Installation Instructions for the
Visual Navigation for Flying Robots Workshop

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This sheet comprises a summary of the software required for the VisNav Workshop. We highly recommend to install the software before the workshop, as some of the steps require downloading / compiling large packages, which requires a good internet connection and may take some time.

Option 1: VirtualBox

The easiest way to get a working setup is to install VirtualBox on your machine (version 4.2.12).

1. Download and install VirtualBox from here:

    https://www.virtualbox.org/wiki/Downloads

2. Download the virtual disk image that contains Ubuntu 12.04, ROS Fuerte, and all (pre-compiled) packages that you need for the workshop exercises:

    http://vision.in.tum.de/~sturmju/visnav_ubuntu-disk1.vdi

3. Create a new virtual machine using this disk image and you are done.

4. To verify whether the VirtualBox works as expected, run the following commands: Open three terminal windows and enter the following commands. First, we check whether the 3D visualization tool works at a reasonable speed:
   ```
   $ roscore
   $ rosbag play Desktop/flight.bag
   $ rosrun rviz rviz
   ```
   RVIZ should display the recorded image stream at 20Hz. Furthermore, it should display a grid in the OpenGL window. Make sure that you can see the grid and that you can rotate/move it with the mouse without flickering.

5. If this works, close RVIZ and stop rosbag (by pressing CTRL-C). Now attach the PS3 joystick and tell VirtualBox to enable it (Menu — Devices — USB Devices — Sony PlayStation3 Controller). Then run:
`$ rosrun joy joy_node _dev:=/dev/input/js2 $ rostopic echo /joy` Click the start button on the joystick and move the axes. You should see some text output in the console window from the joystick.

6. You are well prepared!

Option 2: Own Installation on Ubuntu

Preparation: Install ROS

This section comprises the core steps of installing ROS Fuerte on Ubuntu 12.04 as described here:

`http://www.ros.org/wiki/fuerte/Installation/Ubuntu`

1. First, add the respective keys and repositories:
```
$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu precise
main" > /etc/apt/sources.list.d/ros-latest.list'
$ wget http://packages.ros.org/ros.key -O - | sudo apt-key add -
$ sudo apt-get update
```

2. Now install ROS and some useful packages:
```
$ sudo apt-get install ros-fuerte-desktop-full ros-fuerte-joystick-drivers
$ sudo apt-get install python-rosinstall python-rosdep liblapack-dev
libblas-dev
$ sudo apt-get install daemontools libudev-dev libiw-dev
```

3. Create your ROS workspace folder
```
$ mkdir ~/workshop
```

4. Add ROS commands and your workspace folder to your .bashrc: Open it in your favorite text-editor (e.g. using `gedit ~/.bashrc`), and append the following two lines at the end:
```
$ source /opt/ros/fuerte/setup.bash
$ export ROS_PACKAGE_PATH=$ROS_PACKAGE_PATH:~/workshop
```

5. Check your installation by opening a new console window and starting
```
$ roscore
```

Everything is fine when you see the line "`started core service [/rosout]`". You can then stop roscore by hitting CTRL-C.

Preparation: Install and compile ROS packages

1. Download the source code into your ROS workspace (note the dot at the end)
```
$ cd ~/workshop
$ GIT_SSL_NO_VERIFY=1 git clone
https://svncvpr.informatik.tu-muenchen.de/git/visnav-workshop-public
.
```

2. Compile the packages. Note that the compilation process requires internet access and takes around 10–20 minutes.
```
$ roscd ardrone_autonomy
$ ./build_sdk.sh
$ rosmake ardrone_autonomy ardrone_joystick ccny_vision
$ rosmake visnav_exercise tum_ardrone
```

3. Download the bag files (500 MB) which you will use during the exercise from

http://vision.in.tum.de/~engelj/flight.tar.gz