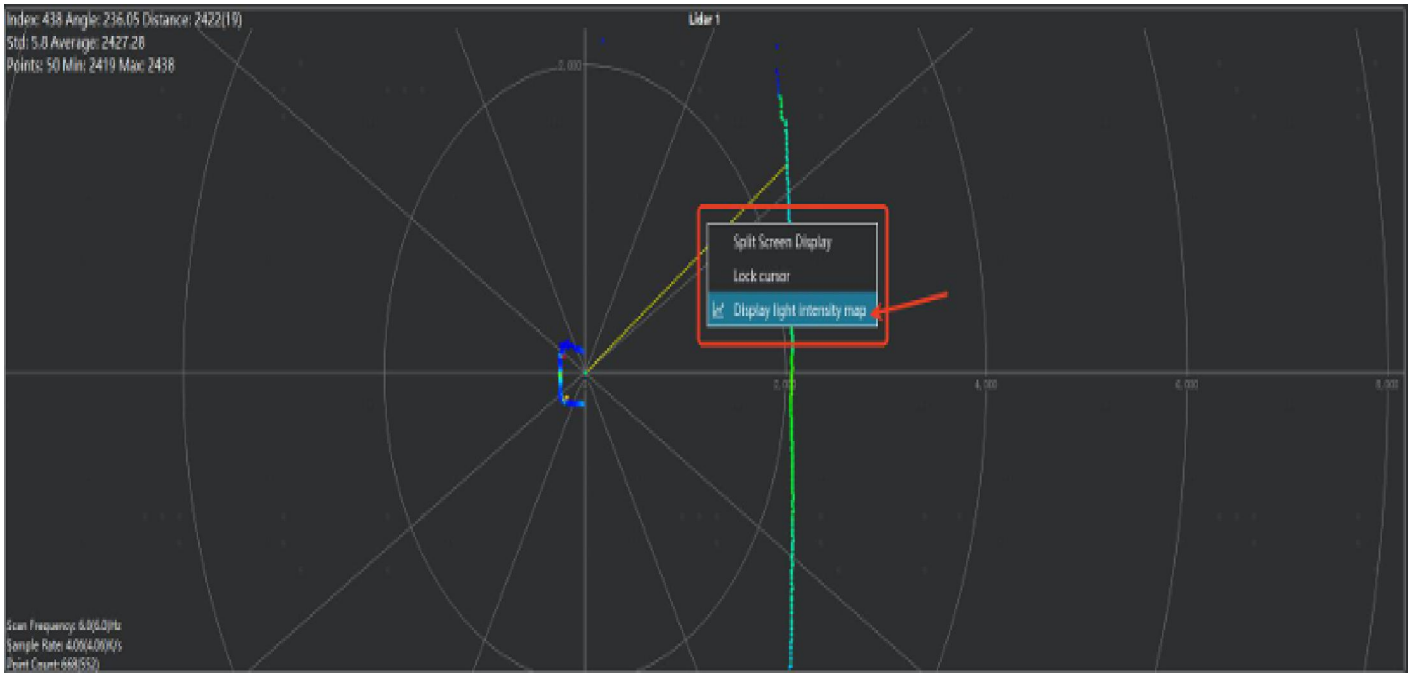


FIG 11 RIGHT-CLICK MENU

