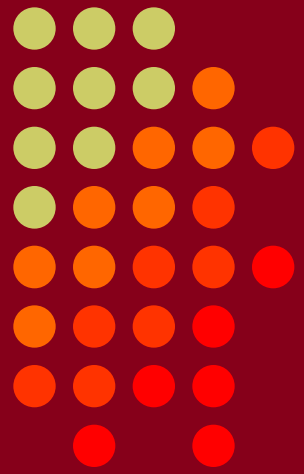
CTU Presents

Effective Antennas
for Contesting
Fred Lass

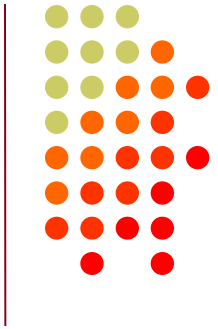
K2TR

• CTU •
CONTEST
UNIVERSITY

ICOM



K2TR

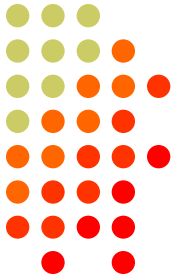


- Plan an operating strategy based on your goals.
- Map out your bands and times for best results.
- Include alternate plans for solar variations.
- Look for strengths that can be exploited or weaknesses that can be overcome.
- Consider the terrain near your antennas.
- Monobanders, tribanders, and/or triplexors.
- Single antennas or stacks?

K2TR

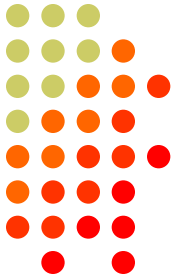
- You configure your antenna system to reach your goals.
- High Power, 100 watts, or QRP.
- CW, SSB; all bands or single band entry.
- DX, domestic contests, or both.
- Single tower, multiple towers, and/or wires.
- Entry class single op, SO2R, Multi-Single, or MM.
- There is no optimum contest antenna plan.
- How to compensate for solar activity.

K2TR



- Design your antenna system for the solar conditions that will exist in the near future.
- Expect 10 meters to fade and the low bands to be more active.
- Yet, if 10 meters opens to Europe, you MUST be on that band.
- Plan your 160/80 antennas and operating times to take advantage of Europe's gray line.

K2TR



- 10 meters is a daytime only band.
- Optimum antenna heights varies day to day.
- Sometimes stacks at 35'/70' are optimum.
- Other times, the higher the antenna, the better.
- Expect skew path to Europe, especially during disturbed conditions.
- If 10 doesn't open to Europe, get as many zones and countries as possible after 15 slows down.

K2TR

- 15 meters is the best band to optimize your score.
- Optimum antenna heights varies hour to hour.
- The band opens with low angles, which favors higher antennas.
- As signals peak, stacks at 45' and 90' are very effective.
- During disturbed conditions expect skew path to Europe; aim at Africa!

