



W6SRR Remote HF Station

Ian Parker, W6TCP
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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

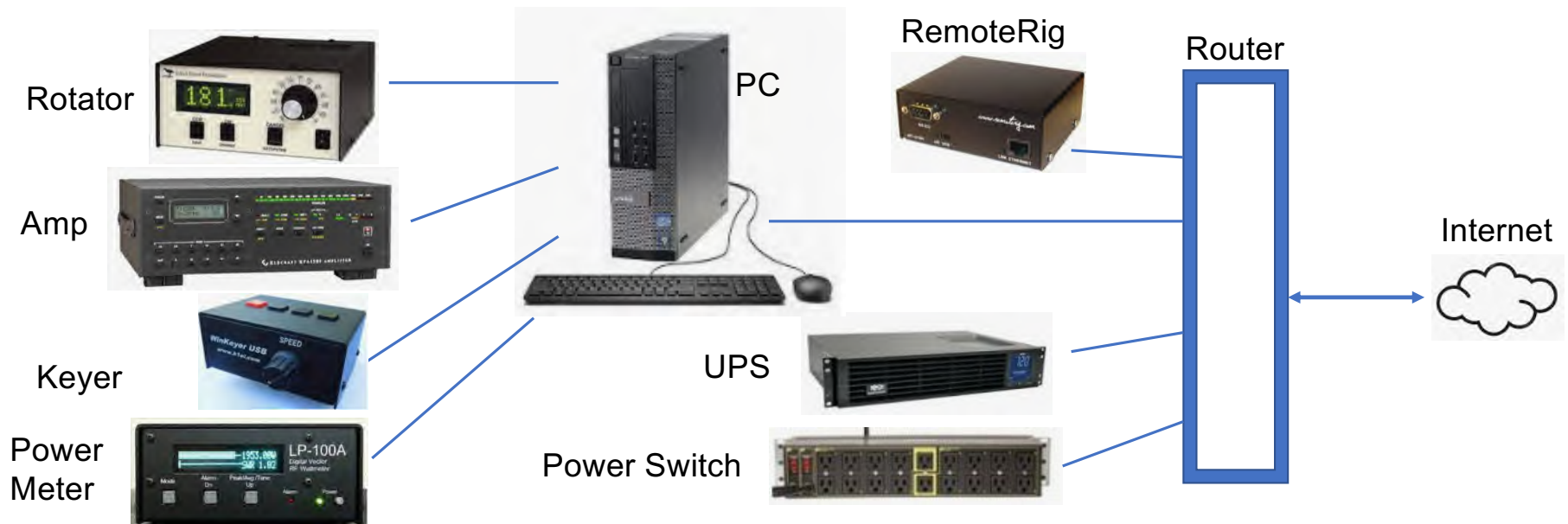
RemoteRig solves lots of problems

- 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 NA60



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

