Contest Station Layout & Design

Contest Academy
International DX Convention
Visalia California
April 2014

Tom Taormina, K5RC

NCCC

Contest Academy

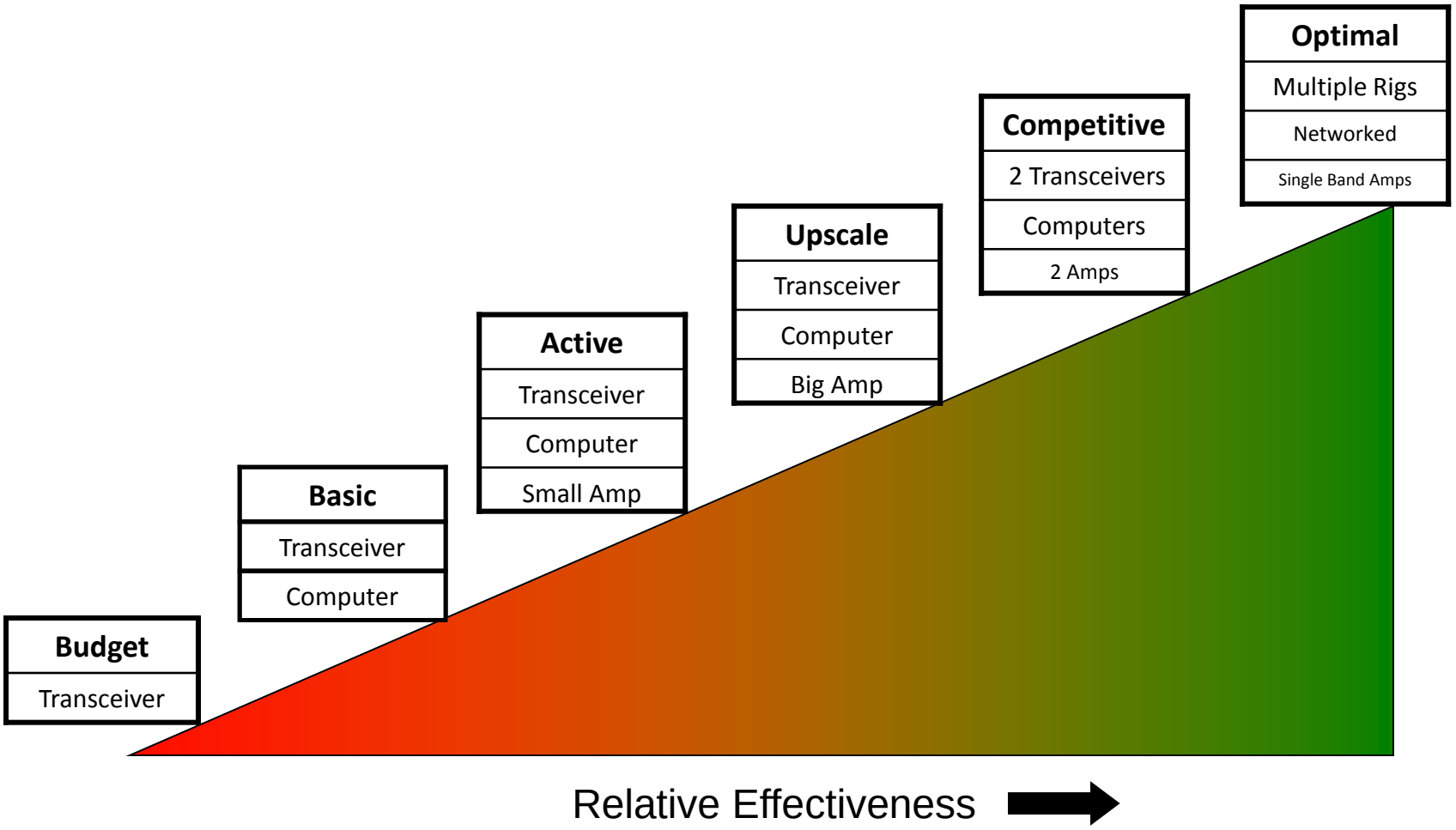
Contents

- Defining Your Needs and Requirements
- Scalability: Now and the Future
- Station Layouts
- Antenna Layouts