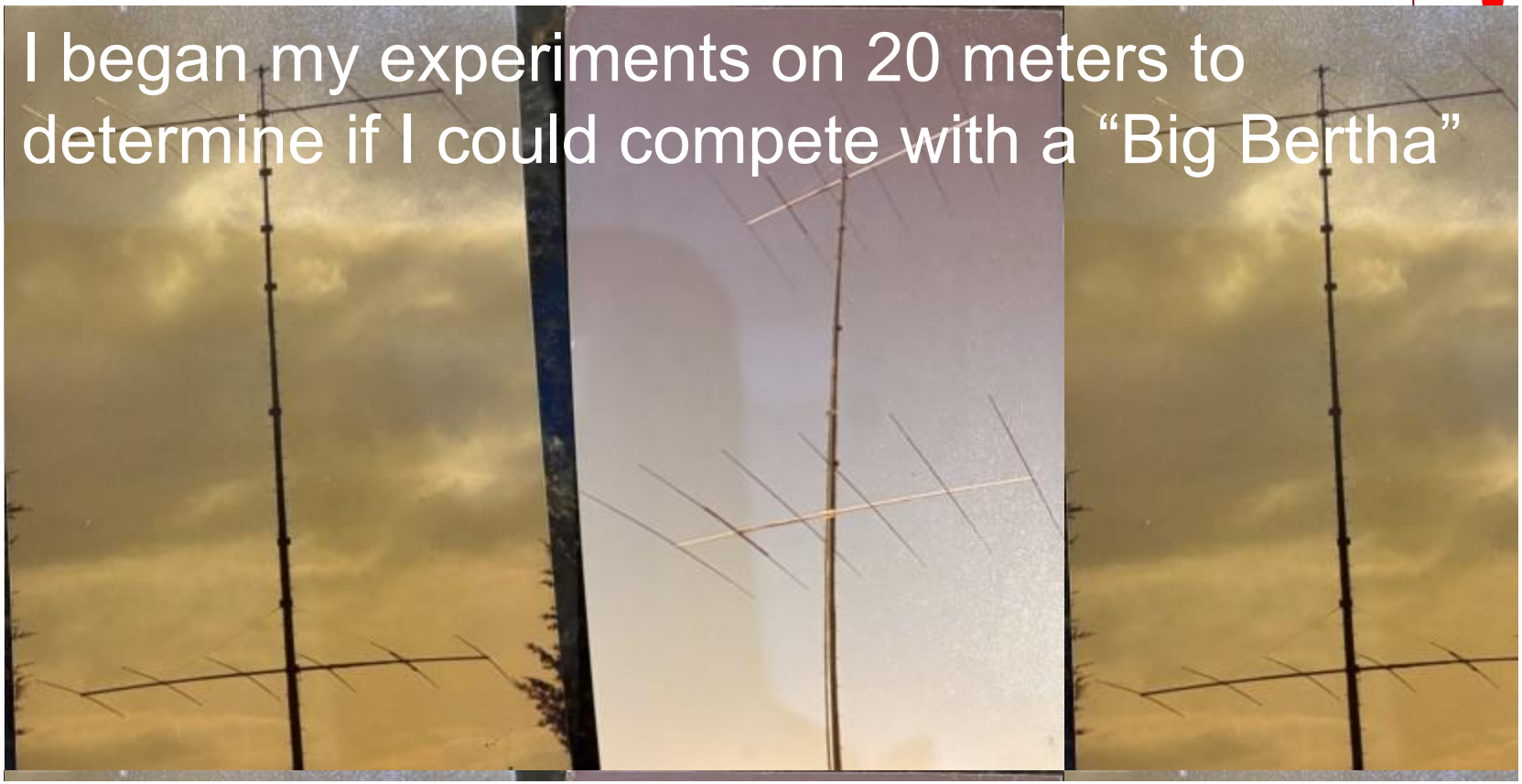
K2TR

- 1981 I built a “Baby Bertha” using Rohn 25.
- It had a swinging gate with a PV4 for 10 at 35' and a Cushcraft 15-4CD at 40'.
- 42' of galvanized pipe extended above the top of the 70' tower.
- The upper two antennas cleared the tower top and did not require a second swinging gate.
- In 1984 my M/2 entry on 15 meters beat all the MM stations! (KN3O won MM that year.)

K2TR

- 20 meters will be the most important band as the solar cycle winds down.
- QSO rates in the morning can be high when using an antenna at 100'.
- Afternoon QSO rates are lower, but consistent, with an antenna at 70' or so.
- A stack of two antennas in the 55'-105' range is optimum. Here's how I learned that:

K2TR



K2TR

- The big Bertha was 6 over 6 at 45' and 106'
- 1970 cost ~25K plus antennas and installation!
- My 4/4 was on Rohn 25 at 55' and 100'. Lower fixed on Europe; upper on Ham-M rotator.
- I configured a ULB switch. Found that the upper antenna worked well early AM, later changed to each antenna equal; afternoon - lower was stronger.
- Yet BOTH was ALWAYS better than either individually. Both also good for EU and JA.

