6-Meter EME

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KJ9I 6-meter EME Array

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Why ????

- Challenge
  - Learn more about antennas & antenna phasing
  - Gain experience optimizing your station to copy very weak signals
- Enhance 6-Meter DXCC total
  - Or complete your 6-Meter DXCC
- Increase your DXCC Challenge total

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You Can DO 6-Meter EME

- You have a 7 element Antenna *MINIMUM*
- A preamp, preferably at the antenna
  - Don't rely on the preamp in your rig
- 500 Watts *MINIMUM*
- Moon tracking software
  - Included with WSJT-x
- Best if you can elevate your antenna
  - If not, catch on moonrise or moonset

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Major DXpeditions

- Most major Dxpeditions now include 6-Meters in the station/antenna lineup
- The past six months included:
  - 4W8X
  - TX5S
  - CB0ZA
  - You could have worked these if you knew how

6-Meters Only DXpeditions

- W7GJ has activated 15 DXCC countries:
  - E5, E6, 3D2, TX5, 5W0, KH8, V6, T8, VK9C, VK9X, C2, S7, FO, TX7, 3B9
- Next is to ZD9 Tristan da Cunha !
  - August 23-September 30, 2024
- Lance uses an M^2 6M8GJ 8 element antenna
  - Manual azimuth and elevation rotation
- 1500 watt SSPA

DXpeditions

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What Do I Need To Know?

- Forget EVERYTHING you know about FT8
  - In the world of EME, FT8 is for WEENIES
- Forget JTDX, MSHV, JT Alert, etc.
  - YOU run the computer, the computer does not run you or operate your station for you
  - This is BIG BOY operating, not your mama spoon feeding you to make the contact for you.

What Do I Need To Know?

- To start, you need to learn Q65
  - It is one of the programs in the WSJT-x suite of programs
- If you think you know how to operate Q65, you don't for EME!
- There is a very specific configuration for Q65 to decode signals and to set up the wide graph for EME

What Do I Need To Know?

- 6-Meter EME uses Q65, Submode A, 60 second sequences
  - Your transmitter will run for almost one full minute on, one minute off, then repeat
  - at full power, 100% duty cycle
  - for 30 mins or longer
  - your amplifier, cables, connectors and everything in the transmit path must handle this.

What Do I Need To Know?

- The meaning of 1st/even and 2nd/odd sequence
- Learn about the moon's 28 day cycle
- Faraday rotation!
  - He is LOUD, why can't the moron hear me?

Let's Take a Test

To work EME I must have a:

a. Full moon
b. Half moon, but signals will be down 3 dB
c. Quarter moon, but signals will be down 6 dB
d. Common moon with the other station

What Do I Need To Know?

Let's take a test !!!!!

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What Equipment Do I Need?

- Modern mid-level and above radios are fine
  - Most everyone uses Elecraft or Icom. I use an IC-7300
- Amplifier capable of >500 watts
  - CAUTION! some amplifiers can have up to 6 dB RX loss on 6 meter in the pin diode switching (Elecraft KPA1500 !!!!)
- A receive preamp at the antenna
  - Must be sequenced and have a bypass relay sufficient to handle the full transmit power
- Low loss cable to the antenna

What Equipment Do I Need?

- For a single Yagi, absolute minimum is a 7-element antenna ~30 ft boom
  - 6M7JHV, 2LFA-HD-50
- If you can elevate the antenna you will have longer opportunity to work a station
- If you can only rotate azimuth then catch moonrise or moonset
  - Usually up to or down from 15 degrees

New W5ZN 6-Meter Antenna

- Started working W7GJ during his FO and TX7 trips
- Used either M² 6M9KHW on moon rise and moon set or M² 6M7JHV manually elevated
- Now using 4x7LFA array with full elevation
  - Gotta get BIGGER and better !!!!!
  - Driven by desire to work 4W8X

New W5ZN 6-Meter Antenna

An antenna project of this magnitude requires

"*Multi-Disciplinary Project Management*"

- Civil
- Mechanical
- Electrical
- Religious
  - I created several new cuss words during this project

New W5ZN 6-Meter Antenna

- Initial plan was to use four M² 6M7JHV's that I already owned
  - LFA crowd went bonkers and insisted I must LFA's because they are MUCH less noisy
- Sold the 6M7's
  - The LFA crowd bought my 6M7's !!!!!!!
- Purchased four Innovantennas 7-LFA2-HD
  - Must purchase direct from WiMO in Europe
  - After purchase the M² gang said "You WASTED your money!!!!!!