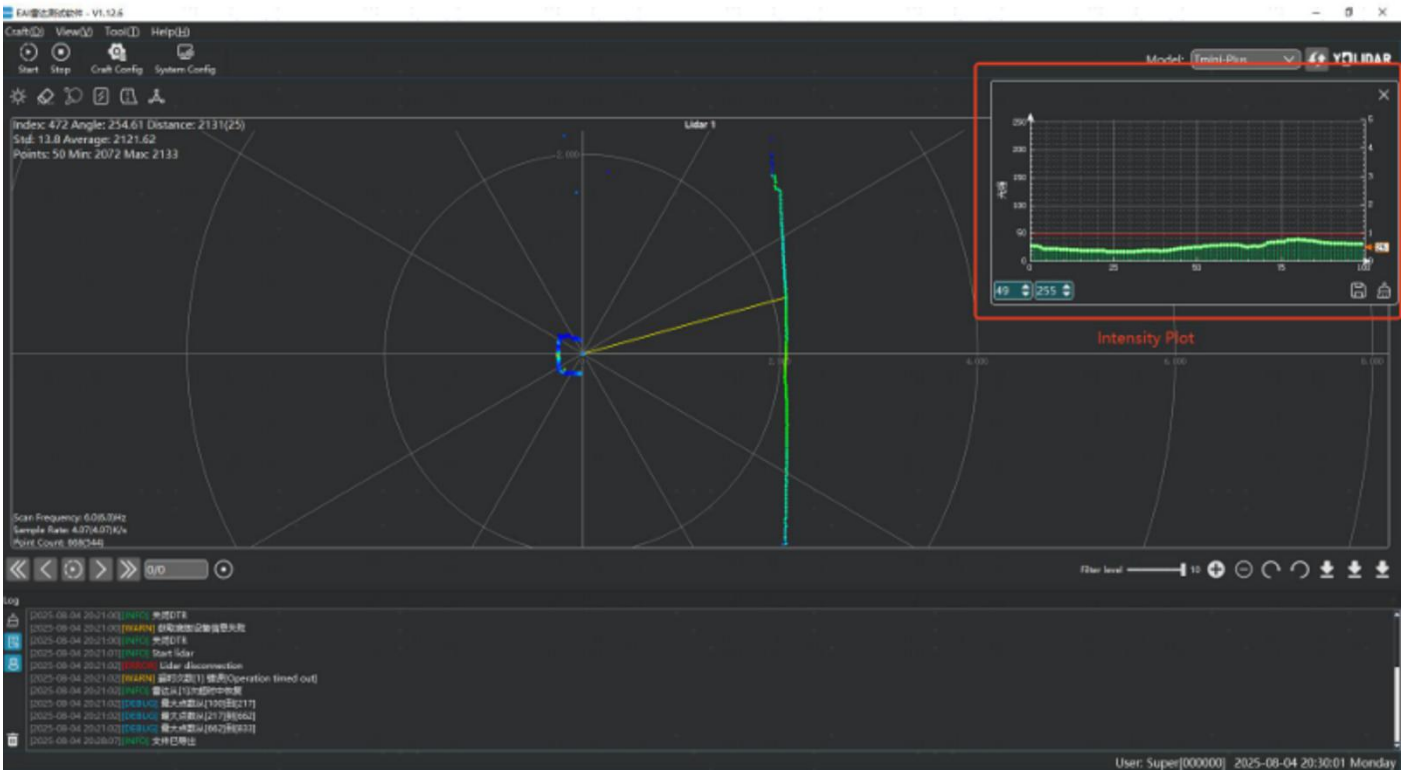
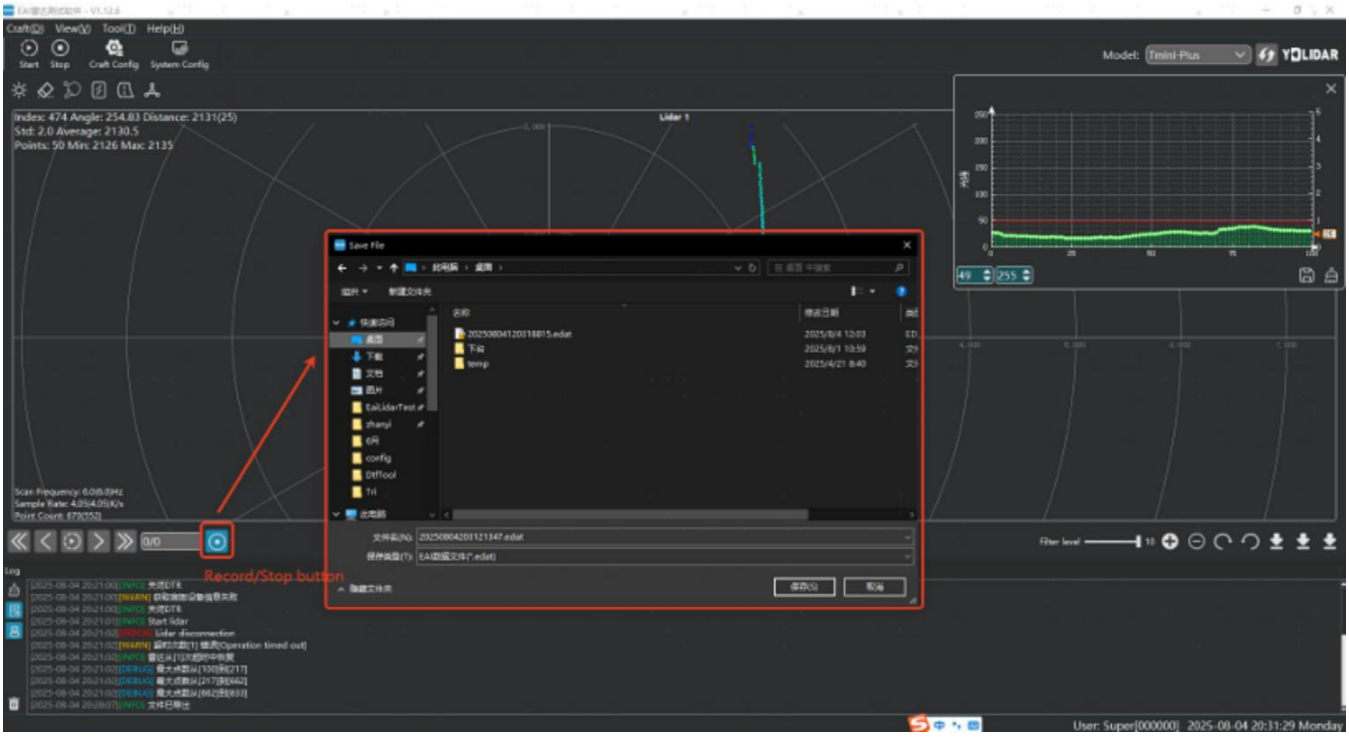


