

ON TURTLEBOT 2

Camera and Mapping

3/1/2016

1. Unplug POWER CORD TO NETBOOK - Make sure it is charged.
2. LOG ON NETBOOK PASS: TB
3. Connect ASUS camera to Netbook - USB
4. POWER ON BASE (Button to right of base)
4. ~~CONNECT NETBOOK TO BASE (lower left of base)~~ Connector not available yet.
5. **CONNECT TO BUFFALO ROUTER**

ON WORKSTATION FOR KEYBOARD TELEOP

1. **CONNECT TO BUFFALO ROUTER (System settings > Network)**
2. Terminal 1: **\$.turtlebot2** (Set up Netbook as ROS MASTER)
#This makes TurtleBot the Master through the Buffalo Router 9/29/2015
export ROS_MASTER_URI=http://192.168.11.110 # TurtleBot 2 IP as MASTER
export ROS_IP=192.168.11.120 # Wireless IP on Workstation uNCommented out 1/25/2016
3. Terminal 1 **\$ ssh turtlebot-0877@192.168.11.110**
Enter Password turtlebot@192.168.11.123's password: xxxxxxxx
4. **\$ roslaunch turtlebot_bringup minimal.launch**

TO TEST CAMERAS

(RVIZ and Mapping below)

NEW TERMINAL-2

\$.turtlebot2

\$ ssh turtlebot-0877@192.168.11.110 **Enter Password**

\$ roslaunch oppenni2_launch oppenni2.launch ASUS Camera Driver

NEW TERMINAL -3

\$.turtlebot2

\$ rosrn image_view image_view image:=/camera/rgb/image_raw



Ctrl+c to exit or Open a New Terminal Window to see raw and depth.

\$.turtlebot2

\$ rosrn image_view image_view image:=/camera/depth/image OK – depth view



RVIZ - Start Over

1. CONNECT TO BUFFALO ROUTER (System settings > Network)

2. Terminal 1: \$ `..turtlebot2` (Set up Netbook as ROS MASTER)

#This makes TurtleBot the Master through the Buffalo Router 9/29/2015

`export ROS_MASTER_URI=http://192.168.11.110:11311` # TurtleBot 2 IP as MASTER

`export ROS_IP=192.168.11.120` # Wireless IP on Workstation uNCommented out 1/25/2016

3. Terminal 1 \$ `ssh turtlebot-0877@192.168.11.110`

Enter Password turtlebot@192.168.11.110's password: xxxxxxxx

4. \$ `roslaunch turtlebot_bringup minimal.launch`

New Terminal 2

\$ `..turtlebot2`

\$ `ssh turtlebot-0877@192.168.11.110`

\$ `roslaunch turtlebot_bringup 3dsensor.launch` (Start camera nodelet manager – no picture)

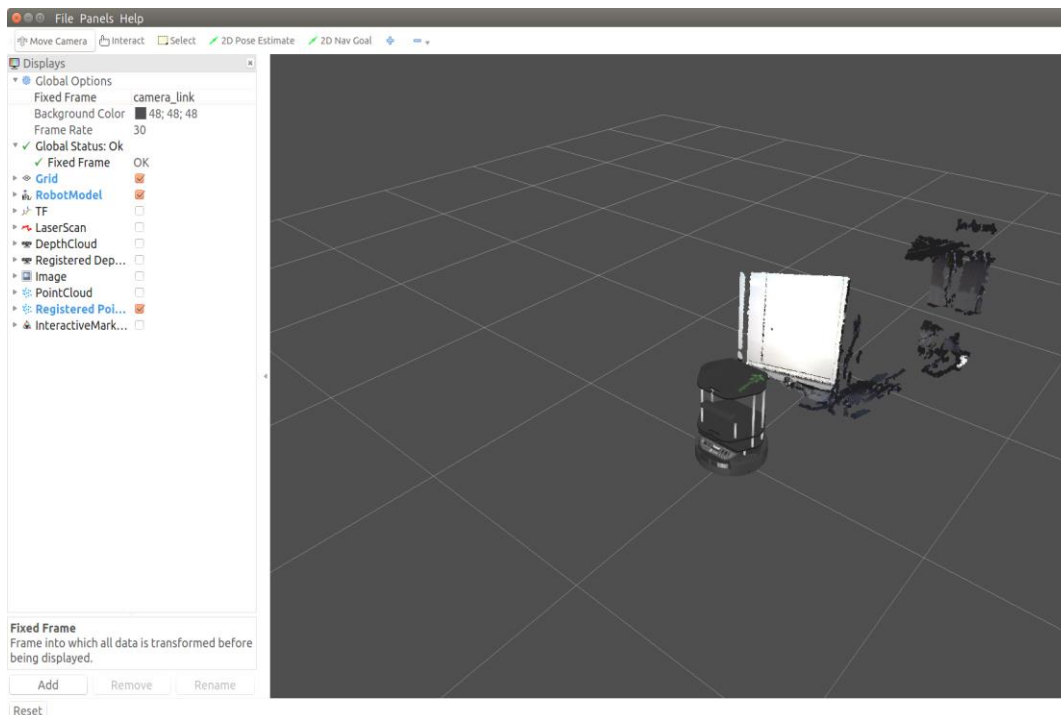
New Terminal 3

\$ `..turtlebot2`

\$ `roslaunch turtlebot_rviz_launchers view_robot.launch` rviz working Look at screen

