W6SRR Remote HF Station

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2022

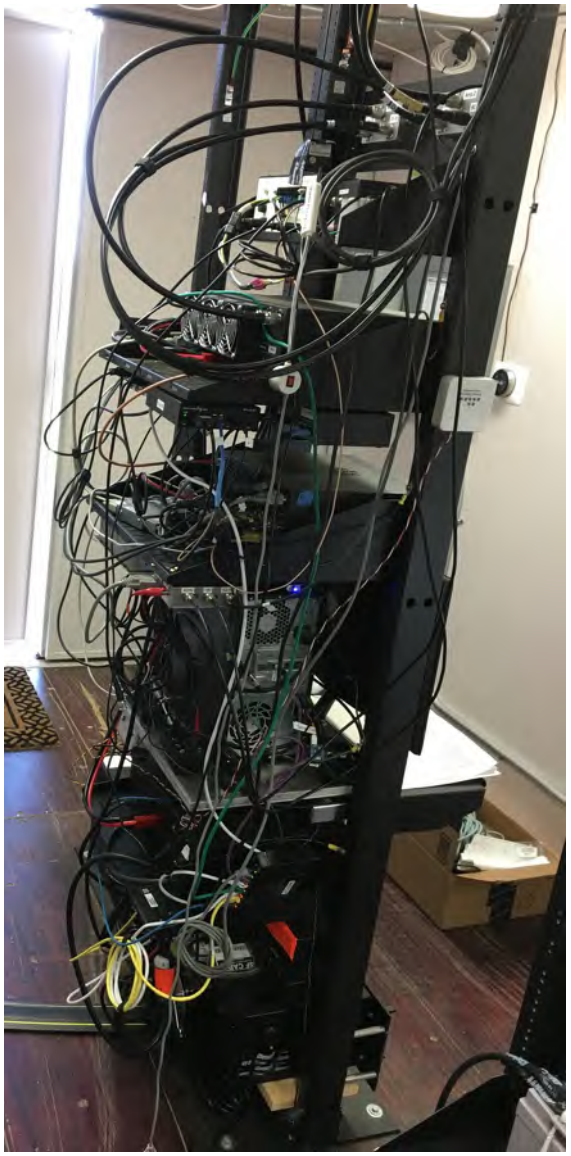
W6
Sunol
Ridge
Radio Group

Why remote-control operation?

- Get away from local noise sources (hopefully...)
- Better location for antennas
  - More space and/or higher
  - No restrictions such as HOA
  - Less QRM from XYL

Remote operation drawbacks

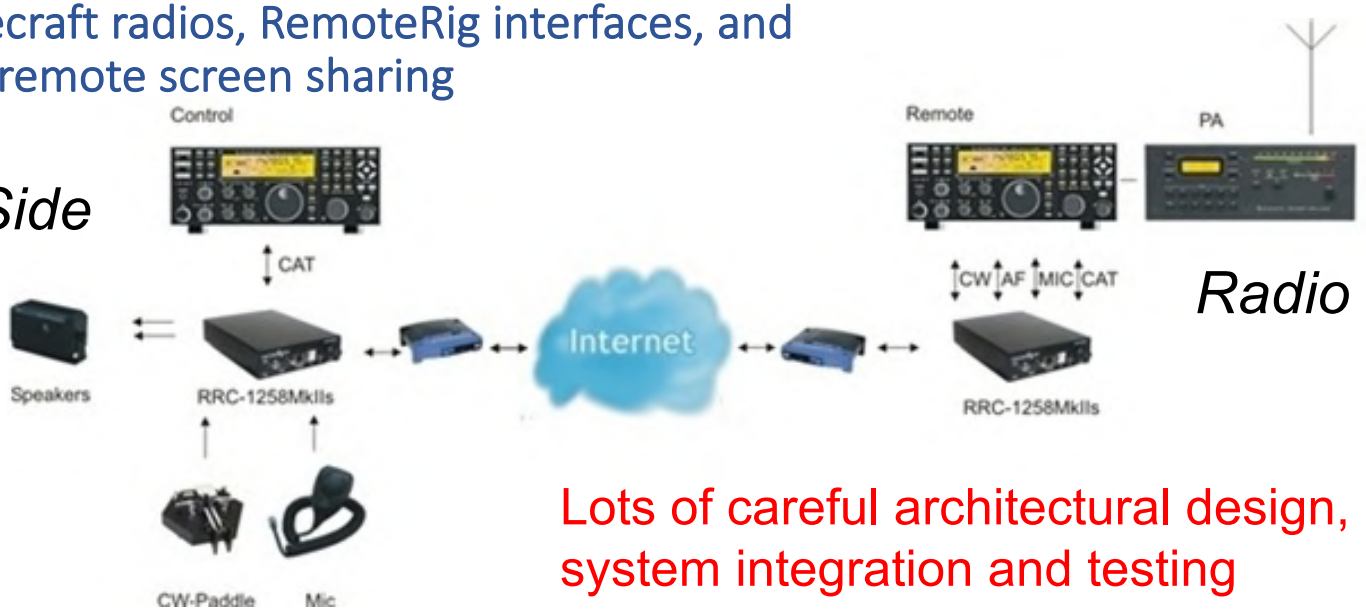
- Complexity and cost of remote systems
- Network shortcomings: dropouts, failures
- Necessity of travel for all repairs
- Bad/steep roads, inaccessible after heavy rain
- Yes, there is RFI! *Other* systems are noisy
- Site rent