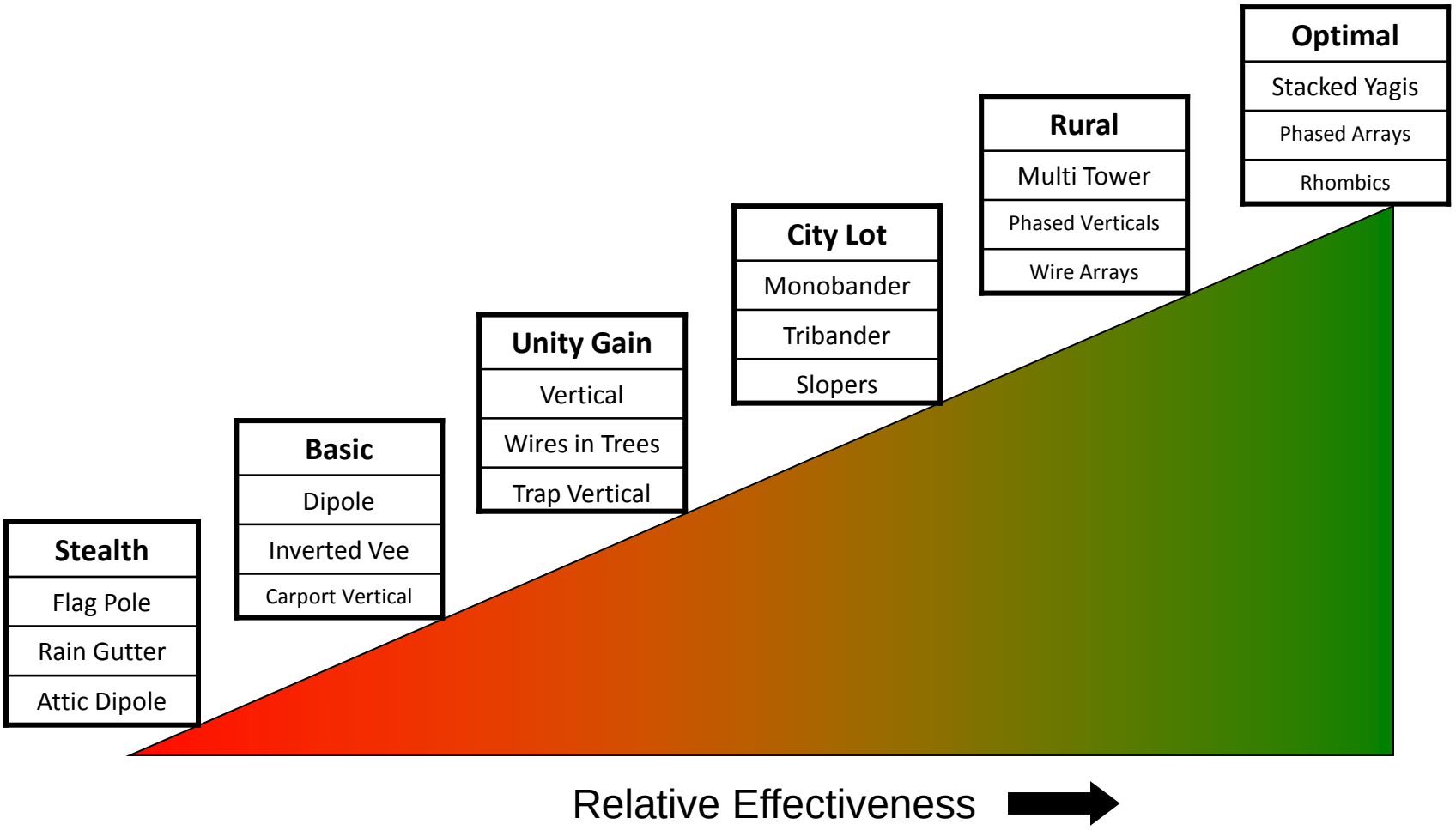
Incontrovertible Truths for Contesters

- There is no such thing as being loud enough
- Technology compels us to upgrade our equipment every year
- Competition forces us to build more, bigger and higher antennas
- There ARE contests every weekend
- He who dies with the most toys, WINS!