As shown in the next screenshot we choose the following:

- Under **Global Options** in the left panel for **Fixed Frame**, change **base_link** or **base_footprint** to **camera_link**.
- To select the view – Check box under Displays **DepthCloud** or **Registered Depth** or **Image** or **Registered Point Cloud** (as here)



New Terminal 3 New Terminal 4 MOVE TURTLEBOT AND WATCH RVIZ

```
$ . ./turtlebot2
```

(We need to move TurtleBot so that odom topic feeds TF information to Rviz)

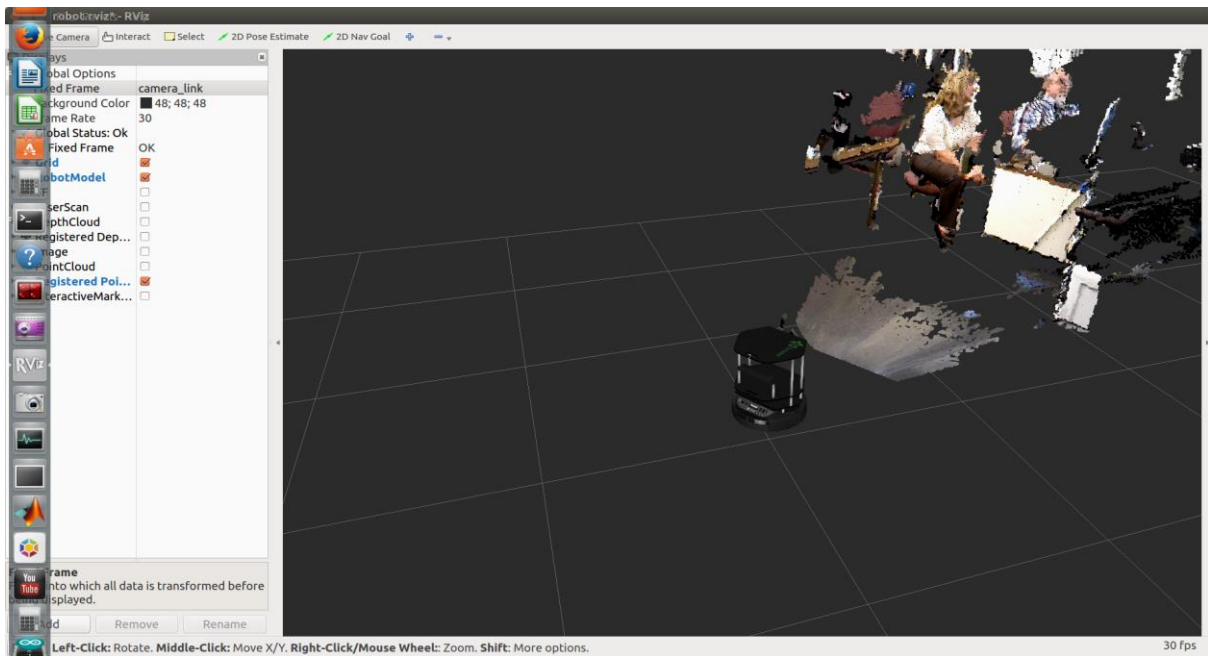
```
$ roslaunch turtlebot_teleop keyboard_teleop.launch OR
```

```
$ roslaunch turtlebot_teleop xbox360_teleop.launch (Joystick)
```

(Hold Deadman Button – Left Upper Button

```
* /turtlebot_teleop_joystick/axis_deadman: 4
```

(Be patient for Updates to RVIZ)



MAPPING

Terminal 1

```
$ . .turtlebot2
```

```
$ ssh turtlebot-0877@192.168.11.110 Enter Password
```

```
$ roslaunch turtlebot_bringup minimal.launch
```

Terminal 2

```
$ . .turtlebot2
```

```
$ ssh turtlebot-0877@192.168.11.110 Password
```

