



KØZR – Jeff Crawford
2017

Background

- ▶ First licensed at age 15 – callsign WAØZRT – in Iowa
- ▶ Began operating in earnest (again) in 2006
- ▶ Envisioned moving out of Leesburg ~ 2007 in order to have better station
- ▶ Moved to Purcellville in 2010; property ~ 3.4 acres
- ▶ Station has been a continual work in progress; relatively stable now

Principles behind station construction

- ▶ This is a hobby, so at every opportunity I try to save money
 - ▶ TX-472 tower purchased at < 50% price of “new”
 - ▶ C31XR 10-20 m yagi purchased for 50% of new – NOS still in the box
 - ▶ XM-240 2-element 40m yagi for 50% of new – NOS still in the box
 - ▶ All hardline, LD4-50A, purchased for no more than \$ 1.25/ft; cost new is ~ \$ 2.50/ft
 - ▶ All trenches, including 5x5x7.5 ft hole for tower, dug by hand
 - ▶ In retrospect, had I calculated the total cost (i.e. knee surgery) I would have likely rented some heavy equipment
 - ▶ Constructed my own tilt-over mechanism for tower as well as gear-motor driven tower raising/lowering capability
- ▶ I strive to make everything a one-man operation
 - ▶ I have put up/taken down both yagis by myself two different times

