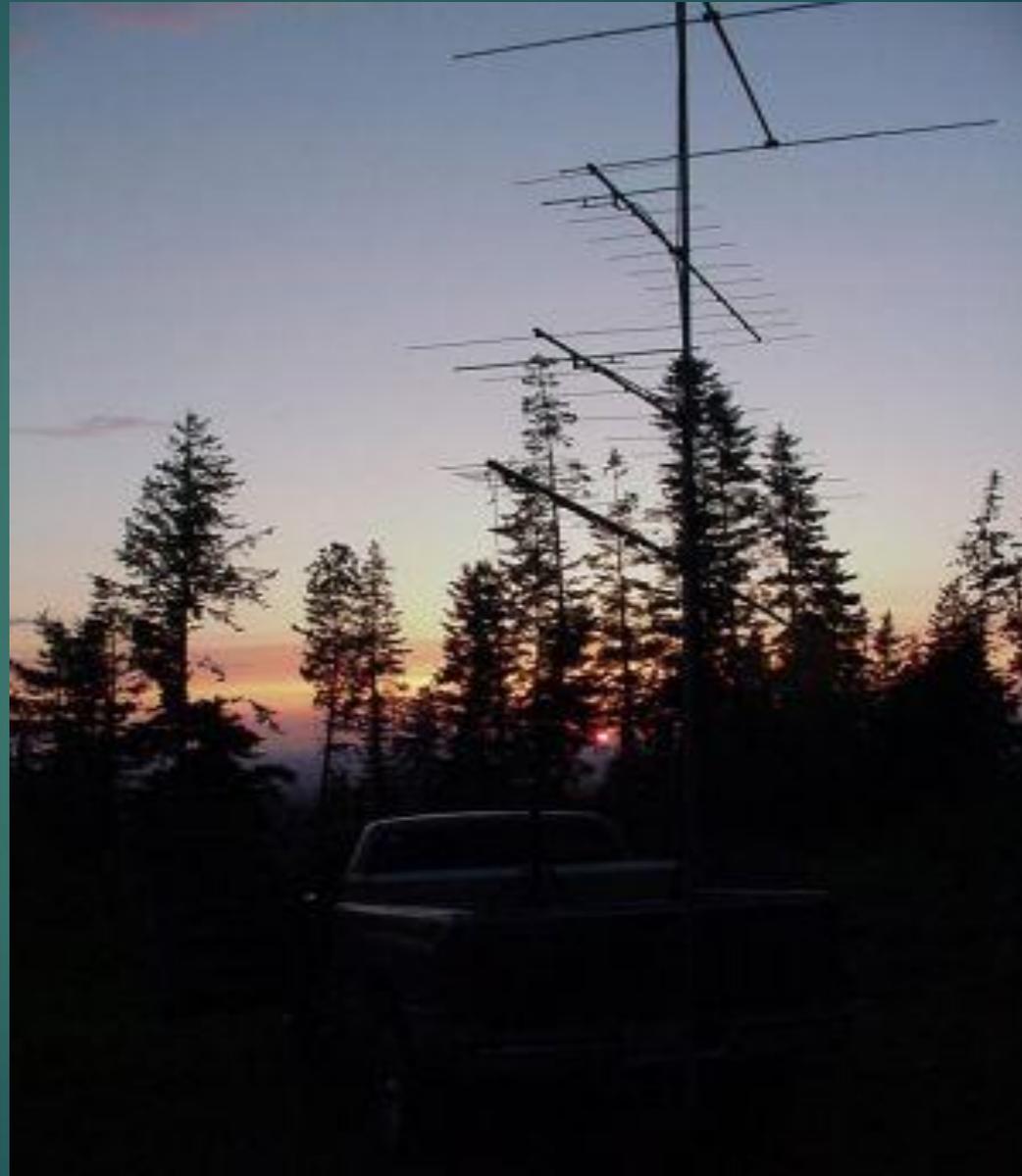


VHF Contesting

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Content

- ▶ This presentation is for entry and intermediate level amateurs
- ▶ We'll cover:
 - ▶ Concepts and definitions
 - ▶ Competitor categories
 - ▶ Objectives
 - ▶ Logging
 - ▶ Equipment
 - ▶ Expectations
 - ▶ Getting started
 - ▶ Local restrictions
 - ▶ The New Mexico VHF Society



What Is VHF Contesting?