Defining Needs
Equipment



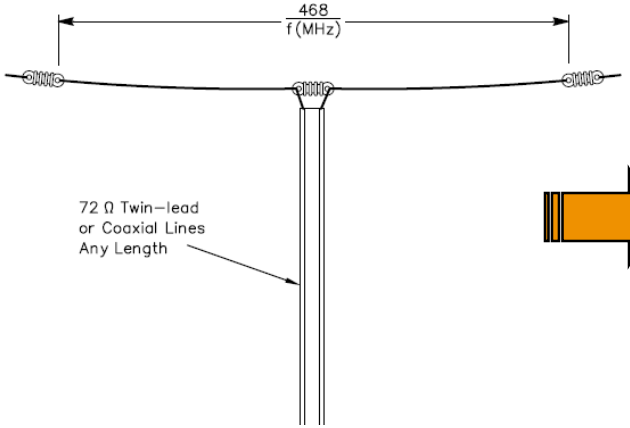
Defining Needs
Antennas

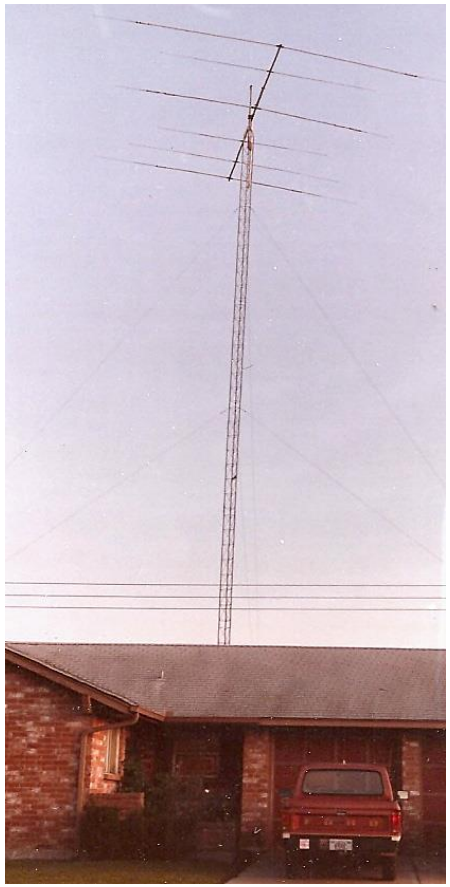


Defining Needs
Now and the Future

	Budget – Basic	Active	Upscale – Competitive	Optimal
Equipment	Older Transceivers QRP Rigs Homebrew	Newer-Used Transceivers Legacy Equipment	Full-Featured Rigs Peripherals Standard Amps	Multiple Rigs Automation Rugged Amps
Antennas & Supports	Stealth Dipoles in Trees Verticals	Small Tribander Small Crankup Tower Inverted Vees	4-Band Tribander Tall Tower Slopers	Single Band Yagis Multiple Towers Phased Arrays
Station Design	What is Available	Comfort and Convenience	Ergonomic and Comfortable	Optimized for Performance
Compatible Activities	QRP, CW, Digital, Satellite	All Modes Fun in Contests Casual DXing	All Modes SO2R Contesting Serious DXing	Experimental Multiop Contesting Push the Envelope
Scalability	**Requires a basic change in priorities and resources or Guest Op**	**Upgrade Radios Add Amps Add Peripherals**	**Usually requires selecting a Radio QTH**	**As the imagination and budget allow**

Scalability
The Next 3 db Theory





What About The NEXT 3db on 40?

3 el Telrex 40@ 140' @ K5RC

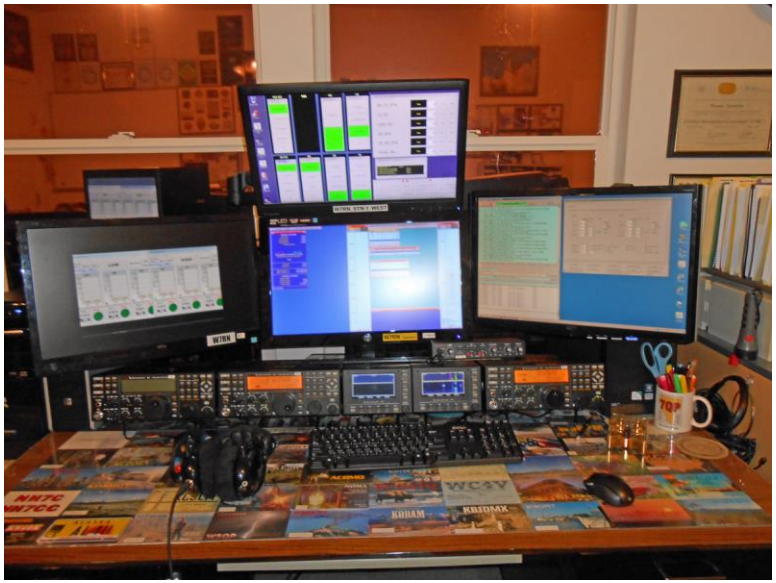
4 over 4 on 40 on 140' Tower at W7RN

Station Layouts – Basic Single Op

Station Layouts – “SO2R”