Acquired over the course of 4 years

Feeding the Antennas



First Cable Run - 2010

3" Copper Strap in Bottom
Connecting House Ground
To Tower Ground

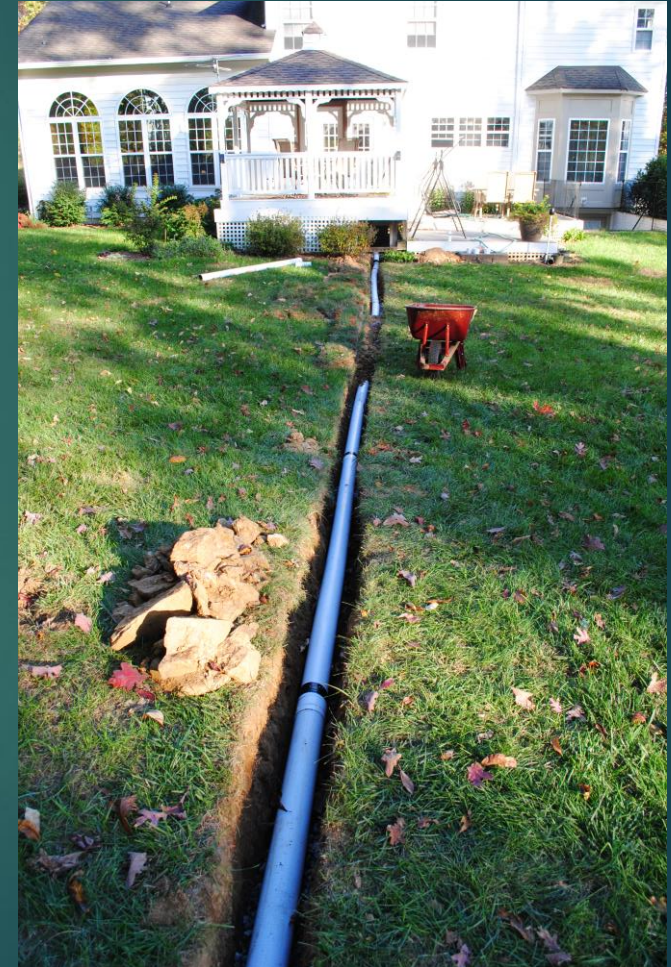


Second Cable Run - 2015

Modifying Station for SO2R
Required More Cables



Five "hard-line" runs to antennas



SO2R = Single-Operator, Two-Radio

More Digging



Hole is 5x5x7.5 ft in dimension

Rebar ~ 350 lbs

Rebar cage “built in the hole”
(in July), from the bottom, up

Concrete pour ~ 36,000 lbs, or 7 yd³



W4AAW
Supervising

Add the Tower



Poor Man's Tower Mover



In Place Ready for Antennas

Tower and Yagis



TX-472 Cranked-down to 23 ft level

Bottom antenna – C31XR for 10-20m

Top antenna – XM-240 for 40 m



Now the Antennas



40m at 81 ft

10-20 at 73 ft



Tower is 125 ft beyond back of house

Vertical Antenna for 80m



Homebrew Base



Hole is 2x2x4 ft

Vertical Actually
Covers 80m and
40m; built-in trap

53 ft tall, self-
supporting

Can tilt-over for
Adjustments

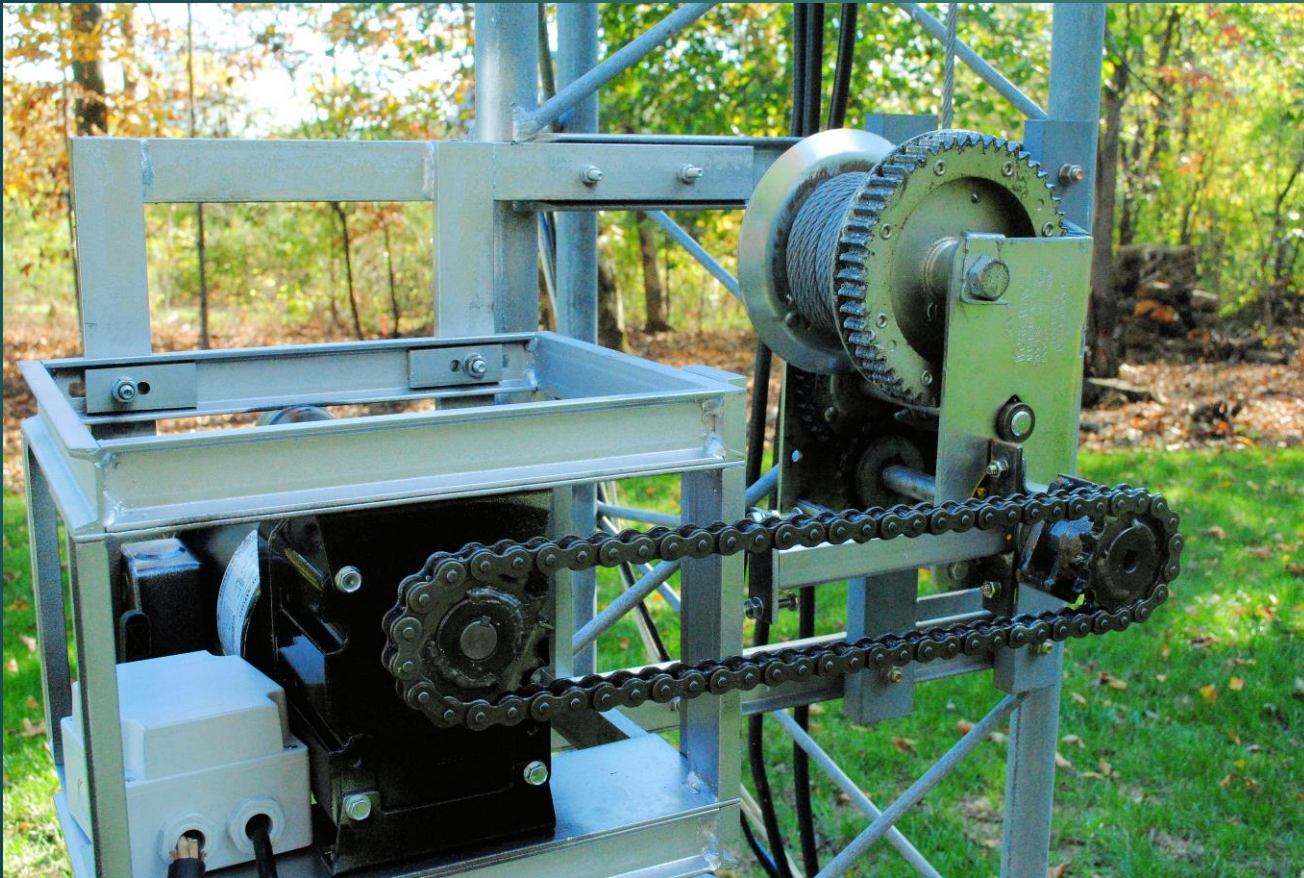
90 radials
~ 1.8 MILES of
14 AWG wire

Even though this is omnidirectional, 90 radials allow me to “hold my own” in the big contests



