

SLAM on a Drone

Installing cartographer package(s) on ROS Noetic, Ubuntu 20.04 focal fossa for the 'SLAM on a drone' project: -

Followed directions from -

<https://google-cartographer-ros.readthedocs.io/en/latest/compilation.html>

Trailing from the following links,

1. <https://www.google.com/search?q=cartographer+for+ros+noetic&oq=cartographer+for+ros+noetic&aqs=chrome..69i57.7201j0j1&sourceid=chrome&ie=UTF-8>
2. <https://answers.ros.org/question/365117/is-it-possible-to-use-google-cartographer-with-ros-noetic/>
3. Faced an issue while installing the dependencies using *rosdep*, one of the dependencies wasn't released for ubuntu focal, and hence had to be commented out in the **<your_workspace>/src/cartographer/package.xml file** (fig. 1). The commented dependency will be installed separately using a command, in the next step.

```
<depend>libboost-iostreams-dev</depend>
<depend>eigen</depend>
<!--<depend>libabsl-dev</depend>-->
<depend>libcairo2-dev</depend>
<depend>libceres-dev</depend>
```

Fig. 1: Commenting out **libabsl-dev** .

4. Follow the next installation steps from :
<https://google-cartographer-ros.readthedocs.io/en/latest/compilation.html>
5. Cloned the gbot_core pkg git from https://github.com/Andrew-rw/gbot_core in a **separate workspace**.
6. The gbot_core pkg runs with rplidar, whereas our project has robotis lds lidar. The drivers will be available on
https://emanual.robotis.com/docs/en/platform/turtlebot3/sbc_setup/#sbc-setu
Follow only the steps relevant to installing the driver (fig. 2): -

```
$ sudo apt update
$ sudo apt install libudev-dev
$ cd ~/catkin_ws/src
$ git clone -b develop https://github.com/ROBOTIS-GIT/ld08_driver.git
```

Fig. 2: Steps for installing the **lidar drivers (ld08)**.

7. Add source commands for all the workspaces in the .bashrc file.
8. The gbot.launch file is written to run the rplidar node along with cartographer, hence the rplidar node needs to be commented/deleted. A new launch file was written to run without the rplidar node. The *ld08.launch* can be included in this new *gbot_ld08.launch*.
9. A tf error was encountered upon running the *gbot_ld08.launch* file as in fig. 3

```
5 16:23:40.000000 37388 tf_bridge.cc:52] "base_scan" passed to lookupTransform argument source_frame does not  
5 16:23:40.000000 37388 tf_bridge.cc:52] "base_scan" passed to lookupTransform argument source_frame does not
```

"base_scan" passed to lookupTransform argument source_frame does not exist.

This was assumed to mean that the laser data was not being transformed to base_link from base_scan.

Hence, to solve this problem, a static transform was published from the terminal using the command: -

roslaunch tf2_ros static_transform_publisher 0 0 -0.05 0 0 1 -0 base_link base_scan

The numbers in the above command were taken as the exact same as the transform between the links ***laser*** and ***base_link***.

After this, the mapping started working, and the map could be visualized on rviz, upon adding the plugins: -

1. Map (Occupancy grid map)
2. PointCloud2
3. Robot model.

Make sure to modify the points from PointCloud2 to make them adequately visible.