

IEE1710: Topic short description (examples):

The student should get familiar with communication protocols, standards and main processing steps.

1) Taltech satellite receiver implementation (group task)

The group (max. 4 persons) have to build the real-time receiver of the satellite telemetric data (example data stored in file)

The GNUradio receiver could be subdivided on the following tasks:

- Detection and filtering
- Demodulator and NRZL decoder
- Search for the start sequence and synchro words
- Descrambler
- AX.25 frame reception
- Data real time representation

For example, some of the steps are shown for here

a) <http://www.dk3wn.info/p/?p=33073>

b) https://www.researchgate.net/figure/GNU-Radio-flow-graph-for-AX25-reception_fig2_320165014

2) Application specific reception (LTE, GSM, ADS-B, etc)

Examples:

a) <https://www.funwithelectronics.com/?id=9>

b) <https://www.rtl-sdr.com/category/tutorial/> (Featured articles->Tutorials)

c) <https://www.rtl-sdr.com/decoding-rds-in-gnu-radio-with-the-rtl-sdr/>

d) <https://www.rtl-sdr.com/rtl-sdr-tutorial-cheap-ais-ship-tracking/>

e) <https://www.rtl-sdr.com/rtl-sdr-tutorial-listening-tetra-radio-channels/>

3) RC controlled devices (toys, drones, cars, etc.)

Examples:

a) <https://blog.compass-security.com/2016/09/software-defined-radio-sdr-and-decoding-on-off-keying-ook/>

b) <https://foo-manroot.github.io/post/gnuradio/sdr/2018/01/15/gnuradio-ook-transmit.html>
<https://www.youtube.com/watch?v=IOKOJIK2kU8>

4) Matlab SDR receiver applications

Examples (with Lime SDR or USRP SDRs):

- a) <https://se.mathworks.com/discovery/sdr.html>
- b) <https://se.mathworks.com/help/supportpkg/usrpradio/application-specific-examples.html>

5) Transmitters and receivers (GNURadio)

Examples:

- a) http://wiki.opendigitalradio.org/Simple_FM_transmitter_using_gnuradio
- b) <https://myriadr.org/news/digital-video-transmission-using-limesdr-gnu-radio/>
- c) https://myriadr.org/app/uploads/2016/06/dvbs2_tx.grc.png