

Lab4: Hacking (Eavesdropping) on Other's Satellite Signal and Random Radio Interference

Lab description

Students are divided into teams. The team with the largest collection of results (described in detail below) wins. After the competition, an evaluation and presentation of the results is held. The interference will happen at random time. You should consider that interference signal exists while you are collecting data through SDR.

Lab objective

In this competition, the objective is to simulate a satellite overpass event where each team will try to collect as much data as possible from CubeSatSim using the ground station radio. At the same time, the opposing teams will try to create radio interference to disrupt the data collection. The team that successfully collects the most data under these challenging conditions will be declared the winner.

Lab instruction

Step 1: The range of frequency is 420 – 450 MHz Frequency will be assigned to each team.
Set the modulation method.

Step 2: Log into your Pi Zero with default settings.

Username: pi
Password: raspberry

Step 3: Type command 'CubeSatSim/config -F'

Step 4: Set the frequency to an assigned frequency.

Step 5: Wait for the system to reboot.

Step 6: Set your modulation method from the CubeSat.

- Number on the left indicates how many times that green LED turns on:

- 1: APRS, 2: FSK, 3: BPSK, 4: SSTV (Image), 5: CW (Morse Code)

Step 7: Set ground station's modulation and frequency to find other satellite signals.

Step 8: If you find out the frequency and modulation at which data is being sent, record the following details in the chart at the last page:

Frequency, Modulation, Data

Competition rules

Each student team will be given a turn to control the satellite and collect data while the instructor tries to create interference.

Interference Generation: The other teams will simultaneously attempt to create interference by sending as many commands as possible to the satellite through the radio network, with the aim of disrupting the data collection. The Python code for jamming must be written by the students. It is important to maintain a sense of fair play and respect for each other during the competition. Any teams found to be cheating or behaving in an unsporting manner may be disqualified.

Winning condition

The team that collects the most data from the satellite during their control period will be the winner. The amount of data will be determined by the quantity of the received data points. Safety and respect for the equipment are paramount.

