



CubeSatSim Project

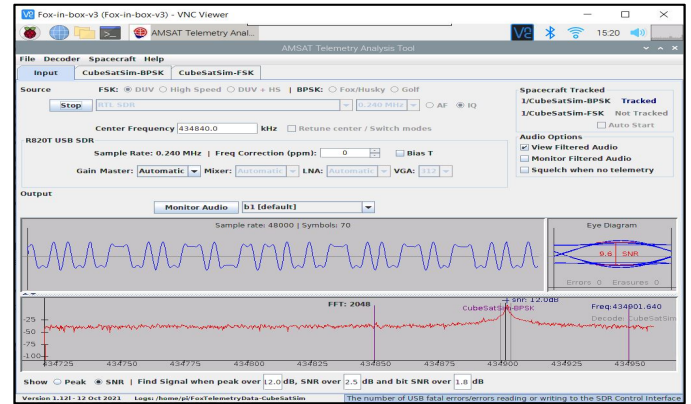
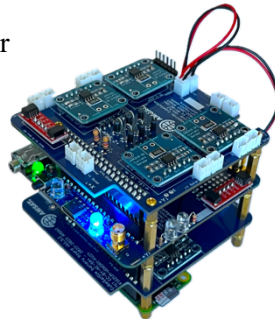
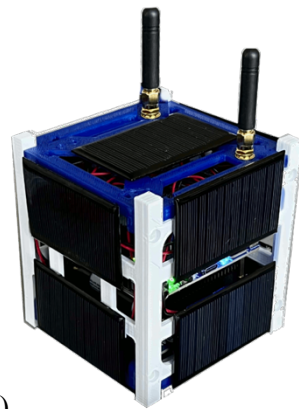


The CubeSat Simulator (CubeSatSim) project is a platform that evangelizes satellite and space technology through education and demonstration.

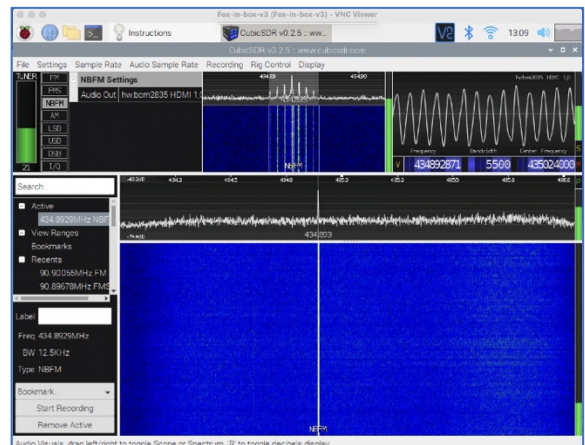
Designed for educators, students, youth clubs, STEM programs, libraries/museums, amateur radio operators (Hams) and anyone interested in learning how real satellites work.

CubeSat Features

- ✓ 1U CubeSat form factor
- ✓ 3D printed frame
- ✓ Solar panels on six sides
- ✓ Rechargeable batteries
- ✓ Camera
- ✓ Raspberry Pi Zero single board computer and Pico microcontroller
- ✓ Six voltage and current sensors
- ✓ Electronic gyro (Rotation & pitch)
- ✓ Temperature/pressure/altitude sensor
- ✓ Five telemetry protocol modes
- ✓ Live telemetry on ham radio UHF (70cm)
- ✓ Extensible sensor grid with Qwiic connector
- ✓ RF Command and Control via radio
- ✓ Completely Open-Source



- APRS – Automatic packet reporting system
- FSK – Frequency shift-keying
- BPSK – Binary phase shift-keying
- SSTV – Slow scan TV
- CW – Continuous wave



Board Stack

The simulator is built on a stack of four circuit boards: STEM Payload board, Battery board, Solar board, and a Pi Zero.

Ground Station

The CubeSatSim telemetry transmissions are captured by a ground station. Telemetry decoding is handled by the Open-Source AMSAT FoxTelem suite of applications.

