Fiducial SLAM Configuration

To install the fiducial software from binary packages:

```
sudo apt-get install ros-kinetic-fiducials
```

Fiducial markers can be generated with a command like this:

```
rosrun aruco_detect create_markers.py 100 112 fiducials.pdf
```

Two nodes should be run, aruco_detect, which handles the detection of the fiducials, and fiducial_slam, which combines the fiducial pose estimates and builds the map and makes an estimate of the robot's position. The map is in the form of a text file (map.txt) specifying the 6DOF pose of each of the markers, and is automatically saved.

To launch the two nodes use the following command:

```
roslaunch aruco_detect aruco_detect.launch

roslaunch fiducial_slam fiducial_slam.launch
```

Remapping:

The camera and aruco_detect might not be linked together. This raises the issue of not being able to detect the markers despite fiducial_slam and aruco_detect are running. Thus remapping inside the aruco_detect launch file was necessary in order to make it works. The following command does the remapping from the terminal as the aruco_detect can accept arguments.

```
rosrun aruco_detect aruco_detect camera:=camera/color/image_raw camera_info:=
/camera/color/camera_info
```

A launch file is also provided to visualize the map in rviz.

```
roslaunch fiducial_slam fiducial_rviz.launch
```

Generated Map

The map file is a text file with a line for each fiducial id: `

`id x y z pan tilt roll variance numObservations links`

`x`, `y` and `z` specify the translation of the fiducial from the origin in meters, and `pan`, `tilt`, and `roll` specify its orientation in degrees. The fields `variance` and `numObservations` represent how good the pose estimate is considered to be, and how many observations were used to generate

it. `links` is a list of the ids of fiducials that have been observed at the same time as the current fiducial. The coordinate frame used is the `map` frame, which is relative to the floor, so markers of the ceiling will have been rotated. The supplied launch files specify the map file as `~/.ros/slam/map.txt`.