How does remote operation work?

- Everything goes over the internet...
  - Rig control, audio, CW paddle, screen sharing
- Many ways to do it
  - We use Elecraft radios, RemoteRig interfaces, and SplashTop remote screen sharing

Control Side



Radio Side

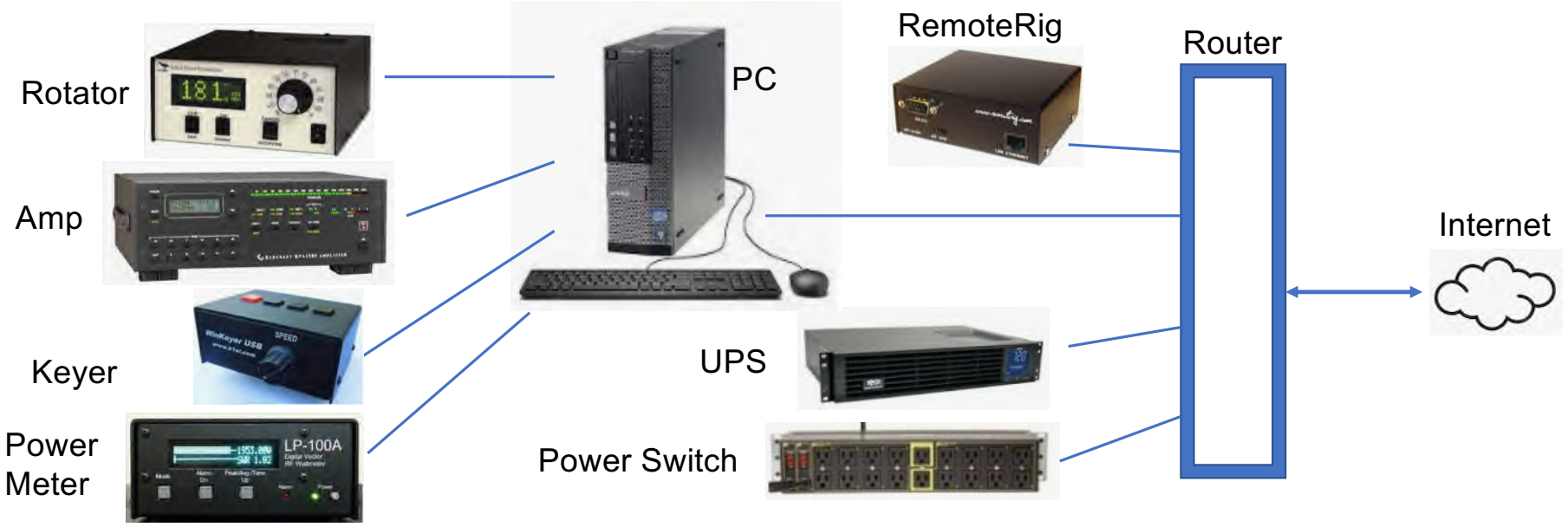
Lots of careful architectural design, system integration and testing

RemoteRig solves lots of problems

- Works with all makes and models of radio
- Low-latency, high-fidelity audio in both directions
- Multiple serial ports
- Elecraft/Kenwood “twin” mode: Local and remote front-panels are 100% synchronized... You’re THERE!
- CW paddle or even a straight key fully supported

"Everything else" has to be remote-operated too

- Amplifier, rotators, antenna switches, power meter, etc.
- And you better be able to cycle the AC power
- We use a dedicated PC at the remote site and desktop sharing



Ian negotiated a site for HF operation

- Located west of Pleasanton, on Sunol Ridge
- Private landowner, restrictions on what we can do
- Piggy-backed on a commercial communications site
- Facility and tower design by NA6O

