EXPANDING INTO VHF … AND BEYOND!

10 Sept 2022

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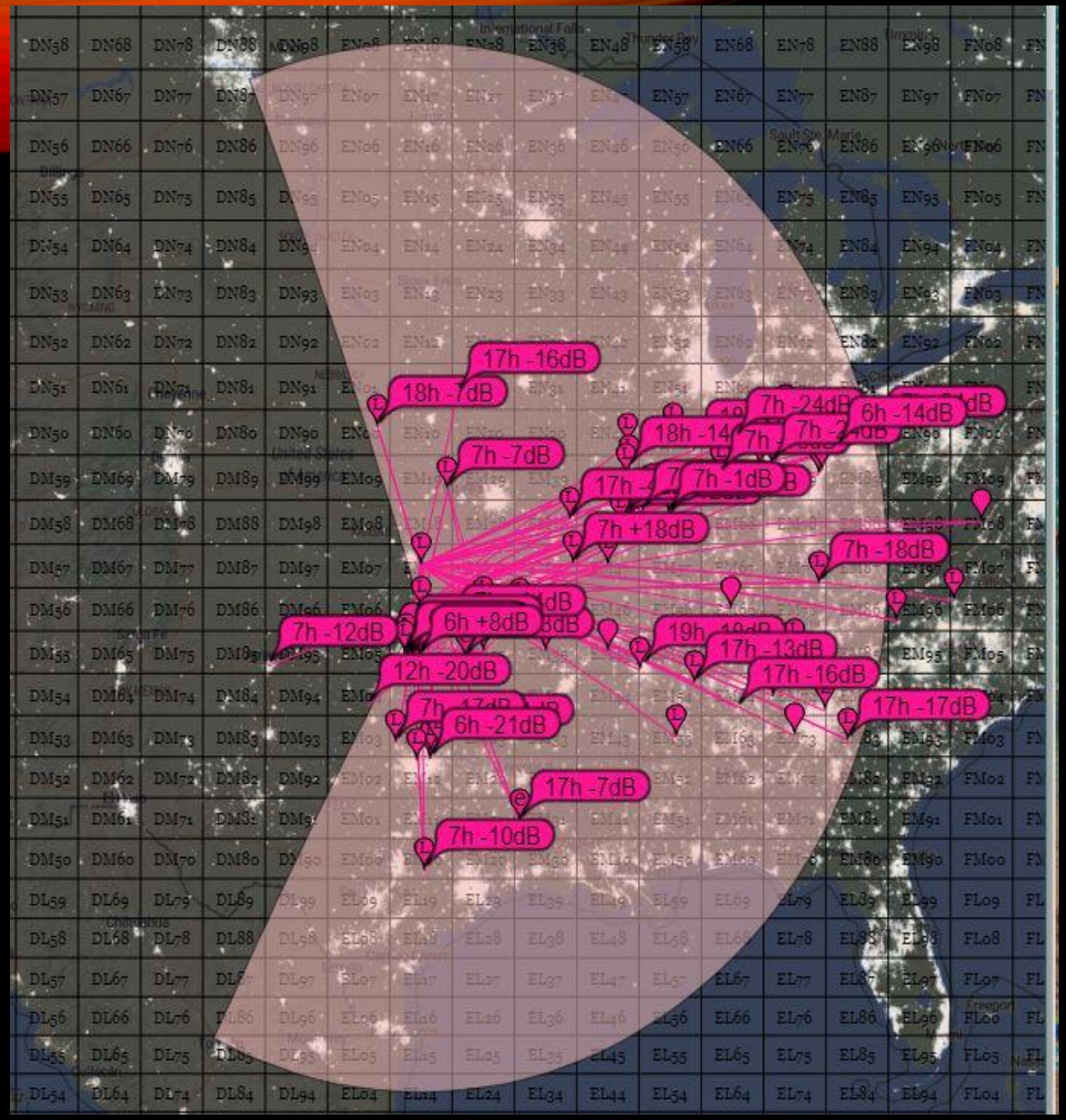
9/9/2022

September 2021 VHF Contest



STATIONS THAT HEARD US ON 2M

Mt. Scott – EM04

70 miles SE of Wichita, KS – EM17

N0LD/R – Randy, Harvey ***KB0YHT/R - Nick***

DO I NEED MUCHO $$$? NO!

Key Factors

- KB0YHT/R's setup included:
  - Used Yaesu FT-100 (160m through 70cm **all-mode** radio)
  - 2m/70cm mag-mount vertical – on the side of his car- **horizontal**
  - 6m vertical – on the side of his car - **horizontal**

- **Band openings** happen all the time – but how often? - I'll get to that!

- **VHF Contests** happen occasionally – but how often? - I'll get to that!

Modest Expenses – Extraordinary Results!

WHAT DO YOU MEAN "EXPAND" INTO VHF … AND BEYOND?

- VHF Definition
- Why VHF?
- Where can I take this?
- Advanced Topics

Operate "beyond" what you do today! Stretch yourself!

VHF DEFINITION

- VHF extends from 30 mhz to 300 mhz which includes:
  - 6 m 50-54 Mhz
  - 2 m 144-148 Mhz
  - 1.25 m 222-225 Mhz
- UHF extends from 300 mhz to 3 ghz which includes:
  - 70 cm 420-450 Mhz
  - 33 cm 902-928 MHZ
  - 23 cm 1240-1300 Mhz
  - 13 cm 2300-2310 MHZ and 2390-2450 MHZ
- "Microwave" is what hams call the bands above UHF (sometimes above 1 Ghz
  - 5 cm 5650-5925 MHZ
  - 3 cm 10 – 10.5 Ghz
  - Many more … including light!

This isn't a test!

WHY VHF?

- VHF is an entry into Amateur Radio – almost everyone has a 2m handheld!
- VHF has so many avenues to explore!
  - FM Repeaters -> FM Simplex -> Other modes!
  - VHF Contesting (FM only, Participation, Competing, Setting Records)
  - APRS – good way to tell when there are VHF openings
  - Meteor Skip
  - Amateur Satellite communication (FM -> USB/LSB -> Digital)
    - International Space Station Communication
  - Moon Bounce
- Extend your range – extend your fun!

Are you Curious? This is what VHF is about!

VHF AND HEIGHT - FM

- The higher the antenna the better for VHF
- At a glance this seems obvious, but how high do I need my antenna?
- Buildings and hills block VHF Signals (mostly)
- Vegetation is a minor impedance on VHF; major impedance on UHF+
- As you start, get your antennas above your house, then the trees, then higher
- If you are mobile, seek out the peak of hills
- If you are buying land, buy a house on a hill, without HOAs, in the country!
- FM Simplex requires an antenna above a house; Above trees for real gain

Above a house is ~7 miles range; if you are on a hill ~30 miles!

VHF AND HEIGHT - USB

- Same as FM, but because of the mode the range is greater on USB/Digital
- Although there are some who FM-DX; An opening is best realized on USB/Digital
- VHF Propagation and Scatter affects range dramatically in USB/Digital stations
- Need your Horizontal antenna above the trees and as high as you can get it!
- If rovering, look for hills or watertowers for high land!

At Ground level on the island - Who can talk farther to the North? FM or USB on 2m? – Height is better

ADVANCED TOPICS

- Satellites
- Meteor Scatter
- EME
- VHF POTA
- VHF Contesting

SATELLITES!

Randy Wing, N0LD

9/9/2022

AFFORDABLE, CHALLENGING SATELLITE OPERATION

- "National Parks on The Air - Satellite Activation #2 - Blue Ridge Parkway – YouTube"
- The first time you see someone use Satellites to make a ham radio contact:
  - What just happened!
  - I had not idea I could do that!
  - Wow! I want to try that!
  - What do I need to buy to try that?
- Why operate satellites?
  - Rewards small efforts to improve
  - Rapidly improves your operating skills
  - Guaranteed to make your neighbors wonder about you!

AFFORDABLE, CHALLENGING SATELLITE OPERATION

- See attached Amateur-Radio-Satellites-V1.pdf

K5ND, JIM WILSON SATELLITE BRIEFING

WHAT WE'RE GOING TO TALK ABOUT

- Fun without Sunspots
- Fun with Satellites
- What are Ham Radio Satellites?
- Orbits and More – Active Satellites
- How Can I Work Them?
- What Radio and Antenna Do I Need?
- What Software Do I Need?

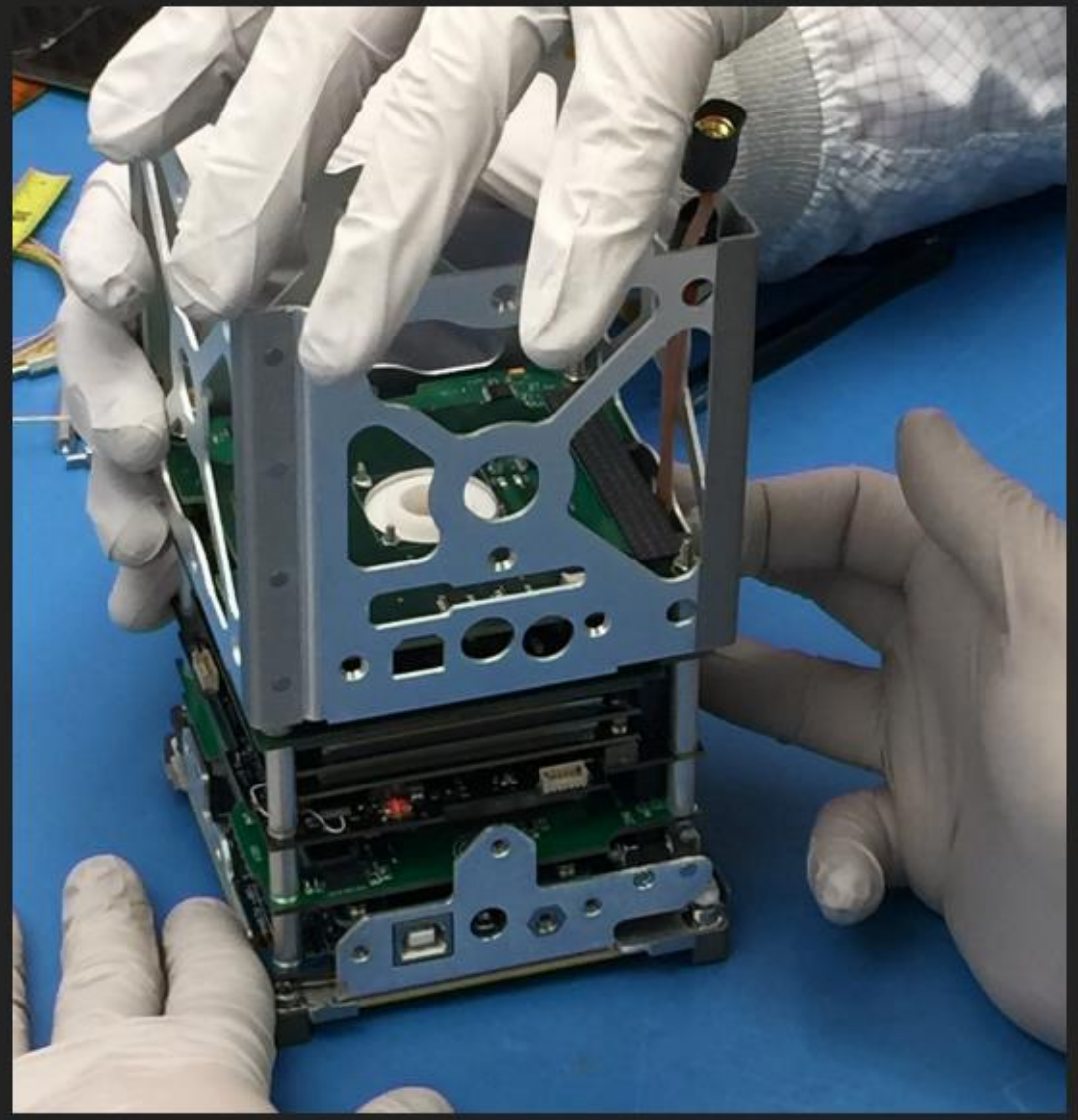
See attached Amateur-Radio-Satellites-V1.pdf

HAVING FUN WITH AMATEUR RADIO SATELLITES

- Technical Achievement
- Working DX and Grids
- Activating DX and Grids as a Rover
- ARRL VUCC Satellites Awards
- AMSAT Awards
- Low Power, Small Antennas, Short QSOs, Predictable Operations, Welcoming Group of Operators

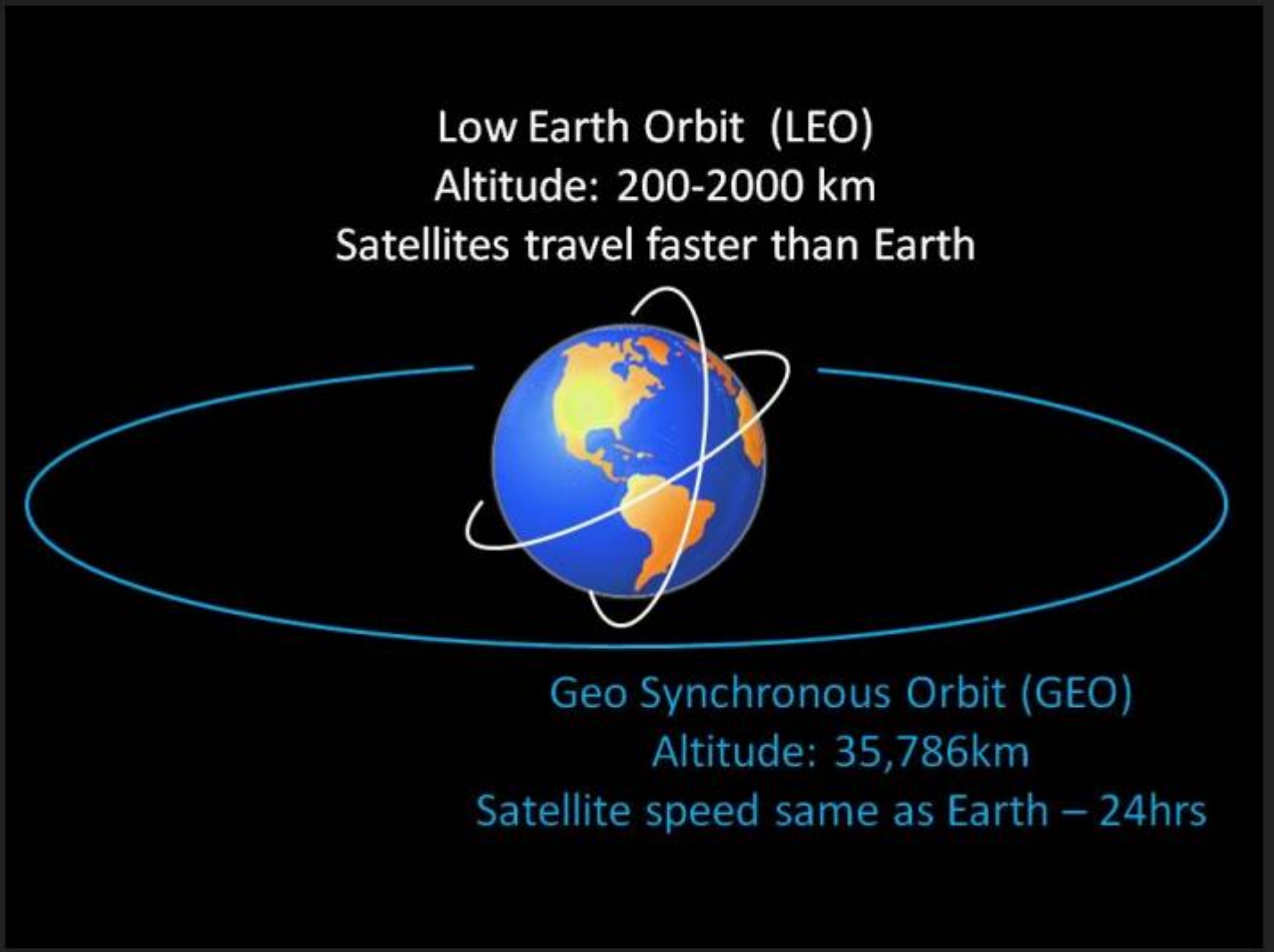
WHAT ARE HAM RADIO SATELLITES?

- Orbiting Repeaters and Transponders
  - Crossband VHF to UHF
  - Crossband UHF to VHF
- FM Repeaters
- SSB/CW/PSK Transponders
  - Bent Pipe Analogy
  - LSB Up and USB Down



ORBITS AND MORE

- Low Earth Orbit (LEO)
- Altitude
- Azimuth
- 10 to 15 minutes AOS to LOS
- 1 hour 25 minute Orbit
- Doppler Shift

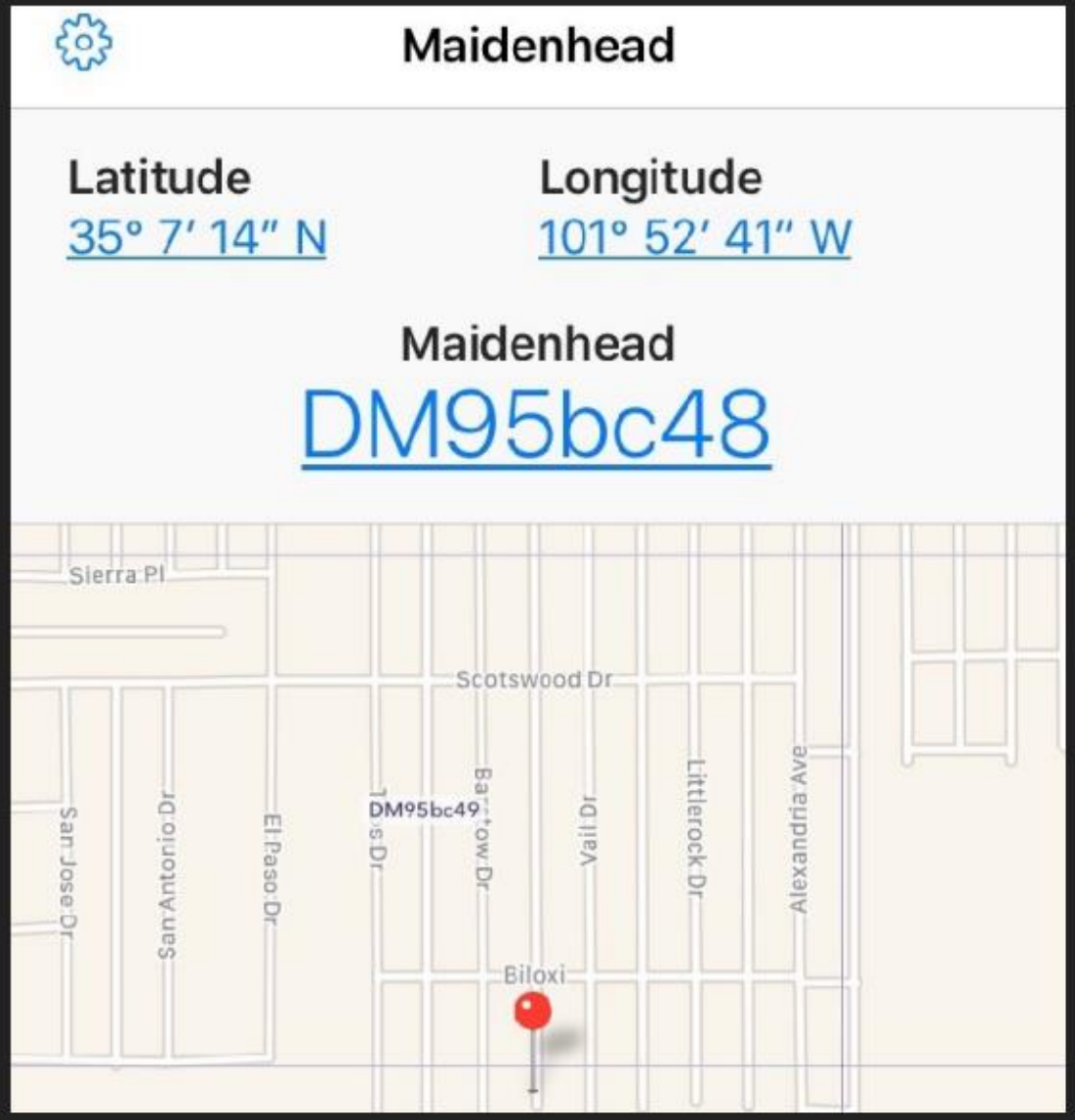


ACTIVE SATELLITES

- ISS
- AO-7, FO-29, XW-2A/B/C/D/F, CAS-4B
- SO-50, AO-85
- AO-91 in orbit since November 2017
- Fox 1-D launched 11-January-2018
- Many, many more plus ongoing launches

HOW CAN I WORK THEM?

- **Know Your Location**
- Know the Satellite
  - Frequencies
  - Keplerian Elements
- Determine Satellite Timing and Path
- Radio(s) and Antenna



HOW CAN I WORK THEM?

- Know Your Location
- **Know the Satellite**
  - **Frequencies**
  - **Keplerian Elements**
- Determine Satellite Path and Timing
- Radio(s) and Antenna

Radio Programming Chart

AO-91 Doppler Shift Correction		
Memory	**Your Transmit Frequency(With 67 Hz Tone)**	**Your Receive Frequency**
Acquisition of Signal (AOS)	435.240 MHz	145.960 MHz
Approaching	435.245 MHz	145.960 MHz
Time of Closest Approach (TCA)	435.250 MHz	145.960 MHz
Departing	435.255 MHz	145.960 MHz
Loss of Signal (LOS)	435.260 MHz	145.960 MHz

HOW CAN I WORK THEM?

