

## ***Installation Process:***

### Software Defined Radio Communication System:

We used the version 3.7.11.5 for GNU Radio software. Therefore, there is a way to install that software.

- 1) Prepare a computer and OS is Ubuntu (18.04 is preferred)
- 2) Open in terminal
- 3) Enter the code below

```
$ sudo add-apt-repository ppa:gnuradio/gnuradio-releases-3.7  
$ sudo apt-get update  
$ sudo apt install gnuradio
```

- 4) The GNU software should be ready to use

At this moment, we already installed the GNU radio. But since we need to use SDR drive the Ettus B210 and B205mini, we also need to install hud image to drive our device. We will use UHD Images Downloader to download that.

- 1) Open in terminal
- 2) Running "<install-path>/lib/uhd/uhd\_images\_downloader.py"
- 3) Waiting for installation.
- 4) Open another terminal and running " uhd\_find\_devices"
- 5) If the terminal tell you the serial for Ettus device then you get success

## ***Configuration and Use:***

### Software Defined Radio Communication System: suzan

To activate the SDR communication system first run the python script for the SDR communication system at the base station and then run the python script for the SDR communication system at the drone. The python script must be executed using python2.

## ***Maintenance:***

### Software Defined Radio:

Please keep Ettus B205mini running between -40 – 75 °C and Ettus B210 running around 25 °C. Once using the SDR, connect three antennas with Ettus B210 and connect two antennas with Ettus B205mini (in Figure 8 shows)



*Figure 8. Ettus B210 and Ettus B205mini Connection to Antennas*

### ***Troubleshooting Operations***

#### **Software Defined Radio:**

*If images or text is not being received at either the base station or drone subsystem:*

Make sure that at the base station three antennas are connected to the SDR B210.

Antenna port J801 is used to transmit text at a frequency of 2.5 GHZ, port J802 is used to receive text at a frequency 2.3 GHZ and port J803 is used to receive images at a frequency of 2.4. At the drone two antennas must be connected to TRX and RX2 of the SDR B205-mini.