1. Introduction and use of 4ROS lidar

1. Program function description

After the program runs, drive 4ROS LIDAR, turn on the lidar scanning data, visualize the data scanned by LIDAR in rviz.

2. Program code reference path

After entering the docker container, the location of the source code for this function is located at.

```
/root/yahboomcar_ros2_ws/software/library_ws/src/ydlidar_ros2_driver-
master/launch/ydlidar_launch.py
/root/yahboomcar_ros2_ws/software/library_ws/src/ydlidar_ros2_driver-
master/launch/ydlidar_launch_view.py
```

3. Program startup

After entering the docker container, docker terminal enter, the

```
ros2 launch ydlidar_ros2_driver ydlidar_launch.py #单独启动雷达 # Activate the
lidar alone
ros2 launch ydlidar_ros2_driver ydlidar_launch_view.py #启动雷达和rviz可视化数据
#Start lidar and rviz visualization data
```

running screenshots.
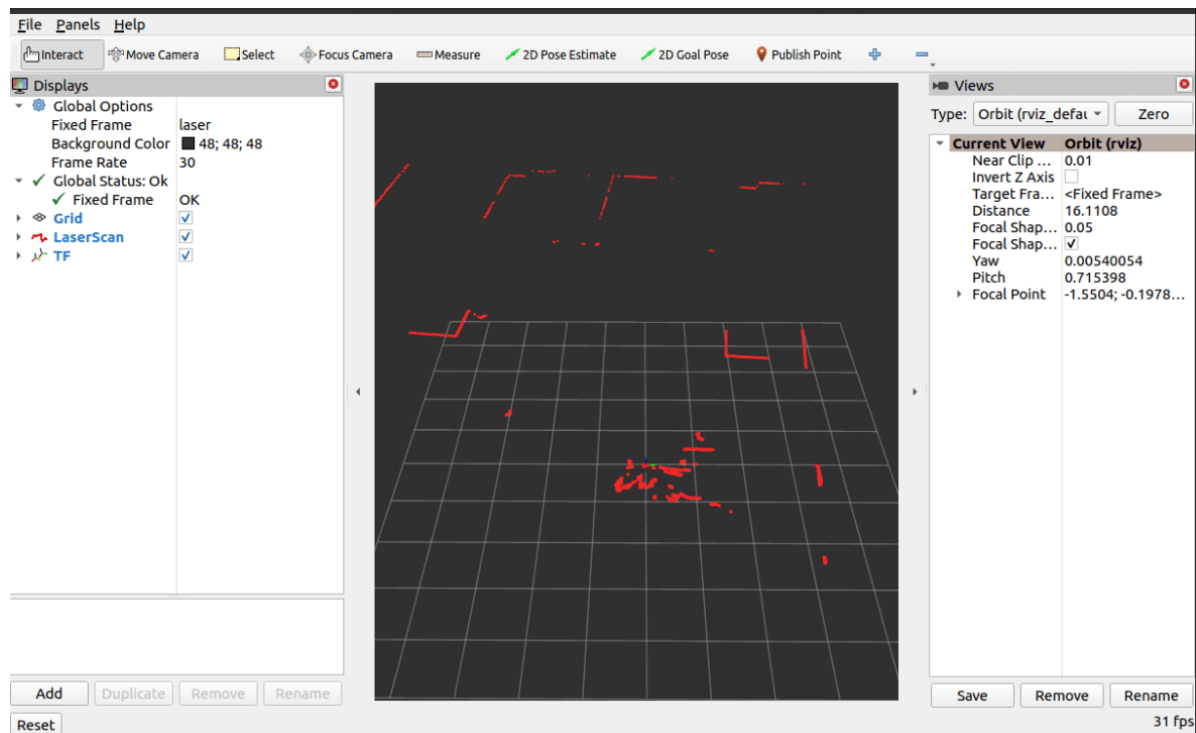
The data from the lidar scan can be printed with the following command, the

```
ros2 topic echo /scan
```

```
---
header:
  stamp:
    sec: 1677917683
    nanosec: 381620000
  frame_id: laser
angle_min: -3.1415927410125732
angle_max: 3.141592741C125732
angle_increment: 0.0013114559696987271
time_increment: 0.00011590439680730924
scan_time: 0.5552979707717896
range_min: 0.009999999776482582
range_max: 64.0
ranges:
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.04724999889731407
- 0.0
- 0.048250000923871994
- 0.04800000041723251
- 0.04899999871850014
- 0.04975000023841858
- 0.0
- 0.0
- 0.0
- 0.0507499985396862
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.04874999821186066
- 0.04924999922513962
```

4. Introduction to 4ROS lidar

4.1 Overview

4ROS laser lidar, based on the principle of pulse ToF ranging with related optical, electrical and algorithmic design, realizes high-frequency and high-precision distance measurement. Meanwhile, the mechanical structure is rotated by 360 degrees to continuously obtain the angle information, so as to realize 360-degree scanning ranging and output the point cloud data of the scanned environment.

4.2. Ranging Principle

TOF ranging method: TOF LIDAR is based on measuring the time of flight of light to obtain the distance of the target. Its working principle is mainly manifested as, through the laser

The working principle is that the laser transmitter sends out a beam of modulated laser signal, the modulated light is reflected by the measured object and then received by the laser detector, and the distance of the target can be calculated by measuring the phase difference between the transmitting laser and the receiving laser.

4.3. Performance Parameters

projects	minimum	typical	maximum	unit	note
ranging frequency	/	20000	/	Hz	/
Scan Frequency	5	7	12	Hz	Software speed control, factory default 7Hz
Range	0. 05	/	30	m	80% reflectance
Scan Angle	/	0-360	/	Deg	/
angular resolution	0. 09@5Hz	0. 13@7Hz	0. 22@12Hz	Deg	Ranging frequency of 20 KHz
laser level	0	/	1	Deg	/

4.4 Ranging accuracy

Distance (mm)	Average error (mm)
50-5000	≤±60
5000-20000	≤±40
20000-30000	≤±100

4.5. Product Features

- Dustproof and waterproof, meets IP65
- 360-degree omni-directional scanning, 5-12Hz adjustable scanning frequency
- High-speed ranging, ranging frequency 20000Hz
- Small ranging error, good ranging stability.
- Strong resistance to ambient light interference