- Know Your Location
- Know the Satellite
  - Frequencies
  - Keplerian Elements
- **Determine Satellite Path and Timing**
- Radio(s) and Antenna

AMSAT Online Satellite Pass Predictions - AO-91

View the current location of AO-91

Date (UTC)	AOS (UTC)	Duration	AOS Azimuth	Maximum Elevation	Max El Azimuth	LOS Azimuth	LOS (UTC)
12 Jan 18	20:09:01	00:09:39	203	15	267	326	20:18:40
13 Jan 18	06:25:44	00:08:44	52	6	95	135	06:34:28
13 Jan 18	08:00:19	00:13:03	10	79	286	196	08:13:22
13 Jan 18	09:38:54	00:07:08	329	4	302	260	09:46:02
13 Jan 18	18:54:11	00:10:43	153	37	99	358	19:04:54
13 Jan 18	20:32:24	00:07:31	222	7	265	311	20:39:55
14 Jan 18	06:46:56	00:11:07	38	14	101	152	06:58:03
14 Jan 18	08:22:37	00:12:56	2	40	265	208	08:35:33
14 Jan 18	17:43:41	00:04:34	90	2	77	39	17:48:15
14 Jan 18	19:16:14	00:10:58	167	87	331	349	19:27:12

WHAT RADIO DO I NEED?

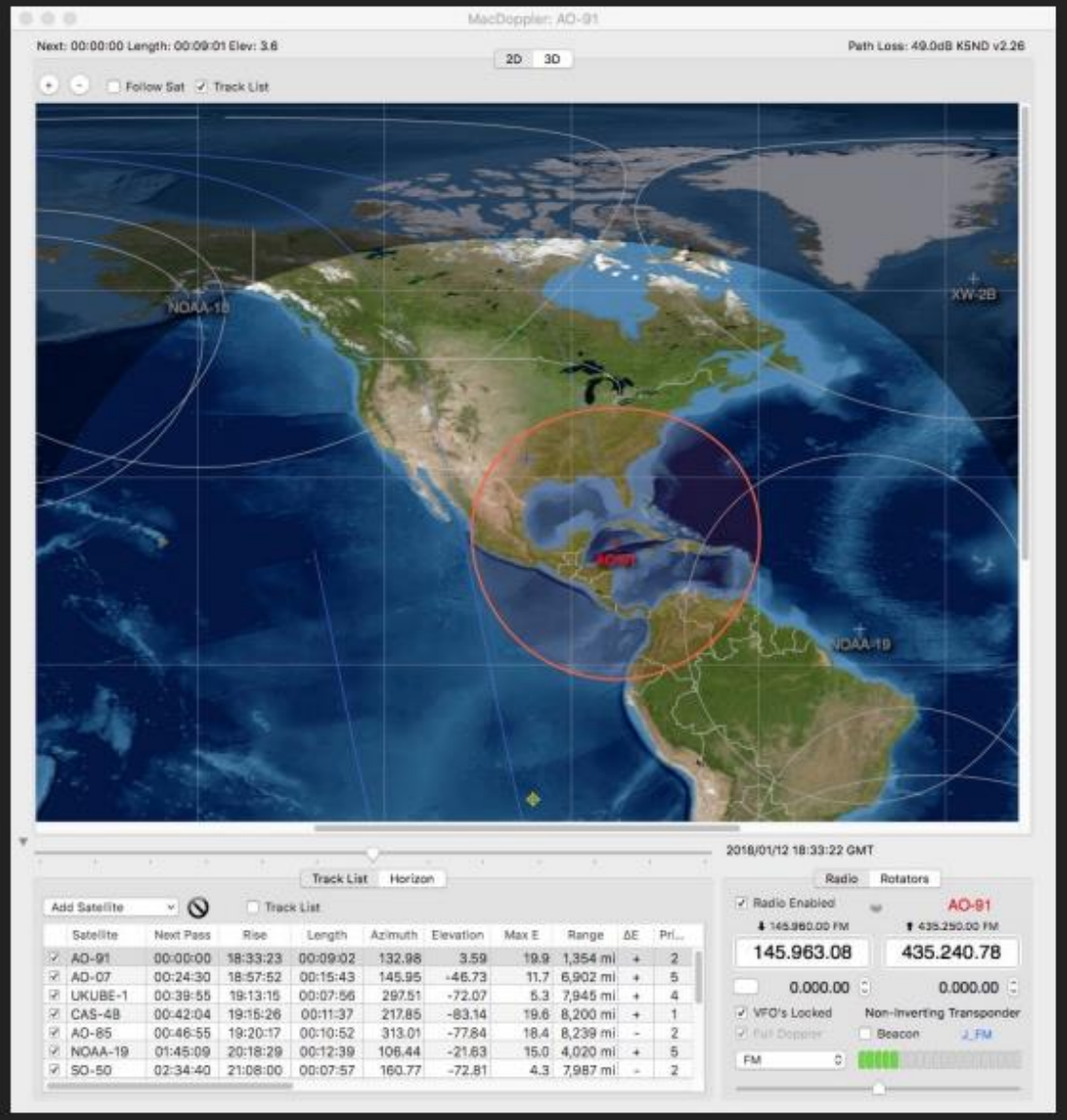
- Full Duplex versus Half Duplex
- FM HTs – Kenwood TH-D72A
- FM Mobile – Icom IC-2728H/2800
- Portable Rigs – FT 817/847
- Base Station – Icom IC-9100, Kenwood TS2000
- SDRs on the receive side

WHAT ANTENNA DO I NEED?

- HT Long Whips can work
- WA5VJB Cheap Yagis
- Hand-Held Arrow Satellite Antenna
- Fixed Elevation
- AZ-EL Rotators
- Switchable Circular Polarization
- Listen First

WHAT SOFTWARE DO I NEED?

- Phone Apps for predictions and paths
- Online prediction software
- SatPC32 tracking software
- MacDoppler tracking software
- Manual or automatic doppler correction



PHONE APP

- GoSatWatch App on iPhone
- World Map of AO-91
- Overhead Chart of Satellite Path

S.A.T. BY CSN

- Just purchased
- Easy to Install / Integrate
- Affordable ~$250

S.A.T.

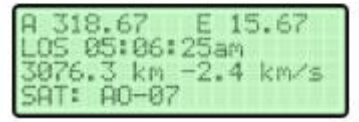
Self-contained Antenna Tracker

A self contained antenna rotator and radio controller. Natively controls Icom radios, Yaesu rotators and can interface with PSTRotator.

The S.A.T. works with any modern web browser on any device. No software, no apps and no com ports.

Rig Control

The tracker can control Icom radios through the CI-V jack.



METEOR SCATTER

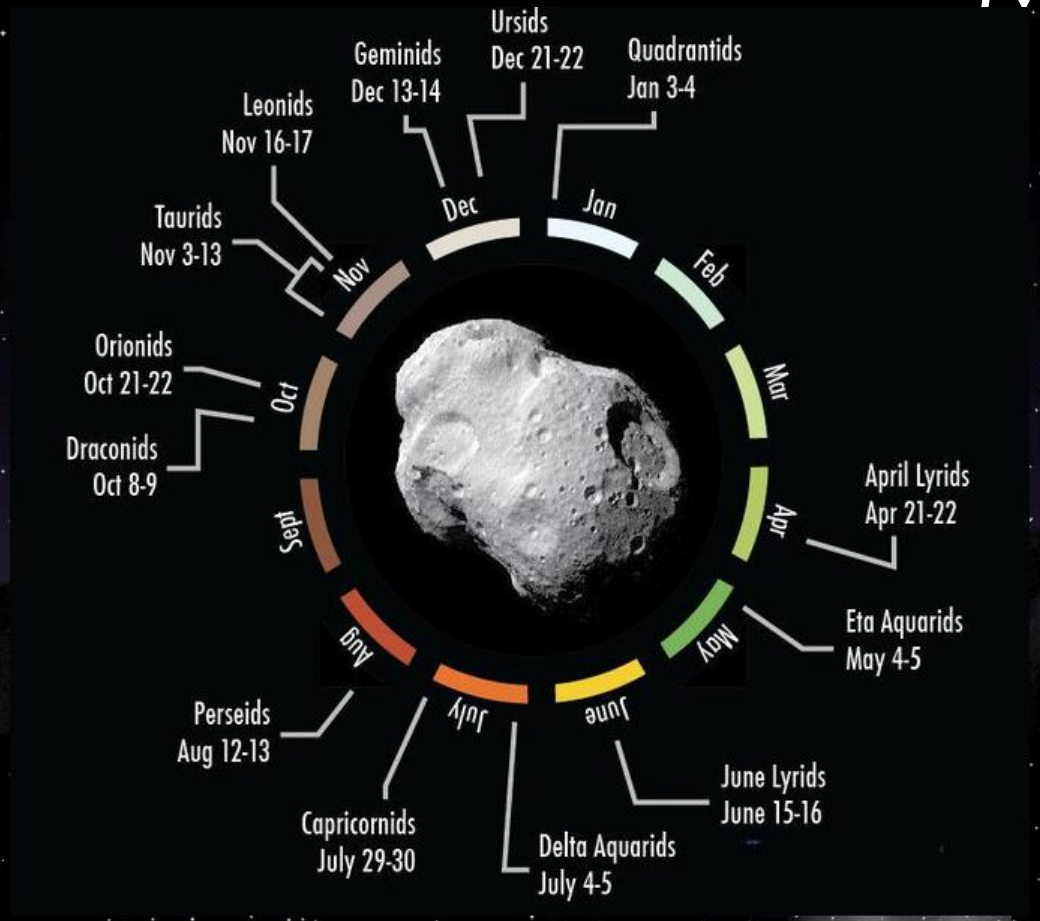
Randy Wing, N0LD

9/9/2022

METEOR SCATTER INTRODUCTION

- "10 Meter Meteor Scatter QSO - YouTube"
- Similar to 6m FT8, just use the MSK144 mode
  - WSJT or any digital program with MSK144
  - You can make verbal qsos / CW qsos on 6m – if you are fast!
- Why operate meteor scatter?
  - Easy - most months have a meteor shower that can result in contacts
  - Easy - If you can operate WSJT-X, you can do meteor scatter!
  - Rewarding - Paper chasing – FFMA, 6m VUCC, 2m VUCC. Etc.

HOW AND WHEN METEOR SCATTER WORKS



- [G0ISW Meteor Scatter (qsl.net)]

Amateur Radio Meteor Scatter

METEOR SCATTER WHAT DO I NEED? WHY SHOULD I?

- "10 Meter Meteor Scatter QSO - YouTube"
- Similar to 6m FT8, just use the MSK144 mode
  - WSJT or any digital program with MSK144
  - You can make verbal qsos / CW qsos on 6m – if you are fast!
- What do I need?
  - Radio capable of VHF all mode operation – preferably 6m, then more
  - 6m Loop or even a dipole M2 6m Loop – gain helps
  - You can try other bands, 2m is popular, people experiment on 1.25m and 70cm
- Why operate meteor scatter?
  - Easy - most months have a meteor shower that can result in contacts
  - Easy - If you can operate WSJT-X, you can do meteor scatter!
  - Rewarding - Paper chasing – FFMA, 6m VUCC, 2m VUCC. Etc.

EME

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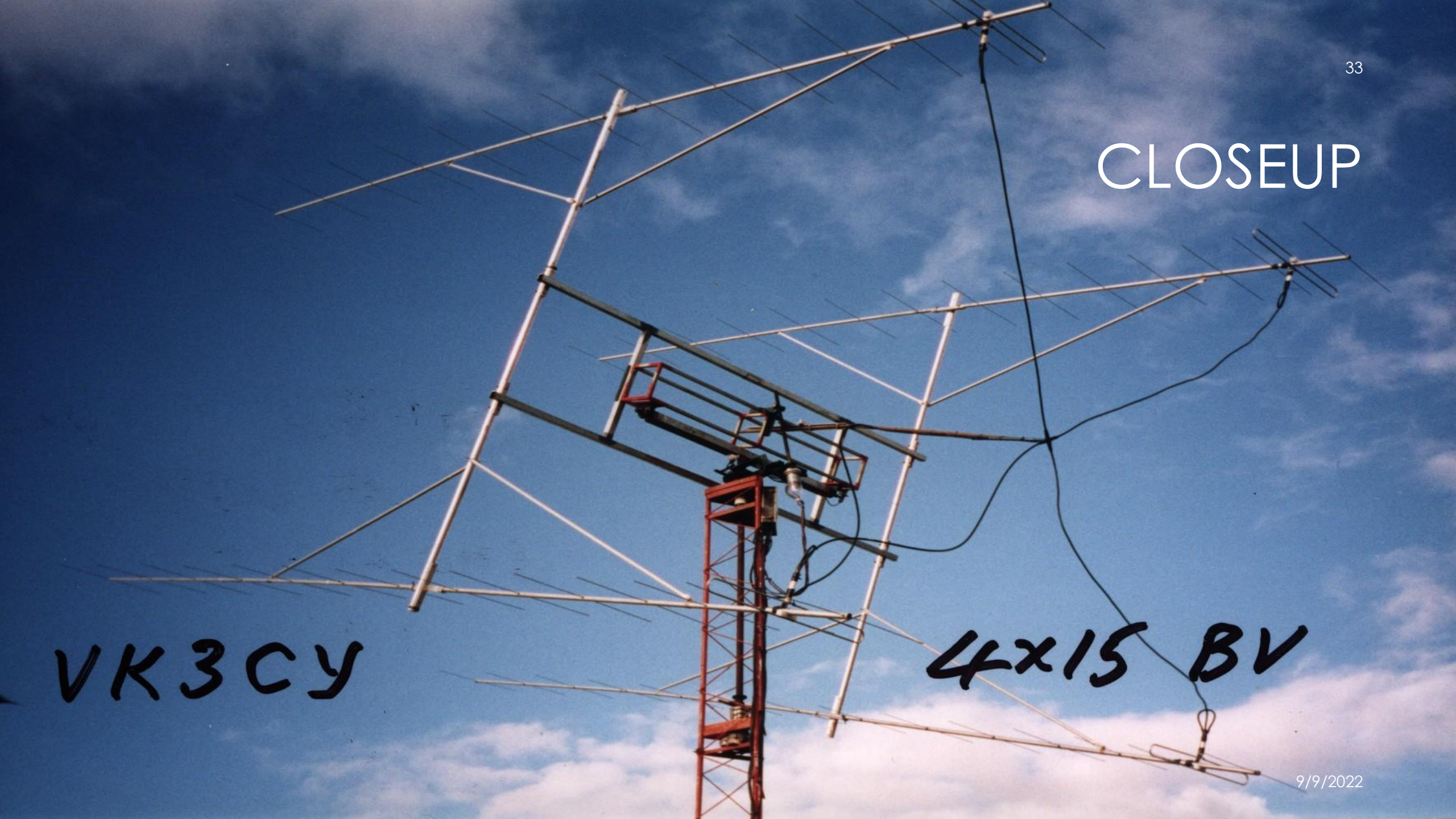
EME – THE CHALLENGE!

- Portable EME moon bounce setup – YouTube
- If you setup a sked with a large station EME you can operate moonbounce with a 12 ft 70cm antenna, 100 watts, and WSJT-X using the JT65 mode
- More antennas in tandem vastly improves performance!
- More power vastly improves performance!

TYPICAL EME STATIONS

CLOSEUP

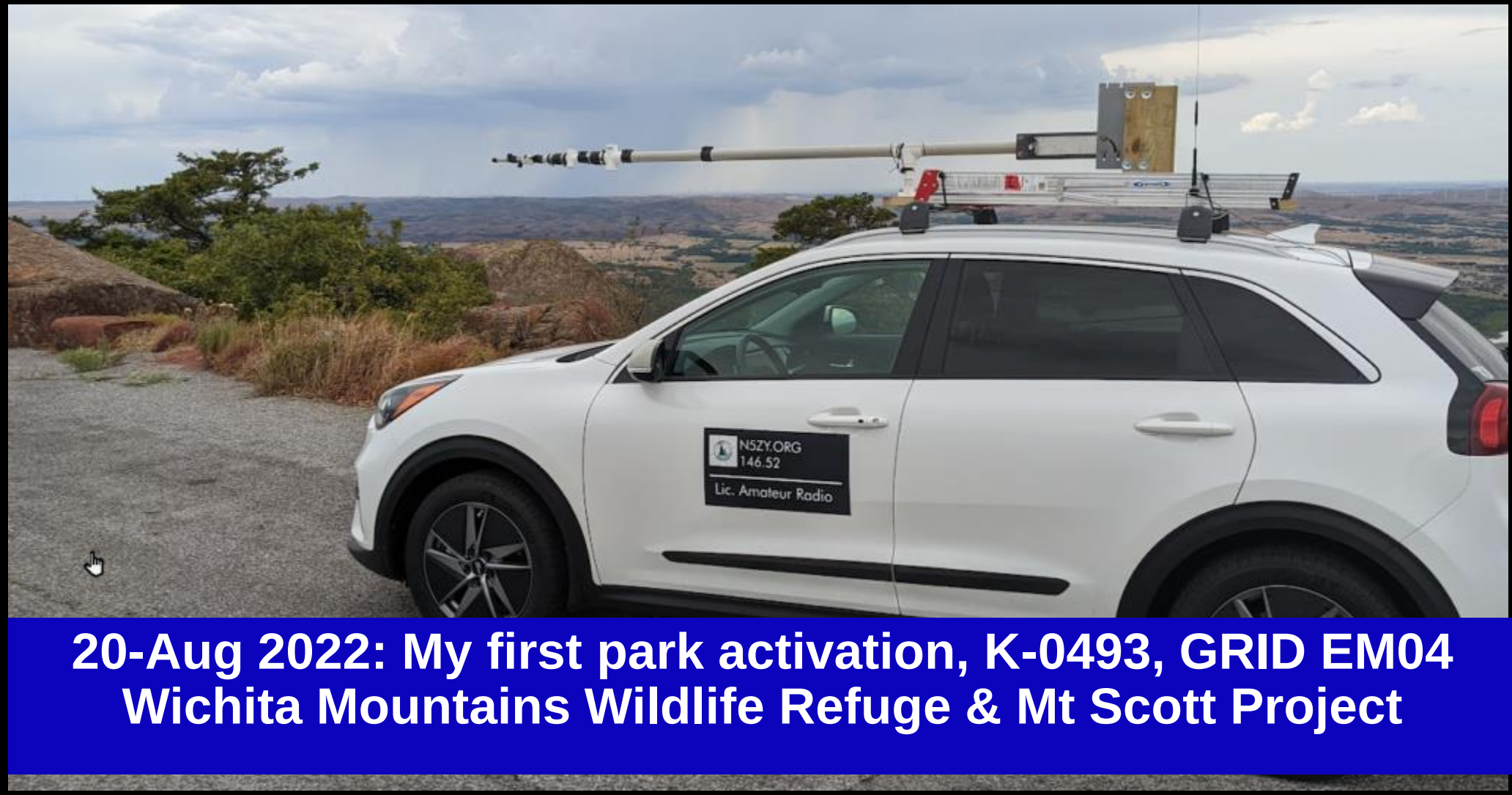


VHF POTA

Credit to Marcus Sutliff, N5ZY

Full story on: Parks on the Air – N5ZY (https://n5zy.org/parks-on-the-air)

OK POTA – N5ZY



20-Aug 2022: My first park activation, K-0493, GRID EM04
Wichita Mountains Wildlife Refuge & Mt Scott Project

DEPLOYED N5ZY ROVER

- On the air with 2m and 6m Moxons from PAR Electronics
- Omniangle Antennas | PAR Electronics | loop | vhf uhf loop antenna | weak signal HO loop

INSIDE THE ROVER

N5ZY
VHF OPERATING CONDITIONS

Band	Freq (MHz)	Mode	My antenna	Radio
2 m	146.52 (up 15kHz steps if QRM – 146.535, 146.55, 146.565…)	FM	Horizontal moxon	IC9100
	144.200	SSB	Horizontal moxon	IC9100
1.25 m	223.5	FM	Only a vertical whip ant on mobile radio	Anytone AT-5888UV-III
70 cm	446	FM	Only a vertical whip ant.	IC9100
6 m	50.125	USB	Horizontal moxon	IC7610
	50.313, 50.214	FT8/FT4	Horizontal moxon	IC7610

CONSTRUCTION
MANY DETAILS ON THE N5ZY WEBSITE (AFOREMENTIONED)

Design rules:

1. Read your vehicle's roof rack load limit!
2. It's not how fast you can drive, it's how fast you can stop with everything still attached. Most cars use friction clamps for the roof rack and in an emergency stop you may overcome the friction holding them on! Go lightly, and keep as much weight as low as possible.
3. Remember that if something comes loose it could kill someone. Be mindful of safety and inspect at every opportunity.
4. Do not drink and drive because then using it as a jousting rod may seem like a great idea.
5. Do not have two horizontal masts as they could resemble blasters and invite Imperial stormtroopers to attack.

- The mast is an MFJ-1906H. (Note: DXE-TCFP-33HD is a new Carbon Fiber version of the same thing! This wasn't available in July!)
  The tilt base is the DXE-VA-BASE
  I also added the wing nut knobs, DXE-AOK-TB1193

VHF CONTEST FUN!

Randy Wing, N0LD

9/9/2022

WHAT IS VHF CONTESTING?

- Competing with other Amateur Radio VHF operators
- Weak Signal / Horizontally polarized antennas
- Higher Power the better / but many use "barefoot" power
- Using 50 mhz and above frequencies
- Popular VHF contests:
  - ARRL Spring Sprints (50 144, 222, 432, 902 and up)
  - ARRL January, June, and September VHF Contests
  - CQ World Wide VHF Contest (15-16 July 2017)
- Fixed, Rover, Multi-Op Categories
  - Fixed: SOHP, SOLP, SO Portable, SO 3-Band (50, 144, 432 mhz), SO FM Only
  - Rover: Rover, Classic Rover, Limited Rover (lowest 4 bands), Unlimited Rover
  - Multi-Op: MO Limited (max 4 bands), Multi-operator Unlimited

WHY ARE YOU HERE?