- ▶ A set of controlled radiosport operations and times that may be used to *measure personal and station performance*
- ▶ The contest rules are established to allow fair and open competition within a given region
- ▶ These definitions apply to operations on amateur radio bands at frequencies of 50 MHz and above.....
- ▶ The objective is to work contacts as fast as possible while picking the maximum number of multipliers



Why do we contest

- ▶ It's fun
- ▶ It complements the commitment to expand the use of frequencies 50 MHz and above
- ▶ You'll never operate on a VHF+ band with more people listening. Possibilities for a surprising contact will never be better



Who Does This?

- ▶ Competitors
- ▶ Experimenters
- ▶ DX'rs
- ▶ Contributors



Differences between HF and VHF+ Contesting

- ▶ CW and Phone allowed (promoted) on same VHF+ frequency
 - ▶ If you call a station and he/she cannot hear you, switch immediately to CW
- ▶ More opportunity to use weak signal techniques
- ▶ Many say the VHF+ contesting environment is "friendlier" than the HF contesting environment
- ▶ VHF has a broader array of classes/categories -- something for everyone
- ▶ Antennas are smaller



Common US VHF+ Contests

- ▶ January -- ARRL VHF Contest
- ▶ April – May -- Central States VHF Society single band sprints
- ▶ June -- ARRL VHF Contest
- ▶ July -- CQ World Wide VHF Contest 6 and 2 meters only
- ▶ August -- ARRL 222+ Distance Contest
- ▶ August -- ARRL 10 GHz plus Contest, Round 1
- ▶ September -- ARRL VHF Contest
- ▶ September -- ARRL 10 GHz plus Contest Round 2
- ▶ September -- ARRL EME Contest, 2.3 GHz plus
- ▶ October -- ARRL EME 50 – 1296 MHz Round 1
- ▶ November -- ARRL EME 50 – 1296 MHz Rounds 2 and 3



Contest Entry Categories

- ▶ Single Operator
 - ▶ High and low power
 - ▶ Portable
 - ▶ Three Band
 - ▶ FM only
- ▶ Rover (3 sub-classes defined by power, bands and number of operators)
- ▶ Multi-operator (two sub-classes defined by number of bands)