AA3B

N9RV



W7RN

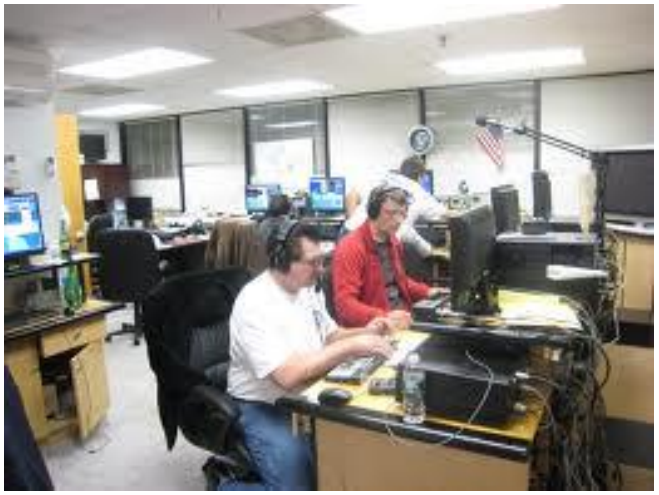
Station Layouts – “SO2R”

K5KG

K5NA

K5ZD

Station Layouts - Multiop



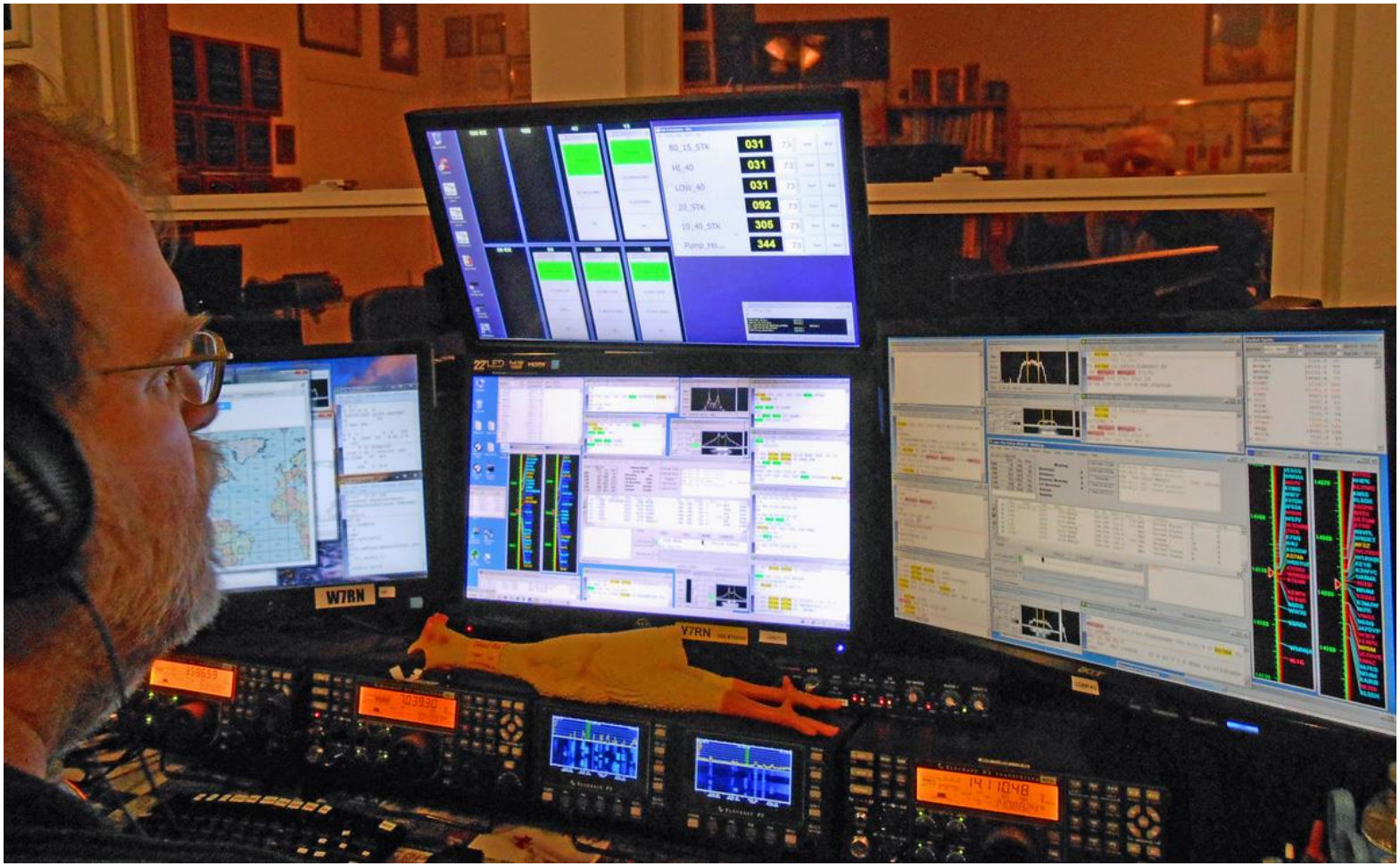
K1LZ

K3LR

NR5M

KC1XX

RTTY (SO5V)