- I would like you to consider trying VHF contesting!
- VHF Contesting is increasing! ~10% increase in June 2017
- Midwest and southern Plains have a lot of flat terrain! Conducive to VHF
- We need more VHF contest operators to have more fun!
- …and most importantly…

VHF CONTESTING IS FUN!

- Challenge:
  - Compete with others in your "contest class"
  - Can do it alone or with others

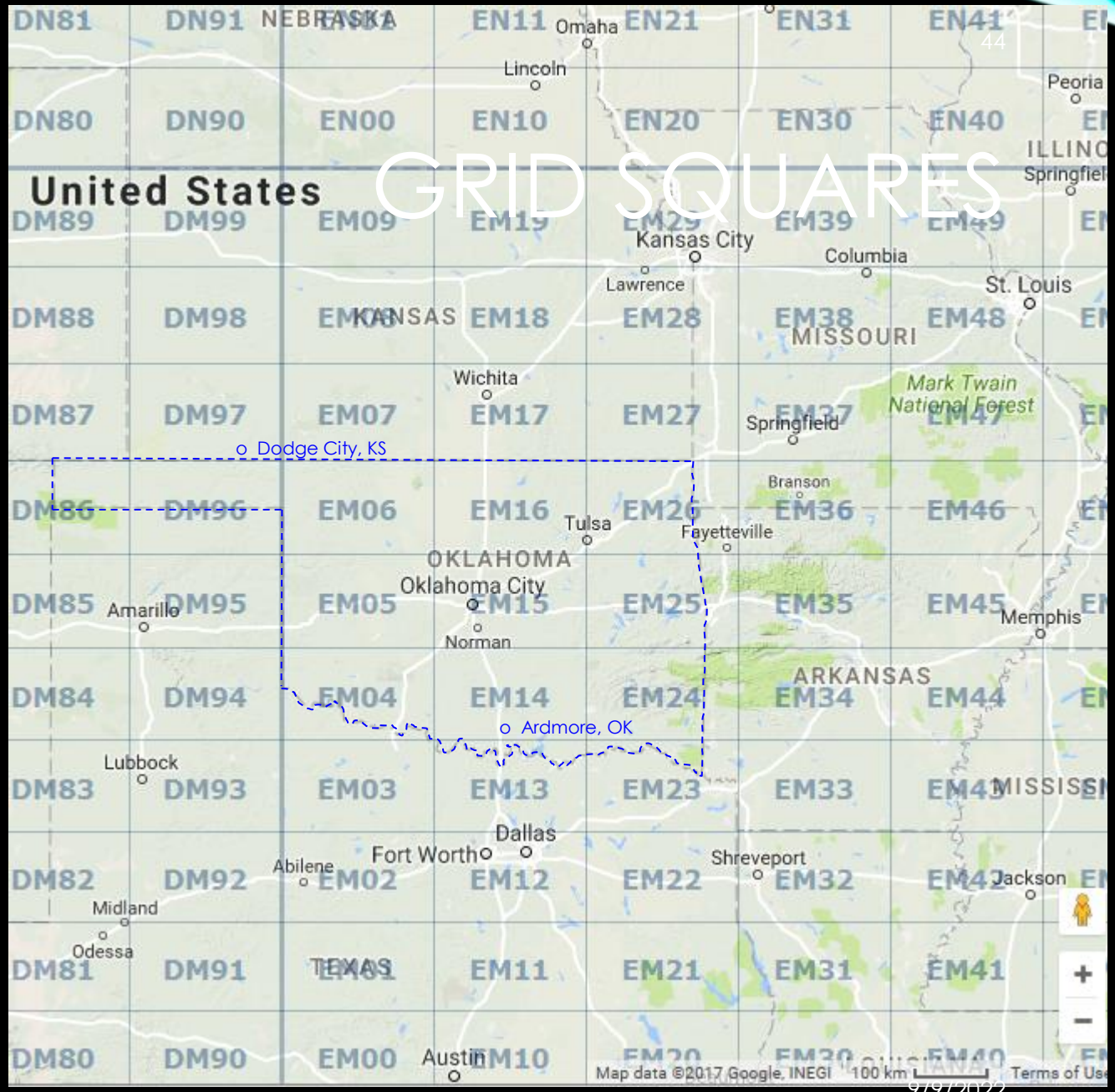
- Excitement:
  - Band Openings – during contests they are more noticeable!
  - Helping Friends, Making Friends
  - Learning – Opportunities to Mentor and be Mentored

- Awards:
  - Recognition from the contest sponsor; VHF contests are collaborative as well as competitive

- Side Benefits:
  - Improves operating skills
  - Excellent preparation for emergency operations
  - An excellent use of our allocated spectrum ***Remember: "Use it or lose it."***

GRID SQUARES

- Grid Squares are:
  - 2 deg EW; 1 deg NS
  - ~100 miles x 60 miles
- Example: Ardmore, OK
  - EM14 "Echo Mike , One Four"
  - Please copy …N0LD/R in EM14
- Strategy
  - Go North and South thru corners as much as possible
    (60 miles < 100 miles)
  - Stay within VHF population center range

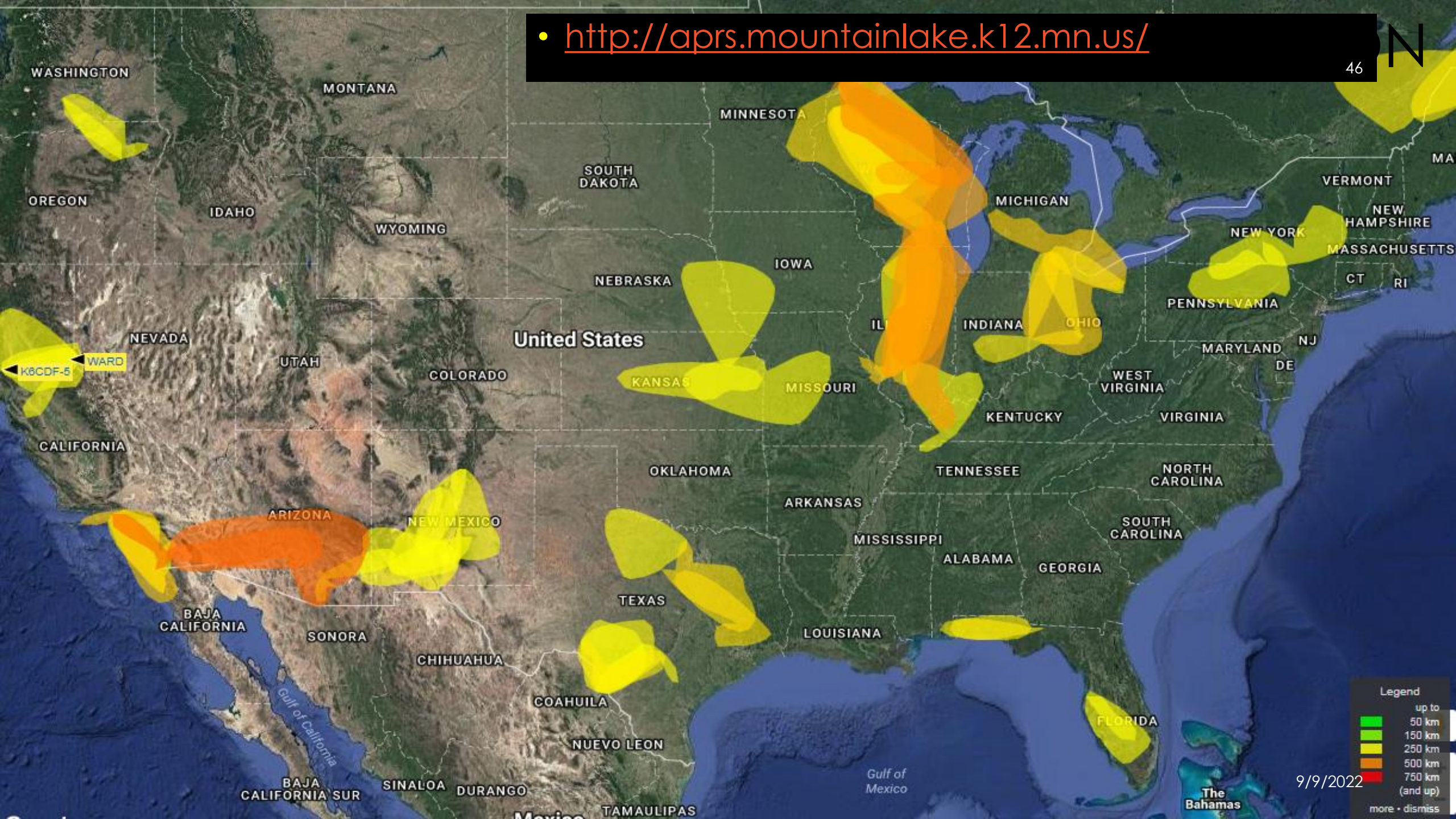


HOW DO YOU SCORE IN A VHF CONTEST?

- QSO Points (read the rules they change)
  - Count 1 point for each 50- or 144-MHz QSO
  - Count 2 points for each 222- or 432-MHz QSO
  - Count 3 points for each 902- or 1296-MHz QSO *
  - Count 4 points for each 2.3 GHz (or higher) QSO *
    - TIP - Work Mode that is quickest (or that you can)
- Multipliers
  - Total number of different grid squares worked per band
- Final Score
  - Total QSO Points x Total Multipliers = Final Score

* January VHF and other contests has different points

- http://aprs.mountainlake.k12.mn.us/



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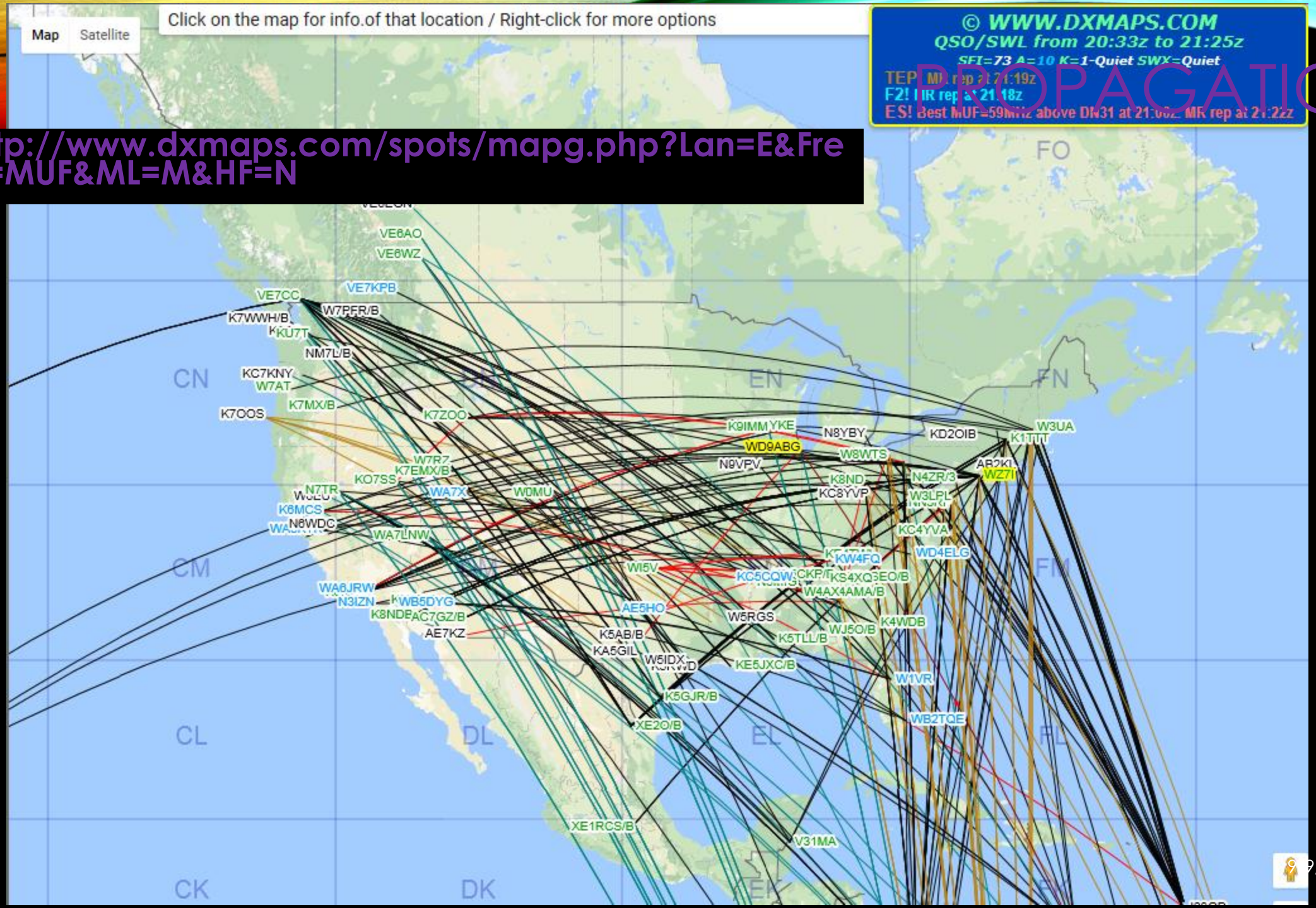
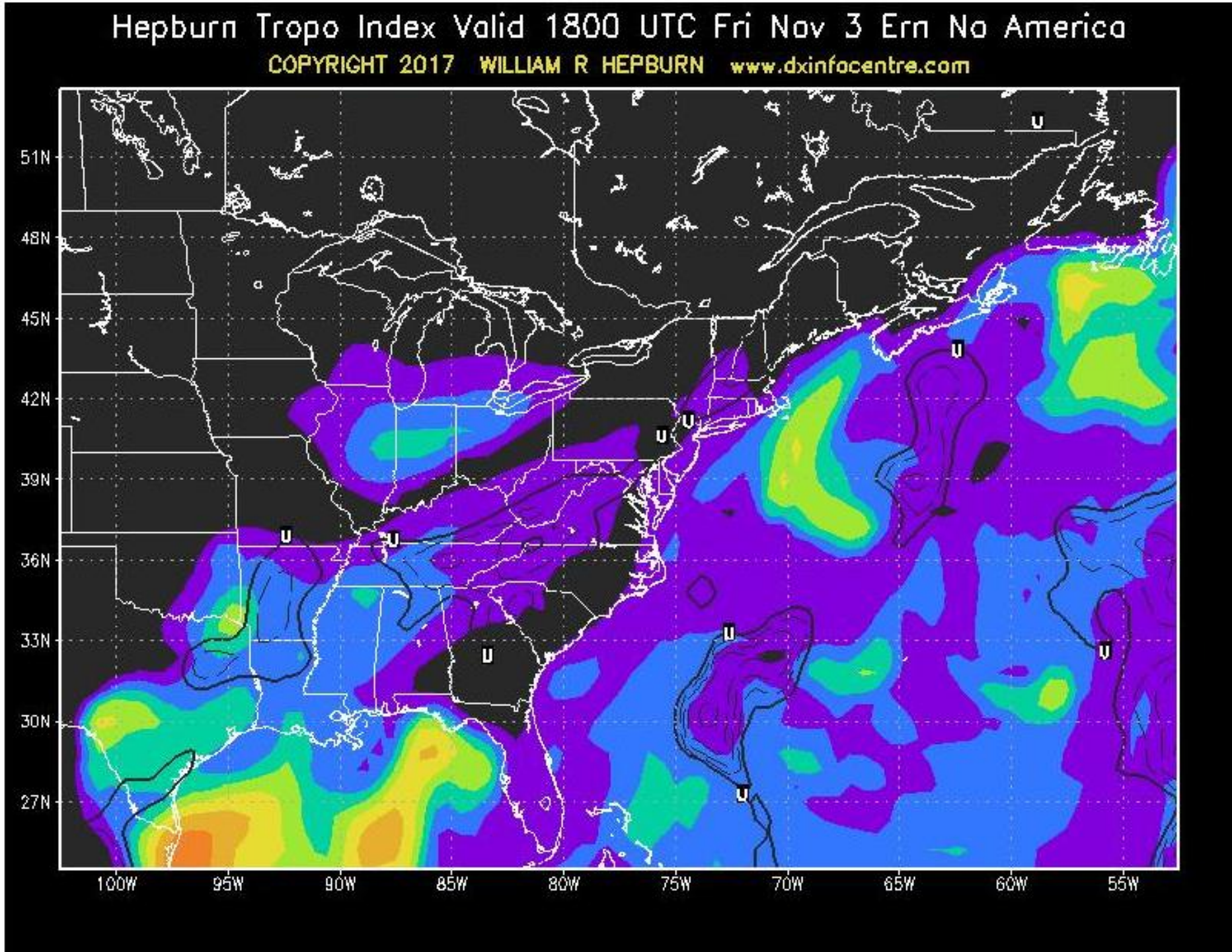
PROPAGATION

- http://www.dxmaps.com/spots/mapg.php?Lan=E&Frec=MUF&ML=M&HF=N

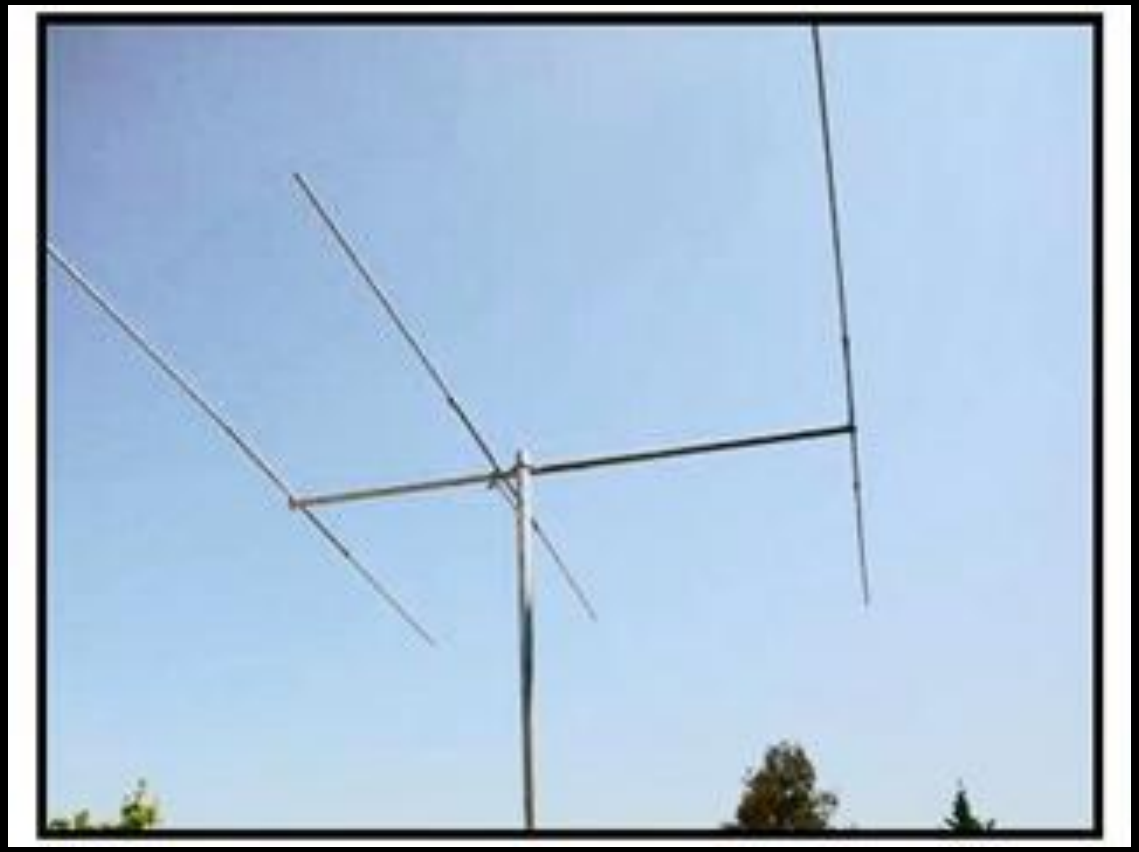


- http://www.dxinfocentre.com/tropo.html



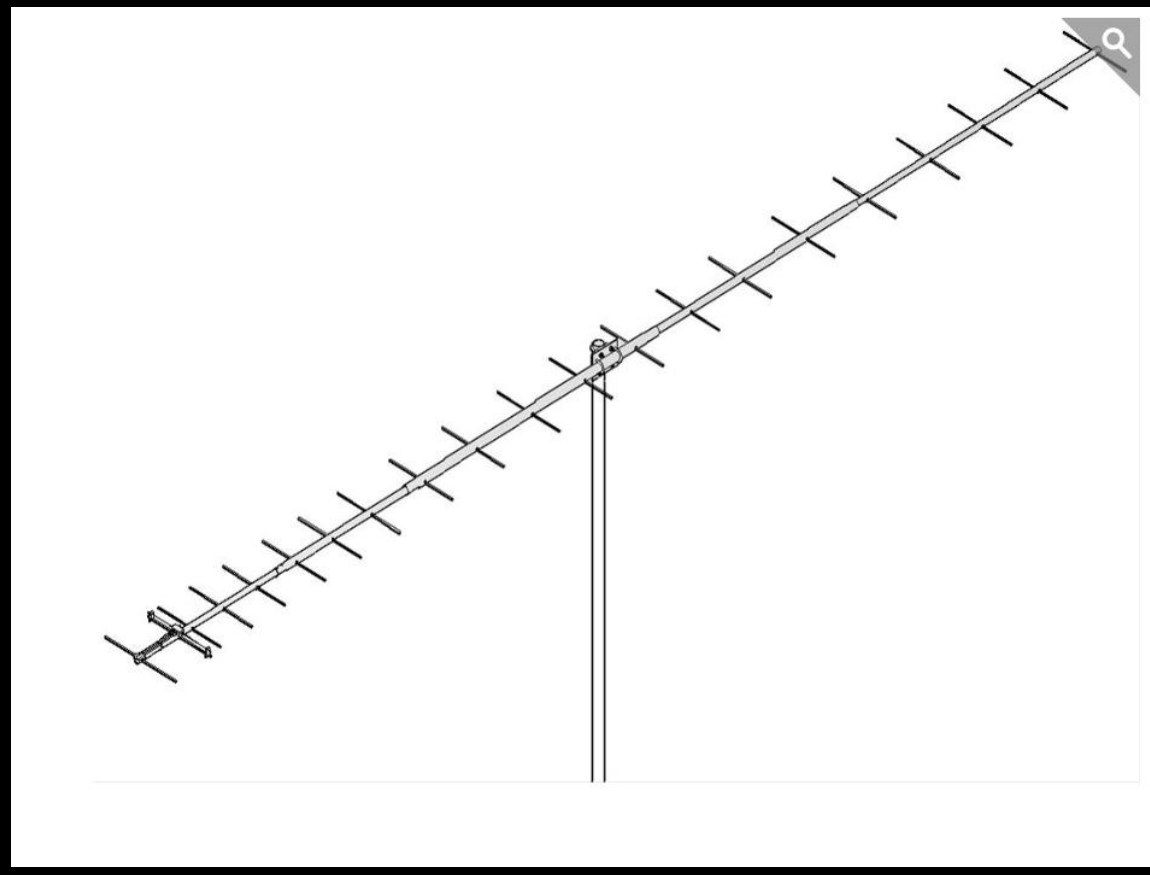
WHAT DO I NEED TO START?