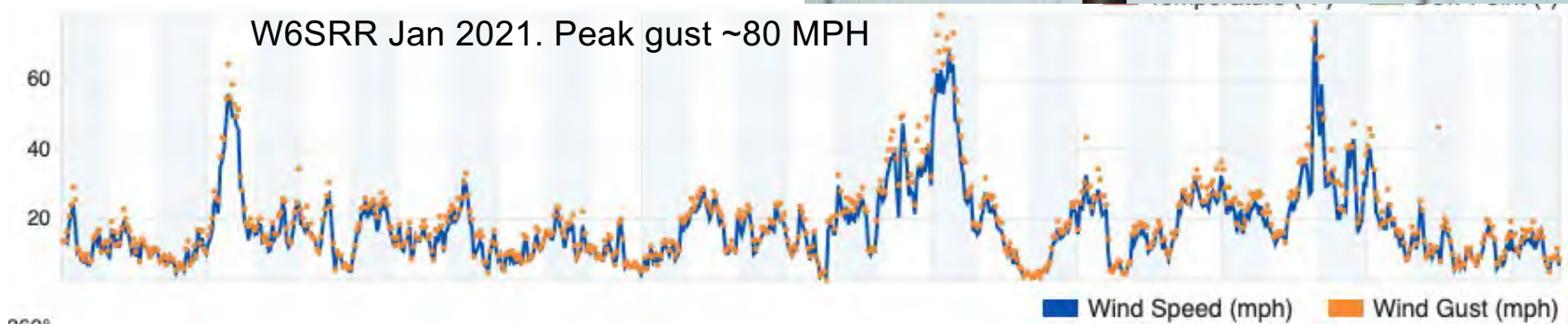


Hilltop challenges

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

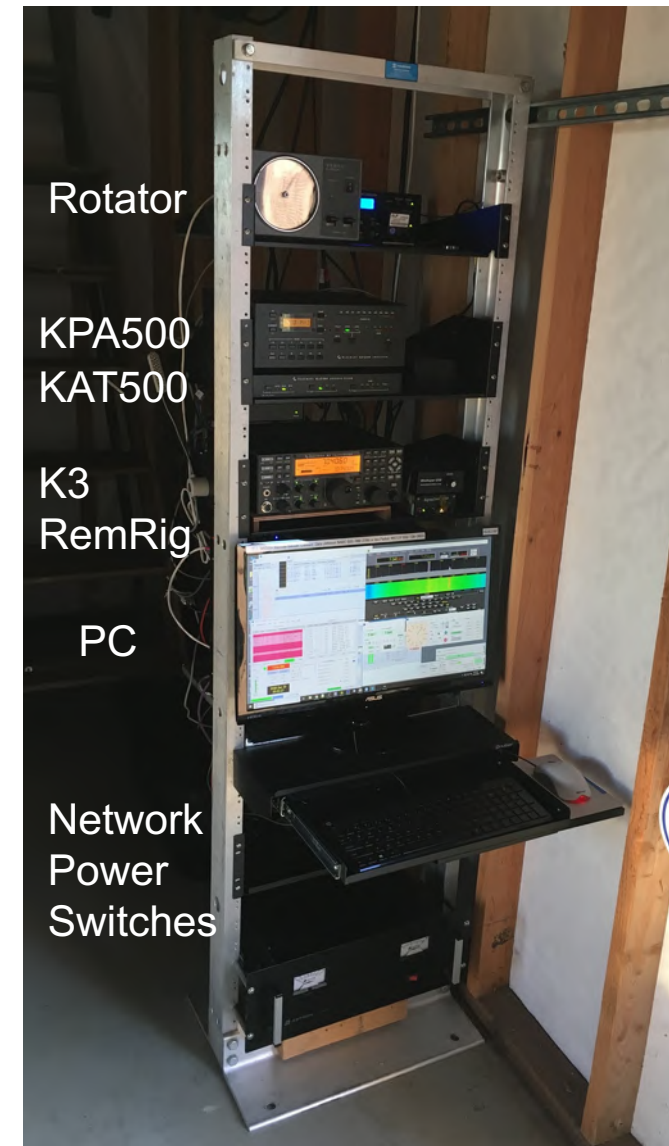


W6SRR Jan 2021. Peak gust ~80 MPH



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



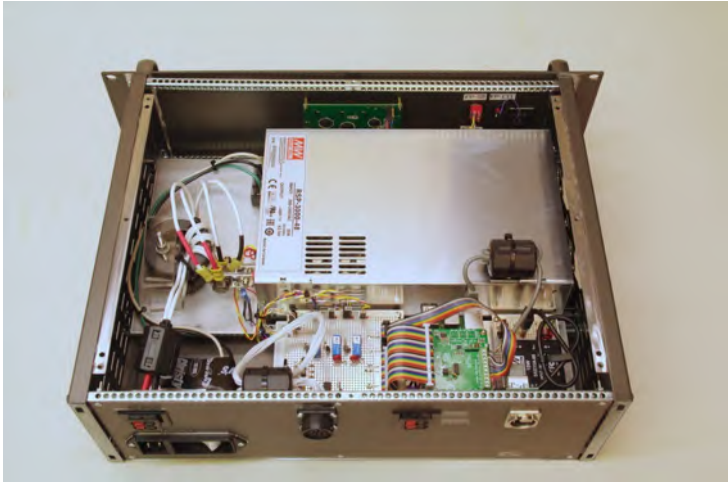
Rohn 65G. Big stuff.