W7RN Main Position

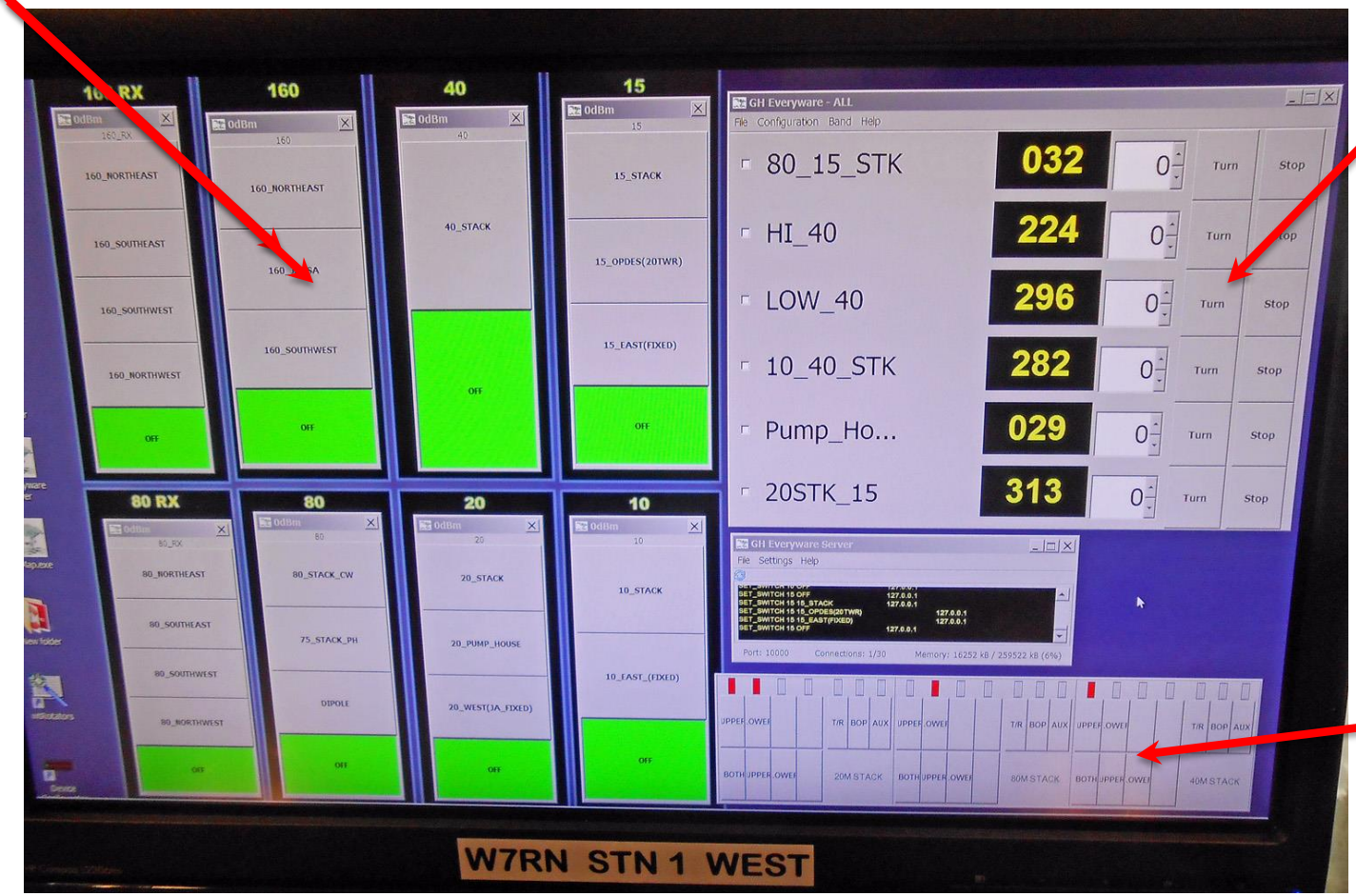
Alternative Station Layouts

International Space Station

Station Enhancements

Green Heron Antenna Switch Controls

Green Heron Rotator Controls



Mirco Ham Stack Match Controls

HP TOUCH SCREEN MONITOR

NCCC

Contest Academy

Computer Control Devices

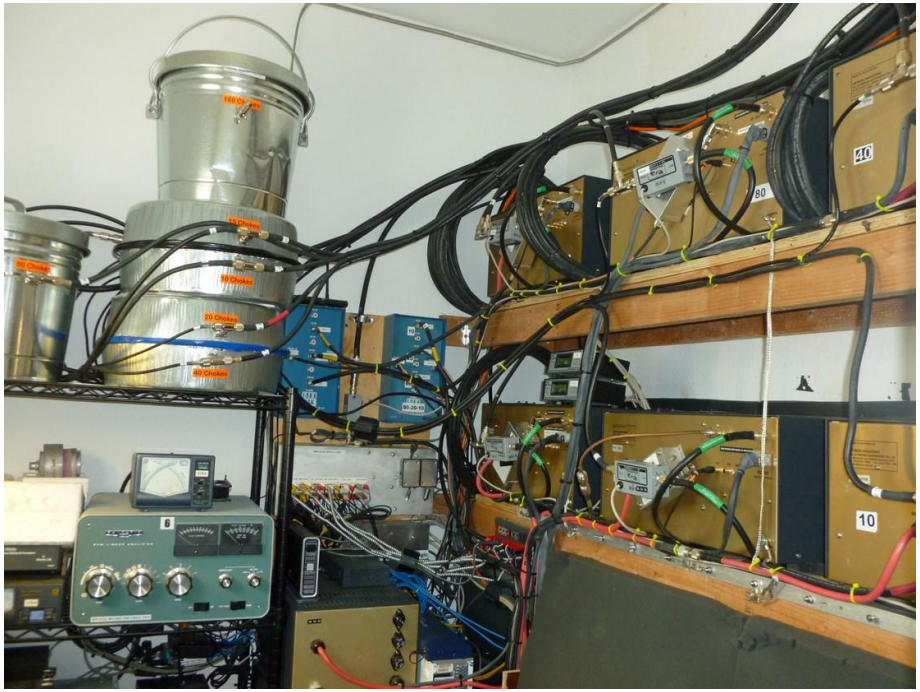
Station Enhancements

WAVE NODE SWR METER DISPLAYS