The site is 1500 ft above the Livermore valley

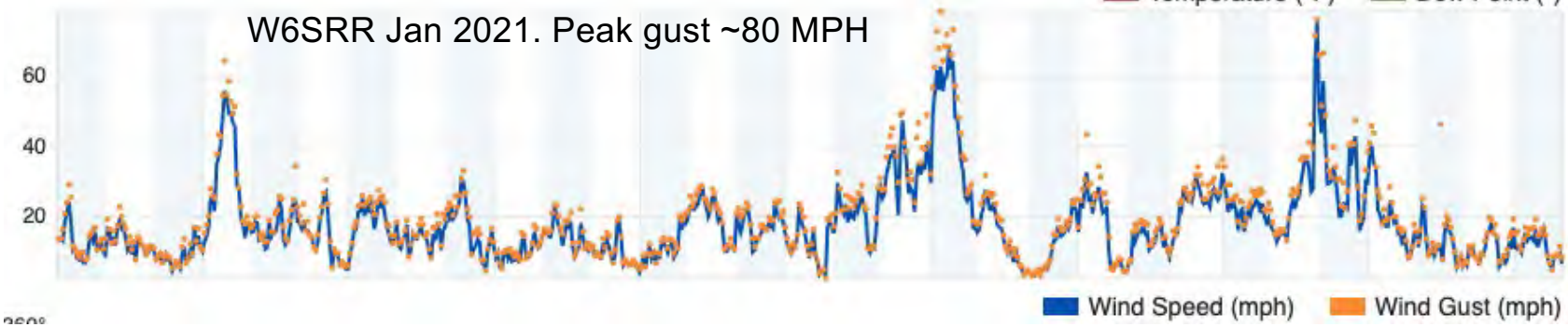
- Behaves like a VERY TALL tower
- Low takeoff angles for DX

Terrain profile, W6SRR toward Europe

Hilltop challenges

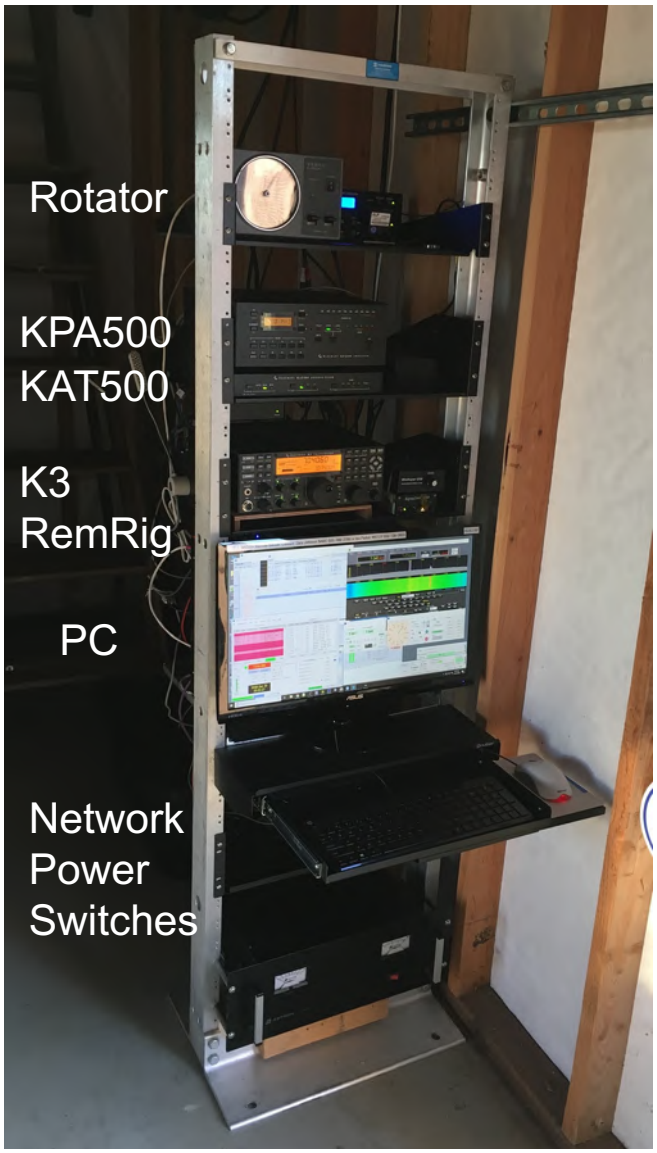
- Wind! Determines tower, mast, antenna design
- Travel - long drive, impassable mud
- Access permission, multiple gates

W6SRR Jan 2021. Peak gust ~80 MPH



Initial test station, Dec. 2018

SteppIR UrbanBeam on a small crankup tower trailer.
Thrown together on the hill in one day.