K2TR

- Comparisons with W2PV's 6/6 were weaker in the AM and stronger in the PM.
- Jim added two 7 element 20s @ 90' and 180'.
- His 6/6 always beat the 7/7 or either 7 alone!
- Moved the 7/7 to 75' and 150', 6/6 still better.
- Replaced the 75' antenna with 5/5; 50' + 100'
- 7/5/5 good for JA and Europe simultaneously.
- 6/6 still best for Europe only.

K2TR

- Monobanders vs Tribanders?
- K1VR heard about my ULB and tried it with three TH6-DX tribanders at 40’ 80’ & 120’.
- Today’s tribanders are more efficient than old trapped antennas.
- The old stackmatch is now available from Hamation, but 1.5 KW on one band.
- Add a triplexor for more flexibility.
- The DX Engineering Prostack for MM & SO2R.

K2TR

- The lower pair can be fed always as a pair and phased for a 50% 25% 25% power split.
- SO2V mode needs no triplexor or filters.
- SO2R mode needs two radios, 2 amplifiers, a triplexor, and a high isolation antenna matrix; but you must aim every band in the same direction.
- Monobanders for either 20 or 15 with tribanders can add flexibility.

K2TR

- Next project at W2PV's was to add two 3 element 40s at 90' & 180'.
- A Telrex 3 element at 75' opened the band; the 90' worked well later, 3/3 best after dark.
- However, the F/B ratio of the 3/3 was poor.
- Used W2SZ to W2PV as a test range.
- Found F/B maxima at 7550 Khz.
- Jim developed element tapering formulas.

K2TR

- 40 meters is dominated at night by high yagi antennas, but there are workarounds.
- CW ops can run Europe in the late afternoon using a wire beam or Moxon at 75'
- Wire antennas can be stacked horizontally!
- After sundown a 4-Square can beat a low wire beam.
- SS ops will want a daytime dipole at ~45'.

K2TR

- For 80 & 75 meters a dipole at 80' is the best height for SS.
- You can gain a db or two using a full wave.
- INV-Vs, slopers and EFHWs are used by some, but are down slightly from a dipole.
- Many do well with a 4-Square + radials, but it is tricky to get a 4 Square dialed in, especially with nearby towers or wires.

K2TR

- In 1974 I built a 2 element 80 meter Quad @ 170' fed at middle of the bottom & fixed 250° for SS.
- Jim opted for a top fed Delta loop @170' switchable NE/SW plus CW/SSB.
- Both of these had sufficient low angle gain to compete favorably with a 4-Square.
- In the 1980's I built 2 side by side bottom fed Deltas at 120' strung between two towers. It did better than a 4-Square after dark.