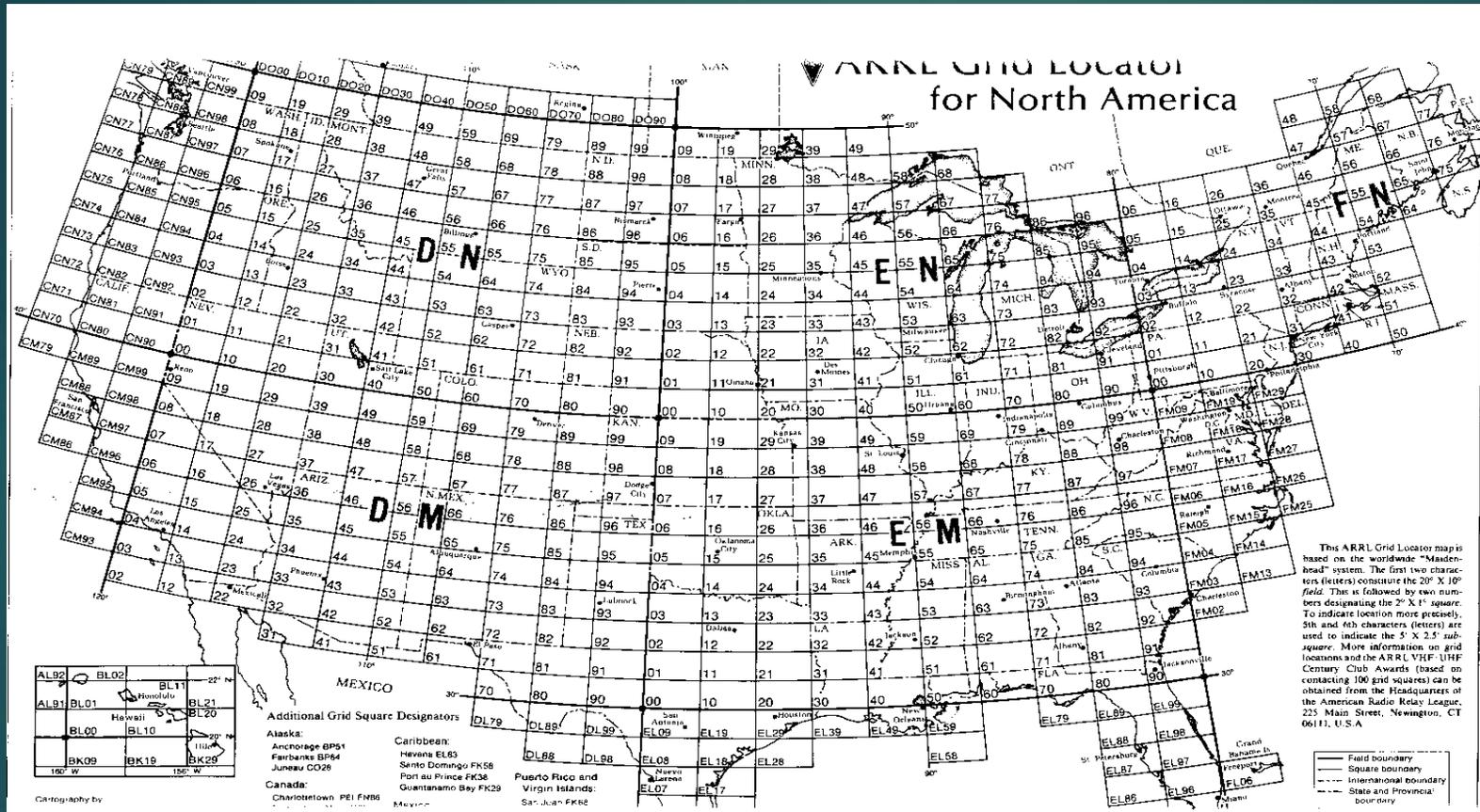


Contest Exchange

- ▶ Your **Callsign**
- ▶ Maidenhead (four digit) **Grid "Square"**
 - ▶ Some contests require a six digit grid "square"
 - ▶ *example -- Distance based contests such as the August 222+ contest



Maidenhead Grid "Square"



Logging

- ▶ Hand written logs are perfectly acceptable -- effective for contestants with QSO counts below 100
- ▶ Computer supported logging is very powerful
 - ▶ Dupe warnings
 - ▶ Automated capture of radio and time info
 - ▶ Frequency, Mode, Date/Time
 - ▶ Automated Cabrillo log (and entry) generation. ADIF logs too.
- ▶ Some computerized logging systems also provide a good deal of (legal) assistance.
 - ▶ Band mapping by grid square and band
 - ▶ Directional antenna controls
 - ▶ Rate and running score analysis



Logging

- ▶ Roversupport is a bit rough:
 - ▶ Grid changes are "clunky"
 - ▶ Navigational interface with GPS is immature
 - ▶ Learning curve is a bit steep
 - ▶ Many assistance features depend upon Wi Fi or cell availability

Equipment

- ▶ The desert southwest region does not place high performance demands on equipment
 - ▶ Filtering
 - ▶ Power output
- ▶ VHF+ Contesting places demands on features and growth capability beyond entry level equipment
 - ▶ Computer interface (logging and digital mode generation and decoding)
 - ▶ Transverter interface
 - ▶ Frequency precision and accuracy
 - ▶ Band management
 - ▶ "Per Band" drive power controls
 - ▶ Keying and sequencing