It lasted 7 days.

Gusts around 70 MPH. Guys were to be installed the next week!

After months of planning, in June 2019, commercial construction started

A serious tower base...

Took 4 months to get permission to bring in a concrete truck!

6 yards of concrete

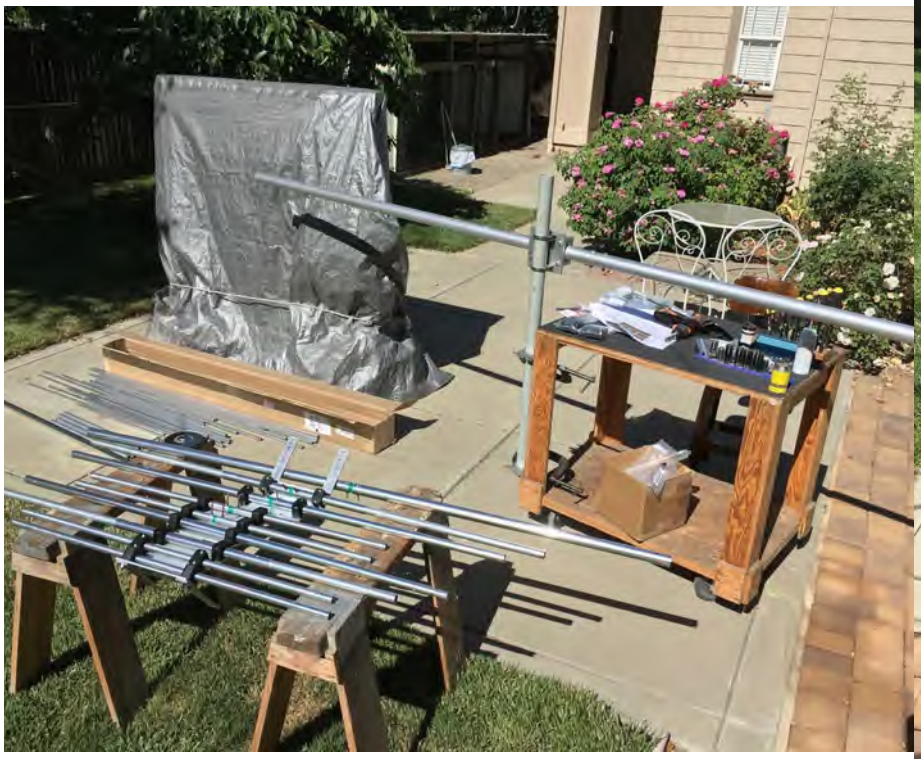
Rohn 65G. Big stuff.

- 30 ft free-standing
- Full-spec concrete base
- Rated 30 square feet at 110 MPH
- 22 ft 2-inch chrome-moly mast for the ham antennas

This is a COMMERCIAL tower installation, not your average backyard ham setup

Custom hardware

Antenna assembly



JK Navassa 5

Optibeam OB1-4030

Final assembly on-site

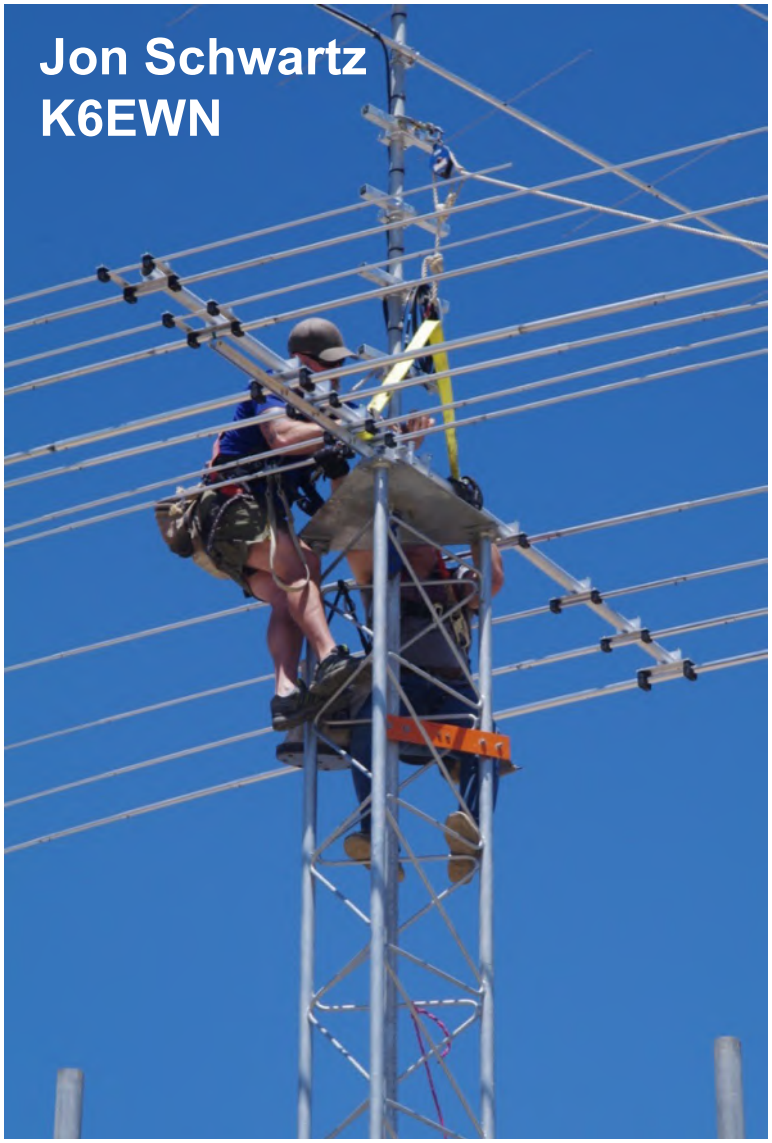
Ian gets his hands dirty:
Applying Noalox anti-sieze

