

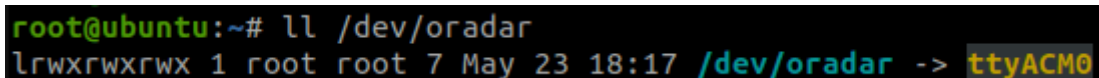
1. Introduction and use of lidar

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Before driving the lidar, you need to recognise the olidar lidar device on the cart side. The environment is already set up in the system image, SSH connect to the cart and enter it in the terminal:

```
ll /dev/olidar
```



```
root@ubuntu:~# ll /dev/oradar
lrwxrwxrwx 1 root root 7 May 23 18:17 /dev/oradar -> ttyACM0
```

The result shows the olidar and its corresponding port, which means the lidar device is connected successfully. If no result is displayed, you can try to re-plug the lidar USB.

1.1. Program Function Description

After running the program, start the Lidar of olidar MS200, turn on the Lidar scanning data, and visualise the Lidar scanning data in rviz on the virtual machine side.

1.2 Program Code Reference Path

SSH connection to the car, start the lidar function source code location is located at.

```
~/software/library_ws/src/olidar_lidar/launch/ms200_scan.launch.py
```

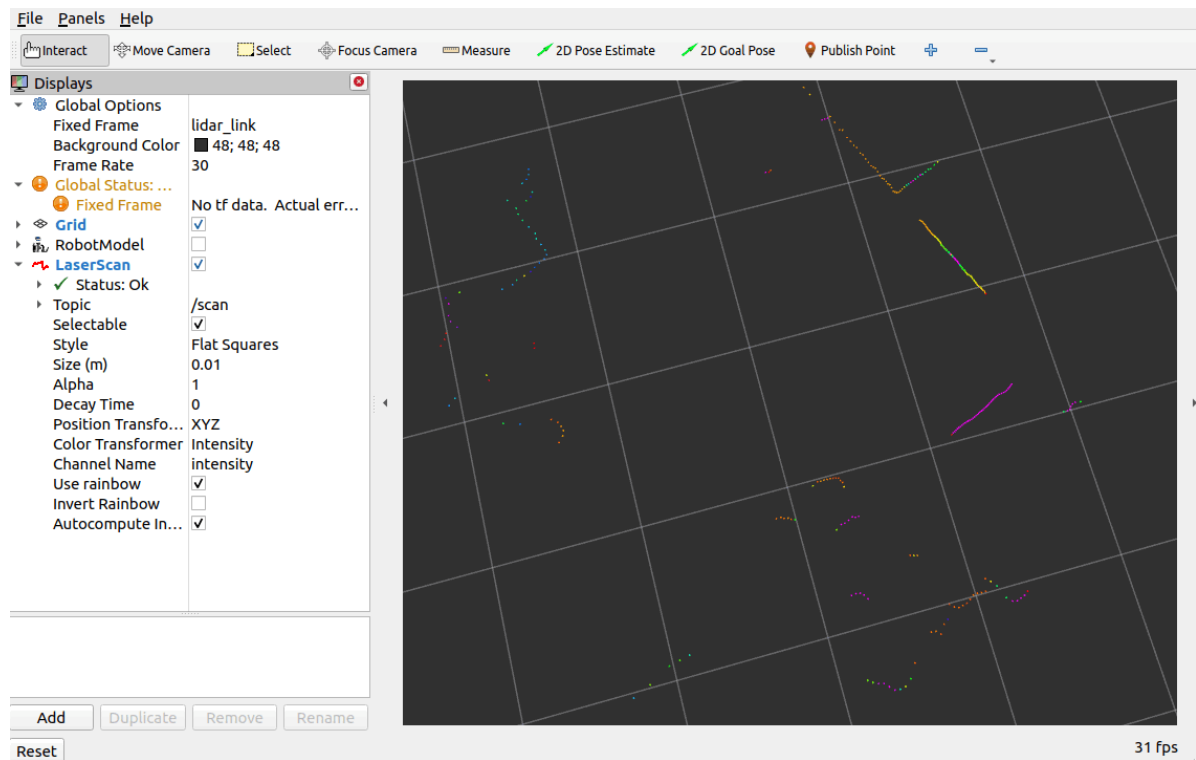
1.3. Programme startup

After SSH connecting to the car, run in the terminal, the

```
ros2 launch olidar_lidar ms200_scan.launch.py
```