- 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

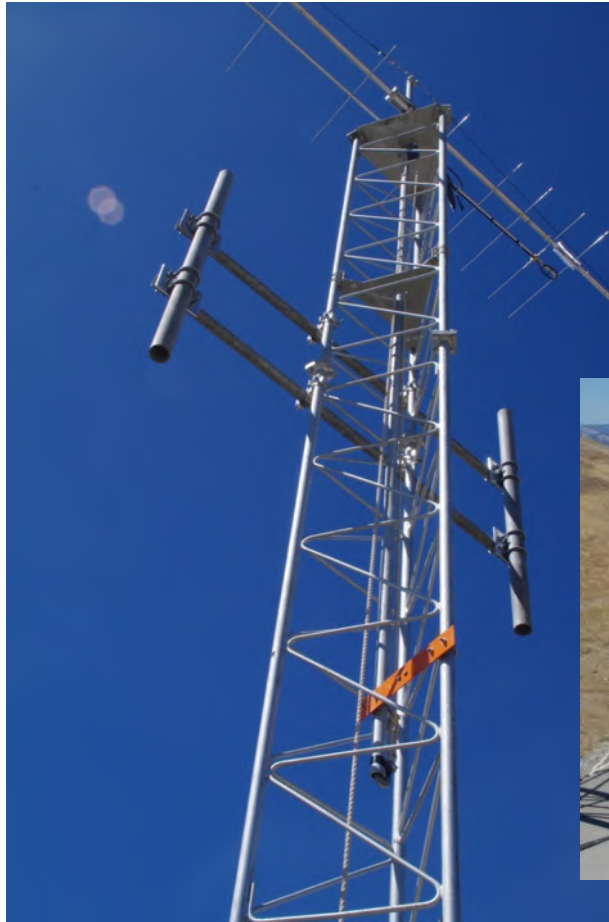


**Ian gets his hands dirty:
Applying Noalox anti-sieze**

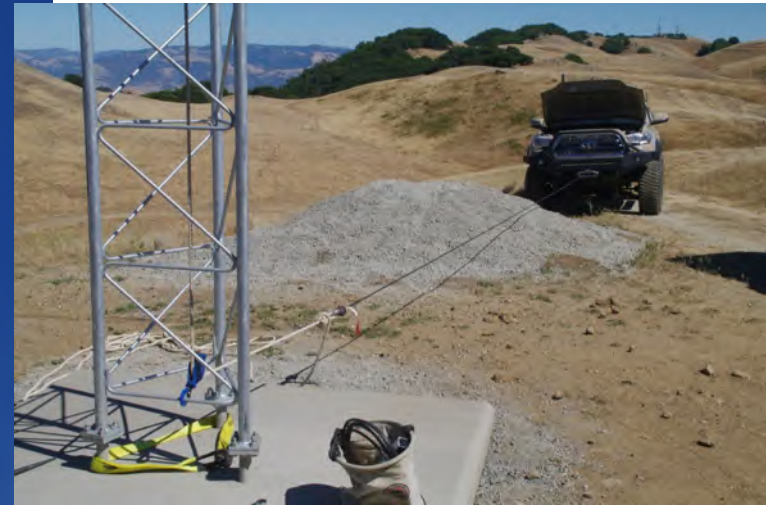


Up go the antennas

Hand-tramming



Power-winchning the mast up in steps





Earl Early



**Jon Schwartz
K6EWN**

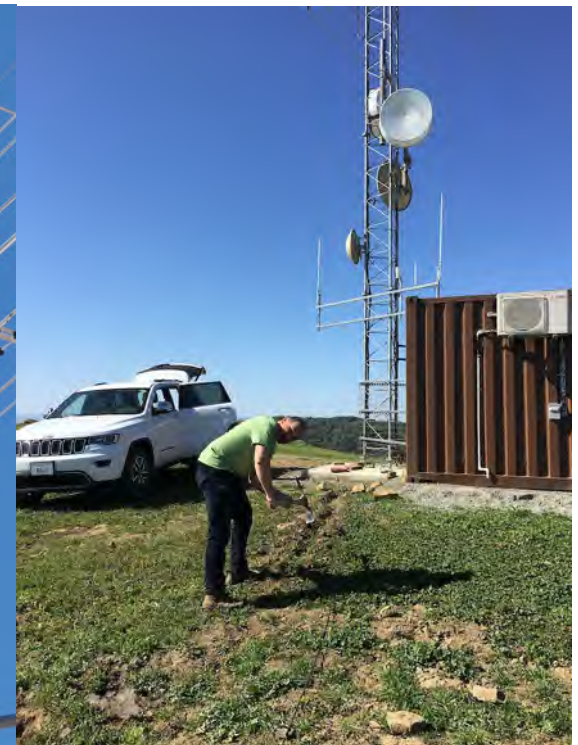
Here's what's on the tower

- 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



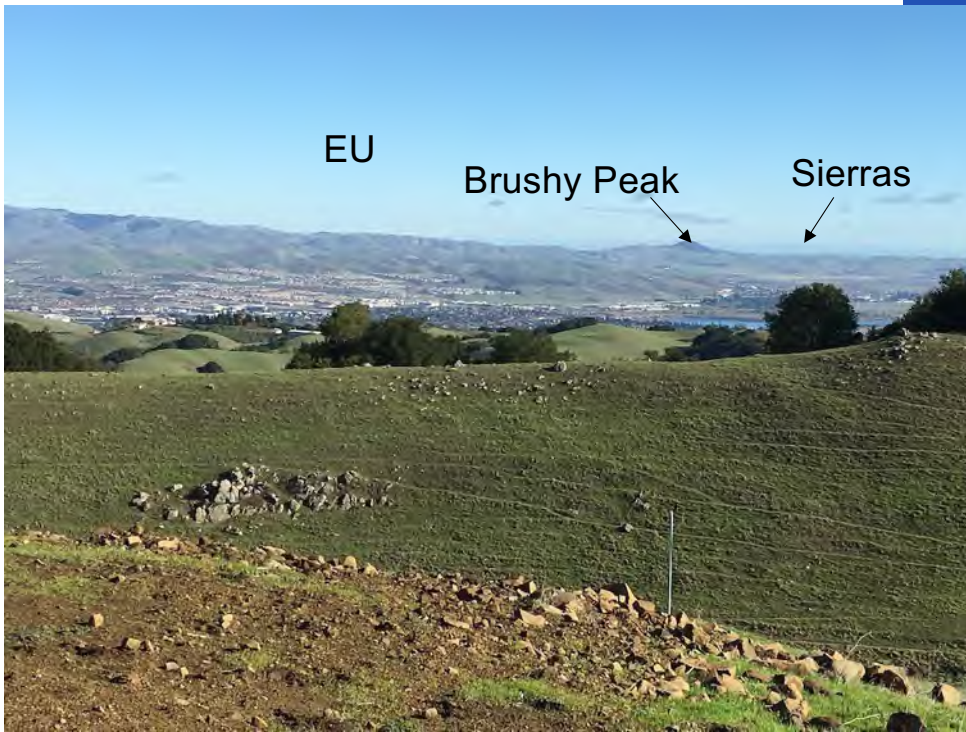
W6TCP buries radials

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

Log4OM [User Profile: NA6O Config] [Solar data info K: 1 A: 6 SFl: 103 Sunspot: 53]

File QSO Manager QSL tools Radio Utilities Settings Help

VFO A **21.026940** VFO B **24.915000**

Callign: **WRKD SAME BAND** QSO info (F1) Country IOTA SOTA (F2) Club and Awards (F3) Contest (F4) Extended info & QSL (F5) SAT/Prop (F6)

Name: **TZ4AM** Comment: [] Manual time [] Use Real end time []

Name: Jeff Dorsey Note: []

Sent: 599 Rcvd: 599 Mode: CW TX Power: 1500.000 MHz: 21.026940 Hz: 940

Start: 3/18/2022 17:51:46 End: 17:51:46

Distance: 6942.4 Mi

SP: 65.08 Country: [] LP: 245.08 Mail: []

Locator: IK5ZXO IOTA: []