Tower Raising/Lowering

Gear Motor and Manual Winch



US Tower's cost before 2017 was \$ 1,800. Today over \$ 4,000

KØZR Cost ~ \$ 850

Gear Motor Develops ~ 420 in-lbs of torque

Phase reversal switch for up/down operation

Made for outdoor environments

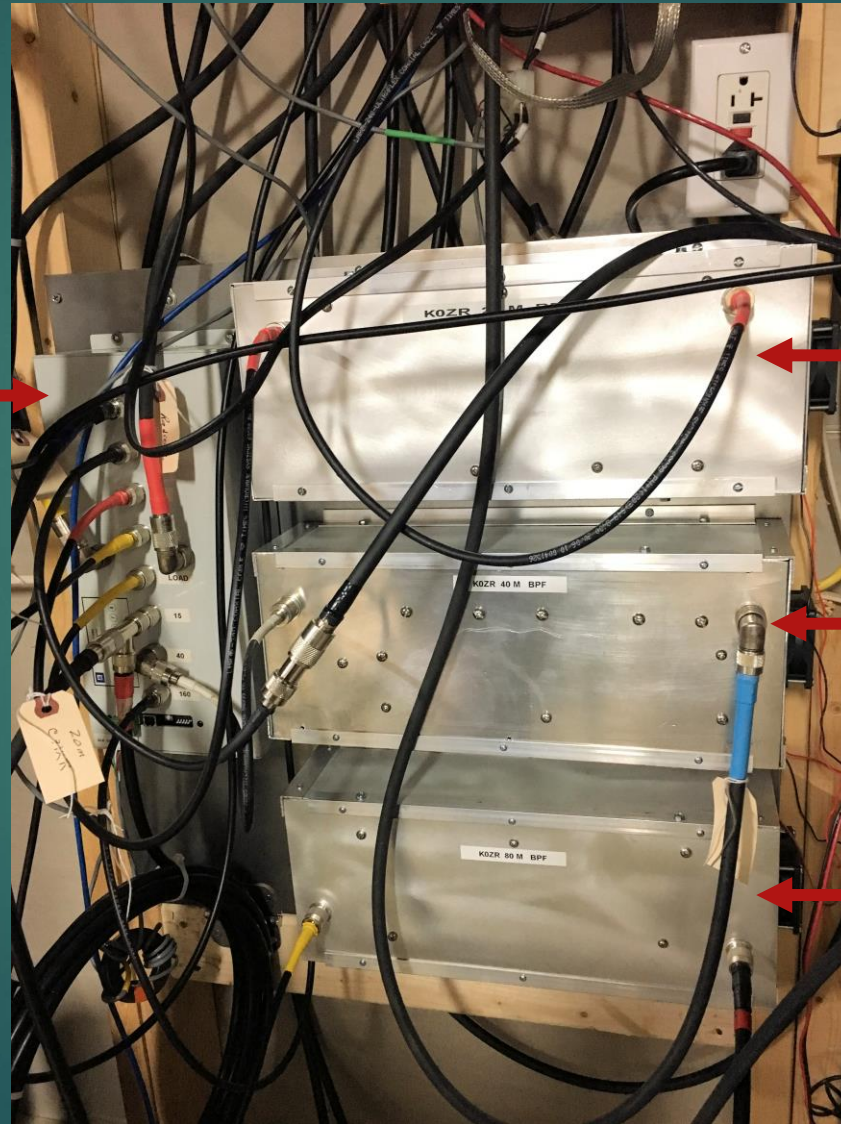
Tower Tip-Over Fixture by KØZR



Tower Partially Tipped to Adjust Elements for SO2R in 2015

2x8 Antenna Switch and 2 KW Band-Specific Bandpass Filters

2X8 Antenna Switch



2 KW Filters by KØZR

20 m

40 m

80 m

Filters for
160m, 15m, and 10m
"in Work"