Open a terminal on the VM side and run.

```
ros2 launch yahboomcar_rviz yahboomcar_laser_launch.py
```



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

```
ros2 topic echo /scan
```

```
header:
  stamp:
    sec: 1684740712
    nanosec: 121202197
    frame_id: lidar_link
  angle_min: 0.00959963072091341
  angle_max: 6.280392646789551
  angle_increment: 0.013997306115925312
  time_increment: 0.00022455837461166084
  scan_time: 0.1006021499633789
  range_min: 0.05000000074505806
  range_max: 20.0
  ranges:
    - 1.559999942779541
    - 1.5809999704360962
    - 1.590000033378601
    - 1.6009999513626099
    - 1.6109999418258667
    - 1.6239999532699585
    - 1.6390000581741333
```

1.4 Introduction to the MS200 Radar

1.4.1 Overview

Single-line Lidar is a lidar in which the beam emitted from the laser source is a single line, with triangulation and TOF Lidar, mainly used in the field of robotics. Its scanning speed, strong resolution, high reliability, compared with multi-line Lidar, single-line Lidar in the angular frequency and sensitivity of the response faster, so the obstacle ranging distance and accuracy is also more accurate.

1.4.2, Ranging Principle

The measuring principle of AURORA MS200 is the TOF ranging method.

TOF LIDAR is based on measuring the time of flight of light to obtain the distance of the target. The working principle is that the laser transmitter sends out a modulated laser signal, which is reflected by the measured object and received by the laser detector, and the distance to the target is calculated by measuring the phase difference between the transmitted laser and the received laser.

1.4.3, Baud Rate

The baud rate of MS200 lidar is 230400.

1.4.4 Specification Parameters

Product Model	MS200e	Instruction
Measuring range	0.03m~12.0m	90% reflectivity
Measurement accuracy	Typical value: $\pm 10\text{mm}$ [0.2m~2.0m] $\pm 20\text{mm}$ [2.0m~12.0m] Maximum value: $\pm 40\text{mm}$ [0.2m~12.0m]	Statistical results of at least 100 radar acquisitions at room temperature indoors at 90 per cent reflectivity. Accuracy is the difference between the mean and the true value of the data, and precision is the sample standard deviation of the data (1σ)
Measurement accuracy	Typical value: $\leq 4\text{mm}$ [0.2m~2.0m] $\leq 15\text{mm}$ [2.0m~12.0m] Maximum value: $\leq 15\text{mm}$ [0.2m~2.0m] $\leq 30\text{mm}$ [2.0m~12.0m]	
Data Information	Distance, angle, intensity, timestamp	-
Scan Angle	360°	-
counting frequency	4500 points/second	-
rotational angle	7~15Hz, default 10Hz	Configurable, 1Hz interval
angular resolution	0.8°@10Hz	Angular resolution related to point frequency
Laser Output Pitch Angle	0.5°~2°	Based on the bottom surface of the outer frame of the lidar base
Laser zero degree exit azimuth	0±2°	-
laser wavelength	near infrared	-
human eye security level	Class 1 IEC60825-1:2014	-
Ambient light resistance	30,000Lux	-
working life	≥10,000 hours	Based on 600rpm test
Working power	DC 5.0±0.5V	-
voltage ripple	<100mV	-
Start-up current	<500mA	-
Working Current	typical value 260mA	-
working temperature	-10°C~50°C	typical value 25°C
Storage temperature	-30°C~70°C	typical value 25°C
Protection level	IP5X	-
Product Size	37.7*37.5*33.0	Length X Width X Height (in mm)
net weight	About 40g	-
accreditation	RoHS2.0, REACH, CE, FCC	-

Among them, parameters such as range, measurement accuracy, rotation speed, and angular resolution are important indicators of the lidar's operational performance.