FIG 12 SHOW INTENSITY GRAPH

2.3.4 Play and Record

When start to scan, you can click"Record" button in the lower left corner and enter file name to start recording. If you do not need to record, click the "Record" button again to stop recording.



If you need to play the recorded point cloud, you can click the "Playback" button and select the file saved during recording to play the point cloud. You can pause the playback and manually switch frames, as shown in the figure below.

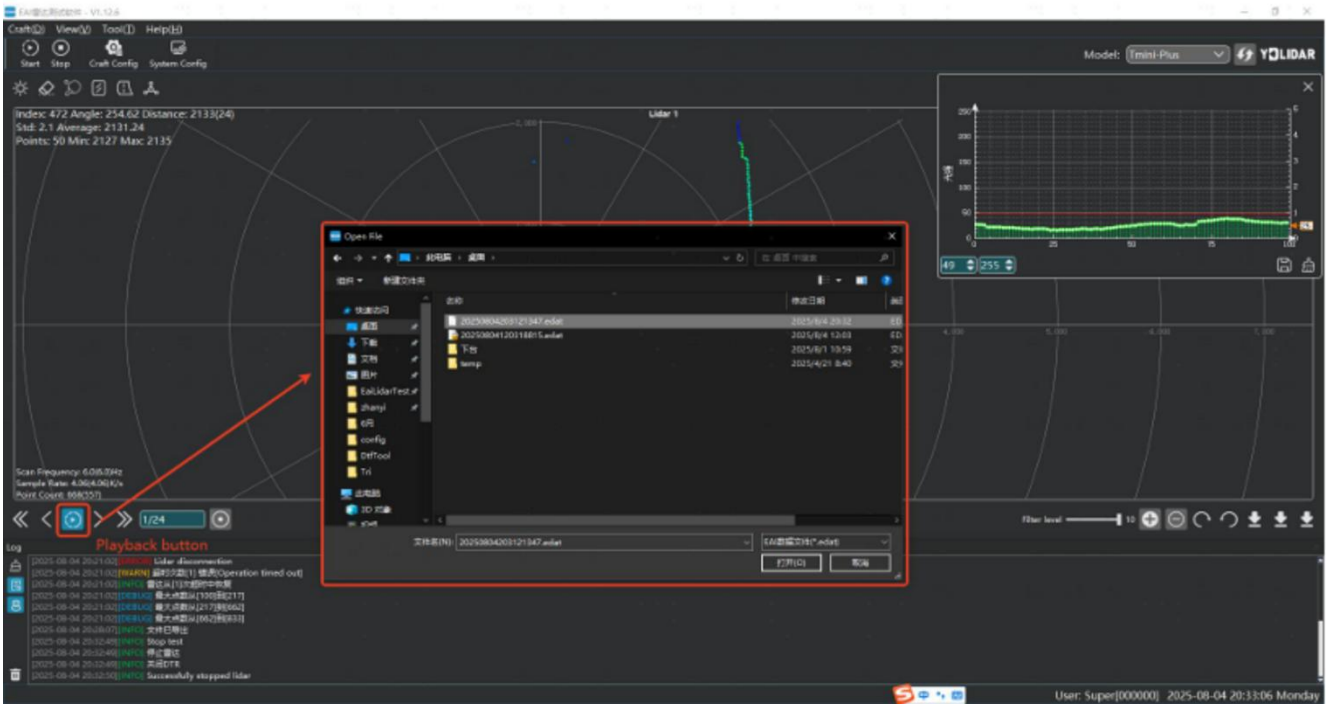


FIG 13 RECORD ANDPLAY

2.3.5 Debug

If you fail to connect LiDAR, you need to enable debugging to check the LiDAR's raw data and analyze it in conjunction with the log in the log bar.You can click [System Configuration-> LiDAR Configuration-> Double-click the LiDAR item-> Click "Enable Debugging" in the pop-up interface, as shown in the figure below.

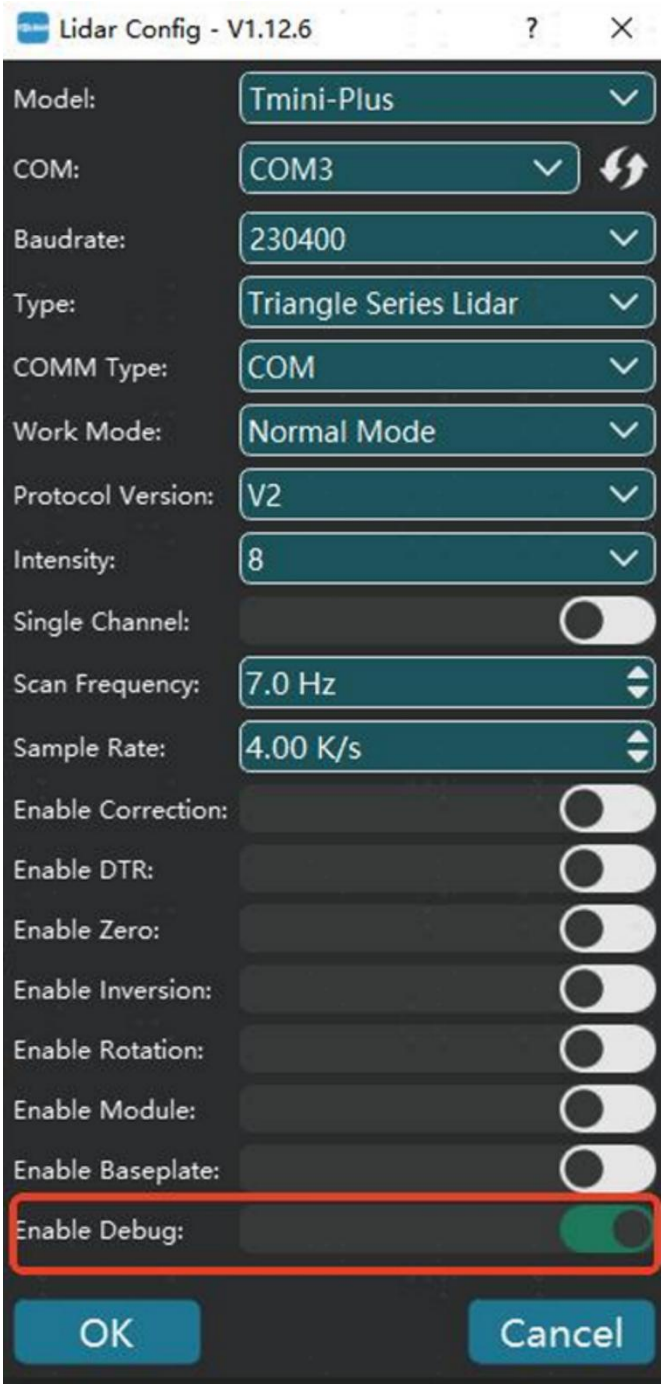


FIG 14 START DEBUGGING

2.3.6 Filter

Please do not use filter function if unnecessary.