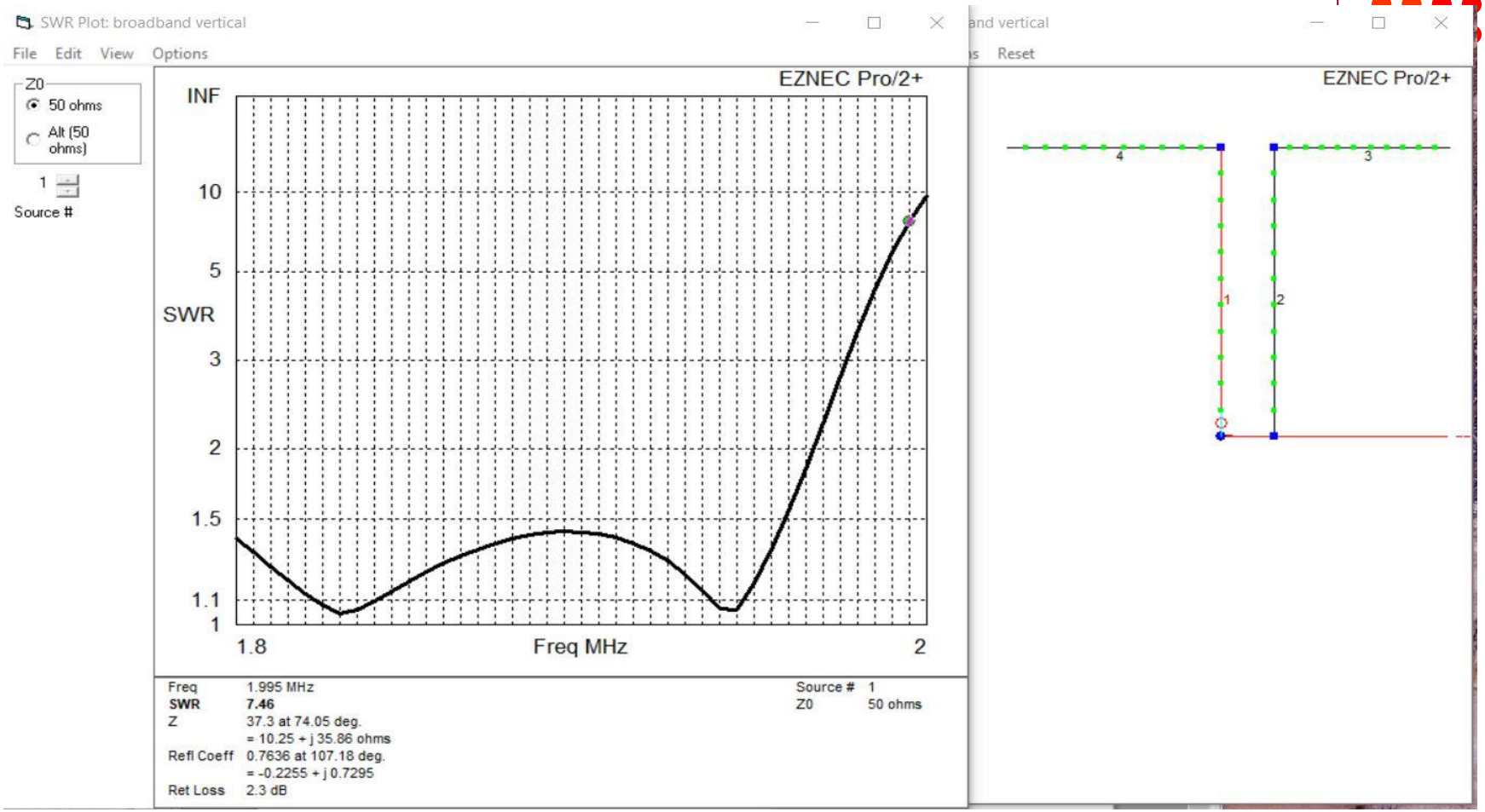
K2TR

- It is possible to feed a delta loop for low angle vertical polarization and skip the radials.
- A parasitic reflector would add gain an directivity.
- K2KQ designed a bent V-pol dipole for low radiation angles.
- Directive receive antennas are very common.

K2TR

- Practical 160 antennas are a very high INV-V, an INV-L with radials, a sloper, a V- POL K2KQ style dipole, or a 4-Square.
- Most effective is a 3/8 lambda central tower with parasitic reflector and directive wires.
- Directive receive antennas are very common.
- SWR curves on 160 are narrow. This INV-L design adds a second OWA style wire.

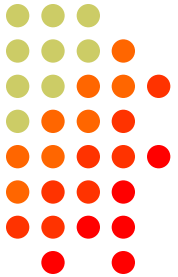
K2TR



CTU CONTEST UNIVERSITY

ICOM

K2TR



- Remember that a good antenna plan needs to adapt to your operating style and the current solar conditions.
- A better antenna plan allows you to vary your operating style to maximize your score
- An optimum antenna plan can be fun to design and a fantastic experience to operate.