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://192.168.11.110:11311   # 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@192.168.11.123'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 openni2_launch openni2.launch   ASUS Camera Driver
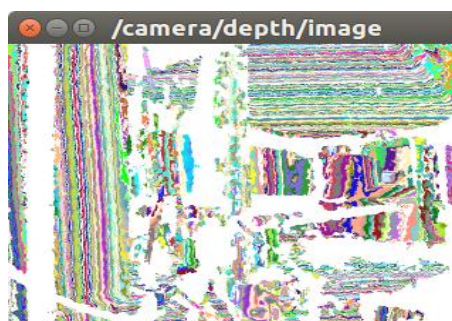
NEW TERMINAL -3
$ . .turtlebot2
$ **rosrun image_view image_view image:=/camera/rgb/image_raw**

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

$ . .turtlebot2
$ rosrun image_view image_view image:=/camera/depth/image   depth view (??) Check other topics

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)
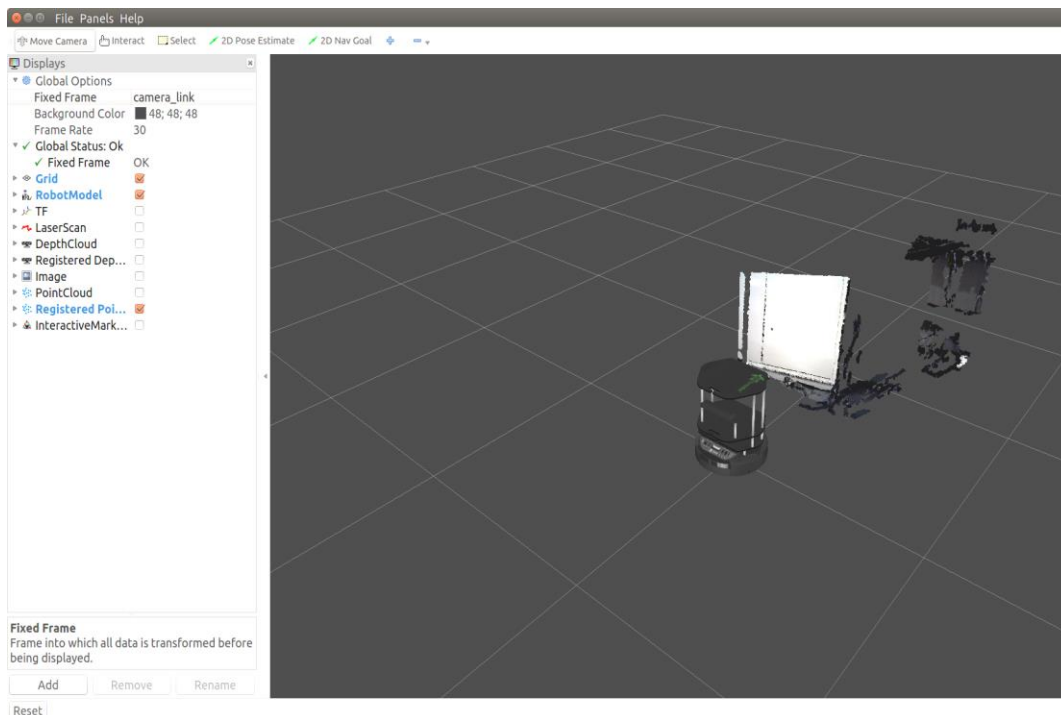
New Terminal 3New Terminal 4   MOVE TURTLEBOT AND WATCH RVIZ
$ . .turtlebot2
(We need to move TurtleBot so that odom topic feeds TF information to Rviz)
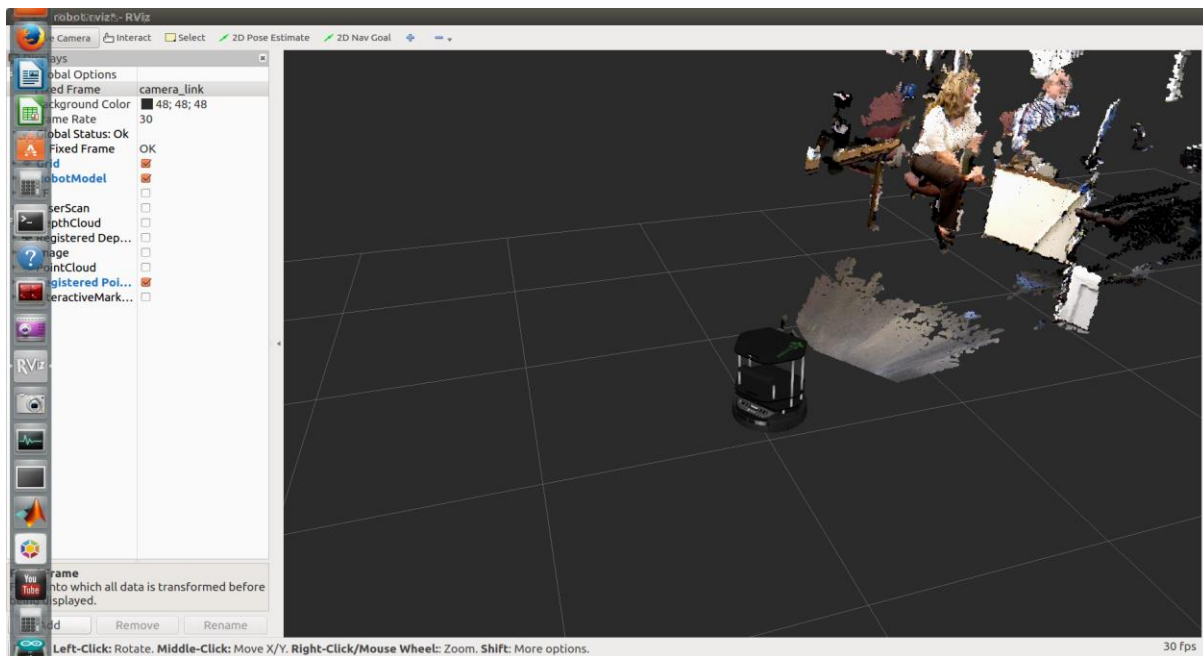$ roslaunch turtlebot_teleop keyboard_teleop.launch   OR