GSL via W0SA

Time	Callign	Country	Frequency	Note	Band	Mode	Reporter	Rank	Other info
1751Z	IZ2MGN	Italy	21023.00	CW 19 dB 29 WPM CQ	15m	CW	KM3T	339	CW 19 dB 29 WPM CQ
1751Z	F5POJ	France	21012.00	CW 5 dB 21 WPM CQ	15m	CW	W30A	336	CW 5 dB 21 WPM CQ
1750Z	OH6NVC	Finland	21032.00	CW 33 dB 29 WPM CQ	15m	CW	K9IMM	323	CW 33 dB 29 WPM CQ
1750Z	JY5HX	Jordan	21007.20		15m	CW	KA4ICK	196	
1750Z	IK4GRO	Italy	21325.00	Lauro, very loud	15m	PHONE	N8ACP	339	Lauro, very loud
1750Z	9A4W	Croatia	21020.10		15m	CW	N6DHZ	325	CW 21 dB 28 WPM CQ
1749Z	I13WRT	Italy	21084.90	RTTY +40 dB CQ	15m	DIGIT...	WE9V	339	RTTY +40 dB CQ
1749Z	EA5AHN	Spain	21026.90	CW 12 dB 16 WPM CQ	15m	CW	K1TTT	335	CW 12 dB 16 WPM CQ
1749Z	9A4W	Croatia	21020.00	CW 21 dB 28 WPM CQ	15m	CW	K1TTT	325	CW 21 dB 28 WPM CQ
1748Z	TZ4AM	Mak	21026.30	CW 11 dB 24 WPM CQ	15m	CW	VE7CC	139	CW 11 dB 24 WPM CQ
1748Z	OY1CT	Faroe Is.	21030.80	CW 3 dB 21 WPM CQ	15m	CW	WB6BEE	208	CW 3 dB 21 WPM CQ
1748Z	IK4GRO	Italy	21325.00	cq dx	15m	PHONE	VO1COD	339	cq dx
1748Z	G3ZRJ	England	21033.00	CW 10 dB 21 WPM CQ	15m	CW	KM3T	332	CW 10 dB 21 WPM CQ
1748Z	IK3VIT	Italy	21019.20	CW 14 dB 18 WPM CQ	15m	CW	WSXG	339	CW 14 dB 18 WPM CQ

Filters: Highlights Custom Statistics

CW LoTW users Digital Ext. view Phone

Remove wkcd countries Keep unworked bands Keep unworked mode on band

Band: []

Link to radio Band Link to radio Mode

Save settings []

Hide >>

QSO: 70403 CAT status: [] HRDLog ON AIR: [] Comm Services: [] Cluster: [] Super Cluster: [] WinKeyer: []

KPA1500 Remote by Elecraft® (Local Connect)

Power: 0000 W

15m SWR: NO RF

Operate: []

Temp: 25 C

Standby

On Top **AMP ON** Clear Fault

Ant 1 Ant 2 ATU Tune ATU IN ATU BYP

ATU Pwr Limt: N/A Last Att Reason: NONE Fan Speed: 0

LP-100 Virtual Control Panel

File Style Help

Property of NA6O

Pwr: [] 0.00W Peak

Swr: [] 1.00

Range/Auto Alarm Off Power Mode []

JK PstRotatorAz - Registered to W6TCP v14.14

Communication Setup Tracker Map View Show Preset Help

Mode: [] Manual [] Tracking

QRB: km

QTH Locator: []

GO to Locator

Local Time: 10:51:47

BD: 0 90 ANT: 1 STOP

Latest spots: Digital CW Phone

- *IZ2MGN 21023.00 Ital
- *HR5/F2JD 28180.00 Hond
- *F5POJ 21012.00 Fran
- *LU9GBR 28022.00 Arge
- *IK3VUT 18083.70 Ital
- *I13WRT 14017.00 Ital
- EAS/IK1EMR 24894.90 Cana
- KF8R 7032.00 Unite
- OH6NVC 21032.00 Finl
- *N7QT 18081.90 Unit

Station Configurat...

ADIF Plus QRZ

Update Blocker

Type here to search

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

Setup STOP DataText Record Controls Spots Macros Help

VFO B: 21.026940 24.915000

100Hz 32768

Signal: [] Edge: []

21.015 21.020 21.025 21.030 21.035 21.040 21

21.015 21.020 21.025 21.030 21.035 21.040 21

34000 -6860.0Hz -89.3dBm 21.020 080 MHz

SUB SPLIT A/B A > B 0 Beat Avg Span:all Peak Fixed Centre

GEN 160 80 60 40 30 20 17 15 12 10 6

10:51 AM 3/18/2022

NA60 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

