

## Exercise 1. - Quadrotor

In this scenario a sky scraper has collapsed. Reports indicate that there are still persons in the building. The fire department would like to get a picture of the situation before entering the building. They want to use a quadrotor to fly around the building and search for humans. The quadrotor also has a camera attached to it.

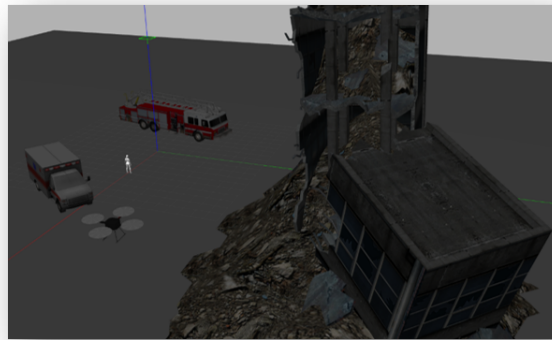


Figure 1 Quadrotor Scenario

Fork following repository: [https://github.com/l-schilling/rescue\\_quadrotor\\_exercise](https://github.com/l-schilling/rescue_quadrotor_exercise) and clone it to your VM. You can submit your solution as zip-file via e-mail or a link to your own github repository. The deadline for this exercise is the **02.06.2021**.

Your task is to write a position controller. The goal position should be entered via terminal and include the variables  $x, y, z$  and the heading/ yaw angle of the drone. The current position of the drone can be acquired by subscribing to the topic `/ground_truth_to_tf/pose`. You should write a proportional controller that uses the goal and current position to publish a velocity command on the topic `/cmd_vel`, which will move the drone to the goal position.

You are free to choose the parameters of the controller and can also extend it to include saturation, which would limit the minimal and maximal outputs of the controller.

Be aware of the different coordinate systems in this exercise. The goal and current position are inside the world frame, while the velocity command is inside the drone frame. This is important for the  $x$  and  $y$  components of the velocity command!

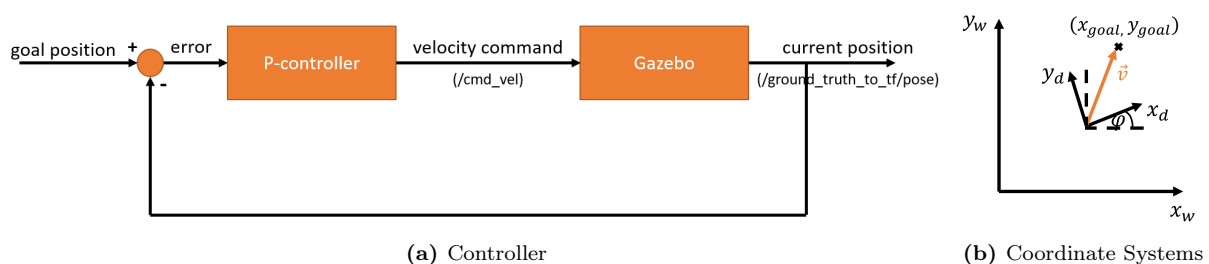


Figure 2 Exercise Illustration