This set of tools, provides a highly visual and audio sensory experience of live digital radio signals.

The software runs on Windows, Linux, MacOS, and the Raspberry Pi.

Telemetry Protocols

The simulator can transmit telemetry in five protocols.

These are the same protocols used by CubeSats in orbit above the earth.

Attention Educators

Use the wonders of the CubeSatSim project to take your STEM program to the next level. All of the STEM components are present.

The *science* of space, the *technology* of modern electronics, the *engineering* requirements to survive harsh environments, and the *math* of orbital mechanics and radio telemetry.

We are committed to igniting a spark of curiosity in young people to the wonders of space exploration and communications. Everything we do is focused on this mission.



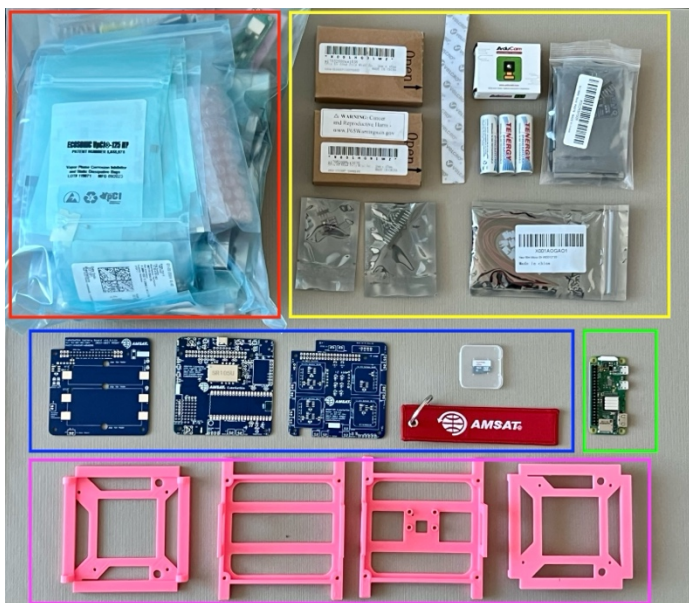
CubeSatSim Project

AMSAT

The project has loaner demo systems that can be shipped to your location. You can enrich your learning environment without leaving the campus. You are also encouraged to build a CubeSatSim with your students.

Attention Makers

If you have basic soldering skills and can follow instructions, you can build a CubeSatSim.



The project was designed with Makers in mind. Everything you need to build a device is readily available online.

This includes a complete list of required parts, schematics, CAD drawings, build instructions, and all required software.

There is even a complete set of build videos that allows you to watch the assembly of each circuit board.

All of the project is Open-Source so you are free to make any changes you want. In fact, enhancements to the project are encouraged.

Get Involved

There are plenty of opportunities to join our mission to introduce young people to the wonders of space communications.

- ✓ Invite us to your school or club meetings.
- ✓ Borrow a CubeSatSim demo system
- ✓ Build a CubeSatSim
- ✓ Earn a Ham Radio license
- ✓ Refer organizations to our programs

Join AMSAT

This exciting project is sponsored by the Radio Amateur Satellite Corporation (AMSAT). It is a 501(c)(3) non-profit organization founded in 1969.

For more than 50 years, AMSAT groups around the world have been pivotal in advancing the art of Ham Radio communications aboard space satellites.

AMSAT has launched 13 satellites, including 5 CubeSats, and 6 are still operational. Join AMSAT today to be a part.

Project Links

Website: <https://CubeSatSim.org>

Github: <https://github.com/alanbjohnston/CubeSatSim>

Wiki: <https://CubeSatSim.org/wiki>

Quick Start Guide Video: <https://cubesatsim.org/qsg-videos>

AMSAT: <https://www.amsat.org/join-amsat/>

Contact Us

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For more information about AMSAT, contact info@amsat.org