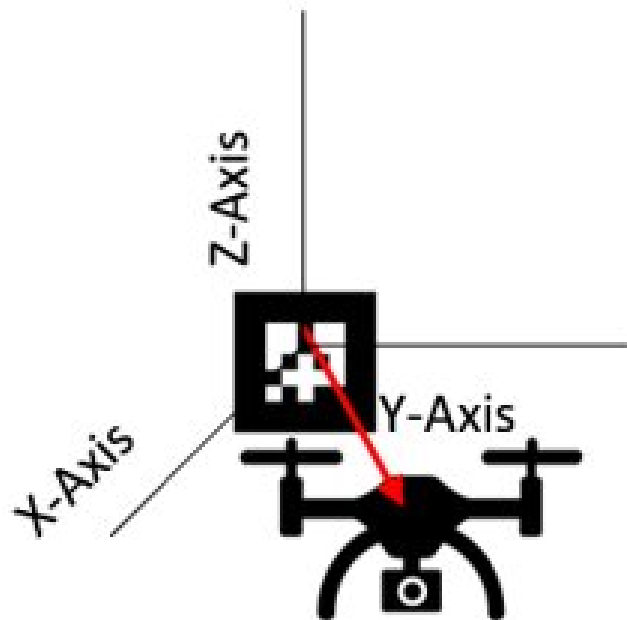Manual of the UAV

Project Visual servoing UAV

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Inhoudsopgave

1. Requirements

- Knowledge of battery usage
- Knowledge of fly the drone manually
- Complete the Report and setup manual of the UAV
- Safety rope for the drone

2. Preparations

- Check if the battery is full
- Connect the battery before plugging the USB into the computer! Otherwise, the computer cannot detect a heartbeat or connect to the webcam

2.1 Start-up Vision software and flight controller node

Open up a terminal and go to:

```
$ cd ~/visual_ws
```

At this location each of the following lines need to be run in separate terminals from the root of the visual_ws project.

This first terminal command will connect your system to the drone:

```
$ roslaunch mavros px4.launch fcu_url:="/dev/ttyACM0:57600"
```

Tip: Make sure a heartbeat has been detected after this line. Otherwise, disconnect the USB, disconnect the battery from the drone, reconnect the battery to the drone and then plug in the USB again. Then rerun the command

These next 3 commands will each separately run a piece of code for the vision tracking:

```
$ rosrun code_qrcode feature_scanning4.py
$ rosrun code_qrcode distance_scanning2.py.py
$ rosrun code_qrcode det_movement3.py
```

Tip: The, vision based programs only start sending data after a qr-code has been detected from the feature scanning aspect.

This command will run the offboard vision controller code:

```
$ rosrun offboard_control vision_controller_node
```

At this point, the offboard node should be publishing on the /mavros/vision_pose/pose channel. You can check this by opening another terminal window and type: "$ rostopic echo /mavros/vision_pose/pose". By holding a qr-code in front of the camera, you should also be able to see these values change.

3. Roadmap to fly the UAV

1. Place the drone in front of the qr-code. The front of the drone is always the arrow of the PX4. See picture below.
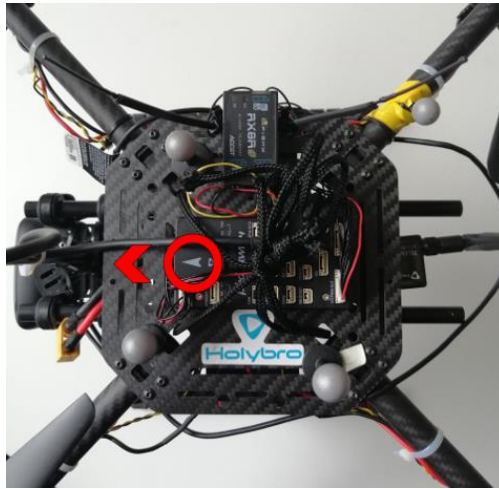
2. Connect the safety rope on the drone.

After the preparation. Both the vision software and the flight controller should be up and running.

3. Fly the drone manually and hover approximately one and half meter away from the qr-code measured from the camera. Once the qr-code is detected, give the system a few seconds to update its internal local pose.
   Tip: let someone else look if the qr-code is in the boundaries of the vision software.

4. If the drone hovers in the boundaries of the software. Switch the SG 3 position button.
   Now the drone is in offboard mode and flies autonomously. The only buttons that now still work is the kill and offboard swich! you can see that it is in offboard mode on the following actions:
   - The GPS on the drone flickers a green light for 2 seconds.
   - The state chances in QGround control

   Tip: hold your finger on the kill swich if you go into offboard mode.

   ⚠️ If you activate the kill switch, follow these steps!!!
   - Hold down the kill swich
   - Disarm offboard mode with the button on the RC
   - Disarm the drone
   - Let the kill swich go

   trouble shootings:
   You can see that the drone failed to go in offboard mode if:
   - The drone GPS flickers a red light for 2 seconds.
   - The state does not change in QGround control

The problem could be:
- A crash in the vision-based flight controller. Check if there are red warnings in the terminal and restart the software.
- A crash in the vision software. Check if there are red warnings in the terminal and restart the software.
- A crash in ROS core. Check if there are red warnings in the terminal and restart the software.

5. To switch back to manual mode, switch the offboard button again.

⚠️ If you switch back to manual mode. Watch out for the throttle state on the RC controller. If you changed it in offboard mode for example to 100%. When you switch back to manual mode, the drone shoots up fast in the air.