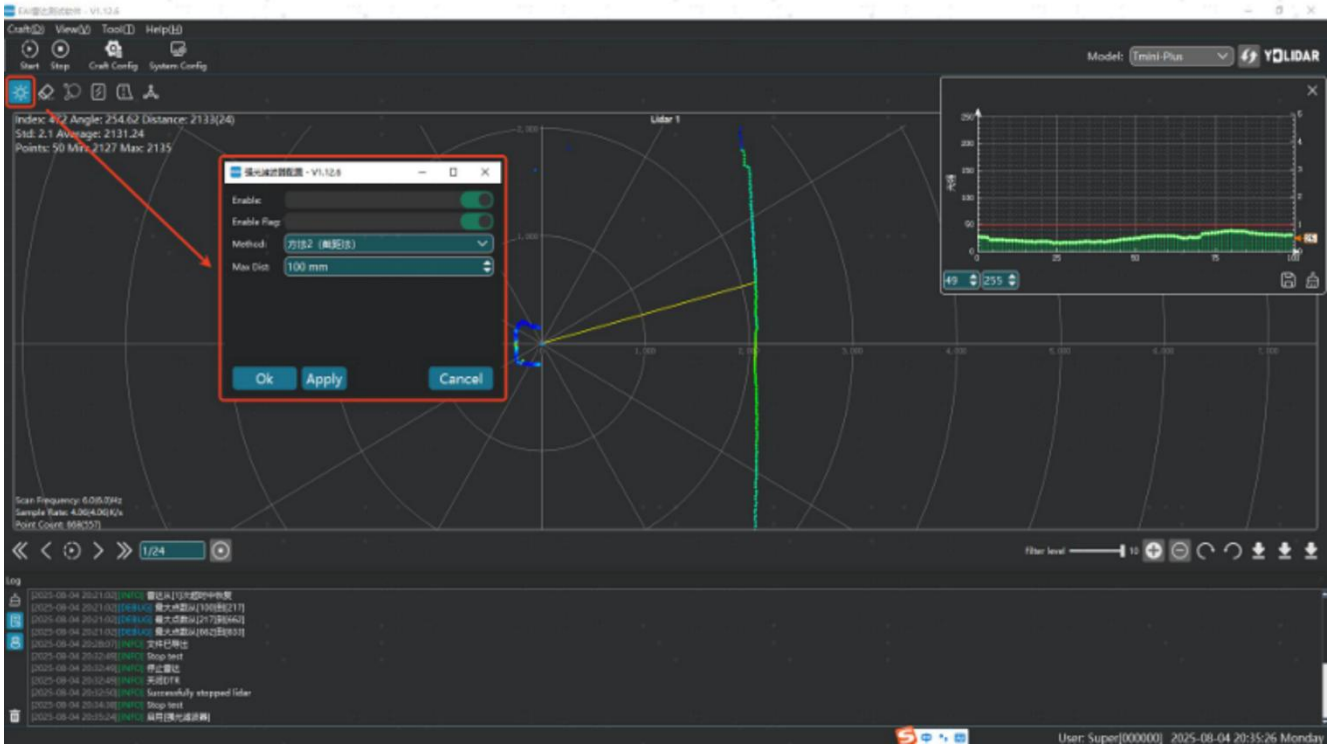


FIG 15 FILTER SETTING

Note: For any issues about LiDAR Client software,please contact for help through YDLIDAR after-sales team support@ydlidar.com directly.

3 LINUX ROS OPERATION

There are many Linux versions， this article only uses Ubuntu 18.04, Melodic version ROS as an example.

SDKdriver address:

https://github.com/YDLIDAR/YDLidar-SDK

ROS driver address:

https://github.com/YDLIDAR/ydlidar_ros_driver

3.1 Device Connection

Under Linux, the TW3 and PC interconnect processes are consistent with those under Windows. See Device Connection under Window

3.2 Compile and Install YDLidar-SDK

ydlidar_ros_driver depends on the YDLidar-SDK library. If you have never installed the YDLIDAR-SDK library, or it has expired, you must first install the YDLidar-SDK library. If you have the latest version of YDLidar-SDK installed, please skip this step, then go to the next step.

```
$ git clone https://github.com/YDLIDAR/YDLidar-SDK.git
$ cd YDLidar-SDK/build
$ cmake ..
$ make
$ sudo make install
```