- Recommend a small 6m Beam and a 2m Beam ~ $200 each
- Recommend a used radio such as FT-100, FT-857D < $600

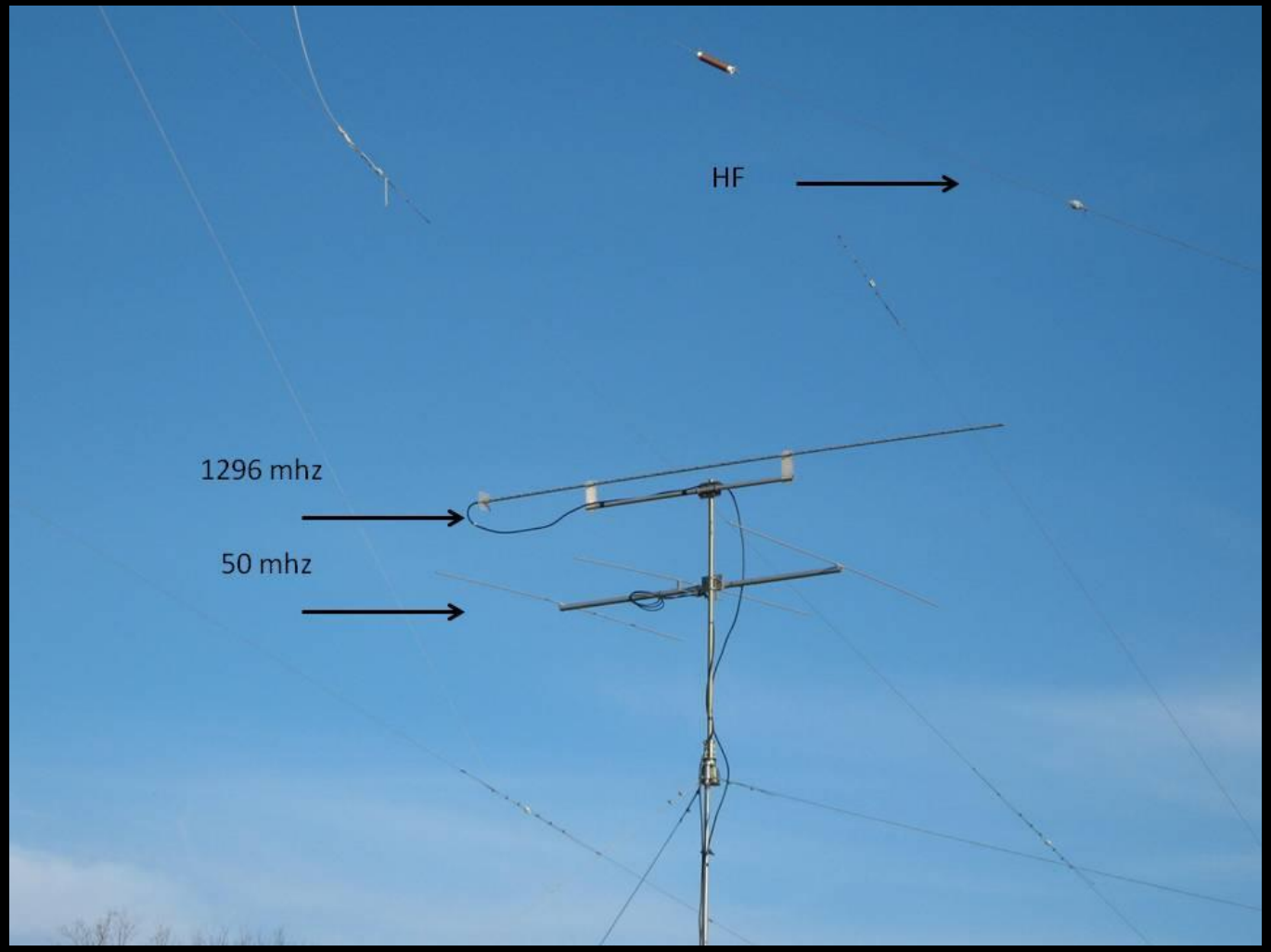


WHERE DO I GO FROM HERE?

- Recommend a 70cm gain antenna ~ $230 each
- Recommend a 2m amplifier (85W) < $160



FIXED OPERATION ANTENNA EXAMPLES



No matter what size station you're operating, it's a thrill to talk to somebody far away.

FIXED OPERATION ANTENNA EXAMPLES (MORE)

You'll improve your VHF operation – just START!

DO I HAVE TO HAVE A "CONTEST STATION"?

- Big Gun contest stations
  - Multiple radios
  - Multiple towers
  - Serious station automation
- Small Gun – Big Fun stations
  - There are opportunities for "guest operating" if you have a big gun nearby!
  - Ask your club members to all get on the air on 146.52 FM!
  - If there isn't anyone on, right now – try again several times later!
    - Band conditions change things!

You don't have to be a Big Gun to have Big Fun contesting!

WHO ENTERS A CONTEST? WHY?

- The Casual Contester

  A desire to just have some fun, improve operating skills, and work new countries, states, counties, etc. from the smorgasbord of participating stations

- The Feisty Contester

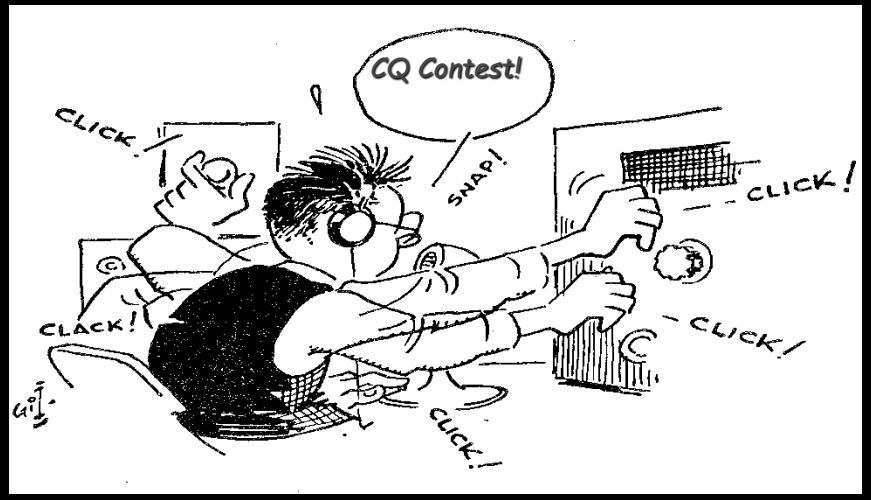
  A desire to compete

  … individually, or as part of a club.

- The Committed Contester

  Able to leap tall buildings with a single bound

  Able to master the art of sleep deprivation



Contesting can be like this sometimes!

HOW TO WIN A CONTEST

- Choose the "Class" to match your goals!
  - Limited, Unlimited, Rover (classic, limited, unlimited), Single-Op, Multi-Op, LP/HP
- Work a lot of stations
- Work as many "multipliers" as possible
- Work smart
  - Make email/telephone contacts with potential contacts – get the word out!
  - Make good band change decisions
  - Use efficient operating techniques
    - Don't waste time or words (similar to emergency operations)
    - Know when to "Run" and when to "Search & Pounce"
    - Know when to take a break

N0LD/R AND K5SRT/R TEAM UP! (CONT.)

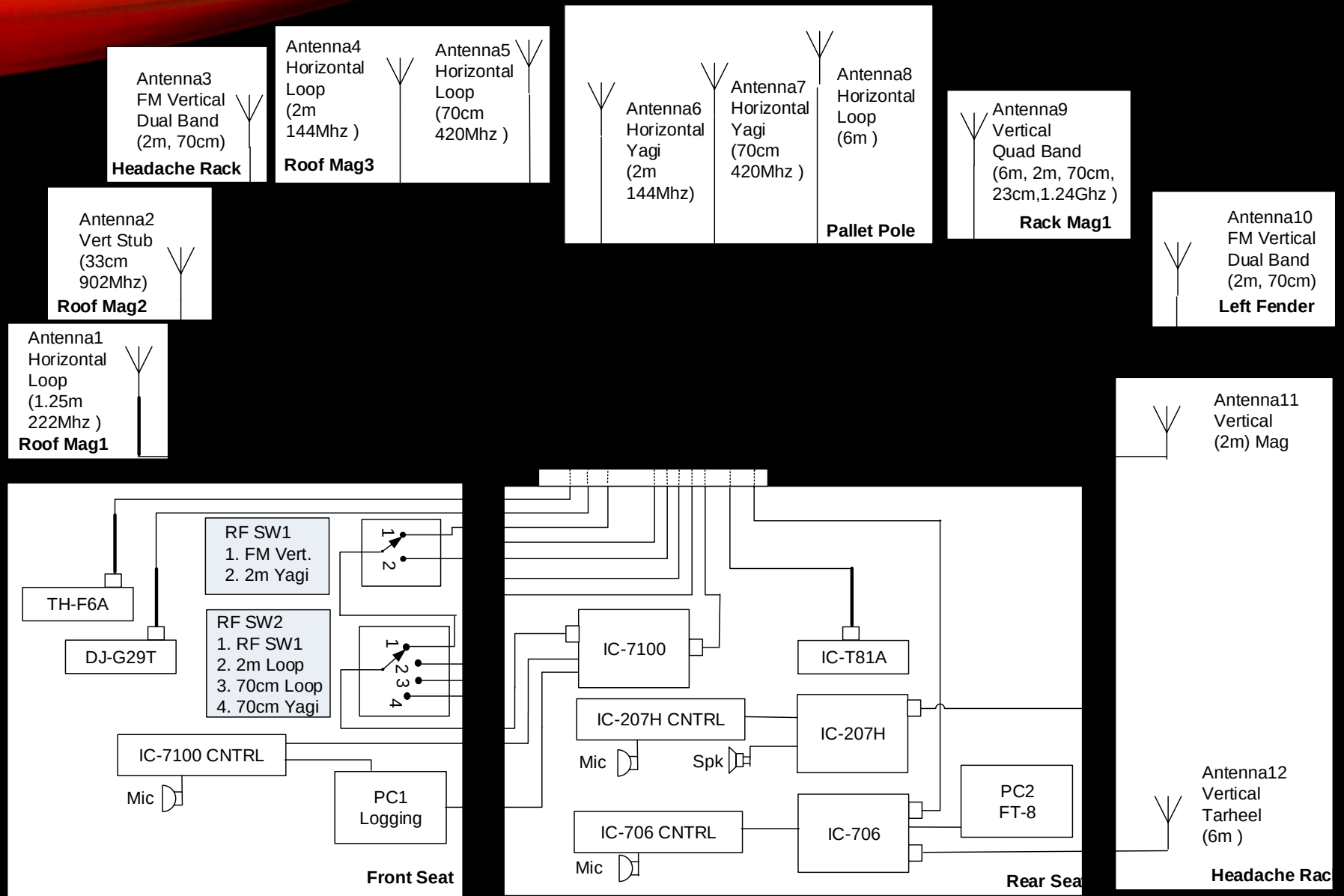
- Tactics!
  - Used all the bands that we have radios for!
    - N0LD/R already had 6m, 2m, 1.25m, 70cm, & 23 cm - **added 33cm Alinco FM handheld**
    - K5SRT/R already had 6m, 2m, 1.25m, 70cm – **added 33cm and 23 cm FM handhelds**
  - Used as many antennas as we could come up
    - N0LD/R
      - 6m Loop, 2m and 70cm dual loops, 2m / 70cm vertical - **added 33cm vertical ($8!)**
      - 2m, 1.25m, 70cm, 23cm – 10 ft long yagis - **added 33cm beam (7 ft long – 80$)**
    - K5SRT/R
      - 2m, 70cm verticals - **added 6m and 33cm vertical – used 23cm adapted radio rubber antenna**
      - 2m, 1.25m, and 70cm loops - **added 6m loop ($180)**
      - 2m (3 elements), 70cm (5 elements)
  - **TIP – During contest what is the best radio and antenna? The one that's used**

K5SRT/R CONFIGURATION

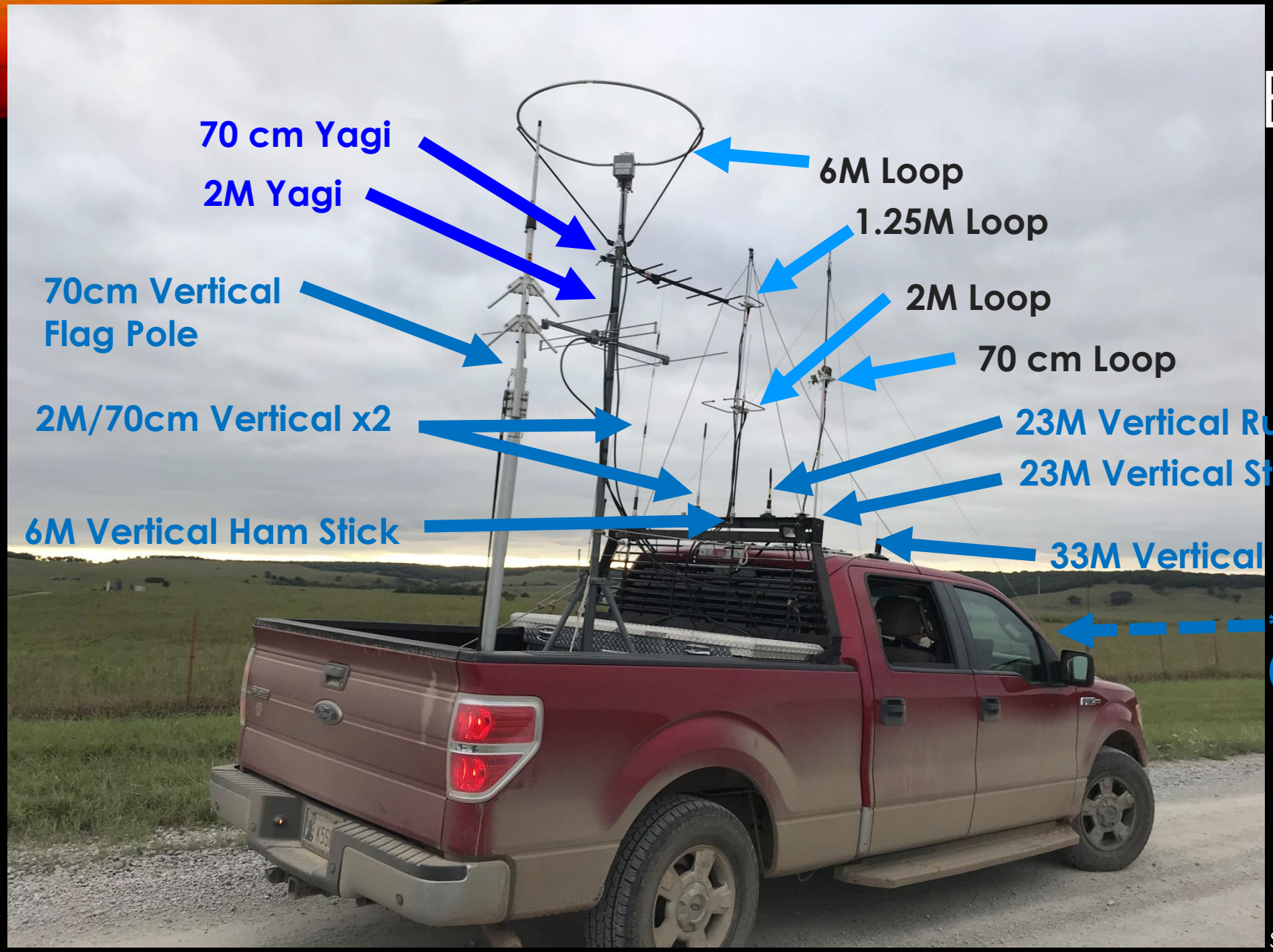
For September 2018 ARRL VHF Contest

9/9/2022

K5SRT/R - ANTENNA AND RADIOS DIAGRAM



ER HILL TOP


70 cm Yagi
2M Yagi
70cm Vertical Flag Pole
2M/70cm Vertical x2
6M Vertical Ham Stick
6M Loop
1.25M Loop
2M Loop
70 cm Loop
23M Vertical Rubber Duck
23M Vertical Stub
33M Vertical Stub
*2M/70cm Vertical (Front Left Not Seen)

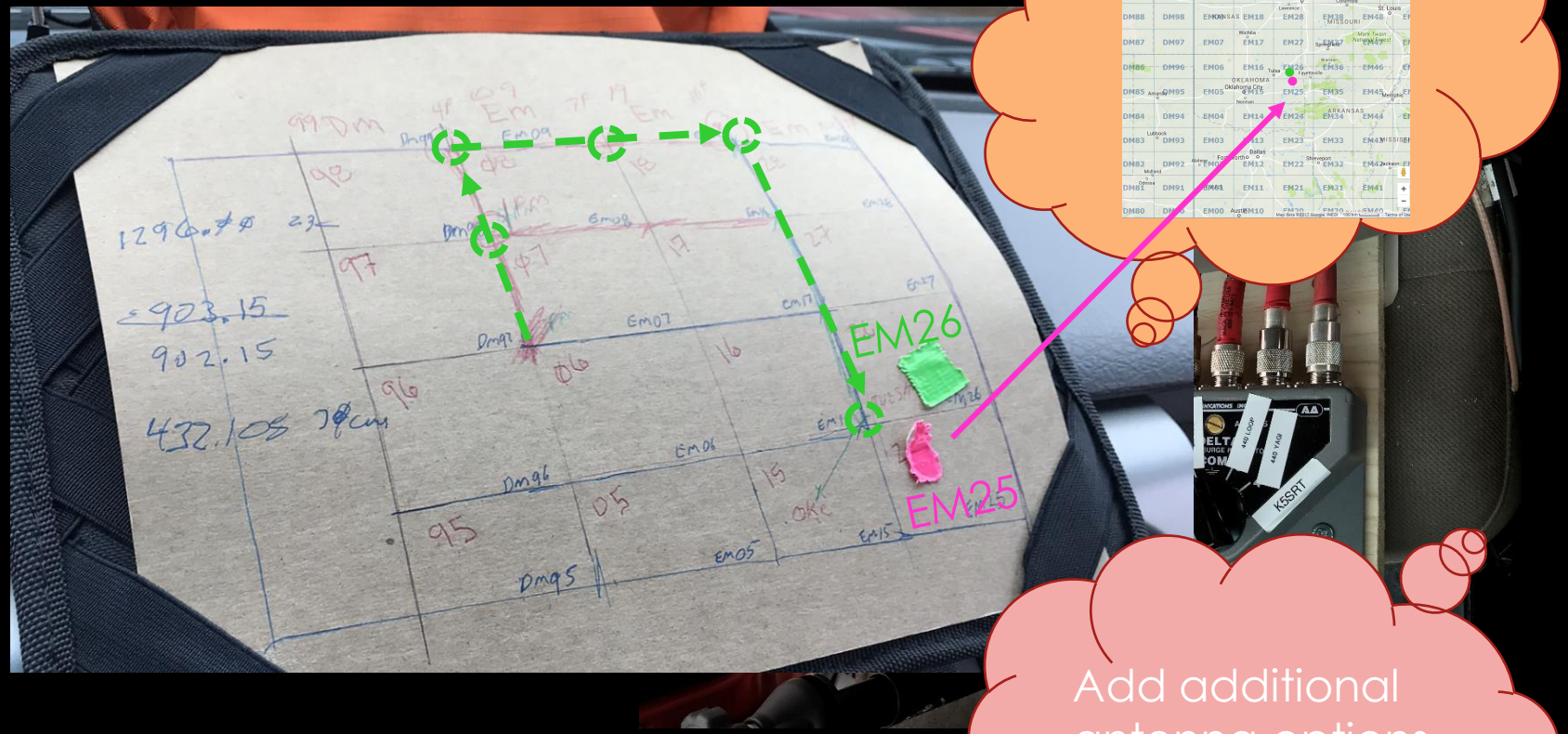
K5SRT/R EQUIPMENT, TIPS, & NOTES

- **Remain flexible - Things change!**
  - Not everything goes the way you plan: Light vs dark, good vs bad weather, equipment operational/no operational, propagation open/closed, team may need a break, frequency or equipment interference
  - Take notes/Build a list of things to improve on the next trip
- **Monitor, give calls, and share contacts and frequencies with others**
  - VHF Contesting is friendly and collaborative – keep the spirit going! Elmer!
- **Work where people are (FM simplex, SSB, Digital, and antenna type)**
  - FM Simplex is a great way to pick people up – and it is OK to solicit people on local repeaters!
- **Be helpful and encourage others**
  - everyone can learn something or improve
- **Start coax installs from the operators perspective**
  - Store excess coax and equipment spares outside of the operators position

