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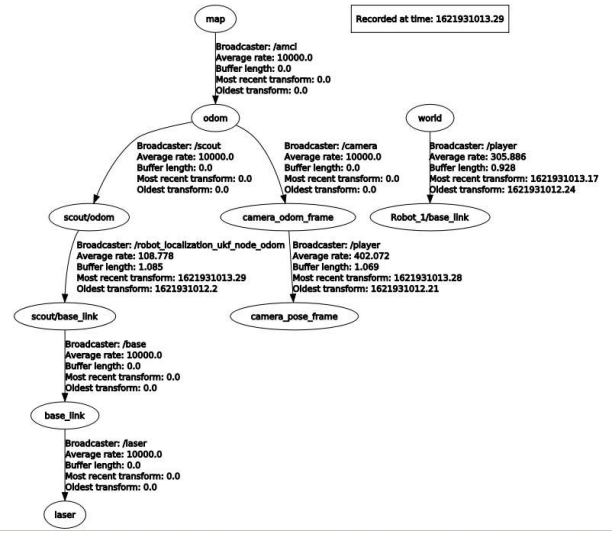
The files inside the archive are:

1. **Launch** folder → contains the map launcher, the launch file for robot localization and *calibration.launch*, used for the calibration.
2. ***CMakeLists.txt*** → files that have to be compiled.
3. **Rviz** folder → contains *localization.rviz, map_config.rviz, rviz_config.rviz* that are the files relative to the configuration and localization on rviz.
4. **Maps** folder → folder that contains the image of the map and *map.yalm*.
5. ***Package.xml***

The structure of the TF tree is the following one:



The bag that we used to create the map is 1, while we choose bags 2 and 3 for testing (we used the new version of the bags).

Regarding sensors, we chose to use the IMU to correct the odometry, while we add the camera to increase the precision of the localization.

The IMU matrix is $\begin{bmatrix} false & false & false \\ false & false & true \\ false & false & false \\ true & true & false \\ true & true & true \end{bmatrix}$. We set to *true* the yaw, roll and pitch velocities and all the accelerations because they are the values provided by the IMU itself.

The camera matrix is $\begin{bmatrix} true & true & true \\ false & false & false \\ true & false & false \\ false & false & true \\ false & false & false \end{bmatrix}$. We set to *true* X,Y,Z positions, the longitudinal velocity and the yaw velocity. We decided to do that because, also in this case, they are the values provided by this type of sensor.

We think that's important to underline in file *localization.launch* we used the unscented Kalman filter instead of the extended one because we noticed a big difference in prediction quality.