



A Low-cost Mobile Ground Station Architecture for Amateur UHF Communications: POINTY

Bronco Space

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Introduction



POINTY:

(Pleiades Omnidirectional Interface Node to Yearling)

Main Objectives

- Used as initial ground station to pick up post-launch AOS while larger ground station was being built.
- Serve as an accessible tool for education for mission ops and ground station operation for students and amateur satellite groups



Example use-case

Getting a ground station as a student group is complicated:

- University hesitancy of placing new infrastructure regardless of current funding
- Hesitancy on our side of using funding without a guarantee of approval to place a GS in a desired permanent location
- Due to these issues, we needed a quick solution to temporarily use as a ground station



Eventually after receiving all the parts we decided to "park" our ground station.

Example use-case cont.

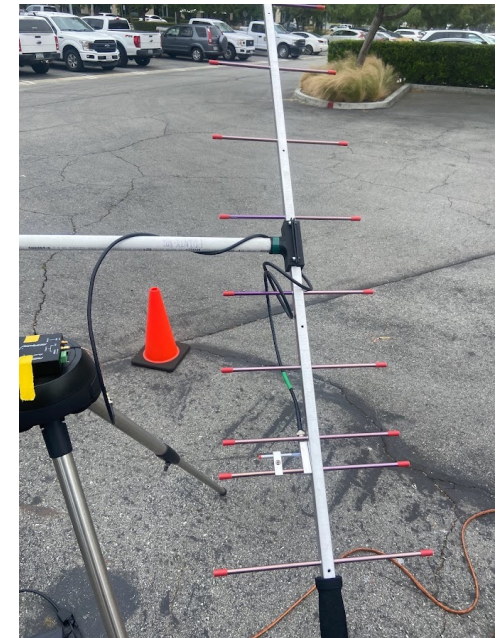


Eventually after receiving all the parts we decided to "park" our ground station.

Build Breakdown

Main Components

- 10 Element hand-held Yagi antenna
- Celestron Telescope mount
- SDR
- Telescope to Yagi adapters/bracket
- Tracking Software



After acquiring all necessary parts total cost comes out to roughly under \$1,000

Setup/Operation

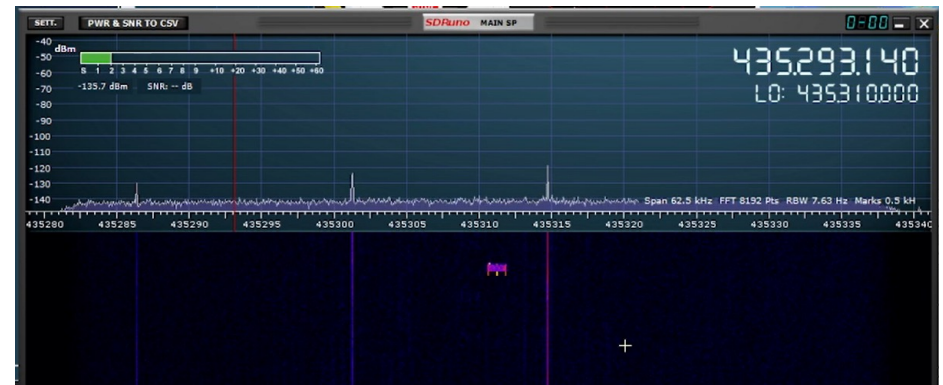
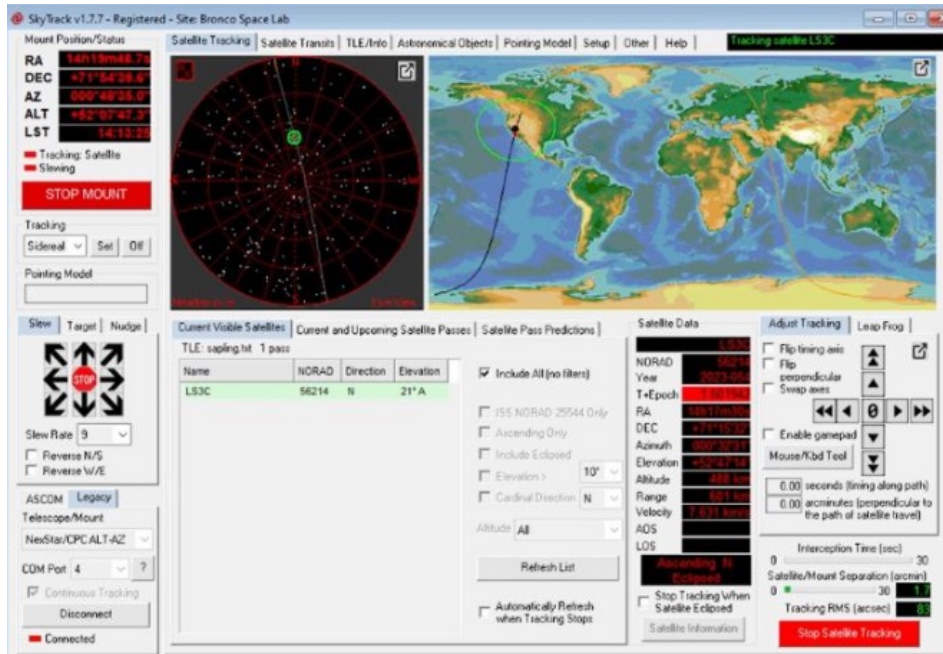
Setup

- Aligning Telescope mount using Celestron 2-Star Align
- Input desired Satellite TLE into SkyTrack if not listed already
- Start SDR software and start tracking/listening
- Record data received for decoding post-pass



After acquiring all necessary parts total cost comes out to roughly under \$1,000

Tracking/SDR Software Used



Although there are quite a few other options, I found that SkyTrack and SDRUno were the two that worked the best for me.

Tool for Education

Mission Ops is a very important part of any given mission so allowing students to practice/learn how to operate a ground station without having to invest a large amount of funding is key to allowing more students to be proficient in the process of communicating with their satellite post-launch independently of the build status of the satellite that will fly.



Having a low-cost ground station enables mission ops education which can be very beneficial when the student works on their own mission

Conclusion

- Overall, this is obviously not a marvel of RF technology however, I believe it is a very valuable tool to provide to students or amateurs who want to learn about operating a ground station and performing mission ops tasks without having to have their own satellite in orbit or spending a large amount of funding on a ground station.
- Thank you for your time, if there are any thoughts or questions feel free to reach out at:
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