

GroundSat

Maggie Hayes and Chris Gutschlag

A dark blue diagonal gradient bar that starts from the bottom left corner and extends towards the top right corner, covering the lower half of the slide.

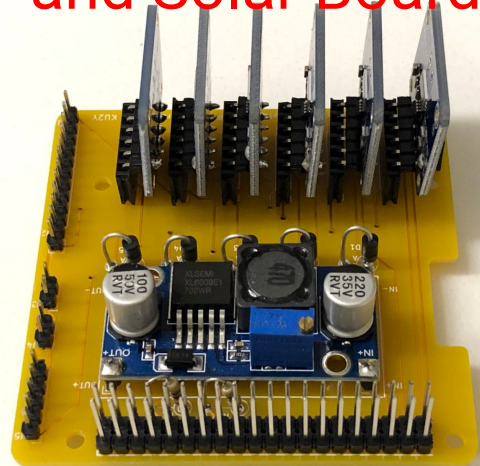
What is a GroundSat?

- AMSAT(Amateur Satellite) CubeSat Simulator
- Earth-based, outdoor version
- Interacts through wireless communication
- Powered through batteries charged with solar panels
- Raspberry Pi Zero

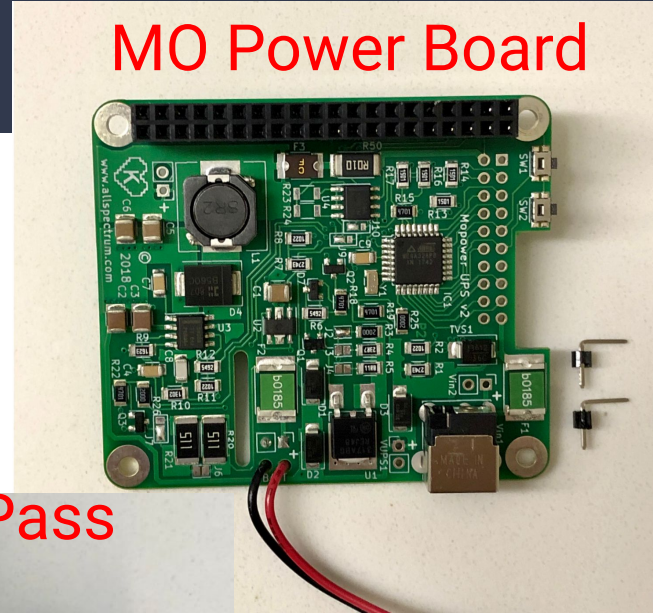
Main Components



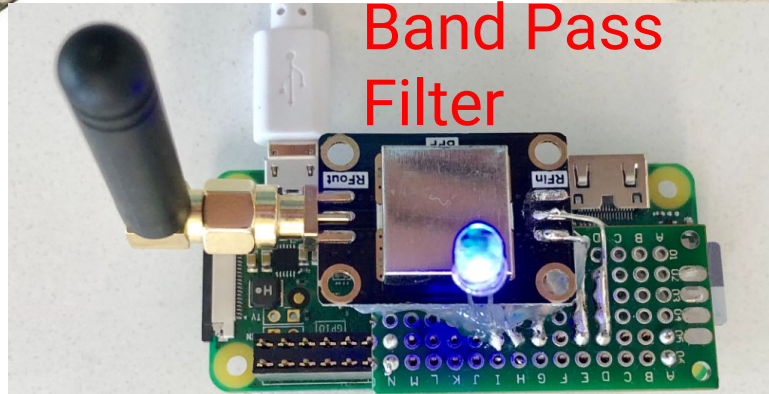
Solar Panels
and Solar Board



Raspberry Pi
Zero W



MO Power Board



Band Pass
Filter

Power

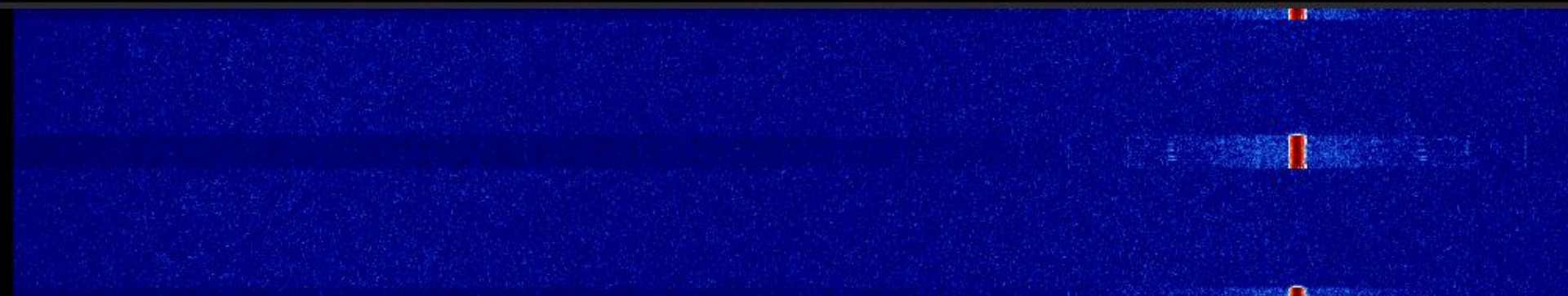
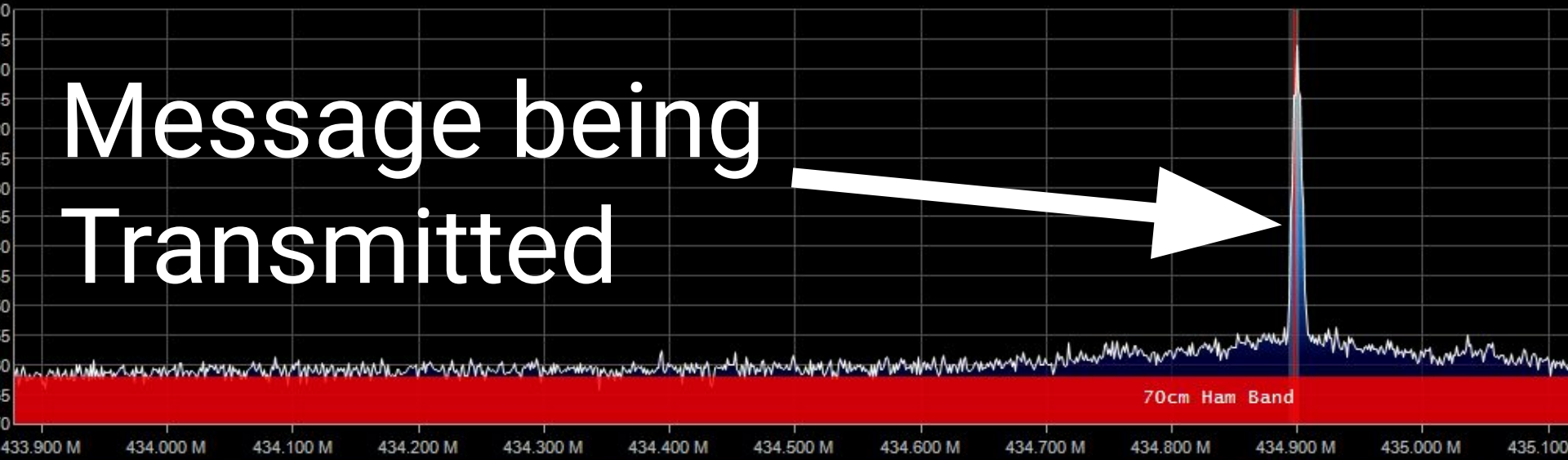
Part Name	Operating Mode	Number of Parts	Current (mA)	Voltage (V)	Duty Cycle (%)	Power (A)
Pi Zero W	Standby	1	100	5	80%	0.4