Up go the antennas

Hand-tramming

Power-winching the mast up in steps

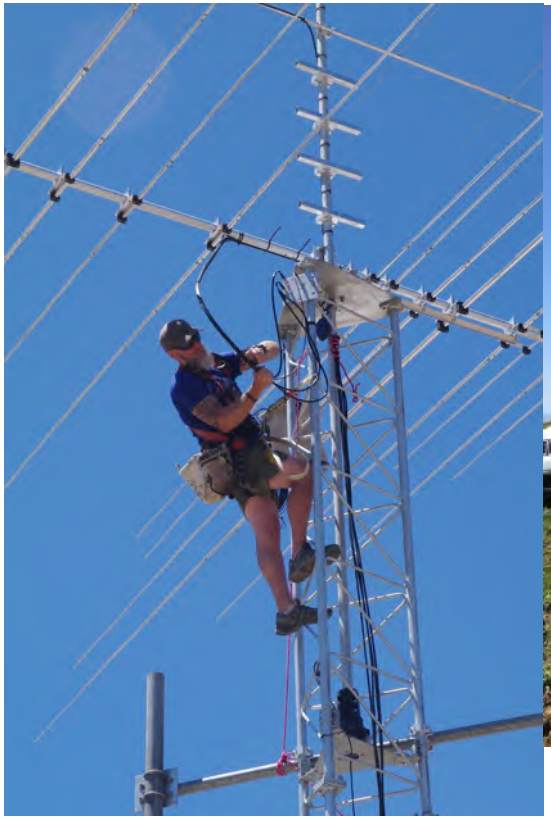

Earl Early


Jon Schwartz
K6EWN

Here's what's on the tower

- OptiBeam OB1-4030 dipole
- JK Navassa-5 Yagi, 20-6m
- Half-slopers for 80, 160
- M-Squared 9M2 2m Yagi
- BOG for 160/80