$ 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

Teminal 1
$ . .turtlebot2
$ ssh turtlebot-0877@192.168.11.110   Enter Password
 $ **roslaunch turtlebot_bringup minimal.launch**

Terminal 2
$ . .turtlebot2
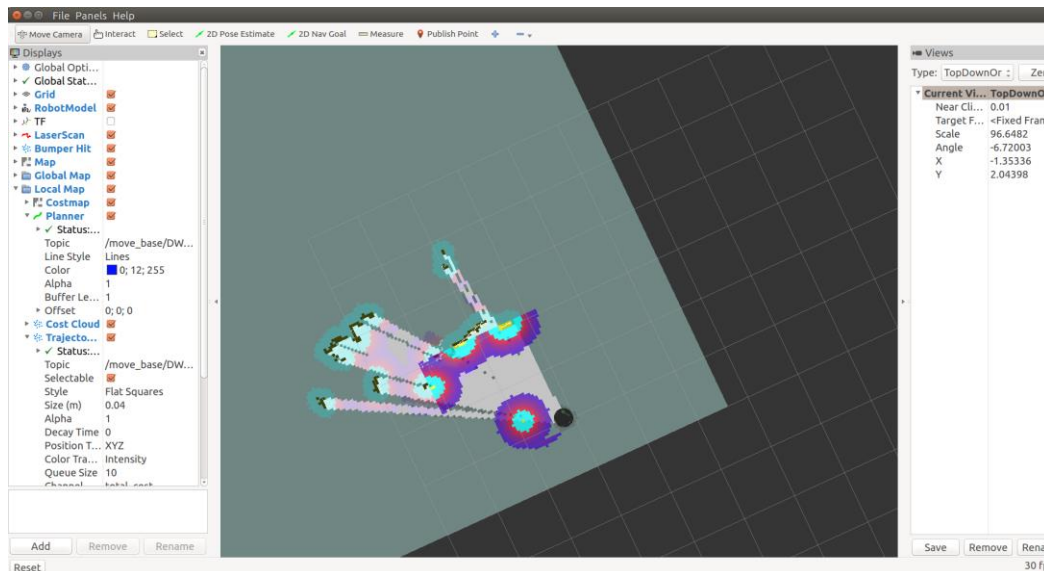**$ ssh turtlebot-0877@192.168.11.110   Password**
$ roslaunch turtlebot_navigation gmapping_demo.launch

