Crash Course Paparazzi 2019
Installing and running Paparazzi

Part 1

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In this part you will install Ubuntu and the Paparazzi autopilot. In the following parts you will perform your first flight using Paparazzi, make the drone autonomous and implement your own algorithms.

1 Installing Ubuntu

For this course you are required to install Ubuntu. If you are already running Ubuntu, skip to the next section. Otherwise, follow the steps here to install Ubuntu in a dual-boot setup with your existing Windows installation. This allows you to keep using your existing Windows installation next to Ubuntu. While it is possible to install Ubuntu as a virtual machine, this frequently causes problems with networking, USB and GPU support. Therefore we do not support virtual machines during the course.

The dual-boot installation of Ubuntu requires you to format parts of your drive, therefore there is a small risk of losing important files. Make sure you have backed up your files before starting the installation.

Follow this tutorial to install Ubuntu next to an existing Windows installation: `https://itsfoss.com/install-ubuntu-1404-dual-boot-mode-windows-8-81-uefi/`. We recommend you install Ubuntu 18.04 Bionic Beaver `https://www.ubuntu.com/download/desktop`. The rest of the course manuals assume that you are running Ubuntu.

2 Installing Paparazzi

Once Ubuntu is running, the next step is to install Paparazzi. We have prepared a github branch here that contains the Paparazzi autopilot and example files for the course. Use the following steps to download this branch and install Paparazzi:

1. Install Paparazzi UAV by opening a terminal (Ctrl+Alt+T) and running the one-liner found here: `http://wiki.paparazziuav.org/wiki/Installation`. After running the one-liner, you should see the Paparazzi center. Close this and return to the terminal.
2. Set up your git credentials using

```
git config --global user.name your_name
git config --global user.email your_email@host.com
```

3. Navigate to the paparazzi folder and add the tudelft remote.

```
cd ~/paparazzi
git remote add tudelft https://github.com/tudelft/paparazzi
git fetch tudelft mavlabCourse2019
```

4. Checkout the mavlabCourse2019 branch using:

```
git checkout mavlabCourse2019
```

5. Initialize, sync and update Paparazzi's submodules using:

```
git submodule init
git submodule sync
git submodule update
```

6. Build Paparazzi by using:

```
make clean
make
```

7. Select the conf and control panel files that were prepared for the course by running:

```
python start.py
```

   and select as Conf: userconf/tudelft/course2019_conf.xml
   and as Controlpanel: userconf/tudelft/course2019_control_panel.xml.
   Click 'Set active' and close the dialog.

8. Next to Paparazzi you will need some additional tools. Install ffmpeg, vlc, cmake, jstest-gtk and java using:

```
sudo apt install ffmpeg vlc cmake jstest-gtk default-jre
```

9. Install the Gazebo simulator. Gazebo version 9 is recommended for Ubuntu 18.04, earlier versions of Ubuntu may require Gazebo version 8. Install Gazebo 9 using:

```
sudo apt install gazebo9 libgazebo9-dev
```

10. Install eclipse to easily navigate through the paparazzi source code.
    (a) Download the eclipse-installer from `https://www.eclipse.org/downloads/download.php?file=/oomph/epp/neon/R2a/eclipse-inst-linux64.tar.gz`
    (b) Navigate to the Downloads directory, extract the .tar.gz file and run eclipse-inst.
    (c) Select the C/C++ version
    (d) It is recommended to use the default installation directory
    (e) After eclipse is installed start eclipse
    (f) Navigate to "File - New - Makefile Project with Existing Code
    (g) Name the project paparazzi select the paparazzi installation location and keep the default options
11. Build OpenCV for the Bebop.
    (a) Navigate to paparazzi/sw/ext/opencv_bebop:

```
cd ~/paparazzi/sw/ext/opencv_bebop
```

(b) Make openCV using:

```
make
```

3 Running your first simulation

To test your Paparazzi installation, you will perform a short test-flight in simulation. Navigate to the Paparazzi folder and launch the Paparazzi Center using

```
./paparazzi
```

In the top left drop-down box labeled 'A/C', select the 'bebop_orange_avoid' aircraft. In the top middle under 'Target', select 'nps', the Paparazzi simulator. Click 'Clean', then 'Build' to compile the example code. Under 'Session', select 'Simulation - Gazebo' and click 'Execute'. You should now see the Ground Control Station and the Gazebo simulator. Click 'Stop/Remove All Processes' in the Paparazzi Center to end the simulation.