Equipment (continued)

▶ Antennas

- ▶ Like all forms of radiosport, use of the most capable antennas is always good advice.
- ▶ Those interested in developing high performance antennas will be rewarded by VHF+ contesting
- ▶ Due to the VHF+ frequencies (and wavelength) high performance antennas are **much smaller** than at HF
- ▶ VHF+ antenna performance is achievable using freeware modeling and hand tools
- ▶ Kit and pre-built antennas are also available from mail order suppliers



Equipment -- Antennas

Cheap yagis



Getting Started

- ▶ Define your objectives and limitations
 - ▶ Examples -- I want to.....
 - ▶ See what this old HT will do with a good antenna and a bag of spare batteries
 - ▶ Finish in the top ten in the US
 - ▶ Participate, turn in a contest entry and help my club
 - ▶ Help other contestants do well by handing out contacts
 - ▶ Improve my score by 1,000 points over last year's contest
 - ▶ Change categories and expand my station's capability
 - ▶ Work some new grids
 - ▶ Get an award from the contest sponsor
 - ▶ I'm only going to operate for 6 hours



Getting Started

- ▶ Start with equipment you already have
 - ▶ A "DC to Daylight" radio -- KX3, IC-706, FT-991, FT-718/818, FT-857, TS-2000 and see what it'll do with good antennas
 - ▶ If you're daunted by contest CW, try again with VHF+. Much lower pressure and speed
 - ▶ Learn WSJT modes for 6 meters. Then learn when and when not to use those tools. Try it on 50 and 144 MHz meteorscatter
 - ▶ Make some skeds with a few of the Arizona or Colorado guys and discover what your station will really do
 - ▶ Enter by filling out a simple hand written log



DC to Daylight



Getting Started

- ▶ Grab your HT or mobile 144/440 rig, build a cheap yagi antenna (or two) and join the FM only category
 - ▶ Read the rules
 - ▶ Find a tall operating spot
 - ▶ Tell people where you're going and make some skeds
 - ▶ Then have fun and marvel at what you can accomplish with an HT on FM
 - ▶ Enter by filling out a hand written log