SHARED MONITORS

NCCC

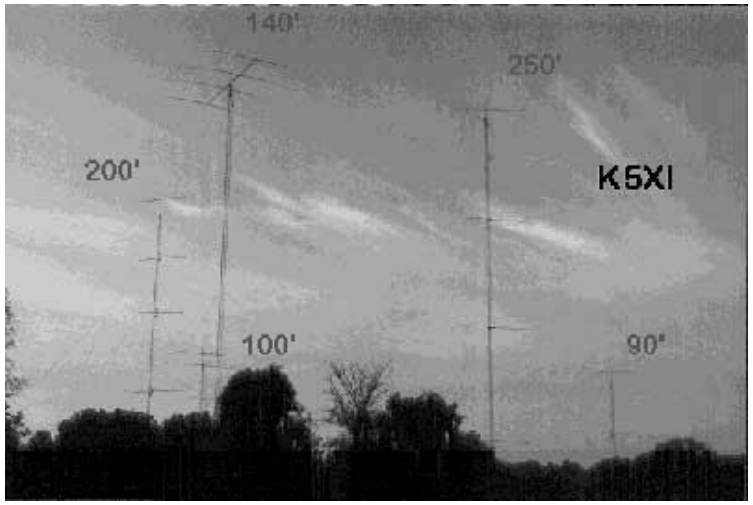
Contest Academy

Station Enhancements
Harmonic Suppression



COAX CHOKES
2 SETS

OUTSIDE



One Tower Compromise

6el OPDES 20
W7RN

F12 C39XRN
W7RN

TH6 DXX
K7NV

NCCC

Contest Academy

One Tower – No Compromise

K7RL

N9RV

Modest Stacks

3 el 6M, 10M Dipole
WA2GGB (K5RC) 1962

6el 10, 6el 15, 7el 6M
W7RN

5el 20, 6el 10, 7el 6M
W7RN

NCCC

