Assignment 1 - Setup, Offboard Autonomy, & Plotting

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1. Overview

The purpose of the assignment is to test out the given system and make sure everything works fine, and to get familiar with the basics of "offboard" control of the simulated drone, which will be proved using plots of the trajectory.

2. Complete Simulation Setup

There were several steps to be done before dealing with the modification of the given offboard node. First, the PX4 and QGroundcontrol had to be set up correctly. After the offboard script was running, the control was switched to Offboard mode and the rosbag was recorded. Since everything worked properly the given code could be modified accordingly to given subscription.

3. Modify Offboard Control

The following path had to be followed.

- (0,0,10) → (10,0,10) → (10,0,25) → (10,5,25)

The drone had to iterate through the points above, and wait a bit at each point, in this case three seconds wait time were implemented to achieve more expressive results. From the programing perspective four instances of "geometry_msgs::Point" were created with the required coordinates, and using a for loop the target position of the drone were iterated through these points. The two conditions used for the iteration, the drone had to reach the target point using a threshold and three seconds had to pass since the last command.

4. Results

After the .bag file was created the values were extracted, the challenging part was that the "mavros_msgs/msg/PositionTarget" message type had to be registered, to be able to process it. Moreover, using the number of sent messages and the publishing rate we had to scale up or samples to plot the trajectory over time. Although, the results show that the project was successful, a future development can be related to velocity profile.
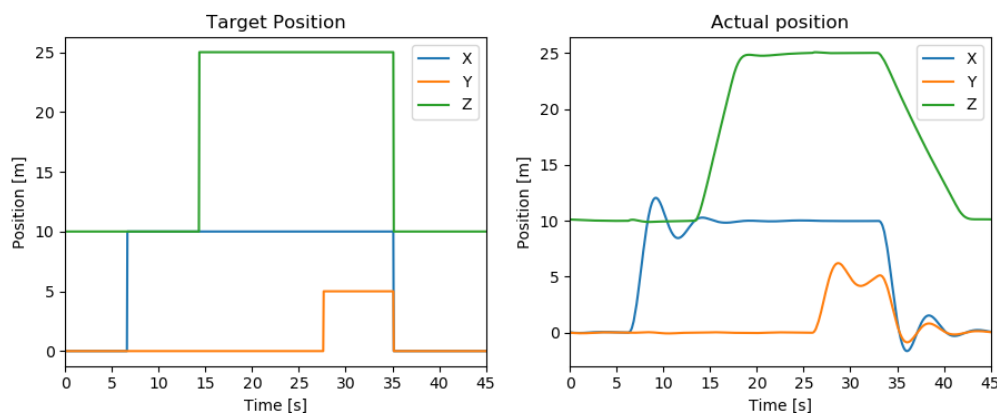
1. Figure: Target and Actual Positions of the drone