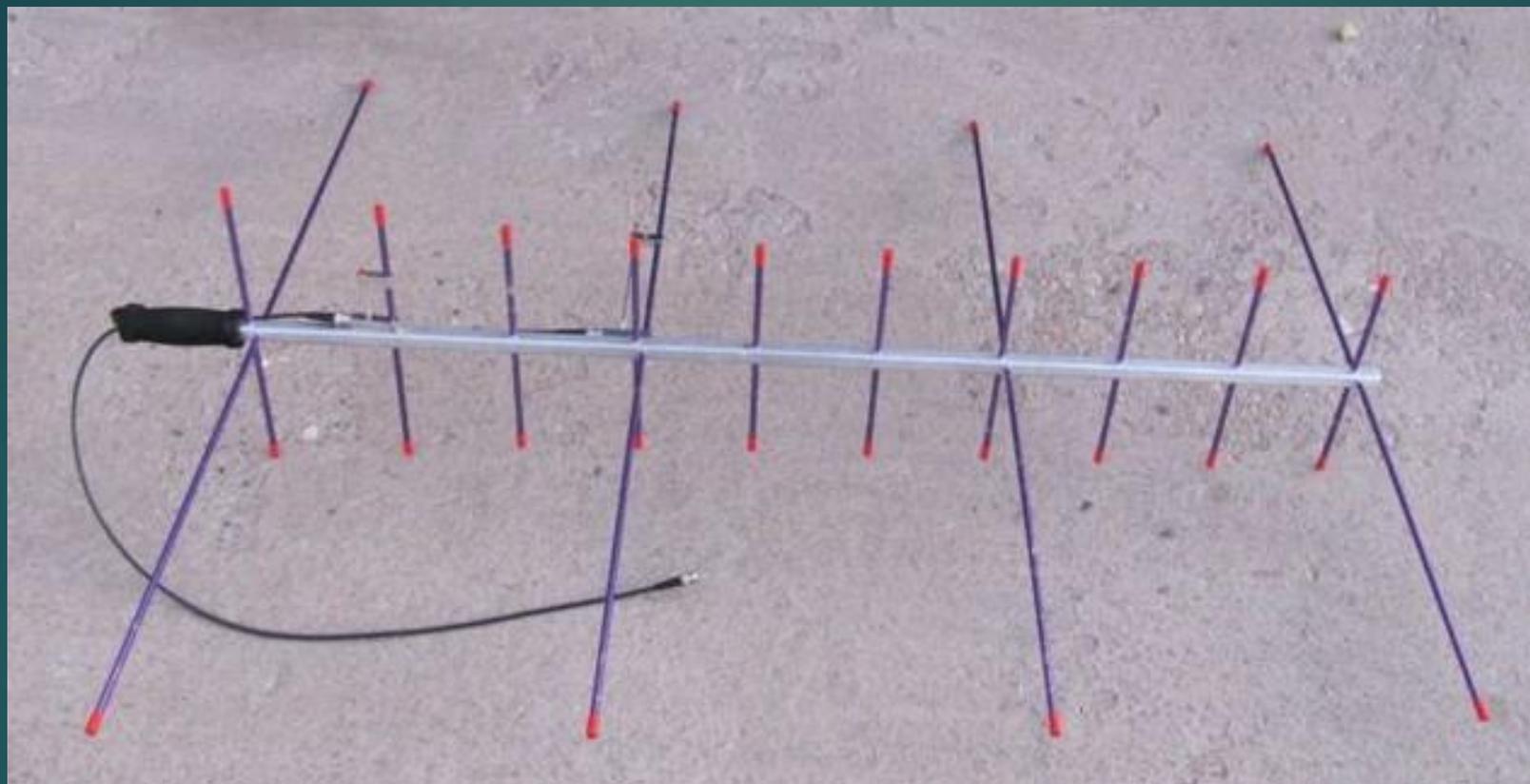


Single Op FM Category

- ▶ All QSOs must be made using Frequency Modulation (FM)
- ▶ Simplex only
- ▶ Restricted to 50, 144, 222 and 440 MHz
- ▶ Powerlimits are 100 W on all bands
- ▶ Antenna polarization
- ▶ The last local person to enter the "FM only" category won first place in the Rocky Mountain Region with less than 5 contacts!



FM Antenna



Single Op Portable Category

- ▶ Ten (10) W PEP output or less
- ▶ Portable power source
- ▶ Portable equipment and antennas
- ▶ Single Operator Portable stations must operate from a location other than a permanent station location
- ▶ Single Operator Portable stations may not change locations during the contest period outside of the original 500-meter diameter permitted circle
- ▶ Recommend limiting antenna length to 12 feet
- ▶ Single op requirements apply



Antennas



Single Op 3 Band Category

- ▶ Limited to 3 Bands
 - ▶ 50 MHz -- 100 watts PEP
 - ▶ 144 MHz -- 100 watts PEP
 - ▶ 432 MHz -- 50 watts PEP
- ▶ Tailor Made for DC to Daylight radios



Roving

- ▶ Contest roving covered by other presentation(s)



Honoring the 6 meter (50 MHz) Band

- ▶ 6 Meters, 50 MHz, or simply the magic band has the capability of ionospheric reflection and signals may therefore travel great distances
 - ▶ Opportunity to complete contacts in many grids (score multipliers)
 - ▶ Openings may be quick and to a geographically focused area
 - ▶ Digital modes (WSJT FT8, FT4 and MSK144) may produce contacts when the band is "closed", but contesting rate maximums are 40 to 50 per hour..... usually much lower.
 - ▶ Some experienced testers employ a separate station for 6 meters only
 - ▶ Use a minimum antenna height of 20 feet (one wavelength)
 - ▶ When 6 meters is "wide open" contesting rates over 200 per hour are common using phone or CW



