

Exercise 3: bags, transforms and apriltags

The department's robotics group bought an autonomous vacuum cleaner (VC) to automate the cleaning of its laboratory. The department also bought 1 charging station (CS).

The VC and the CS are both marked with an **AprilTag** that makes them visible from a service camera on the ceiling. During the night the VC ran out of power and stopped far from the CS. **Where is it now? How far is it from the CS?**

The movement of the robot during the night was all recorded by the service camera and data are available in the **bag_exercise3.zip**.

Develop a node that, listening to the bag:

- Finds the path of the VC and the position of the CS relative to tag36h11:0.
- Projects these data on the plane of the z axis of tag36h11:0.
- Finds VC's path with respect to the CS.
- saves it in a csv file.

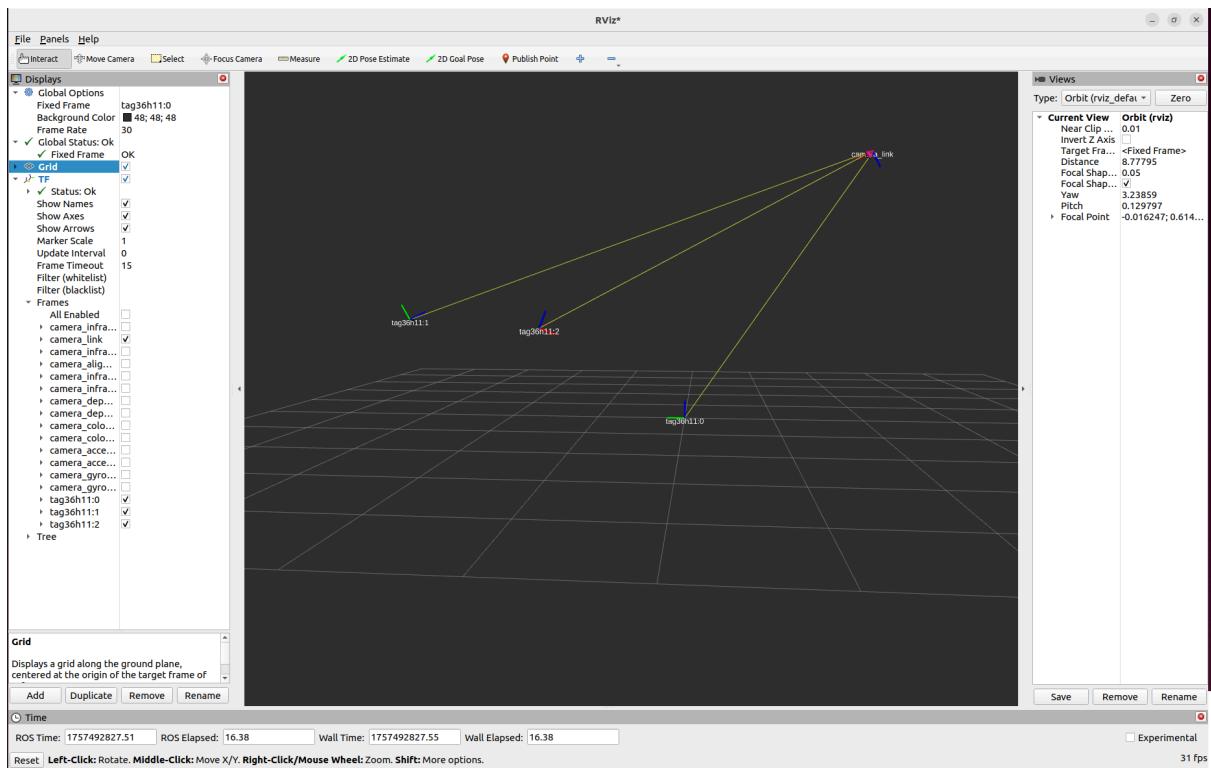
Then,

- write a python script for plotting the path, highlighting the final position of the robot and the CS position.

Some Tips:

1. Start with playing the bag (in loop) and opening rviz2 and configure it as in figure below.
2. Check on the setup of rviz2 so that it does visualize messages with past timestamps.
3. tag36h11:0 identifies the floor plane.
4. tag36h11:1 and tag36h11:2 are CS and VC.
5. Explore geometry_msgs/msg/PoseStamped and nav_msgs/msg/Path for defining poses and paths in ROS2.

NB: You have frame_ids of all the Apriltags, but transformations must be applied to points belonging to the relative spaces.



NB1: AprilTags are seen from the camera. Use **tf2** and **tf2_ros** to transform the data with respect to the requested reference frames.