The Shack



Tentec Orion II and Alpha 8410 1.5 KW amplifier

Elecraft K3 and Tentec 1.2 KW amplifier

Hamation auto-switch bandpass filters on each radio

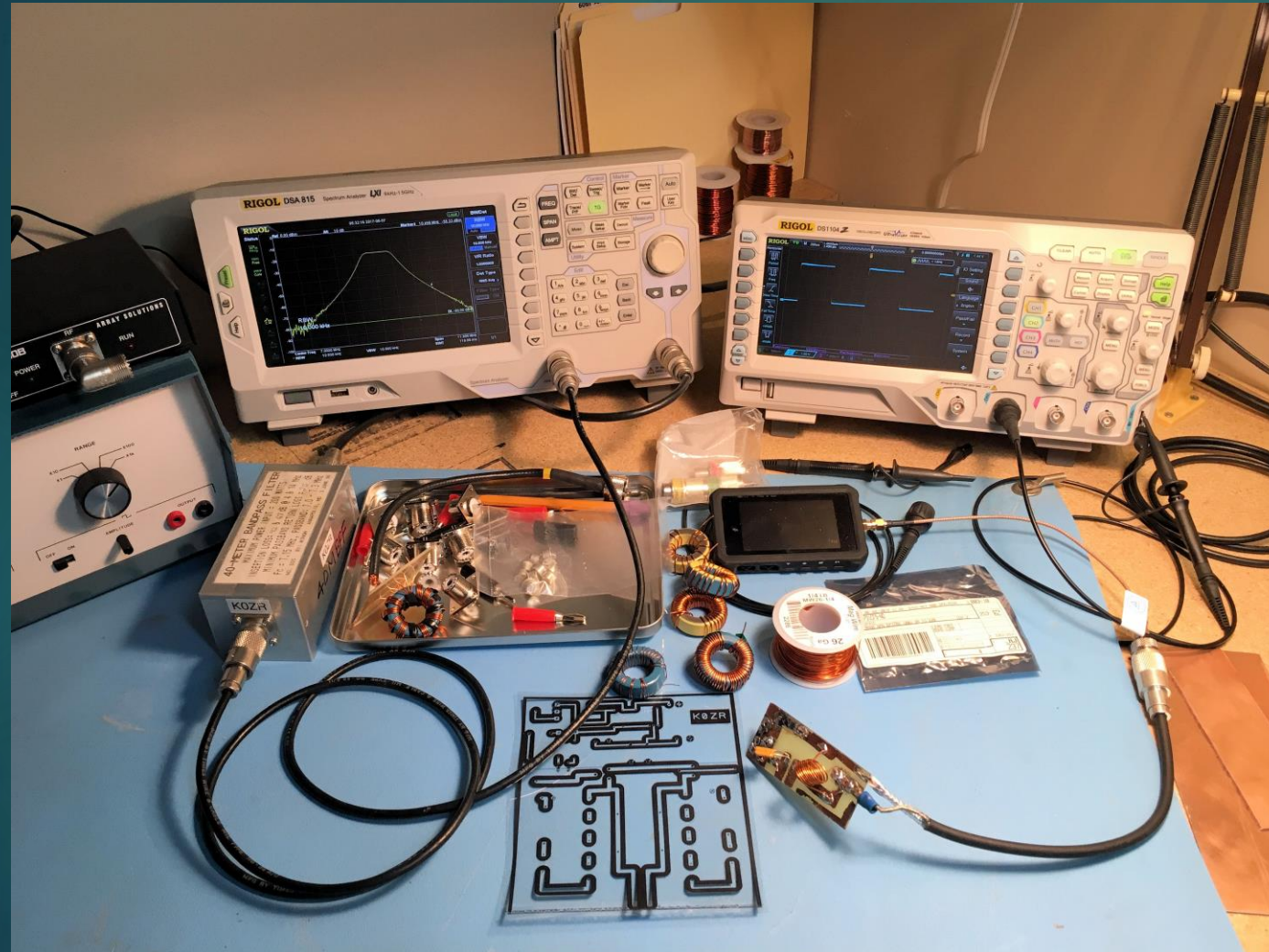
Remote 2x8, 3 KW RF switch from Array Solutions

M2 Orion 2800 antenna rotator
Good for ~ 35 ft²

u2R Micro-controller for SO2R

DX Engineering Active Four-Square
Receive array (160m, 80m)

Test Equipment



Rigol:

1.5 GHz spectrum analyzer
4 Ch, 100 MHz DSO

Array Solutions:

AIM4170 (one-port network anal)

From Steppir

Antenna analyzer