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

Terminal 3
$ . .turtlebot2
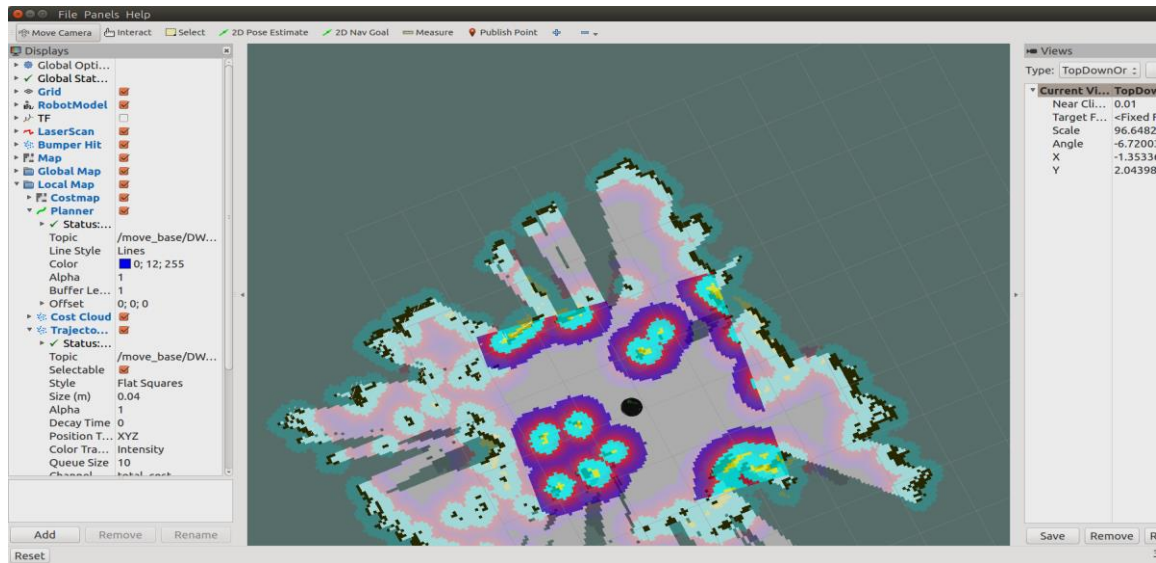$ roslaunch turtlebot_rviz_launchers view_navigation.launch

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:~$ rosrun 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)
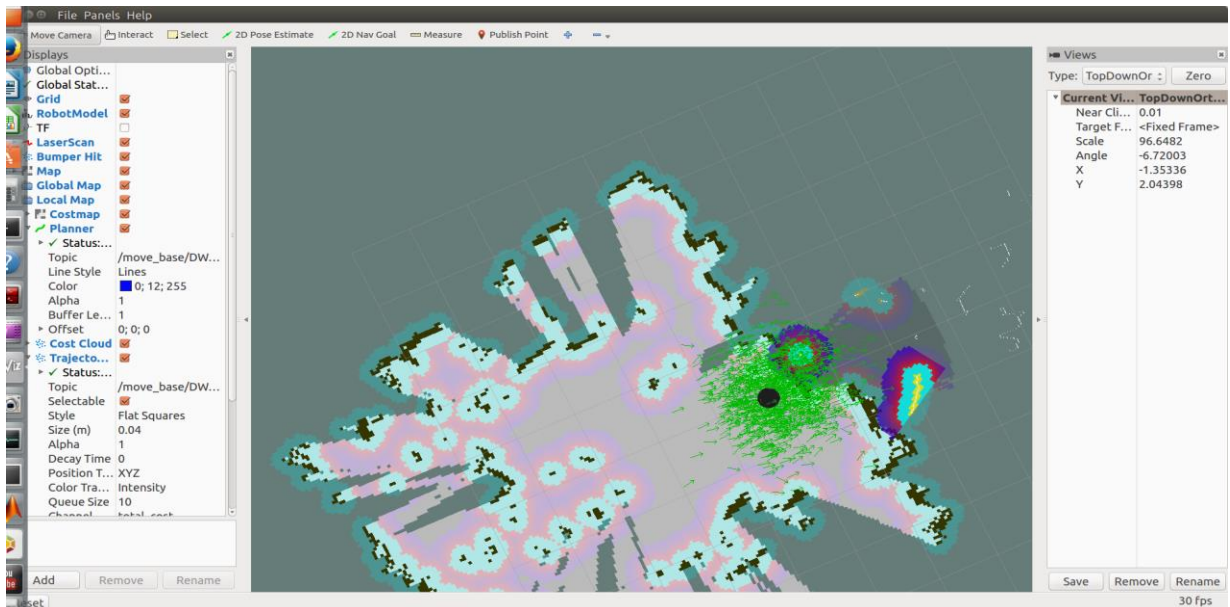　　　　Desktop   examples.desktop laptop   Music   Templates
　　　　Documents frames.gv   Map1_3_1_2016.pgm Pictures Videos
　　　　Downloads frames.pdf   Map1_3_1_2016.yaml Public

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.