K5SRT/R EQUIPMENT, TIPS, & NOTES

- **Start Planning Early!**
  - We start planning at least two months before a contest!
  - Have plans, do test runs, have maps (electronic and paper), alternate routes and use visual aids for operational awareness (helpful during a Grid Dance)
  - Build checklists for installation, beginning the contest, Grid Dancing, and supplies
  - Consider this rover as the practice run for your next!
- **Communicate clearly so that your logger can be accurate**
  - Don't go faster than they can log; no need to make the loggers life miserable!
- **Change position**
  - Let the other people in your car drive, operate, log – it will improve everyone's enjoyment
- **Capture and document before, during, and after the event**
  - Your antenna configuration, your coax, your switches, your power, everything!
  - Capture your configuration in pictures as well

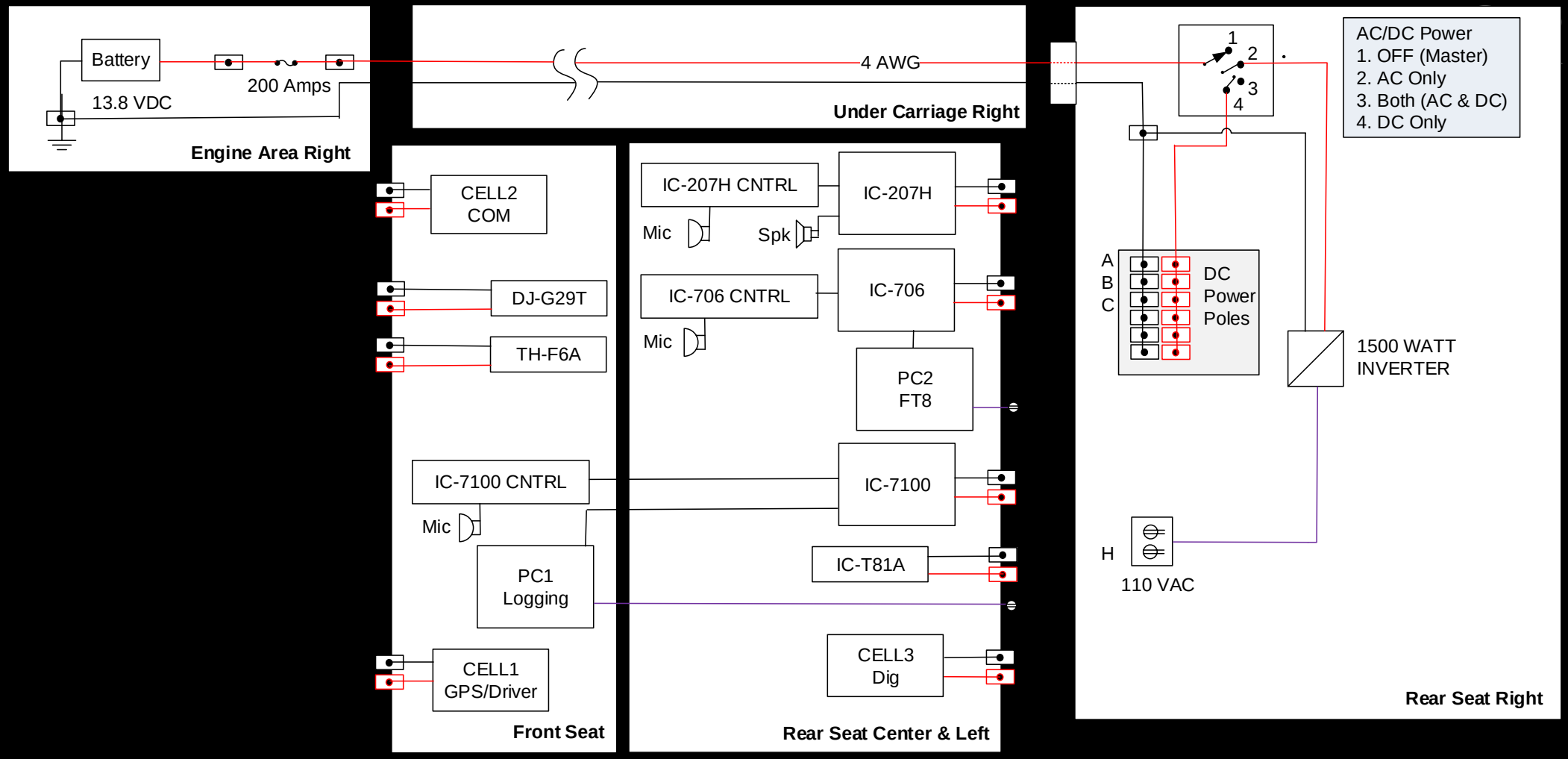
VISUAL OPERATOR AID & REMAIN FLEXIBLE



MAPS

Add additional antenna options, test & verify your configuration

K5SRT/R ELECTRICAL POWER DIAGRAM



K5SRT/R POWER DIAGRAM NOTES

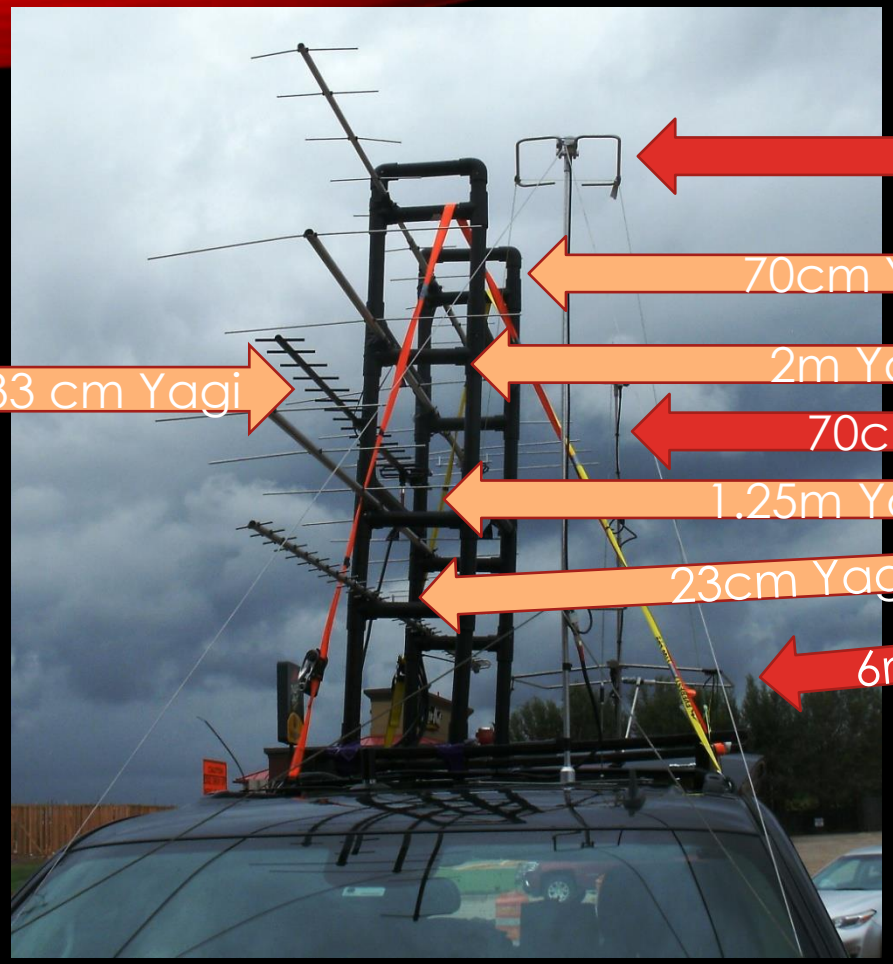
- **Alternator & Battery (source and connections)**
- **Safety fuses for protecting wiring and equipment**
- **AC & DC (Four Position) Master Power Switch**
  - Off, AC Only, DC Only, Both AC & DC
  - Added LED red lights to enable awareness if equipment is powered
- **Use what you have and improve things based on a plan.**
  - Son gave me a 1500 Watt Inverter, N0LD loaned some equipment
- **Look for flexible things**
  - AC Power Strip has 2- USB ports in addition to outlets for PCs this also free up vehicle power points
- **Anderson Power Poles or standardized installation connections**
  - Allows you to add or change components easily
  - Allows you to add a team member at the last minute that has additional equipment
- **Watch for interference, loose power, and ground connections**

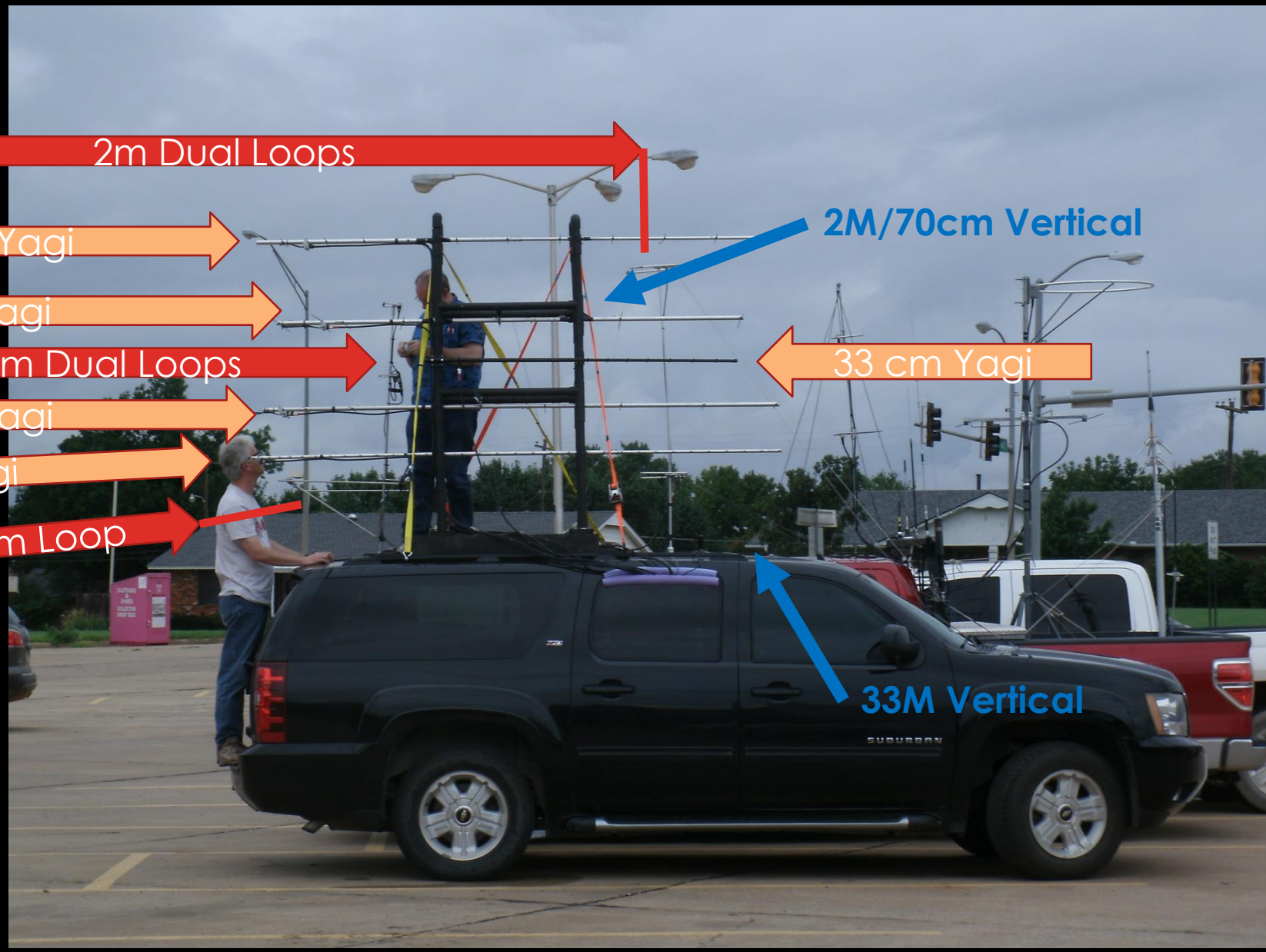
N0LD/R EXTERNAL ROVER SETUP

For September 2018 ARRL VHF Contest

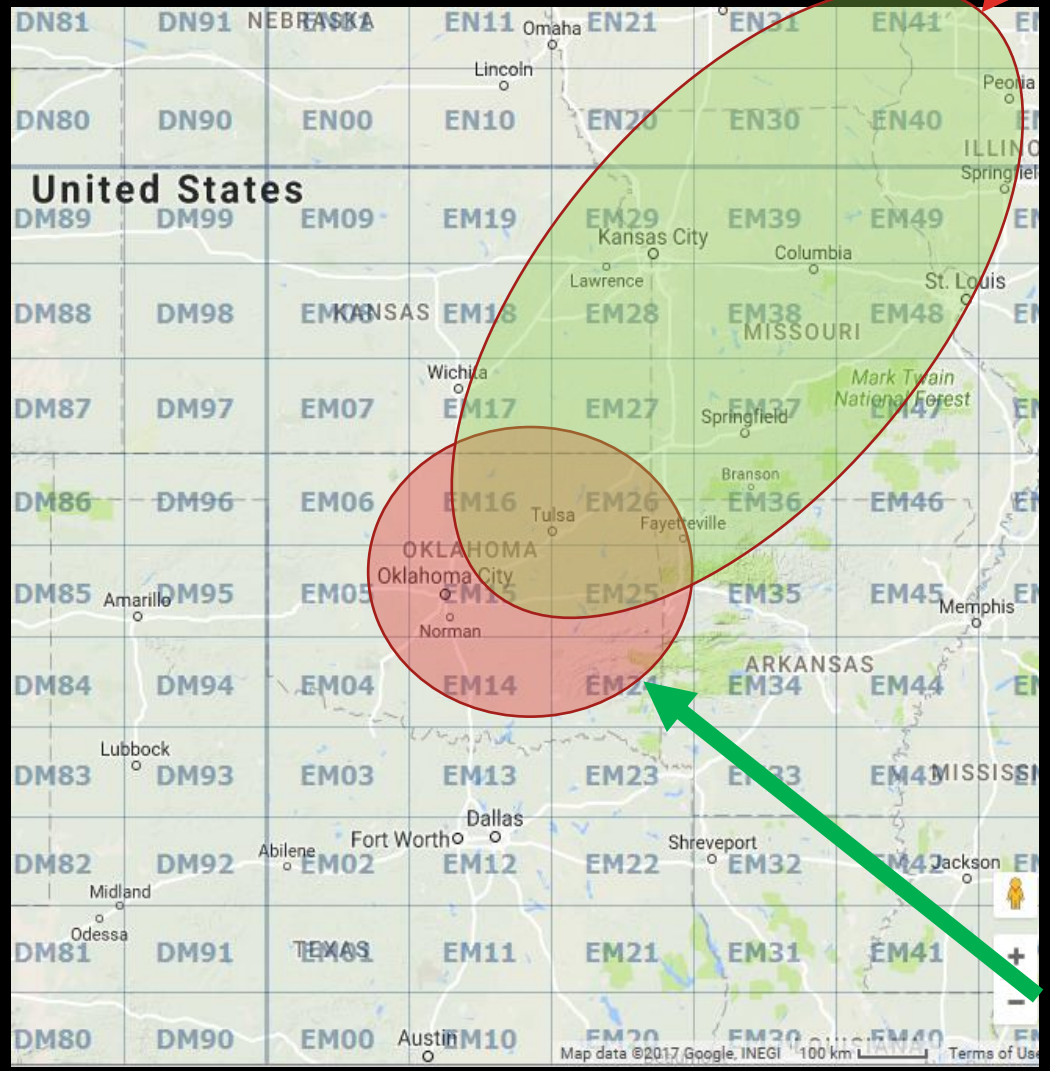
9/9/2022

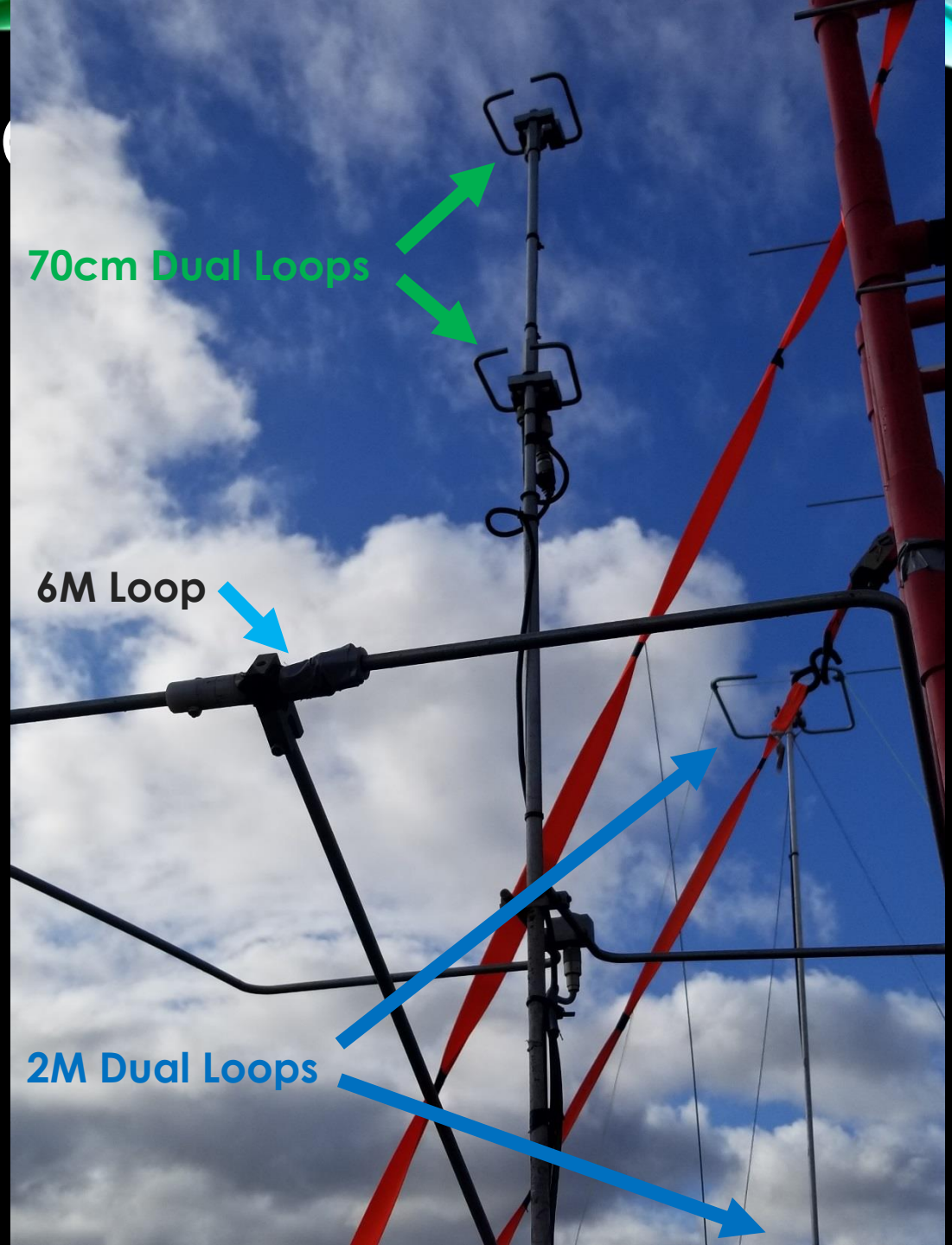
N0LD/R




2m Dual Loops
70cm Yagi
2m Yagi
33 cm Yagi
70cm Dual Loops
1.25m Yagi
23cm Yagi
6m Loop
2M/70cm Vertical
33 cm Yagi
33M Vertical