Contest Academy

More Aggressive Stacks

NCCC

Contest Academy

Two Tower Systems

K3WW

K5ZD

Multi-Tower – Very Competitive Single Op or M/S, M/2

AA3B

K5NA

Multi-Tower – Very Competitive Single Op or M/S, M/2

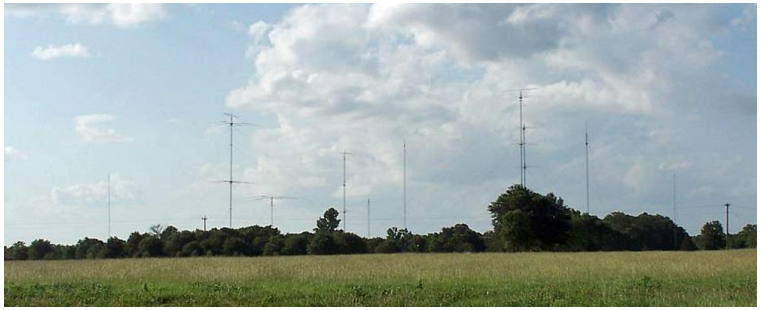
W7RN

Serious Multiop

W3LPL

DR1A

OM7M



NR5M

NCCC

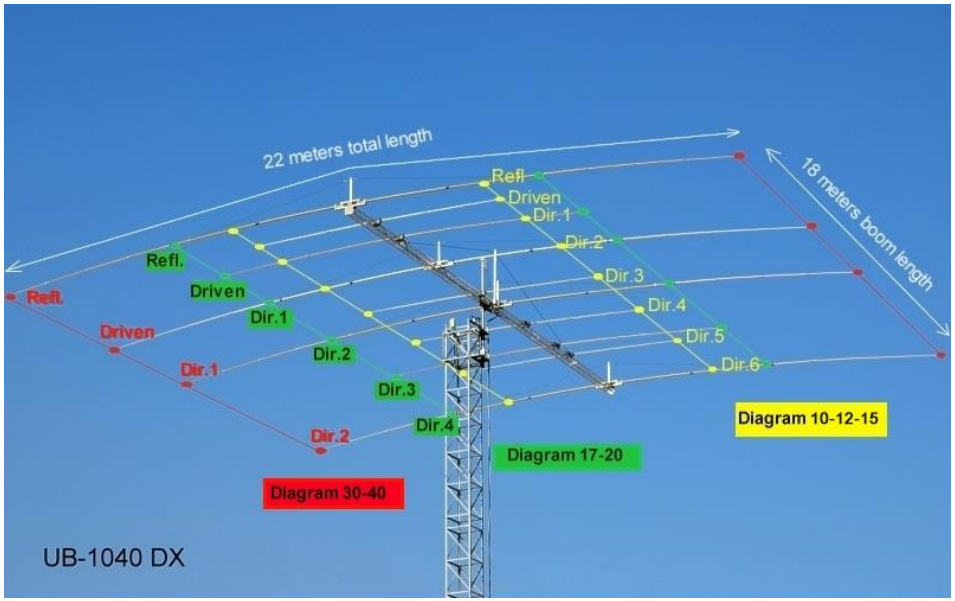
Contest Academy

Engineered Multi-Op

Too Many Towers ?