	Transmit	1	140	5	20%	0.14
MoPower Board	Normal (90% efficiency)	1	100	9	100%	0.9
DC-DC Boost Converter	Normal	1	100	3.5	100%	0.35
					Total Power	1.79

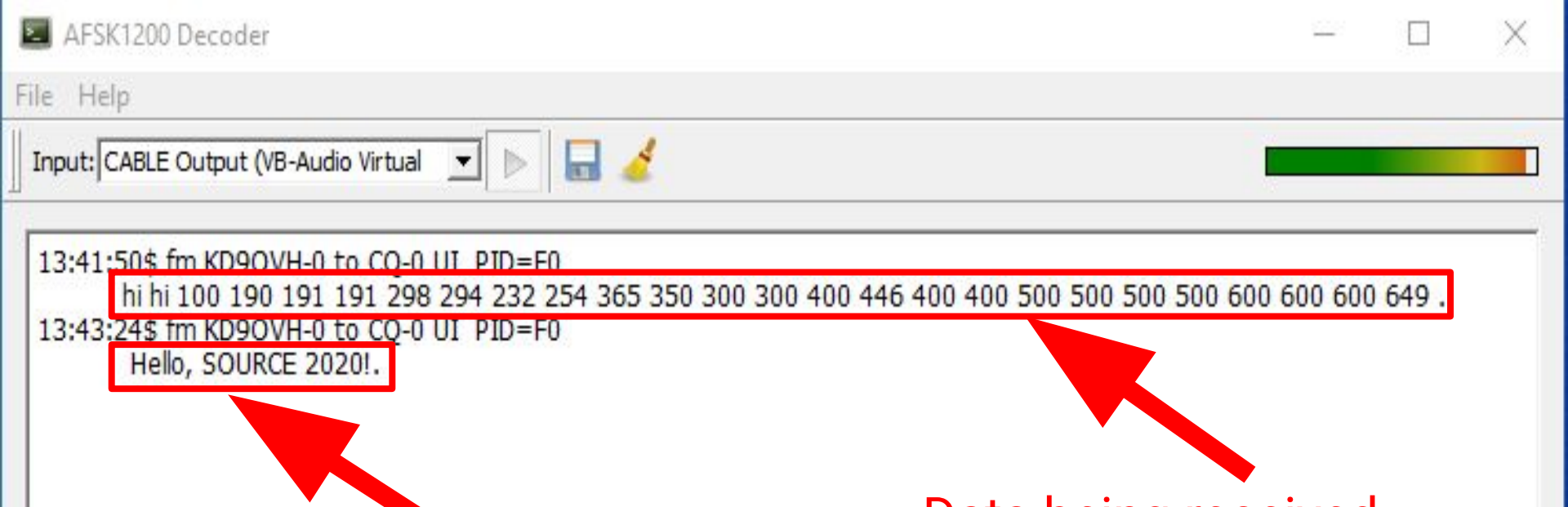
Transmitting and Receiving Data

- 433 MHz, 2 MHz Bandwidth Band Pass Filter
- Radio Frequency Transmission
- Receive through antenna and SDR Sharp
- Telemetry: AFSK Decoder
- Example: 'Hello, Source 2020!'

000.434.897.000 ◀▶

Message being Transmitted





Message transmitted
being read

Data being received

AFSK Decoder Output

Purpose and Future Plans

- Have something for kids to start getting involved with amateur radio and STEM
- Due to COVID-19, we were unable to put this in a weatherproof box and out on a pole in front of Gellersen to test
- Kits for kids
 - Take selfies from space
 - Scratch Programming
 - Play the radio