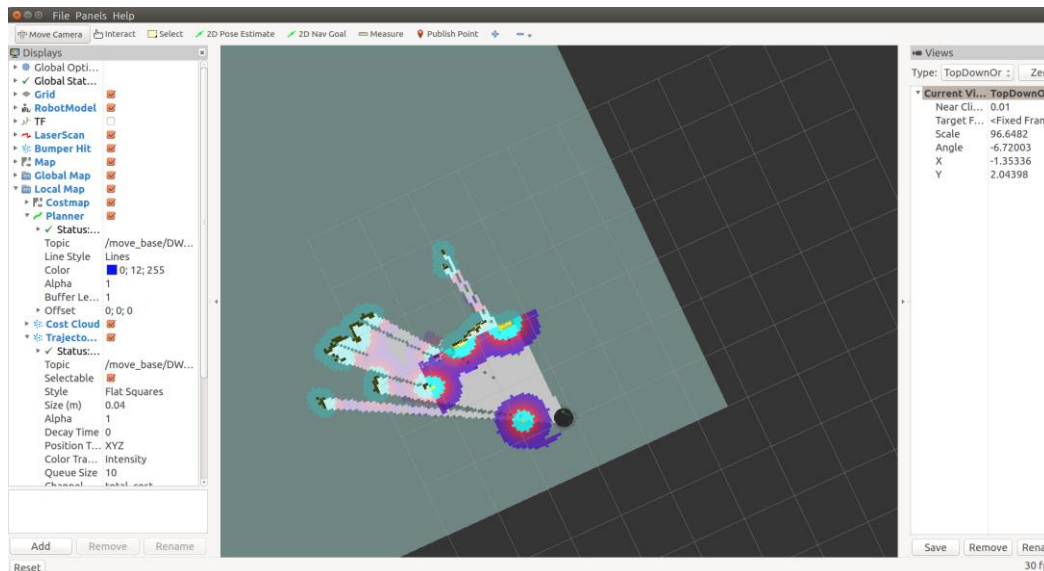
```
$ roslaunch turtlebot_navigation gmapping_demo.launch
```

(Wait for [INFO] [1456876362.958566171]: odom received!)

Terminal 3

```
$ . .turtlebot2
```

```
$ roslaunch turtlebot_rviz_launchers view_navigation.launch
```



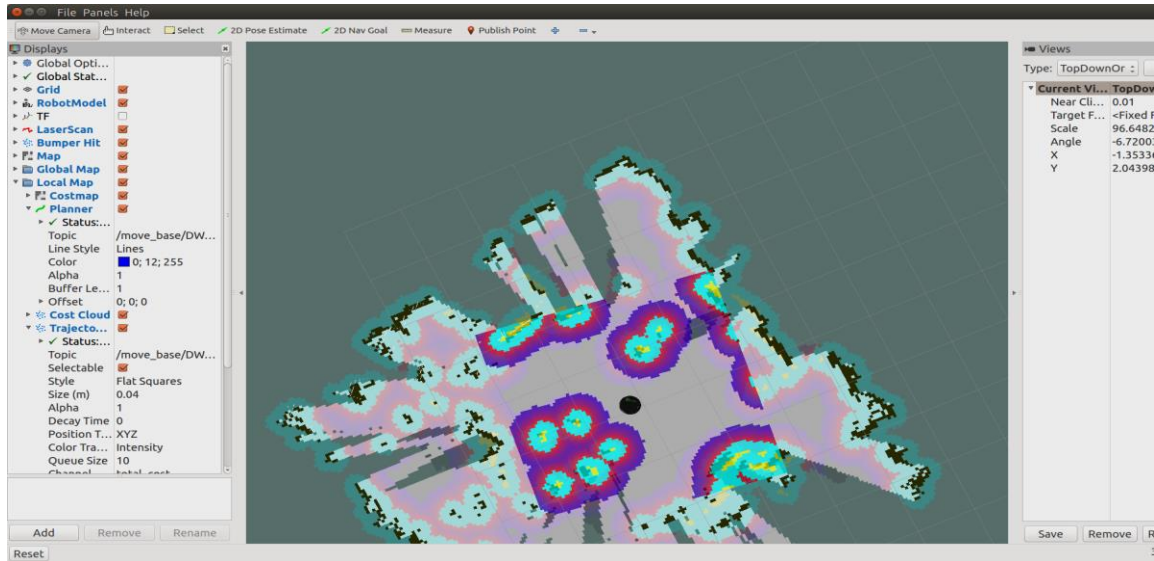
Shows initial location of TurtleBot (Black) – arbitrary position.