W0AIH

Alternative Antennas



SV1EML

Big Signal = Big Risk

W7RN

OH8X

NCCC

Contest Academy

Antenna Systems

- What are your present and long term goals?
- What are your priorities?
- What are your resources?
- Are you going to be moving?
- Is it scalable?
- Is it maintainable

An Alternative Remote Ham Radio

NCCC

Contest Academy

Coming in May 2014 ***QST***

High Performance Antenna Systems for the Motivated Ham

A world-class antenna system requires a world-class effort to design, raise, and maintain.

Tom Taormina, K5RC

In my 55-year career in ham radio, I have designed and constructed four multitower contest stations. I have also consulted and been a participant in building dozens more HF and VHF stations for highly motivated hams.

During my 33 years in South Texas, the scourge of my antenna systems was not winter snow and ice, but frequent thunderstorms, tornados, and hurricanes. My spouse, Midge, K7AFO, and I had seven towers at the K5RC multiop station during the 1970s and it was a continual challenge to have enough working antennas and rotators at the beginning of each contest season in October. When we built NA5R in the 1980s, the design goal was to build towers and antennas that would stay up for more than a year at a time. Hurricane Alicia took down all seven towers in one evening. At K5XI, we had a 250-foot tower for 20 meters with rotators that were continually destroyed by wind.

When we moved to northern Nevada in 1997, we realized that there was snow and ice to contend with. We decided to build a modest three-tower station on our mountaintop. Contesting was addictive, and we now host the Comstock Memorial Station with eight towers and 33 antennas, including stacked 80 meter beams.

This article is written to share with other hams the lessons, pain, and agony of "amateurs" building "amateur" antenna systems. It is our fervent hope that your pleasure will greatly exceed the pain experienced in designing, constructing, and maintaining an antenna system that is at least 3 dB better than most.[1]

[1]A 3 dB increase is essentially doubling your power. We use this measure every time we plan to spend money on increasing station capability. Unfortunately, the cost goes up exponentially with how many 3 dB improvements you have already made!

The Passion

Since the discovery of wireless, hams have pioneered many of the breakthroughs in radio and antenna design. Often, the design and construction was done in smoke-filled makeshift labs or garages where the goal was to get the project finished — not necessarily to make it robust. I learned the patience required for pioneering breakthroughs as a teenager, but I also learned pragmatism. The mantra for many years was "Let's get it working. We will clean it up later."

The singularly unique attribute of most motivated hams is to effect two-way communications under difficult conditions. We are practiced at hanging a wire in a tree and conducting disaster communications. The downside to this is that many of us apply this practical and expedient approach to building our stations. My point here is that we will benefit from being more professional when it comes to installing large antenna systems.

Aerial Pragmatism

Many hams believe that you can put anything on a tower and it will stay up. Wrong. We put a full-size three-element 40 meter beam on a Rohn 25 tower. The welds broke on the top section and it all collapsed. We used schedule 40 water pipe for mast material until it bent over and created an extremely unsafe disassembly situation. We have a stockpile of old HAM-M

This is a 125-foot monopole with four stacked six-element, 10 meter Yagis and a two-element 40 meter beam.

This is the 80 meter monopole. The top antenna is at 165 feet and the bottom one is at 80. The three-element Optibeam 80 meter Yagis were highly modified by Kurt Andress, K7NV.

NCCC

Contest Academy

W1AW/7 NV

The Comstock MemorialStation Will Host W1AW/7 Nevada

Tuesday, April 29, 2014 - 5PM to Tuesday May 6 4PM PDST
Tuesday October 21, -5PM to Tuesday October 27 4PM PDST

The Comstock MemorialStation, W7RN
370 Panamint Rd, VC Highlands NV 89521
775-847-7929 FAX 775-847-7930 146.865 PL 100.0

Come Join Us!

NCCC

Contest Academy

NV CON 2014

Home | Lodging & Travel | Forums & Events | Exhibitors & Ham Swap

Join us in Virginia City, Nevada!

Nevada State Convention - ARRL Nevada Section

May 30 - June 1, 2014

Join us in Virginia City, Nevada for the first ARRL Nevada Section, Nevada State Convention.

Register Now

Contact Information

Sierra Nevada Amateur Radio Society
775.453.4142
Email Us

NCCC

Contest Academy

Questions?

NCCC

Contest Academy