FO

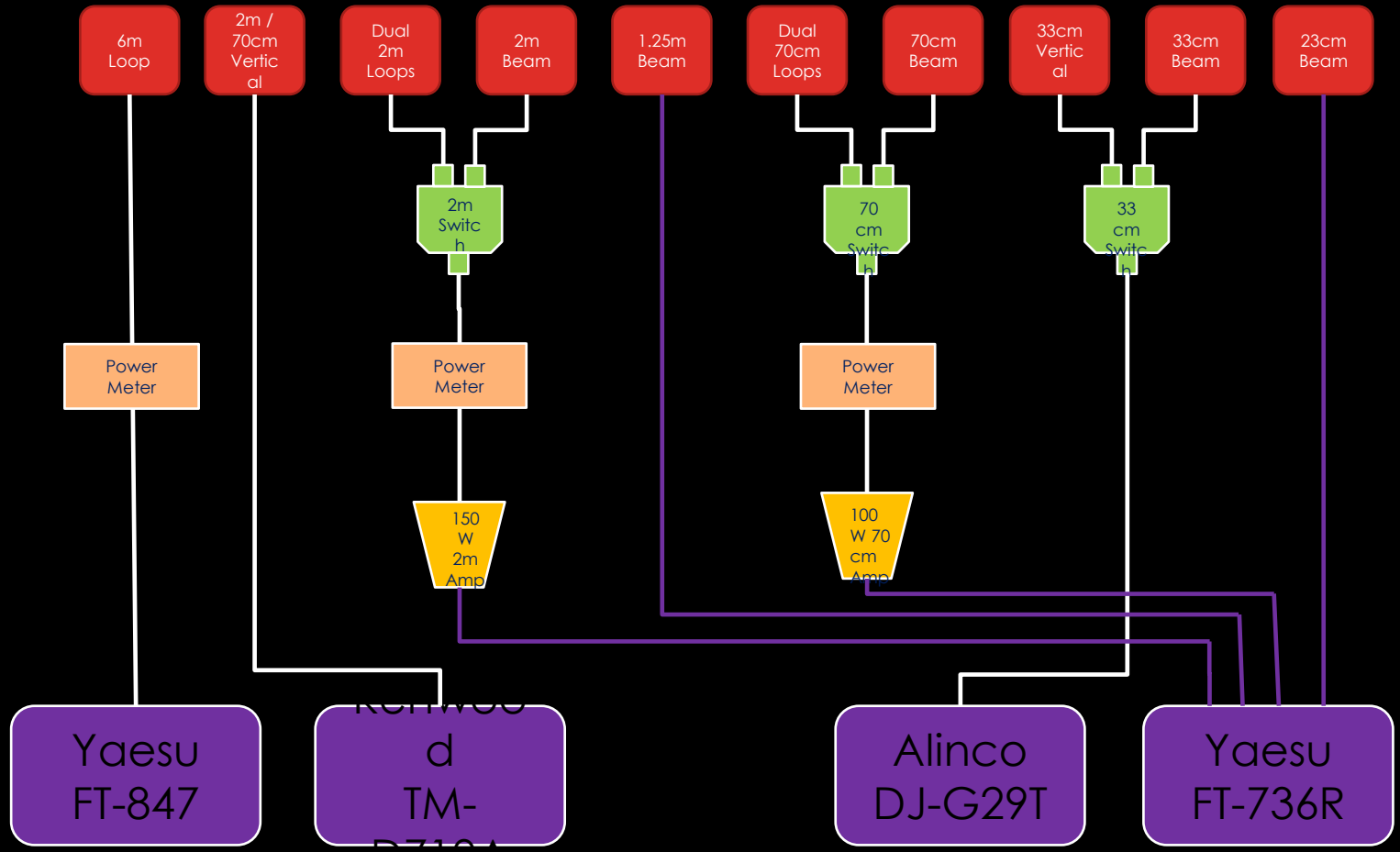

Nom. Yagi Range
United States
NEBRASKA
Omaha
Lincoln
Kansas City
Lawrence
Columbia
St. Louis
KANSAS
MISSOURI
Wichita
Springfield
Mark Twain National Forest
Branson
Tulsa
Fayetteville
OKLAHOMA
Oklahoma City
Norman
Amarillo
Memphis
ARKANSAS
Lubbock
Dallas
Fort Worth
Abilene
Shreveport
Jackson
Midland
Odessa
TEXAS
Austin
Nom. Loop Range
Map data ©2017 Google, INEGI
100 km
Terms of Use


70cm Dual Loops
6M Loop
2M Dual Loops

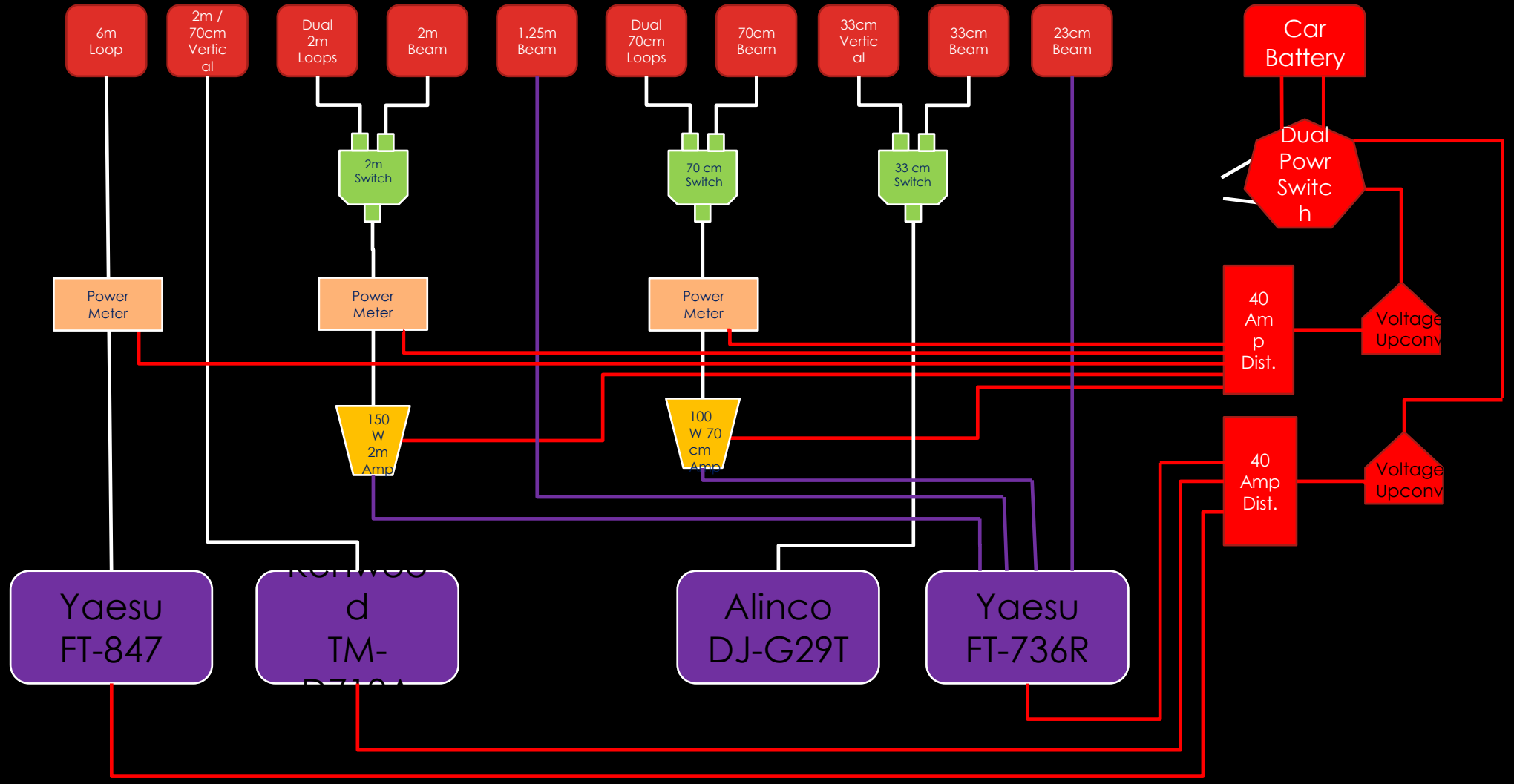
N0LD/R
INTERNAL ROVER SETUP

September 2018

N0LD/R RF Architecture

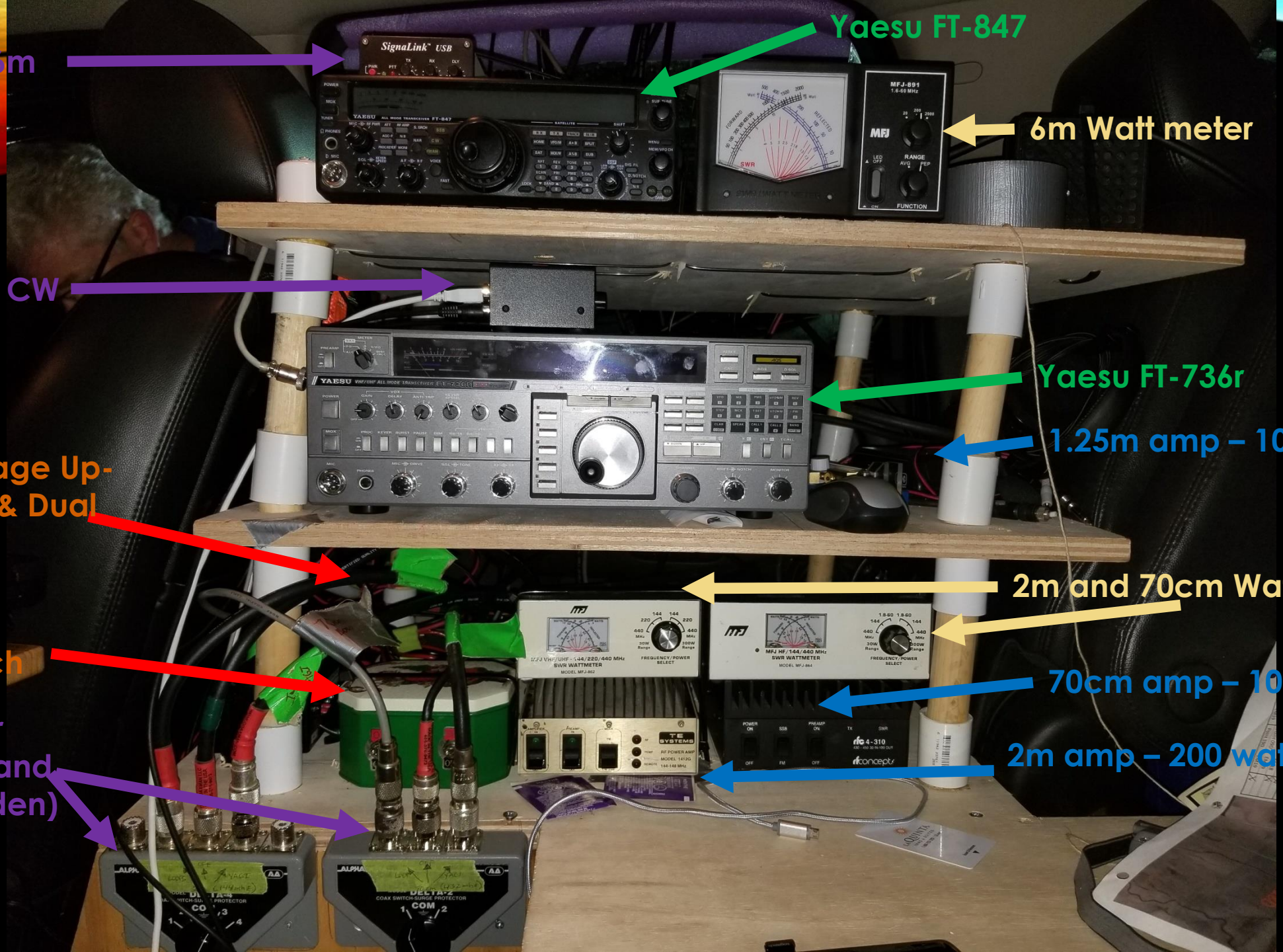


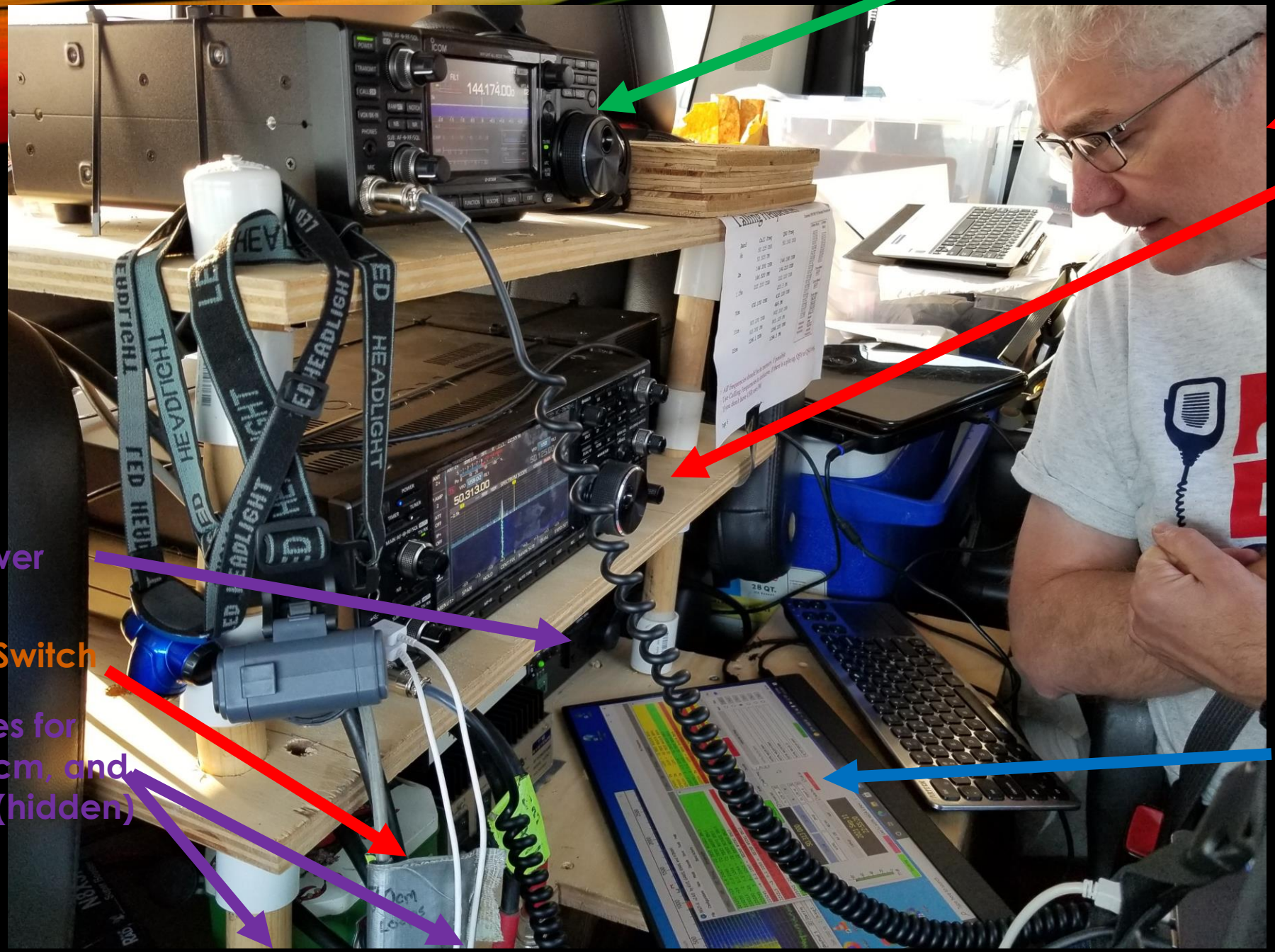
N0LD/R RF and Power Architecture



LE

AB0RX AT THE N0LD/R MAIN OPERATING POSITION


Digital for 6m
Yaesu FT-847
6m Watt meter
WinUSB for CW
Yaesu FT-736r
1.25m amp – 100 watts
Power Voltage Up-converters & Dual Distribution Switches
2m and 70cm Watt meters
Power Switch
70cm amp – 100 watts
Switches for 2m, 70cm, and 33 cm (hidden)
2m amp – 200 watts

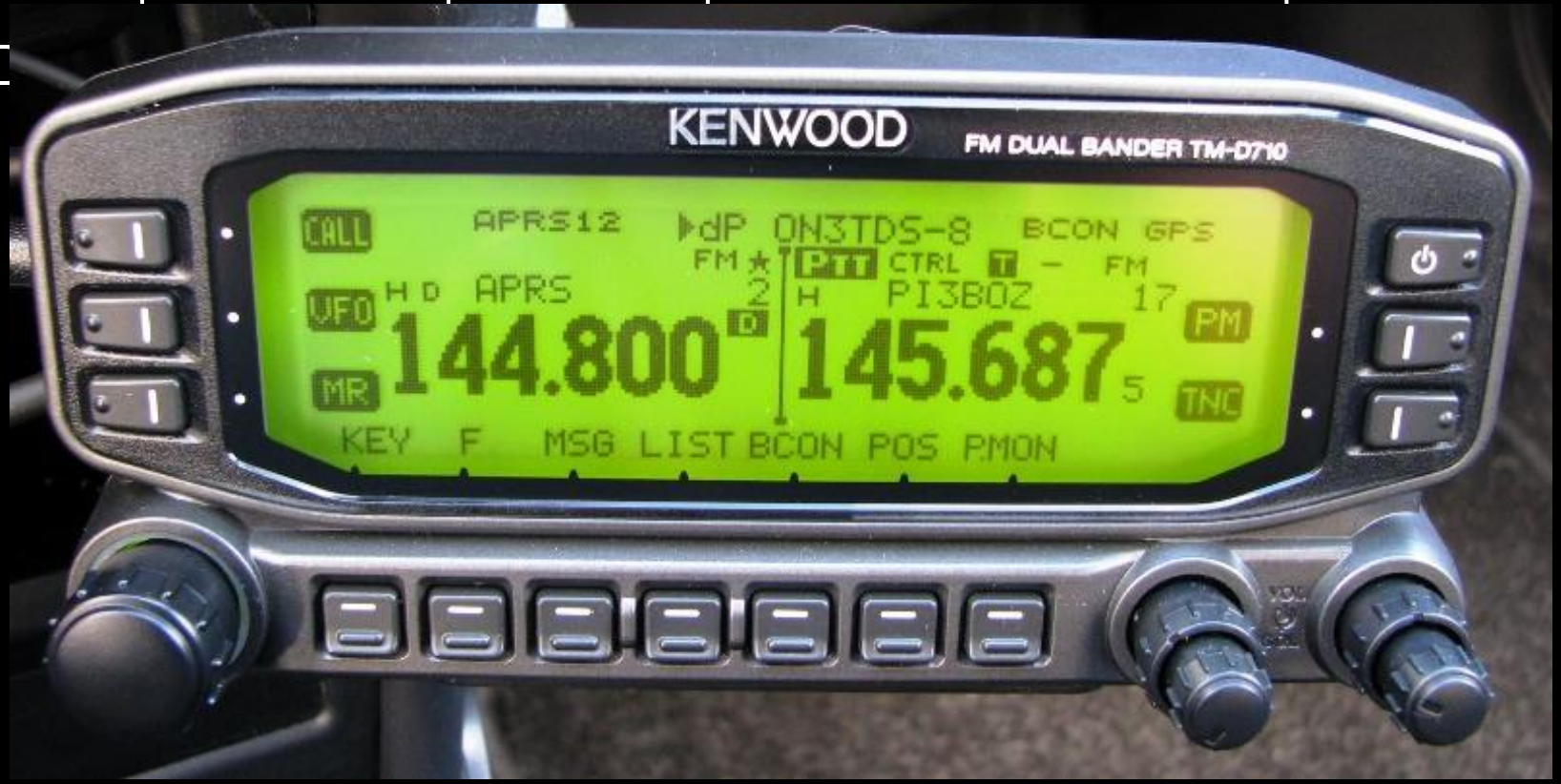

ICOM 9700
W0HGJ, Harvey
ICOM 7610 for 6m
Yaesu FT-736r
Front seat for 1.25m
Logging Laptop – customer software by KG9DUK
AC Power
Power Switch
Switches for 2m, 70cm, and 33 cm (hidden)
2m Digital
6m Digital Laptop

446.000
DELL
YAESU

LAPTOP HARNESS OVER SEAT BACK[76]

STATION 3 – FM 2M & 70CM[77]

- Pre-loaded with Repeater Frequencies specific to the rover trip
- Kenwood TM-D



N0LD/R AND K5SRT/R ON THE ROAD

September 2018

N0LD/R AND K5SRT/R TEAM UP!

- How can we expand the number of VHF Rovers?
  - Find interested people; take them for a ride!
  - We've grown from N0LD to N0LD/KC0MTM to N0LD/KB0YHT to N0LD/KB0YHT/K5SRT to
  - … this September's dual rover team
- Strategy – how did we win a VHF award for Rover?
  - There are three categories of VHF Rover entries:
    - **Classic** – up to 2 people; limits on QSOs w/ rovers of 100;
    - **Limited** – up to 2 people; limits on QSOs w/ rovers of 100; only 6m thru 70cm; limited power
    - **Unlimited** – any # of people; no limits, unlimited power

Best For Our Teams

Unlimited is not popular; not seen as true competition
To win at Unlimited – you have to "gang up" in teams!

N0LD/R AND K5SRT/R TEAM UP! (CONT.)

- Tactics!
  - Built an almost 400 person deep VHF location database
    - Used our prior contest logs
    - Used the logs of friendly fixed based stations
    - Asked everyone for their operational status (bands, phone #, email address)
    - Determine their latitude / longitude from QRZ
    - Constantly under upgrade for current status
  - From this - determined the VHF population centers locations

DEVELOPED A VHF DATABASE

- Over 250 HF hams currently in our database
- Grayed squares allows cutting and pasting to Hamstermap.com

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	email address		telephone	Sent	Receive	Callsign	6m	2m	1.25m	70cm	23cm	Mode	Date	Time	Source	ource Gri	estination Gr	LATITUDE	LONGITUDE	MARKER	COLOR	NUMBER	LEGEND	Comments
126	GORR3210@GMAIL.COM	;		Y		KD0QNC	Y	Y		Y		PH	9/10/2016	2220	N0LD/R	EM17	EM17gr	37.74173	-97.430362	dot6	black		KD0QNC	UNCERTAIN OF BANDS
127	KD0WUF@GMAIL.COM	;		Y		KD0WUF		Y		Y		PH	1/23/2017	0135	KF0M	EM17io	EM18um	38.501922	-96.263697	dot6	black		KD0WUF	FM ON 2M AND 70CM
128	AIZU_SAMURAI@HOTMAIL.COM	;		Y		KD5AMD		Y				PH	9/11/2016	2332	N0LD/R	EM15	EM15io	35.606076	-97.287847	dot6	black		KD5AMD	UNCERTAIN OF BANDS
129	KYLE@KA5D.COM	;		Y		KD5EUO/R	Y	Y		Y		PH	6/11/2016	2038	KC5WX	EM13rs	EM10di	30.345552	-97.723362	dot6	black		KD5EUO/R	Now KA5D
130	KD5IKG@ARRL.NET	;	713-302-1579	Y	Y	KD5IKG/R	Y	Y	Y	Y		PH	9/10/2016	2038	KC5WX	EM13rs	EM10ck	30.436667	-97.793333	cross6	red		KD5IKG/R-713-302-	COMPETITION!
131	KD5VQ@YAHOO.COM	;		Y		KD5VQ	Y	Y				PH	9/11/2016	0247	KC5WX	EM13rs	EM15pl	35.474961	-96.692396	dot6	black		KD5VQ	UNCERTAIN OF BANDS
132	GSTUART22@SBCGLOBAL.NET	;		Y		KE0HOO			Y			FM	1/23/2017	0237	KF0M	EM17io	EM17fp	37.66664	-97.577125	dot6	black		KE0HOO	UNCERTAIN OF BANDS
133	KE5Q@ARRL.NET	;		Y		KE5Q		Y				PH			K5SW	EM25hr	EM13qa	33.037018	-96.651363	dot6	black		KE5Q	UNCERTAIN OF BANDS
134	KF0M@ARRL.NET	;		Y	Y	KF0M	Y	Y		Y		PH			K5SW	EM25hr	EM17io	37.606076	-97.287847	star6	green		KF0M	UNCERTAIN OF BANDS

Copy columns to Hamstermap.com

Re: ARRL June VHF Contest (10-11 June 2017) participation - N0LD/Rover

Richard Johnson 6/6/2017 08:52 PM

To: Randy Wing;

Am posting to WARC, wichita area, MARC, McPherson area, Salina club, SEKARC which is SE Kansas and west Missouri, up to KC area, and several others along your route. Good luck, have fun. My 440 will be limited to about 25 watts, but will try. FM could do 50
Richard

GRID SQUARE VISUALIZATION TOOL #1

- http://hamstermap.com/custommap.html

HamsterMap.com

No Bull, just **Maps**

Like 434 Share

Create a MAP pasting data data from Excel!