- H-frame for microwave dishes
- More VHF/UHF commercial stuff added later



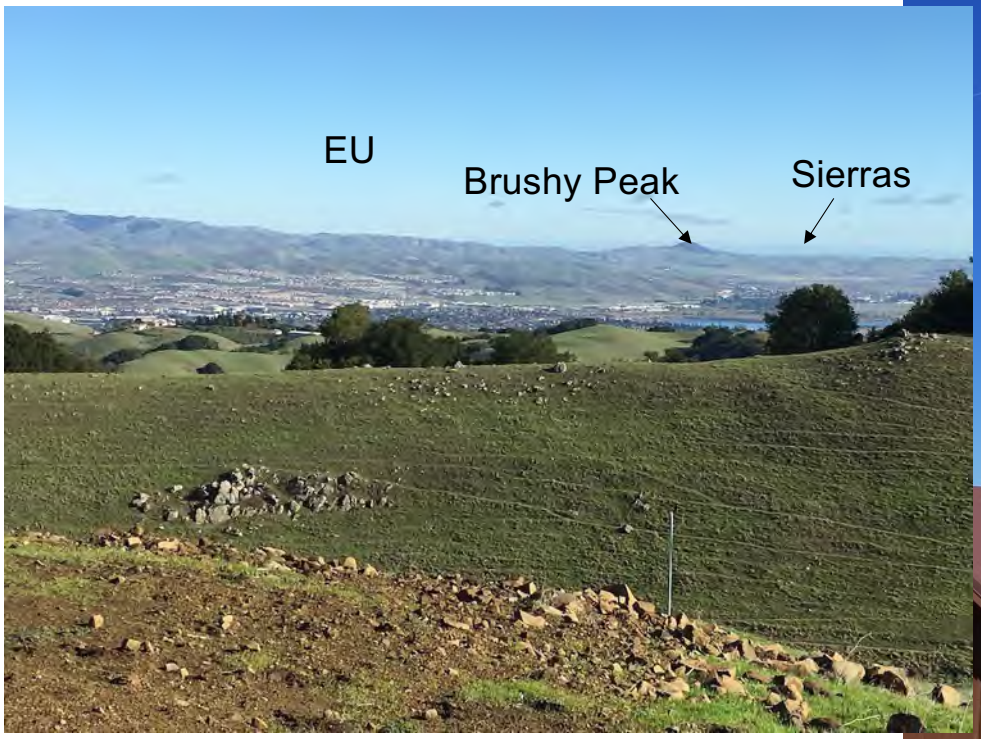
K6EWN

W6TCP buries radials

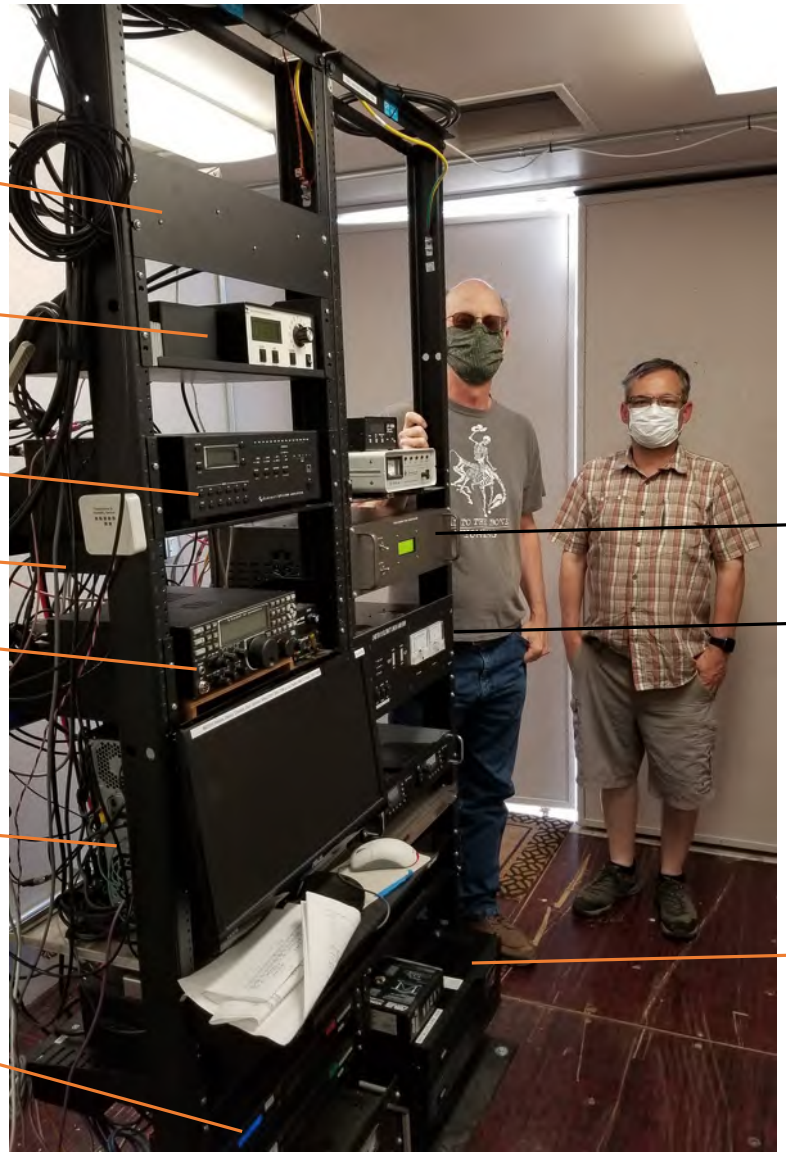
Equipment resides in a 20-foot container

- Fully insulated
- HVAC, 1 ton mini-split
- 120/240 V power

The view toward Europe... Nice!