3.3 ROS Driver Installation

1) Cloning GitHub's ydlidar_ros_driver Package:

```
$ git clone https://github.com/YDLIDAR/ydlidar_ros_driver.git
```

2) Build the ydlidar_ros_driver software package:

```
$ cd ydlidar_ws
$ catkin_make
```

3) Package environment Settings:

```
$ source ./devel/setup.sh
```

Note: Add a permanent workspace environment variable. It will be very convenient if ROS environment variables are automatically added to your bash session every time you start a new shell:

```
$ echo "source ~/ydlidar_ws/devel/setup.bash" >> ~/.bashrc
$ source ~/.bashrc
```

4) Verify that your package path is set, echo the ROS_PACKAGE_PATH variable.

```
$ echo $ROS_PACKAGE_PATH
```

You should see something like this: /home/tony/ydlidar_ws/src:/opt/ros/melodic/share

5) Create Serial Port Alias [Optional]

```
$ chmod 0777 src/ydlidar_ros_driver/startup/*

$ sudo sh src/ydlidar_ros_driver/startup/initenv.sh
```

Note: After completing the previous operation, re-insert the LiDAR again.

3.4 Run the ydlidar_ros_driver

Run ydlidar_ros_driver with startup file, as shown below:

```
$ roslaunch ydlidar_ros_driver Tmini.launch
```

3.5 RVIZ Scan Result Checking

Run the launch file and open rviz to view the TW3 scan results, as shown below:

```
$ ros launch ydlidar_ros_driver lidar_view.launch
```

Note: Take G4 as an example by default. If you use other lidars, change the lidar.launch file in lidar_view.launch file to the corresponding **. (If using T-mini Plus lidar, change to Tmini.launch)