New W5ZN 6-Meter Antenna

- Structurally better than 6M7
  - Utilizes square boom
    - More wind loading than round boom
- Construction is very easy
  - All four assembled in two easy afternoons
- Are the LFA's better than the M^2 ??
  - Not "quiter" at my QTH – I have a noisy horizon
  - Loop feed direct 50 ohm feed and is great
  - Broader resonance

New Support Tower

- Located in same place as previous 144/222 MHz EME location
- Rohn 25 tower was not sufficient to support four 6-meter antennas in an H-frame configuration spaced ~24 ft.
- Had to replace the 17ft Rohn 25 with 27 ft of Rohn 45
  - 3 ft of bottom section in concrete for base

New Support Tower

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Antenna H-frame Support

- For 50 MHz, four antennas must be spaced ~24 ft horizontally & vertically
- An antenna with a 32 ft boom length requires a significant H-frame structure
  - Horizontal H-frame boom is 3” OD ¼” wall aluminum tubing with wire supports
  - Vertical H-frame booms are 2” OD, ¼” wall aluminum tubing with wire supports

Azimuth & Elevation Rotors

You say you want to use a Tailtwister?

If you're very lucky it might last one week?

Azimuth & Elevation Rotors

Must have BIG BOY rotors

Azimuth
M² Orion 2800

Elevation
M² MT-3000

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Azimuth & Elevation Rotors

MT-3000 elevation rotor is a heavy duty motor driven gear/chain mechanism

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Azimuth & Elevation Rotors

Green Heron dual rotor controllers

For azimuth & Elevation

Serial port connection to computer provides auto tracking of moon and antennas

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Assembly Without Vertical Spreaders and Antennas

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Array Completed

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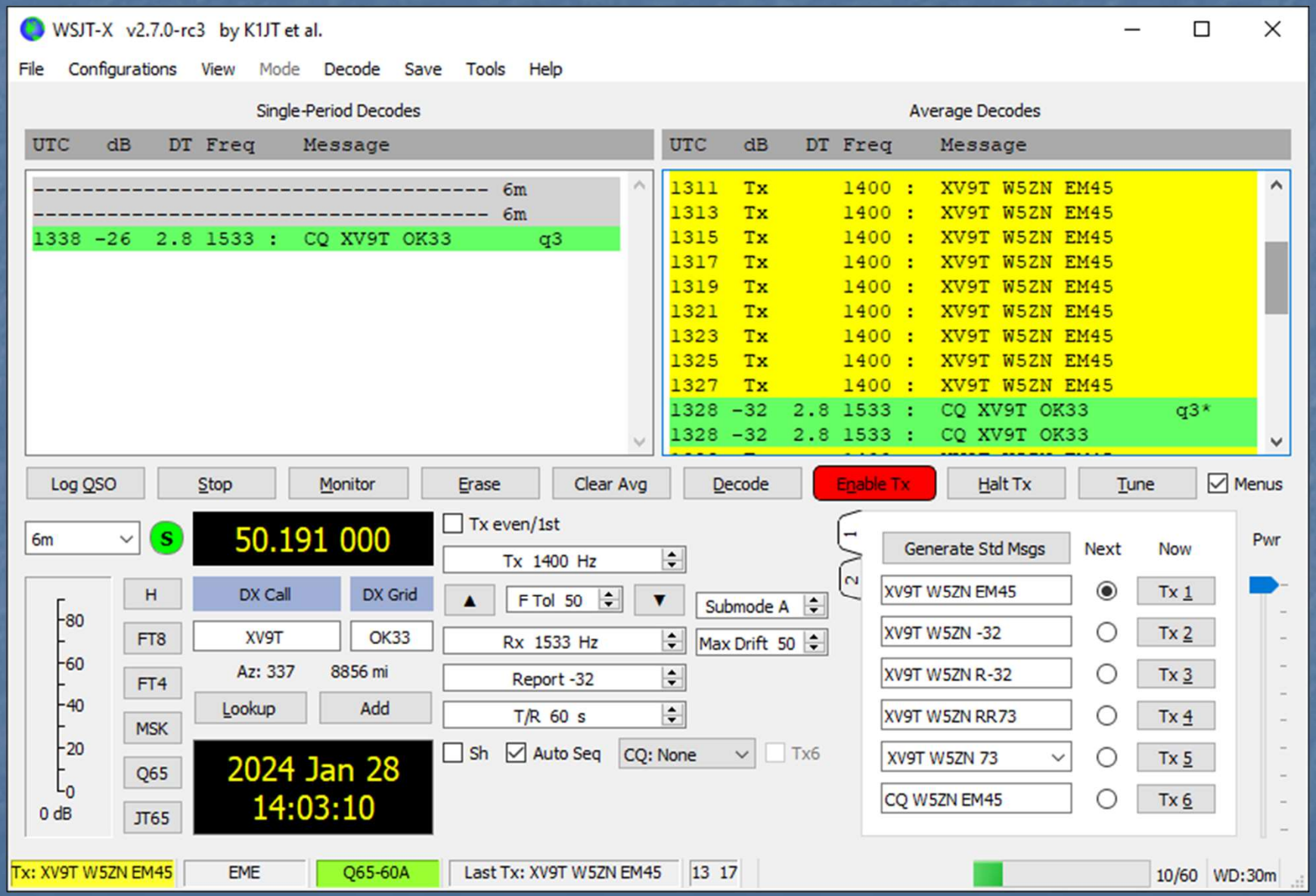
The Elusive One