Be Loud on 2 Meters (144 MHz)

- ▶ Assign your best antenna, highest power, most sensitive, lowest noise receiver to the 144 MHz band
- ▶ Contacts on higher frequency bands are almost *always* "set up" on 144 MHz
- ▶ There are more contestants listening on 144 (and on 50 MHz) than any other band/frequency
- ▶ The objective is to work as many contacts in as many grids while moving contacted stations to other bands. The *moving* part can be tricky (and fun). Skill and experience helps. It's all about managing the variables



Higher Bands

- ▶ Bands higher than 432 are generally not a subject for beginners unless your radio has 1296 MHz built in
- ▶ Equip yourself with as many higher bands as you can manage and afford.
- ▶ The attraction of higher bands is that high performance antennas are relatively tiny.
- ▶ If you are choosing a category that limits the usable bands, assign your resources (\$\$, familiarity, antenna space etc.) to those bands
- ▶ You'll know when you are close to your "higher band limit" when you have to buy at least two stations in order to have someone to work



Higher Bands

Loop yagi for the 9 cm
band (3456 MHz)

49" long 23 dB gain

But only one other
station in NM on that
band



What Should You Expect?

- ▶ There will be more people listening, increasing your chances for contacts
- ▶ If you have prepared well, you'll reach stations further away than ever before:
 - ▶ 6 Meters -- across the country if the band is open
 - ▶ 2 , 1.25, and .7 meters (144, 222, and 432) -- 250 to 400 miles
- ▶ If you prepare well by informing the community of your plans and operate during the entire contest, you are likely to win a Rocky Mountain Region award



Local Restrictions

- ▶ 432 Power Limitations

- ▶ Power limit for the entire state of New Mexico is 50 watts PEP.
- ▶ No ERP limits
- ▶ Special power limit waivers are available

- ▶ 902 Geographic Restrictions

- ▶ No 33 cm emissions are allowed in portions of Texas and New Mexico bounded on the south by latitude $31^{\circ} 41'$ North, on the east by longitude $104^{\circ} 11'$ West, and on the north by latitude $34^{\circ} 30'$ North, and on the west by longitude $107^{\circ} 30'$ West; in addition, outside this area but within 150 miles of the boundaries of White Sands Missile Range the service is restricted to a maximum transmitter output of 50 watts PEP
- ▶ No ERP limits



WSJT

- ▶ WSJT-x is a computer software toolset for weak signal operations
- ▶ Generally thought to be 20 dB more effective than audible CW
- ▶ Requires precise frequency and timekeeping
- ▶ Useful for contesting when audible signals cannot be heard
- ▶ Requires application skill to determine if faster modes are applicable

NMVHFS

- ▶ NMVHF.org
- ▶ Subject matter Experts
- ▶ Dedicated to expanding the use of 50 MHz and above



References

- ▶ www.nmvhf.org Online home of the New Mexico VHF Society
- ▶ <https://www.yagicad.com/> homepage for excellent antenna modeling tool from VK3DIP
- ▶ <https://www.vk5dj.com/yagi.html> another useful antenna modeling tool
- ▶ <https://directivesystems.com/> source for kit antennas for VHF+
- ▶ <https://www.m2inc.com/M2Amateur> source for pre-made VHF+ antennas
- ▶ <https://www.wa5vjb.com/yagi-pdf/cheapyagi.pdf> Inexpensive high performance antennas for the contester
- ▶ <http://www.arrl.org/general-rules-for-arrl-contests-above-50-mhz> general rules for VHF+ contests
- ▶ <http://www.arrl.org/june-vhf> specific contest rules (this one for June)



Questions?