MAKE MAP - KEYBOARD OR JOYSTICK OR INTERACTIVE MARKERS

Terminal 4

```
tlharmanphd@D125-43873:~$ . .turtlebot2
```

```
tlharmanphd@D125-43873:~$ roslaunch turtlebot_teleop xbox360_teleop.launch
```



SAVE THE MAP

Terminal 5

```
tlharmanphd@D125-43873:~$ . .turtlebot2
```

```
tlharmanphd@D125-43873:~$ ssh turtlebot-0877@192.168.11.110
```

```
turtlebot-0877@Turtlebot-0877:~$ rosrn map_server map_saver -f /home/turtlebot-0877/Map1_3_1_2016
```

```
[ INFO ] [1456877398.685189702]: Waiting for the map
[ INFO ] [1456877398.914801040]: Received a 576 X 608 map @ 0.050 m/pix
[ INFO ] [1456877398.914871463]: Writing map occupancy data to /home/turtlebot-0877/Map1_3_1_2016.pgm
[ INFO ] [1456877398.928638227]: Writing map occupancy data to /home/turtlebot-0877/Map1_3_1_2016.yaml
[ INFO ] [1456877398.928874901]: Done
```

```
turtlebot-0877@Turtlebot-0877:~$ ls
```

```
Desktop  examples.desktop  laptop      Music  Templates
Documents frames.gv      Map1_3_1_2016.pgm  Pictures  Videos
Downloads frames.pdf   Map1_3_1_2016.yaml  Public
```

NOW WE HAVE A MAP - HAVE TURTLEBOT NAVIGATE WITH RVIZ

Have Minimal Launch running

New Terminal 2

```
tlharmanphd@D125-43873:~$ . .turtlebot2
```

```
tlharmanphd@D125-43873:~$ ssh turtlebot-0877@192.168.11.110 Password
```

```
turtlebot-0877@Turtlebot-0877:~$ ls (Remember Map's name)
```

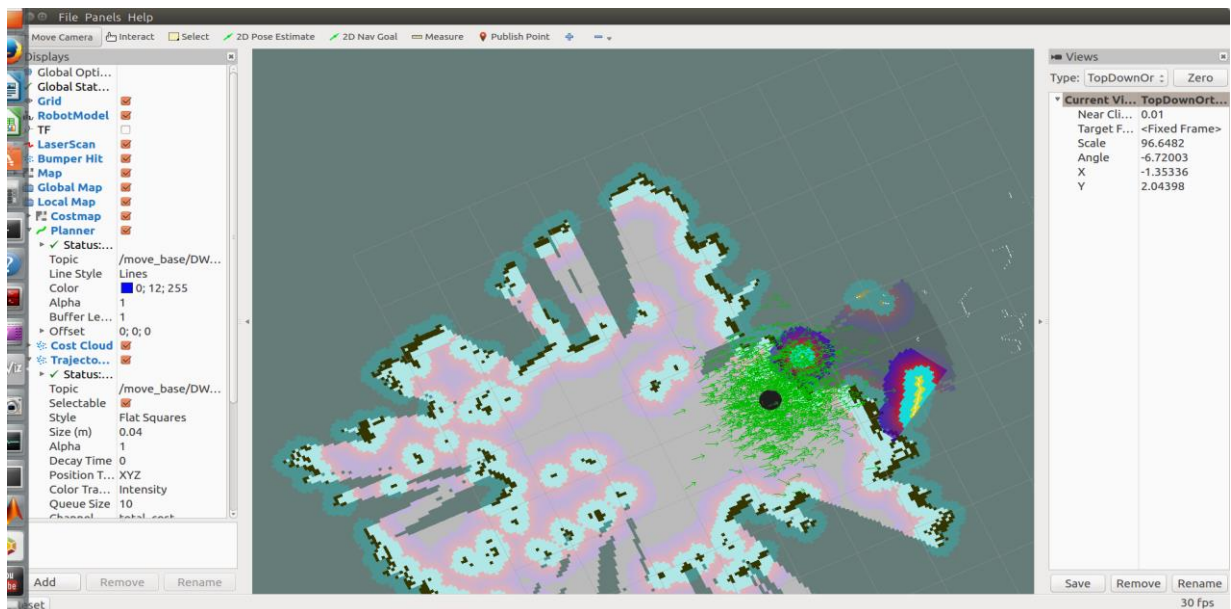
```
Desktop  examples.desktop  laptop  Music  Templates
Documents  frames.gv  Map1_3_1_2016.pgm  Pictures  Videos
Downloads  frames.pdf  Map1_3_1_2016.yaml  Public
```

```
turtlebot-0877@Turtlebot-0877:~$ roslaunch turtlebot_navigation amcl_demo.launch
map_file:=/home/turtlebot-0877/Map1_3_1_2016.yaml
```

Terminal 3

```
$ . .turtlebot2
```

```
$ roslaunch turtlebot_rviz_launchers view_navigation.launch
```



1. Select 2D Pose Estimate on the menu bar- Left Click and keep pressing on TB's approximate location on the map and move mouse in direction that TB is pointing. (TB in map will appear to his location)

2. Select 2D Nav Goal on menu bar - Left Click on goal location and drag mouse so that Big Green Arrow point in the direction that you want TB to face when TB reaches the goal.