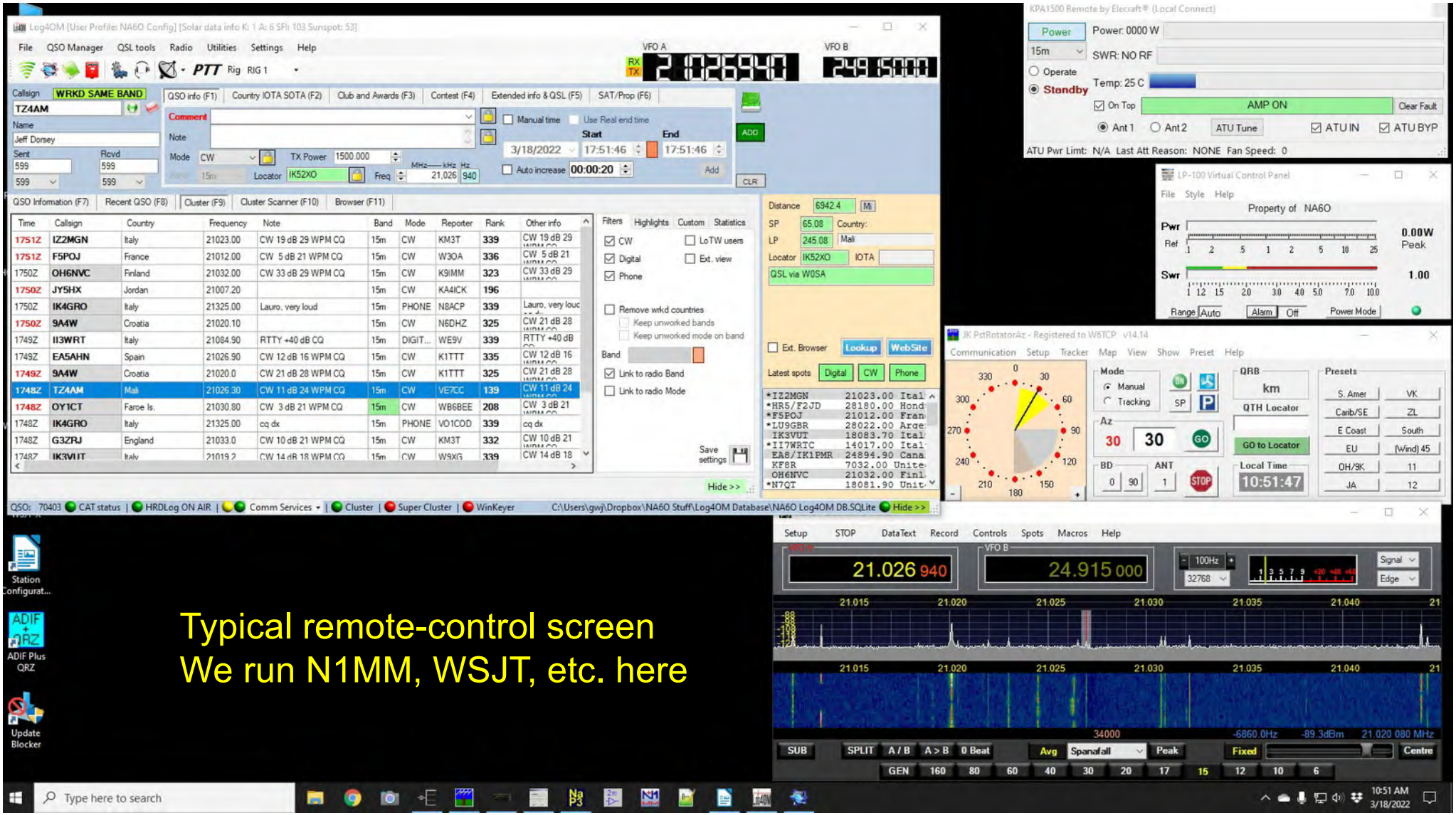


On the air: Aug 2019 😁


Antenna relays
RT-21 rotator controller;
10 MHz reference
KPA1500
RemoteRig; LP-Pan
K3
Computer
DLI network power switches
120 and 240V
2m amp remote interface
2m 1.5 kW W6PQL amp
UPS

Station features

- 160 thru 2m, 1.5 kW
- Fully remote, but could also be operated locally
- “Instant On”. Takes < 10 sec to connect and be ready to operate.
- Automatic/instant antenna switching, nothing to remember
- Full QSK to 25 WPM (with ping time 26 ms)
- We keep spare equipment, just in case
  - Trips are arduous…. find and fix problems in one trip
  - Spare K3, KPA1500, PC, accessories
- Future: K4… when Elecraft has full remote capability proven


