# What is LiDAR?

LiDAR stands for Light Detection and Ranging. It’s a special kind of sensor that uses laser beams to measure how far things are around it. You can think of it like a superhero’s radar—it spins and shoots out tiny lasers, then checks how long it takes for them to bounce back. That’s how it knows where walls, chairs, or even people are! Robots use LiDAR to “see” and move around safely without bumping into things.

# How to Set Up RPLIDAR C1 on ROS 2 (Ubuntu)

Let’s install the LiDAR on a Raspberry Pi running Ubuntu and ROS 2 Humble. Follow these simple steps:

## Step 1: Set up your ROS 2 environment

Open your terminal and type:

source /opt/ros/humble/setup.bash

## Step 2: Create a new workspace folder

This is where you’ll store your LiDAR files:

cd ~

mkdir -p ~/ws\_lidar/src

cd ~/ws\_lidar/src

## Step 3: Download the LiDAR software

Get the code from the internet (GitHub):

git clone https://github.com/Slamtec/sllidar\_ros2.git

## Step 4: Check if the folder was downloaded

Type:

ls -la

You should see a folder named `sllidar\_ros2`.

## Step 5: Build the workspace

Now build the software:

cd ~/ws\_lidar/

colcon build --symlink-install

If you see warnings (stderr), don’t worry! They're just messages—not errors.

## Step 6: Check if the build worked

Make sure these folders show up:

ls -la

Look for: `build`, `install`, `log`, and `src`

## Step 7: Tell your system about the new software

So it knows how to find your LiDAR code:

source ~/ws\_lidar/install/setup.bash

## Step 8: Plug in your RPLIDAR via USB

Now we need to check if the computer sees the LiDAR. Type:

ls -la /dev | grep USB

Look for something like:

crw-rw---- 1 root dialout ... ttyUSB0

This means your LiDAR is connected to port `ttyUSB0`.

## Step 9: Give permission to access the LiDAR

So we can talk to it without admin problems:

sudo chmod 777 /dev/ttyUSB0

Double check:

ls -la /dev | grep USB

Now it should say:

crwxrwxrwx ...

## Step 10: Launch the LiDAR!

Run this command to start seeing laser data:

ros2 launch sllidar\_ros2 view\_sllidar\_c1\_launch.py

That’s it! You’ve successfully installed and launched your LiDAR on ROS 2!

## Step 11: Open RViz2 to See the LiDAR Scan

Once your LiDAR is running, open a new terminal (don’t close the LiDAR one!) and type:

rviz2

RViz2 is like the robot’s eyes! It shows a live 2D scan of what the LiDAR "sees" around it.

## Step 12: Set the RViz2 Display Settings

Once RViz2 opens, follow these steps:

1. On the left panel, click `Add` → choose `LaserScan`.

2. Set the LaserScan Topic to:

/scan

3. Set the Fixed Frame (top left dropdown) to:

laser

Now you should start seeing dots or lines representing objects around the LiDAR!

## Step 13: What if RViz2 is not installed?

If your terminal says:

Command 'rviz2' not found

then RViz2 is not installed yet.

Install it using this command:

sudo apt update

sudo apt install ros-humble-rviz2

Once installed, try again:

rviz2