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Structurally Sound ??

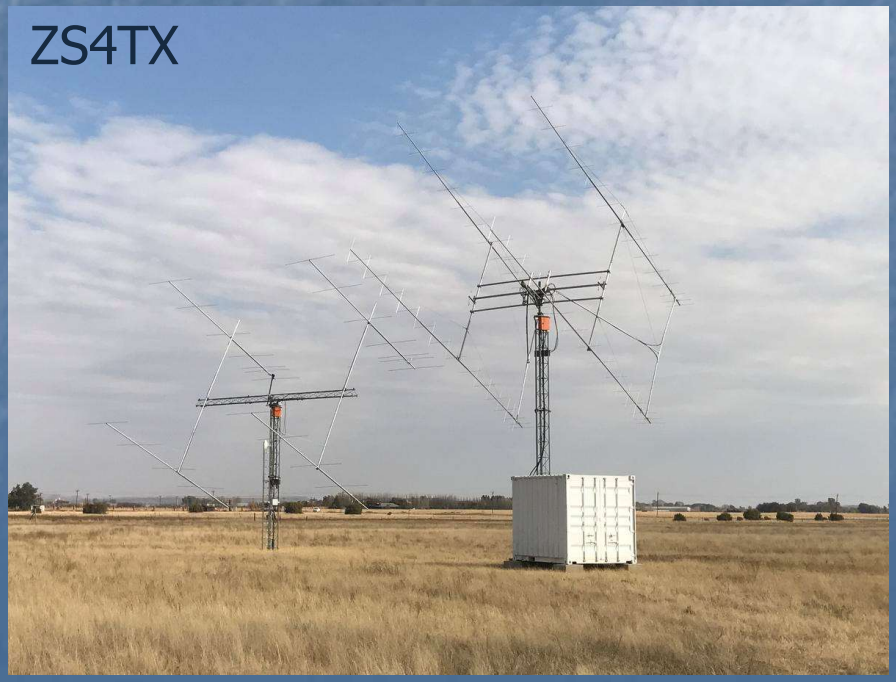
- In January we had a massive cold front with snow, ice and 50 MPH winds
  - Looked like a Foghorn Leghorn floppy around

- One week later Tstorms & tornadoes with 65 MPH wind gusts

Structurally Sound ??

- The array survived
  - Lost one vertical spreader support
- Need to add additional support guys

BIG GUN 6-Meter EME Stations



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GET IN THERE AND WORK `EM!