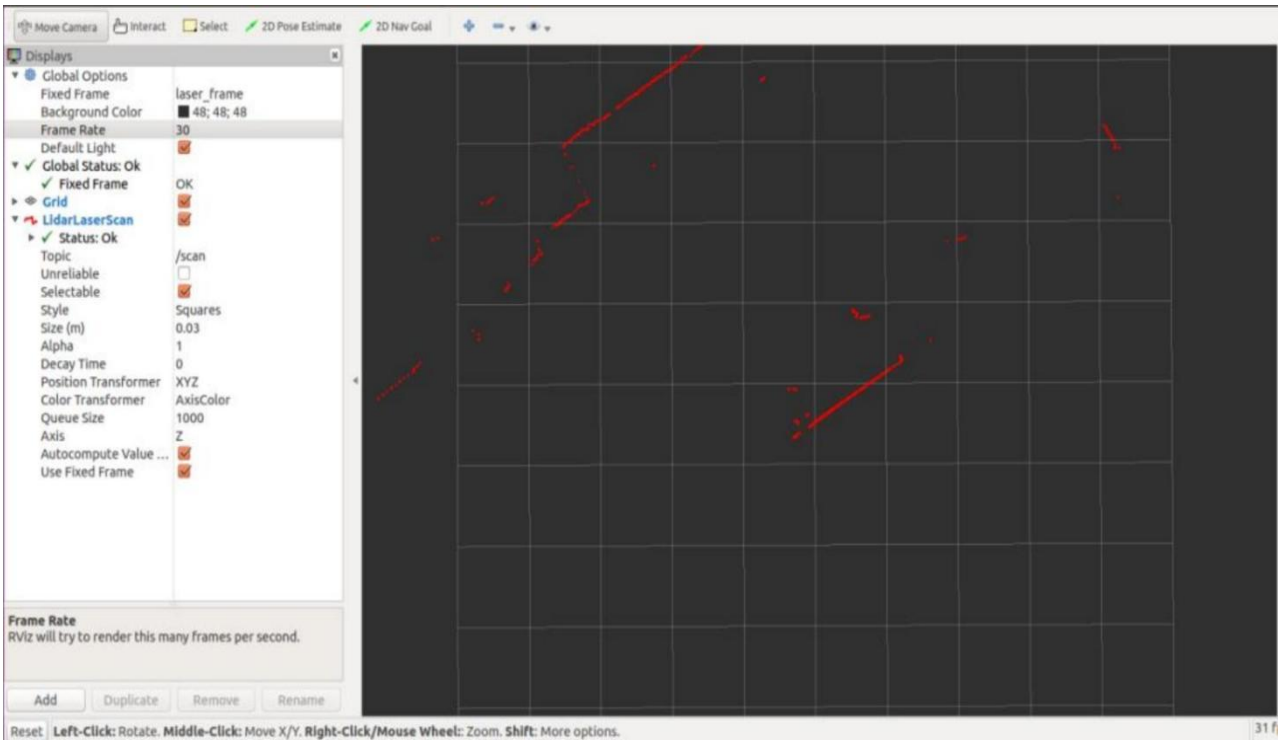


FIG 1 YDLIDAR TW3 RVIZ

3.6 Modify Scan Angle

The scanning data seen by running the launch file is displayed by default with 360 degree data. To modify the display range, you need to modify the configuration parameters in the launch file. The specific operation is as follows: 1) Switch to the directory where the corresponding [launch file] is located, edit the file, and its content is as shown in the figure:

```
$ vim Tmini.launch
```

```
<launch>
  <node name="ydlidar_lidar_publisher"  pkg="ydlidar_ros_driver"  type="ydlidar_ros_d
river_node" output="screen" respawn="false" >
    <!-- string property -->
    <param name="port"         type="string" value="/dev/ydlidar"/>
    <param name="frame_id"     type="string" value="laser_frame"/>
    <param name="ignore_array"     type="string" value=""/>

    <!-- int property -->
    <param name="baudrate"         type="int" value="230400"/>
    <!-- 0:TYPE_TOF, 1:TYPE_TRIANGLE, 2:TYPE_TOF_NET -->
    <param name="lidar_type"       type="int" value="1"/>
    <!-- 0:YDLIDAR_TYPE_SERIAL, 1:YDLIDAR_TYPE_TCP -->
    <param name="device_type"         type="int" value="0"/>
    <param name="sample_rate"         type="int" value="4"/>
    <param name="abnormal_check_count"         type="int" value="4"/>

    <!-- bool property -->
    <param name="resolution_fixed"    type="bool"   value="false"/>
    <param name="auto_reconnect"    type="bool"   value="true"/>
    <param name="reversion"    type="bool"   value="true"/>
    <param name="inverted"    type="bool"   value="true"/>
    <param name="isSingleChannel"    type="bool"   value="false"/>
    <param name="intensity"    type="bool"   value="true"/>
    <param name="support_motor_dtr"    type="bool"   value="false"/>
    <param name="invalid_range_is_inf"    type="bool"   value="false"/>
    <param name="point_cloud_preservative"    type="bool"   value="false"/>

    <!-- float property -->
    <param name="angle_min"    type="double" value="-180" />
    <param name="angle_max"    type="double" value="180" />
    <param name="range_min"    type="double" value="0.0" />
    <param name="range_max"    type="double" value="16.0" />
    <param name="frequency"    type="double" value="6.0"/>
  </node>
  <node pkg="tf" type="static_transform_publisher" name="base_link_to_laser4"
    args="0.0 0.0 0.2 0.0 0.0 0.0 /base_footprint /laser_frame 40" />
</launch>
```

FIG 2 TMINI.LAUNCH FILE

Note: For more information about the file contents, please refer to:

https://github.com/YDLIDAR/ydlidar_ros_driver#configure-ydlidar_ros_driver-internal-parameter

2)The TW3 lidar coordinates follow the right-hand rule within ROS, with an angle range of [-180, 1 80]. "angle_min" is the start angle, and "angle_max" is the en dangle. The specific scope needs to be modified according to actual use.

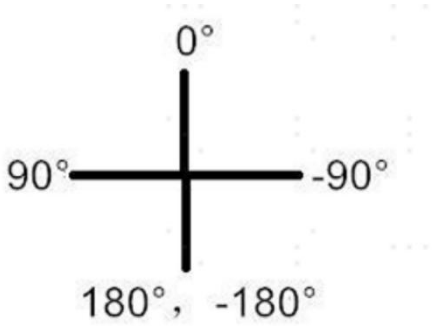


FIG 3 YDLIDAR TW3 COORDINATES DEFINITION

4 Revise

Date	Version	Content
2025-09-06	1.0	The 1st released