Open-Source Software Defined Radio for CubeSat Operations

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Software Defined Radio (SDR)

Do as much as possible in software (flexibility)
Gqrx SDR Receiver

- 2011-2018
- GNU Radio & Qt
- Broad HW support
- Linux, BSD & Mac
- Raspberry Pi 3
Satellite Tracking (Windows)

TLE

Time

[Image of satellite tracking software interface]

[Image of satellite dish and radio equipment]
Satellite Tracking (Linux)

TLE

Time

Network

hamlib
## Satellite Tracking (Gqrx or SatNOGS)

<table>
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<tr>
<th>Time</th>
<th>TLE</th>
<th>Network</th>
<th>hamlib</th>
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![Satellite Tracking Diagram](image-url)
SDR for Satcom Wishlist

- Graphical console application (interactive)
- Command line application (unattended)
- Server + client (remote)
- Receive and transmit
The Problem with Gqrx
Command Line Tools

- Command line interface
- RX / TX
  - SDR HW API
  - DSP lib
  - libsdr1
  - libsdr2
  - libsdr3
Graphical Console Application

- Console
  - RX / TX
    - SDR HW API
      - libsdr1
      - libsdr2
      - libsdr3
    - DSP lib
  - Qt
SDR Server and Client

Server

RX / TX

SDR HW API  DSP lib

libsdr1  libsdr2  libsdr3

Client

Qt

TCP / IP
Current Status (WIP)

- Command line receiver (SatNOGS station #13)
- Console receiver (SDR Makerspace)
- RTL-SDR, Airspy, SDRPlay
- LimeSDR, BladeRF, USRP
- Next: USRP and PlutoSDR
Websdr by Ian MM0DOS
More info (soon)

https://gitlab.com/csete/softrig
https://gitlab.com/csete/nanosdr
https://groups.io/g/nanosdr