Simply **paste data from Excel straight into the textbox**. The only required fields are **Latitude and Longitude Coordinates** - that is all you need to place your ● on the map. If you do not have these you can generate them using a geocoder that turns addresses into the coordinates.

There is no need to fill in *Marker, Colour, Number* or *Legend*. In case you do, just keep the same order of the columns you see at **sample data** below!

CONVERT Coordinates | GEOCODE Addresses | Quick MAP | **Custom MAP**

Sample data was pasted below - you can map it straight away. Now, feel free to **replace the data from excel and hit the MAP button!**

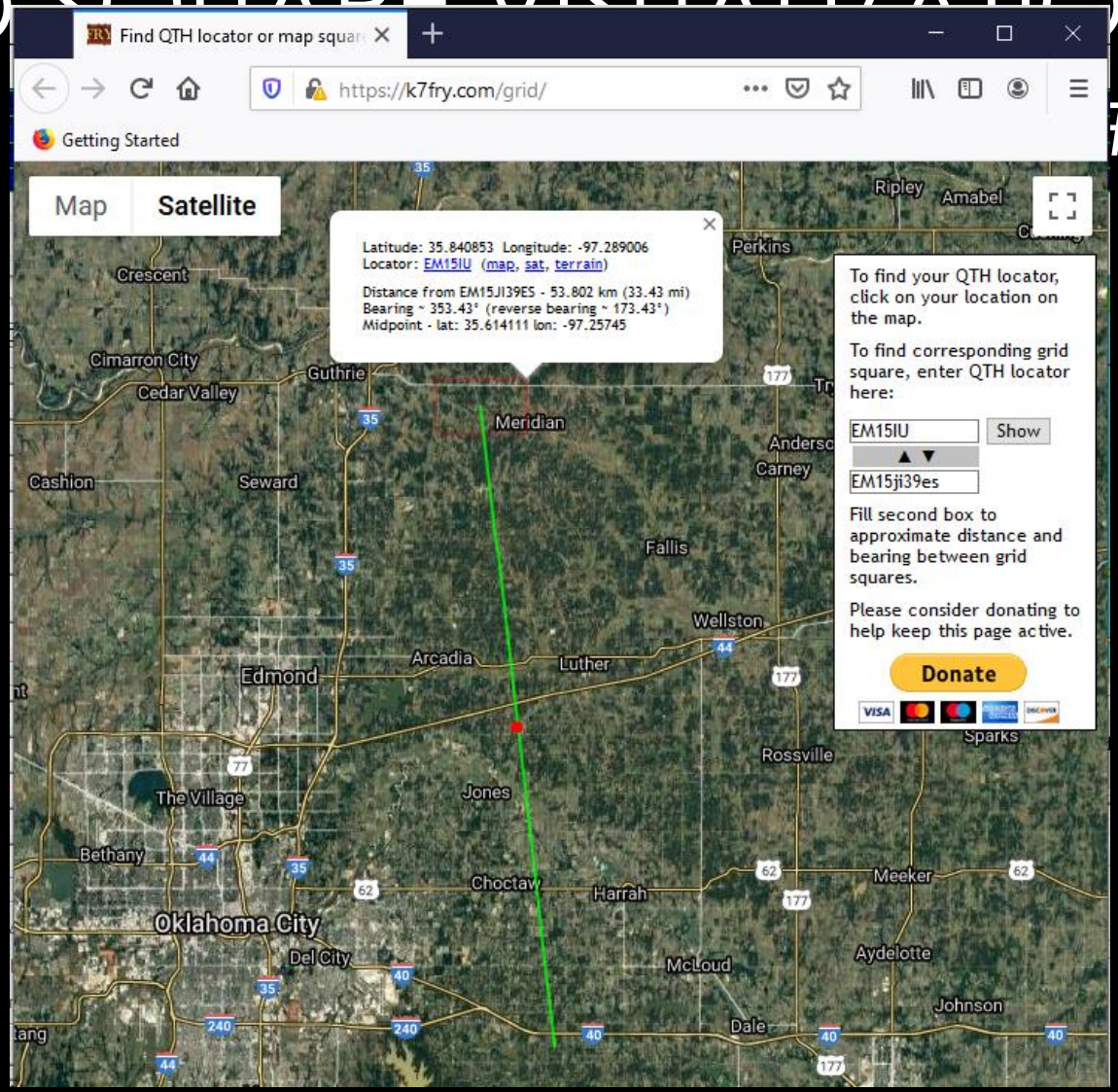
```
52.112507       -8.95761        cross5  red     1       This is a fairly large cross on the map.
52.219071       -8.65764        plus3   green   3       Legend linked to green plus.
52.35235        -8.95573        star3   yellow  2       Difference between diamond and square is 45 degrees.
52.01221        -8.54834        circle4 blue    4       Do not like the black border around the circle? Choose dot.
```

MAP!

Copy and replace this information with the grayed columns from the previous page

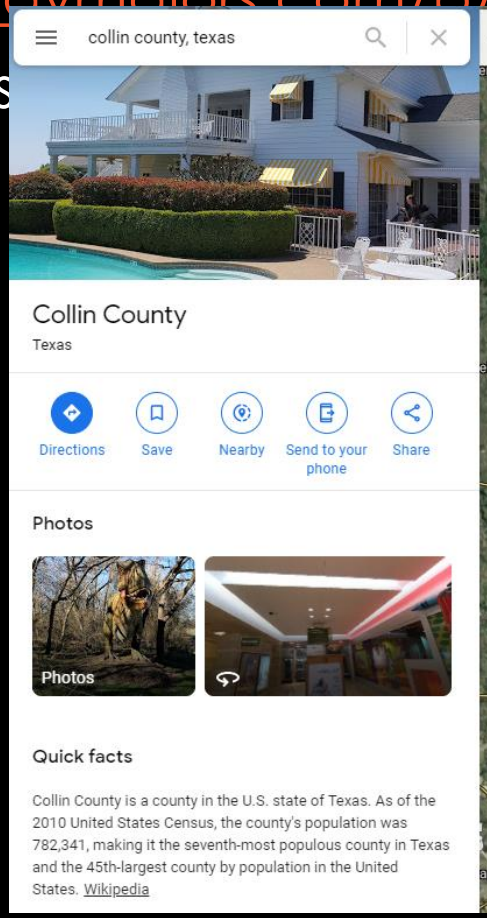
GRID SQUARE VISUALIZATION #2

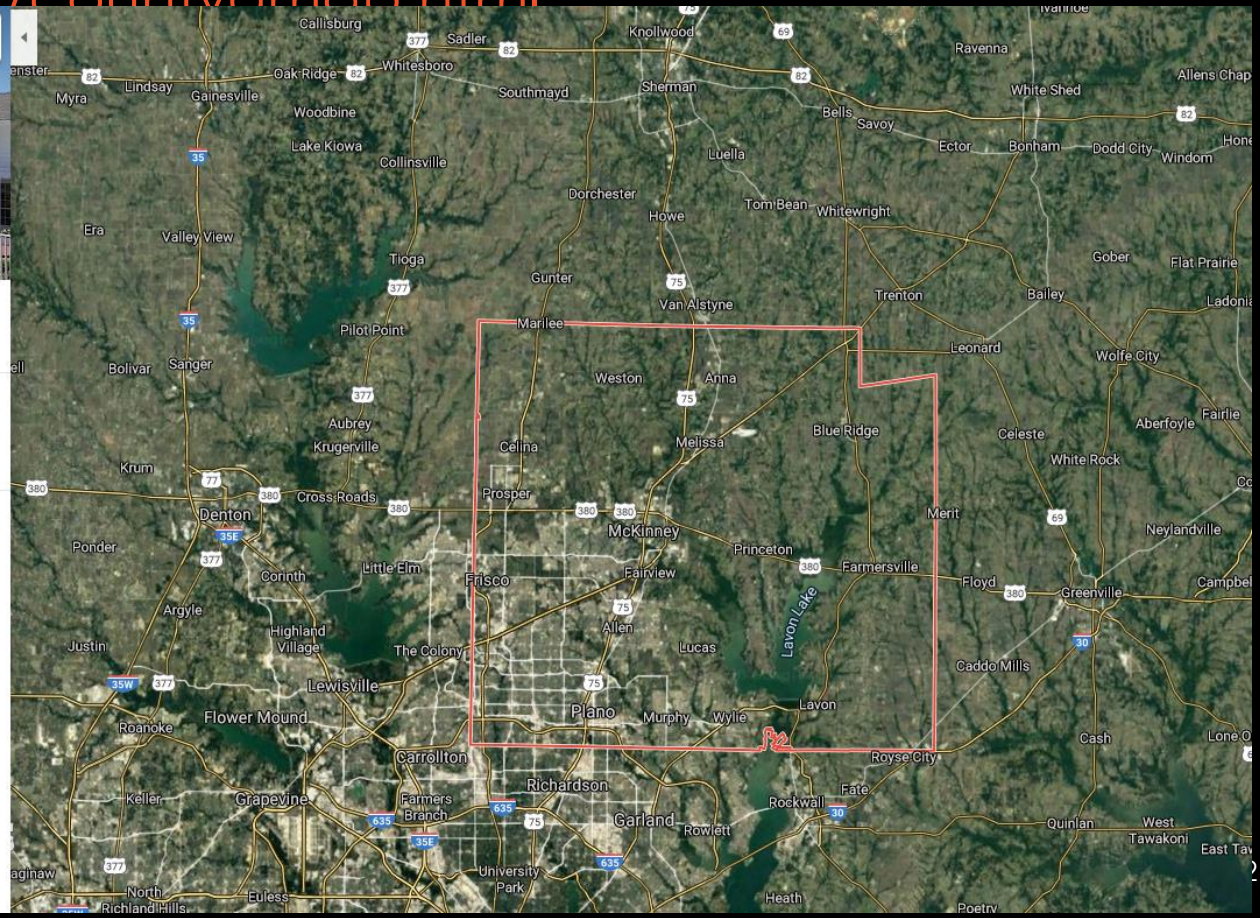
- https://k7fry.com/grid/



COUNTY VISUALIZATION TOOL

- https://www.randymajors.com/p/countymap.html
- Or Google Maps





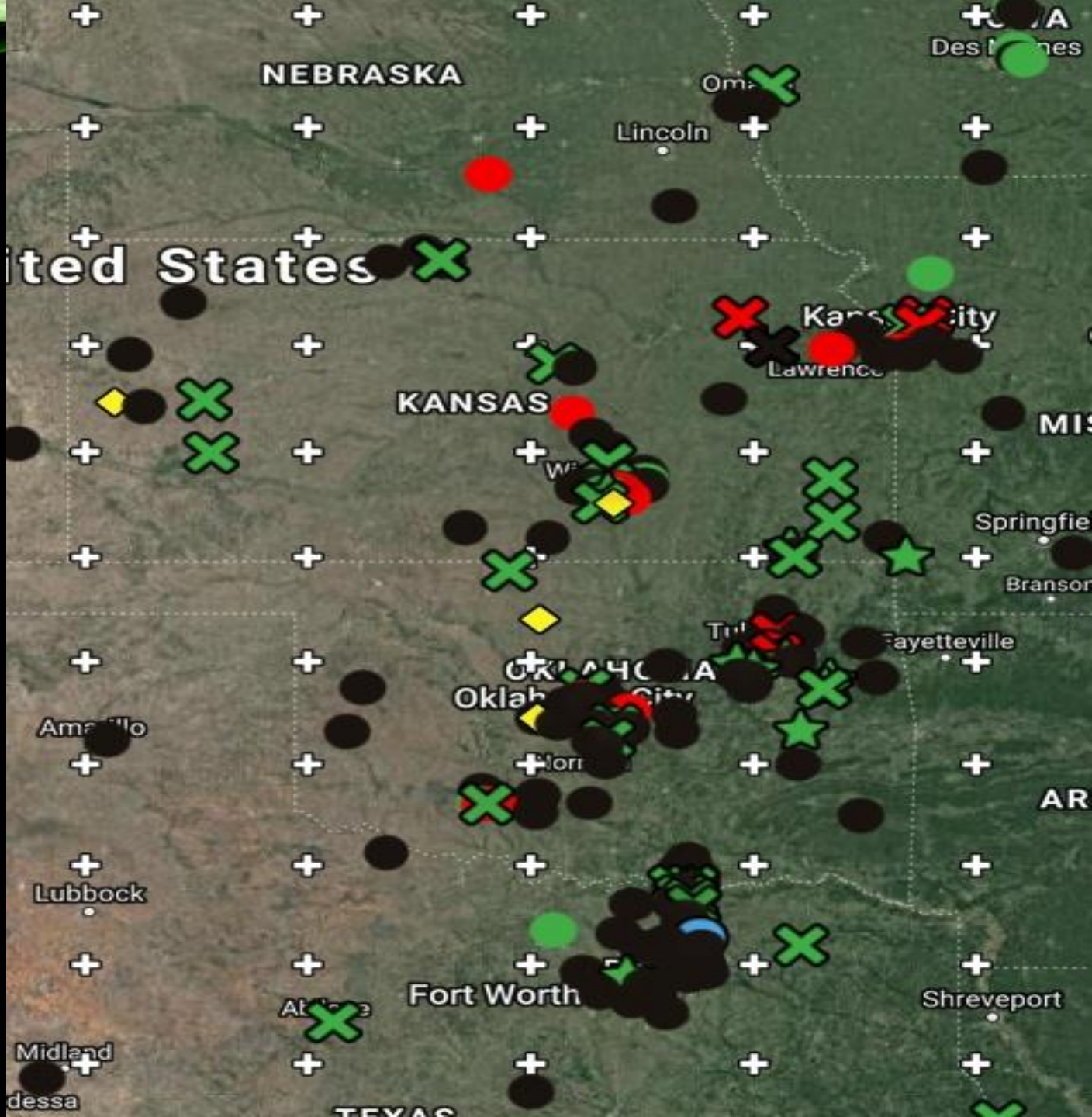
VHF STATIONS

•Black circles are amateur radio VHF stations with 2m and 70cm and who have been active within the last 5 years

•Red circles are more active amateur radio VHF stations with 2m and 70cm and 6m

•Green crosses are VHF super stations – active and multiple bands

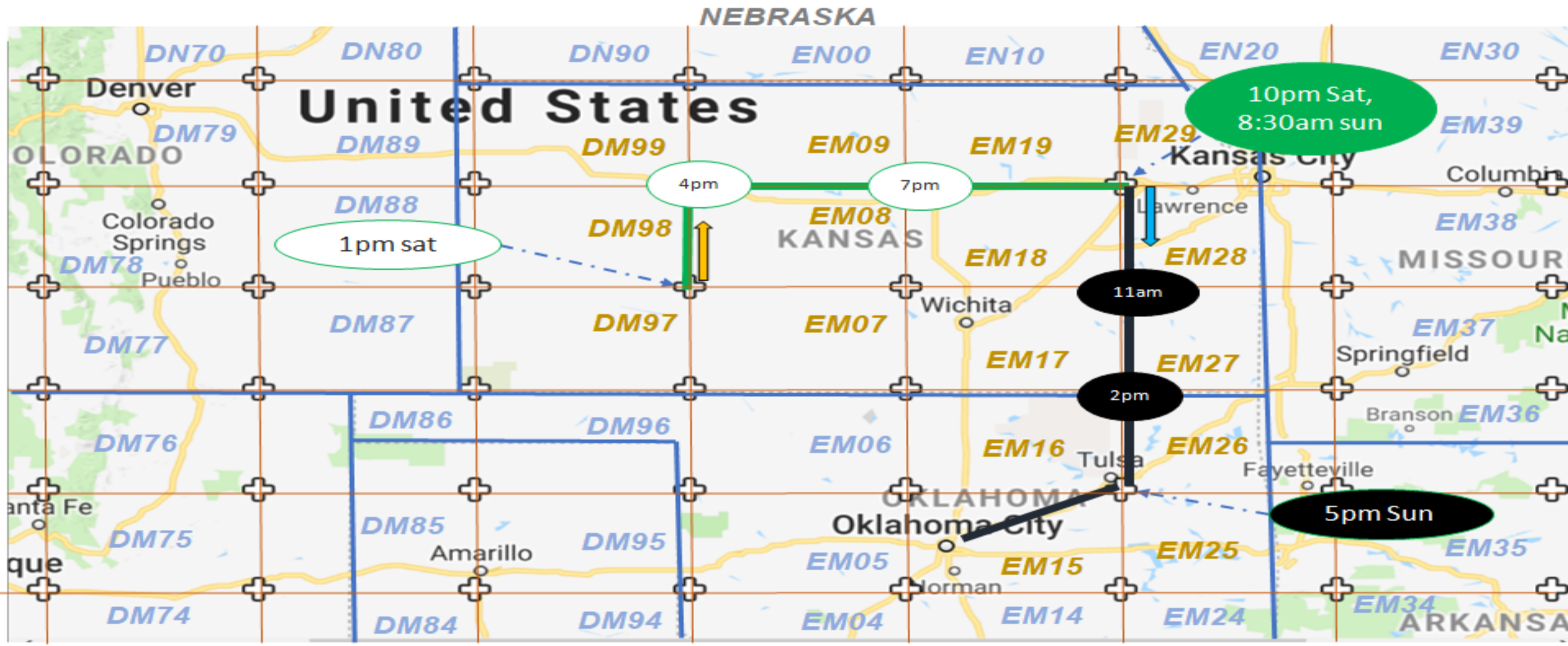
•White pluses are the edges of the grid squares



N0LD/R AND K5SRT/R TEAM UP! (CONT.)