Typical remote-control screen
We run N1MM, WSJT, etc. here

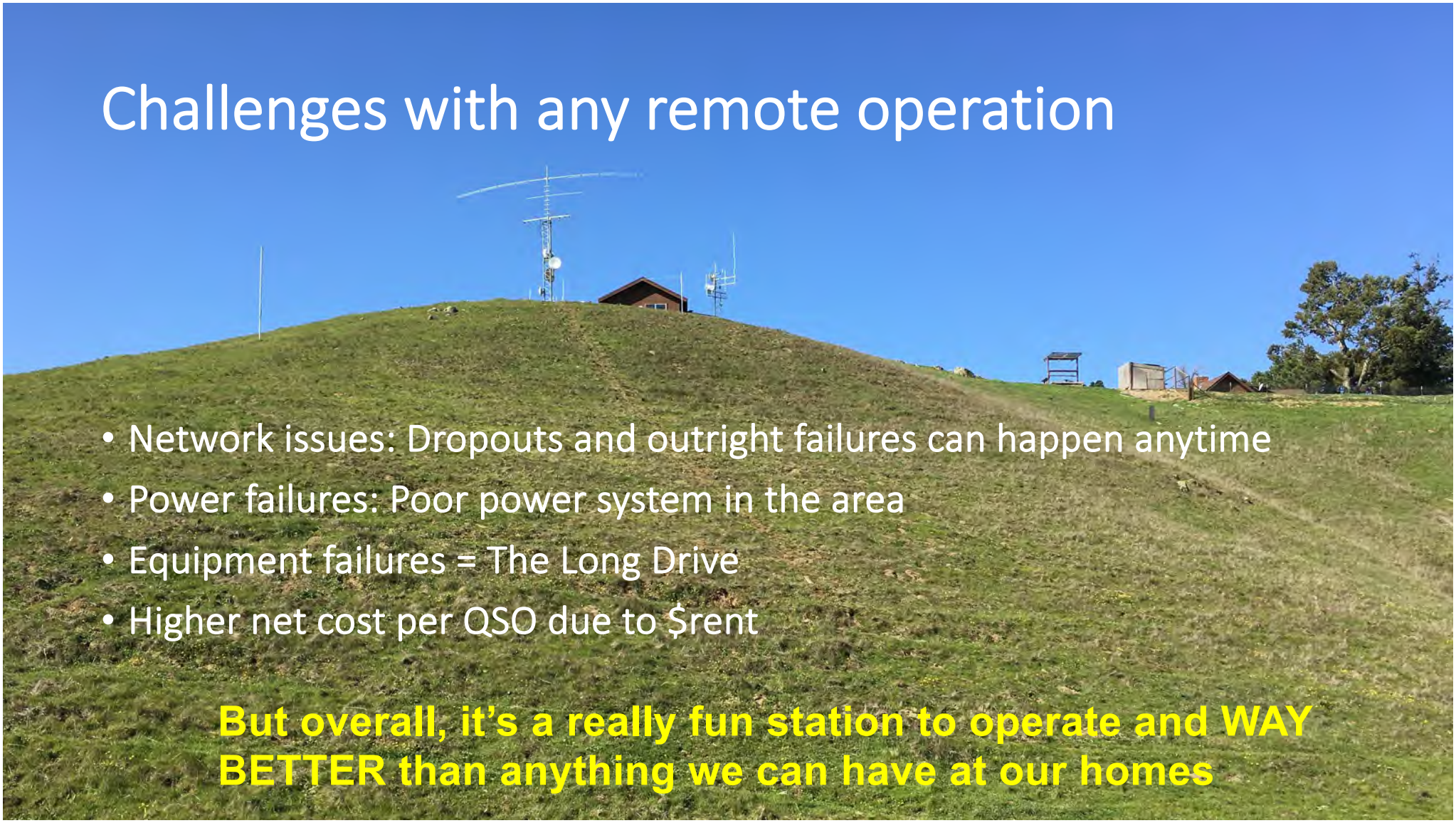
NA6O Control Station

So how well does it work?

- DXing is great on the high bands and VHF
  - CQ DX often leads to a pileup. Never had that at home!!
- Good for contesting, though that wasn't the objective
- Elephant on 160 and 80 (we hear better than xmit)
  - Half-slopers are inefficient, but it's all we can do
- RFI is still a problem
  - Commercial eqpt and property owner eqpt all generate noise. We've done LOTS of mitigation (ferrite $$$).

Massive choke to quiet down the owner's UPS

Challenges with any remote operation



- Network issues: Dropouts and outright failures can happen anytime
- Power failures: Poor power system in the area
- Equipment failures = The Long Drive
- Higher net cost per QSO due to $rent

But overall, it's a really fun station to operate and WAY BETTER than anything we can have at our homes

We also built this...
144/222 EME