- Tactics!
  - Focused on Grid "Circling" in eastern KS and OK; started in western KS
  - Plot a route close to the grid circles
    - As close to North and South as possible
    - Then prepare detailed full route planning:
      - At each grid square
      - And between the grid squares
    - Include operational action queues so that new and experienced operators know

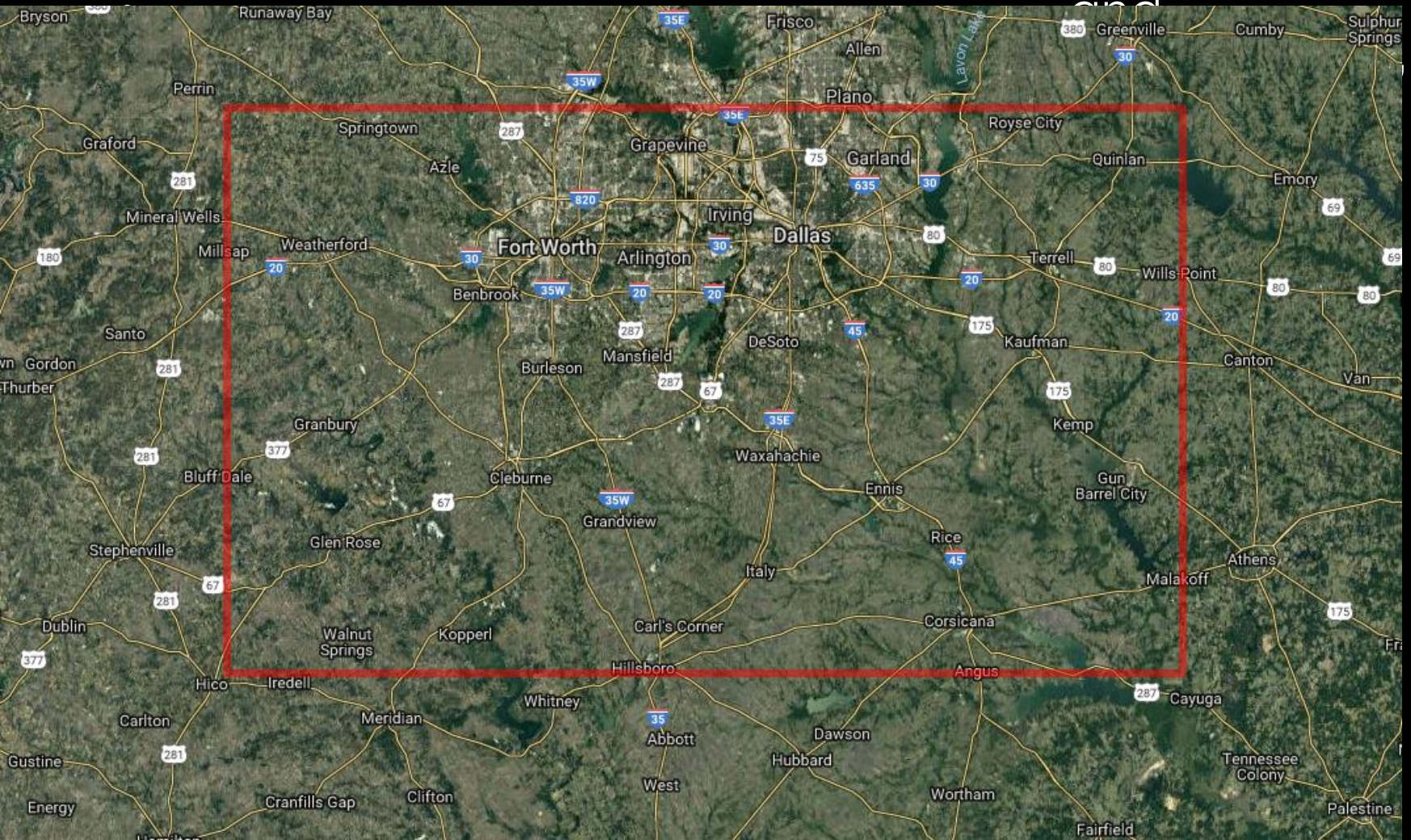
N0LD/R, K5SRT/R Sept 2018 Contest locations

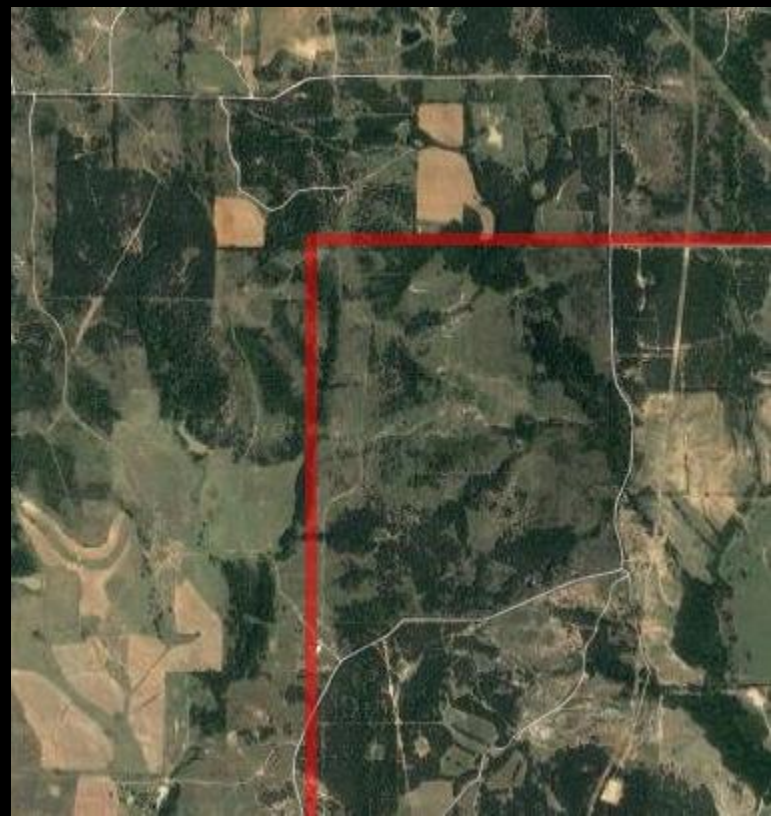


WWW.OKROVER.INFO

GRID SQUARE VISUALIZATION TOOL #2

- http://qthlocator.free.fr/index.php?locator=EM12





GRID SQUARE VISUALIZATION TOOL #3

- http://dxcluster.ha8tks.hu/hamgeocoding/

Grid square: Locality: Country:

Goto HA8TKS dxcluster list | Enter 6 character grid square or Enter locality or Click on the map! | Goto HA8TKS dxcluster map

Map Satellite

Dynamically calculates lat, long, and grid as you move your mouse from location to location !!!

© 2014 by HA8TKS **Latitude:** 033.100745 N **Longitude:** 104.622803 W **Maidenhead locator or QTH grid square:** DM73QC 54ge clear all field and show world map

Itinerary

- Depart Nick's House @ Noon on 7 Sep, 2018
- Arrive Woodward for rest stop @ 2:30 PM
- Arrive @ Dodge House Hotel & Convention Center, 2408 W Wyatt Earp Blvd, Dodge City @ 5 PM

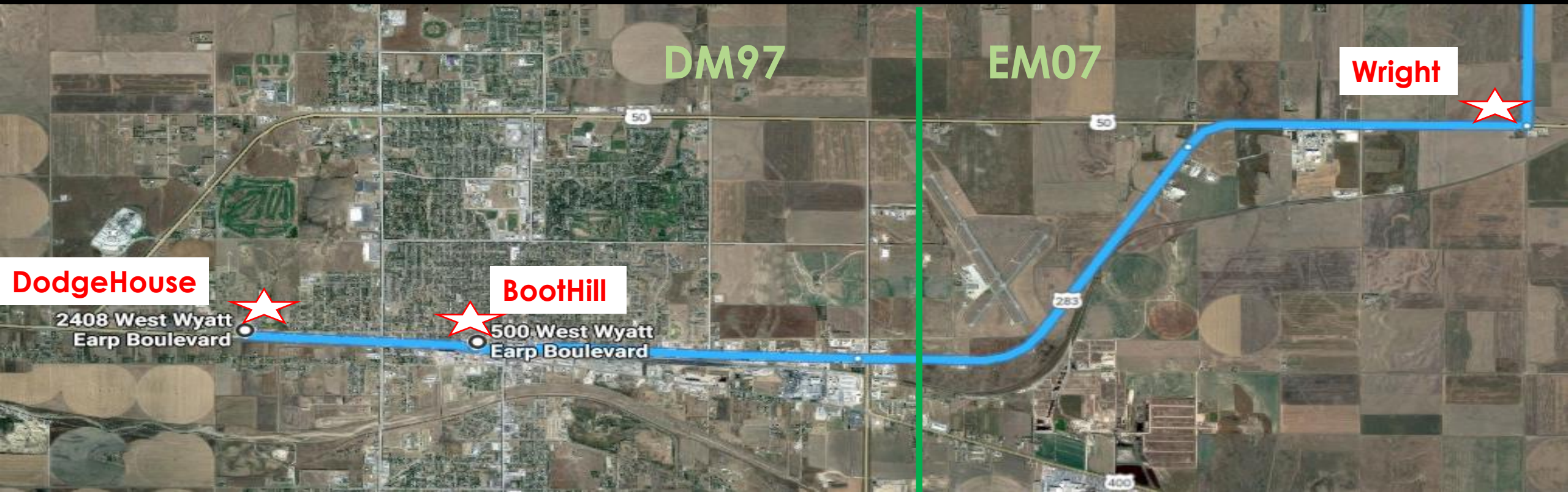
N0LD/R AND K5SRT/R ON THE ROAD

September 2018

GOOD MORNING, DODGE CITY, KS!

Itinerary – Saturday Sept 8 Morning

- Sleep in until 7:30 AM; Have breakfast at 8:00 AM in the hotel or anywhere
- Check out 8:45 AM
- Tour local Boot Hill Museum at 500 W Wyatt Earp Blvd, Dodge City, KS 67801 from 9 AM through 11:30 AM; Depart Museum
- Pick up fast food on the way out of town – one last restroom break!
- Head east on US Highway 283

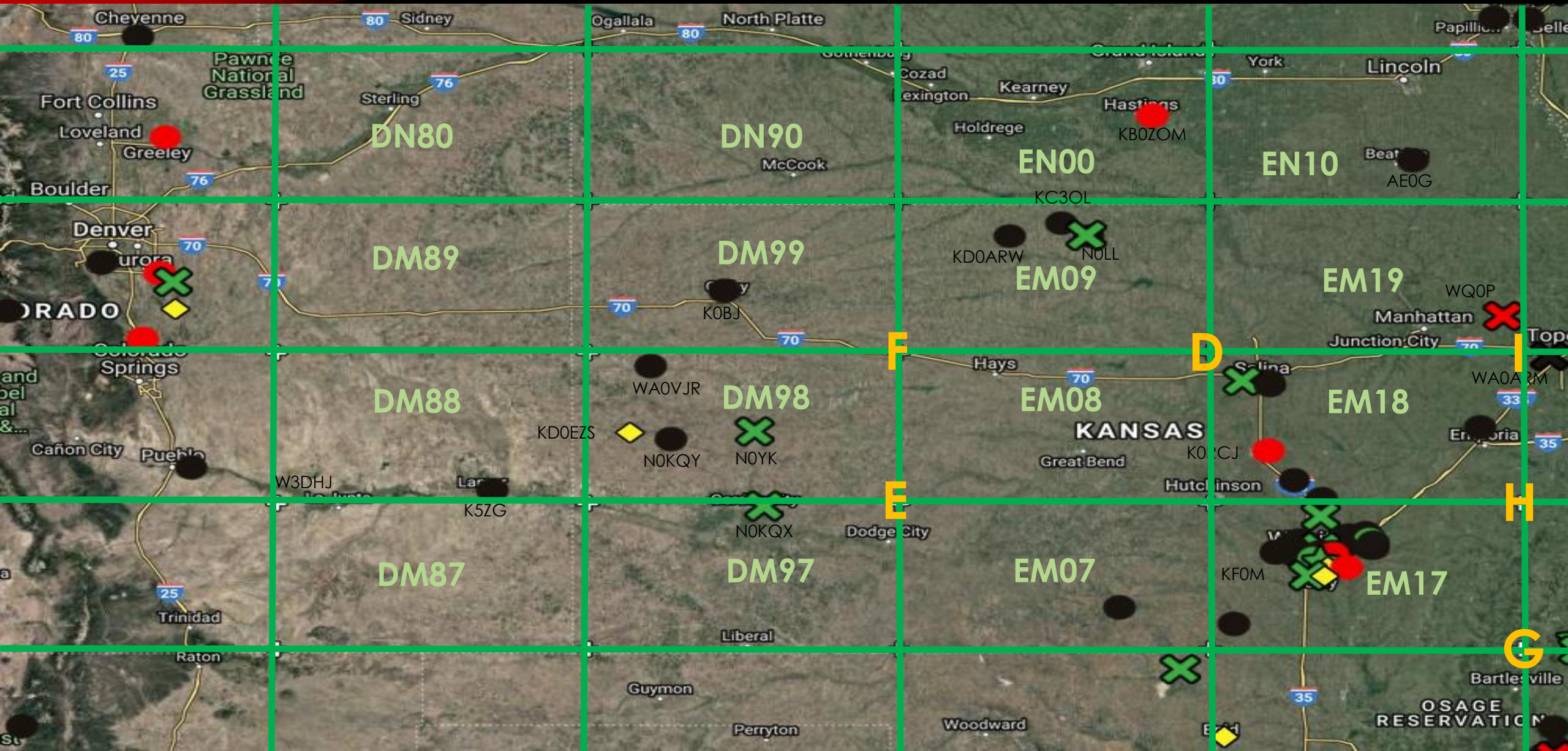


Itinerary – Saturday Sept 8 Morning (cont)

- Continue North on US Highway 283
- Turn left (west) at the Jetmore Airport on F Rd
- Proceed 4 miles to the west to the starting point for the contest – Point 97E in DM97!
- Establish IM for N0LD/R
- Arrive about Noon
- Recommend calling and trying to work before 1 PM:

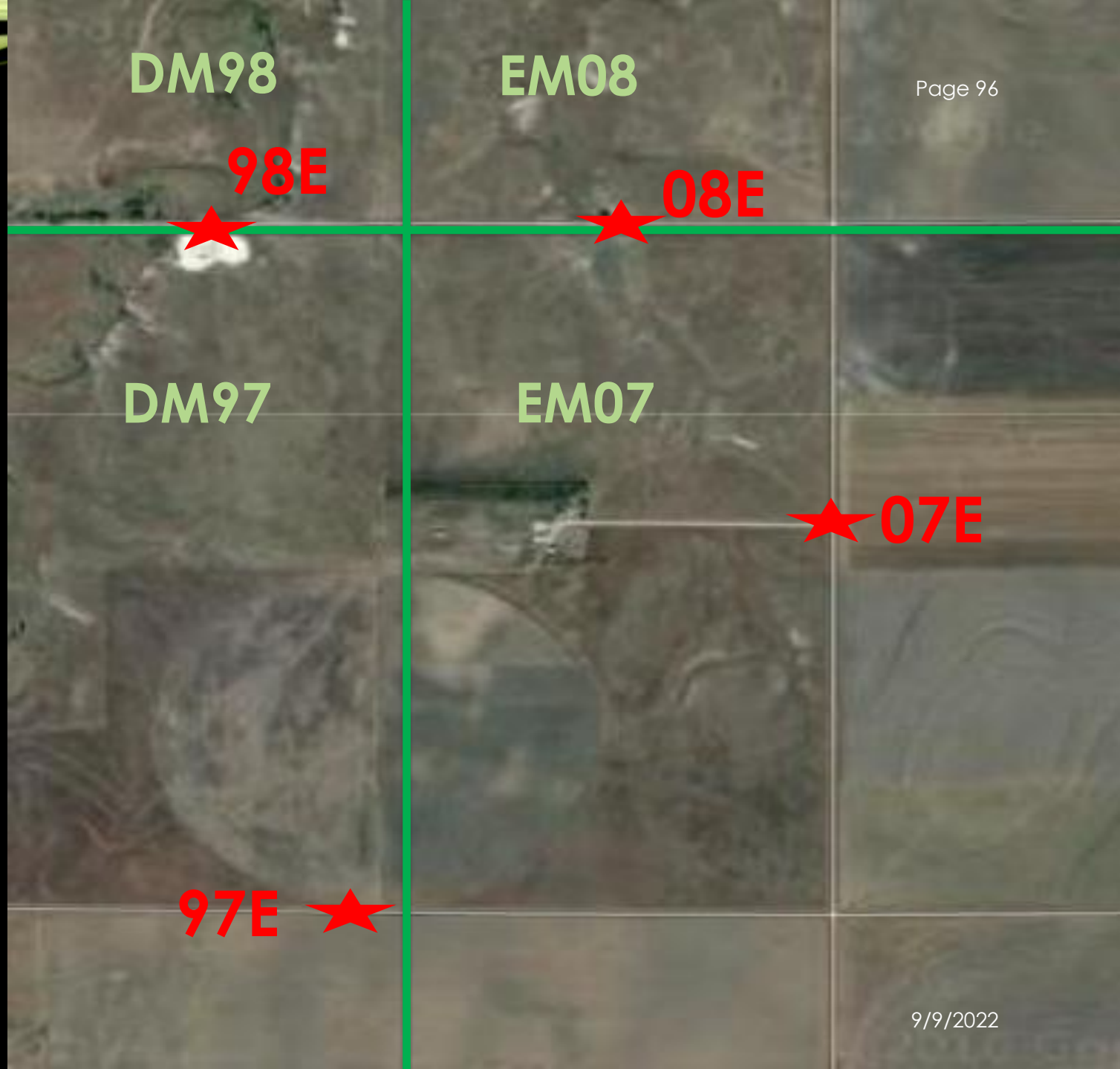
	Callsign	telephone	Grid	6m	2m	1.25m	70cm	33cm	23cm	13cm
☐	K0BJ	785-462-0884	DM99kj	Y	Y					
☐	K0RCJ	620-755-4826	EM18ei	Y	Y		Y			
☐	K5ZG	419-230-1827	DM88	Y	Y					
☐	KB0ZOM	406-740-2114	EN00tn	Y	Y	Y	Y			
☐	KF0M	316-617-3133	EM17io	Y	Y	Y	Y		Y	
☐	N0KQX	620-521-0464	DM97nx	y	Y		Y		Y	
☐	N0KQY	N0KQY@wbsnet.org	DM98gk	y	Y	Y	Y		Y	
☐	N0LL	785-282-5831	EM09os	y	Y	Y	Y			
☐	N0YK	620-874-2292	DM98ml	Y	Y	Y	Y		Y	
☐	W3DHJ	w3dhj@jonz.net	DM78rf	Y	Y		Y			
☐	W5AFY	972-839-6992	EM04id	Y	Y	Y	Y	Y	Y	Y
☐	WQ0P	785-213-7072	EM19wf	Y	Y	Y	Y	Y	Y	Y

Stations we might reach from western Kansas



Itinerary – Point E (SW of Jetmore, KS)

- Recommend contacting N0LL, WQ0P, W3HDJ, N0YK, K5ZG, KB0ZOM, KC3OL, KD0ARW, KF0M, K0RCJ, N0KQX, N0KQY, K0BJ
- N0LD/R to work locals during transition and hand off each local & band to K5SRT/R



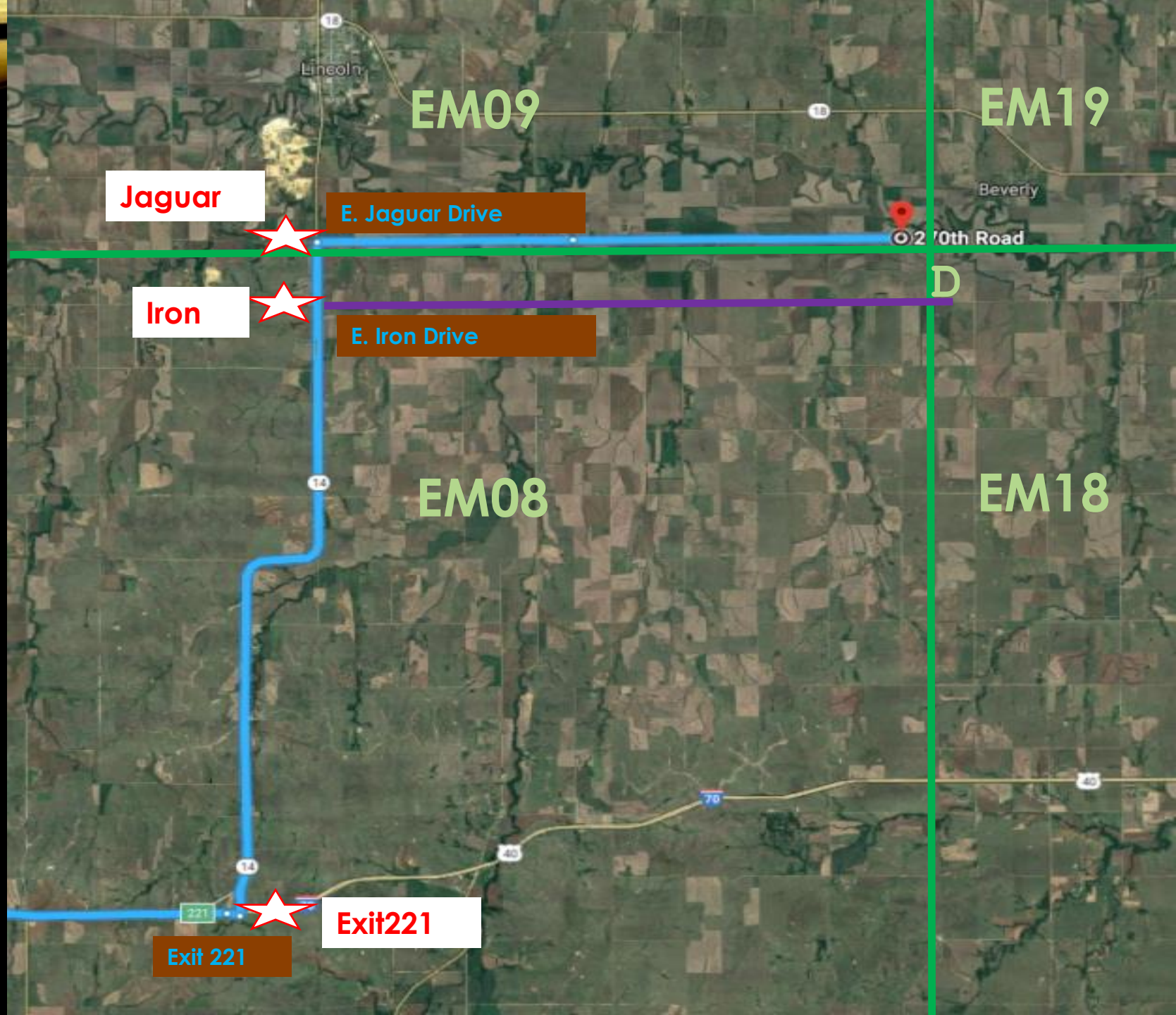
AT THE START OF THE CONTEST! 1:00 PM SAT

- K3NT-Bob noted 6m SWR problem working digital while in route to next four square.
- K5SRT-Ross checks for loose 6m connection on ham stick
- A brief stop near Ness City, KS is also a good time for everyone to stretch legs and to capture pictures to remember events later (note the clouds).

EARLY IN THE SEPT VHF CONTEST…

Itinerary – Transition from Point F to Point D (Part 3 of 3)

- At Exit 221; Turn left (north on US-14) towards Lincoln, KS;
- Recommend calling or texting 20 min before arrival:
  - ❑ W5AFY – Dan - 972-839-6992
  - ❑ N0LL – Larry - 785-282-5831
  - ❑ WQ0P – Greg - 785-213-7072
  - ❑ N0YK – Chad - 620-874-2292
  - ❑ KB0ZOM – Ben - 406-740-2114
  - ❑ KF0M – John - 316-617-3133
  - ❑ K0RCJ - Richard-620-755-4826
  - ❑ N0KQX – Dale - 620-521-0464
  - ❑ K0BJ – Bruce - 785-462-0884
- K5SRT/R travel 10.3 miles to E. Iron Dr.; turn right (east) onto E. Iron Dr; travel 8.3 miles east to **Point 18D**
- N0LD/R travel 11.3 miles to E. Jaguar Dr; Turn right (east) onto E. Jaguar Dr; travel 8 miles to reach **Point 09D**



SOME EXCITEMENT LATE SATURDAY NIGHT…

- Torrential rainfall over the last week
- Western KS was not bad; just a little sloppy
- As we neared Lincoln, KS – fog was forming; but no VHF opening
- As we approached the grid corner… the road was very muddy

We were late two hours as we cleaned the car up so we could drive

THIS IS THE AFTERMATH; NEW WIPER BLADES!

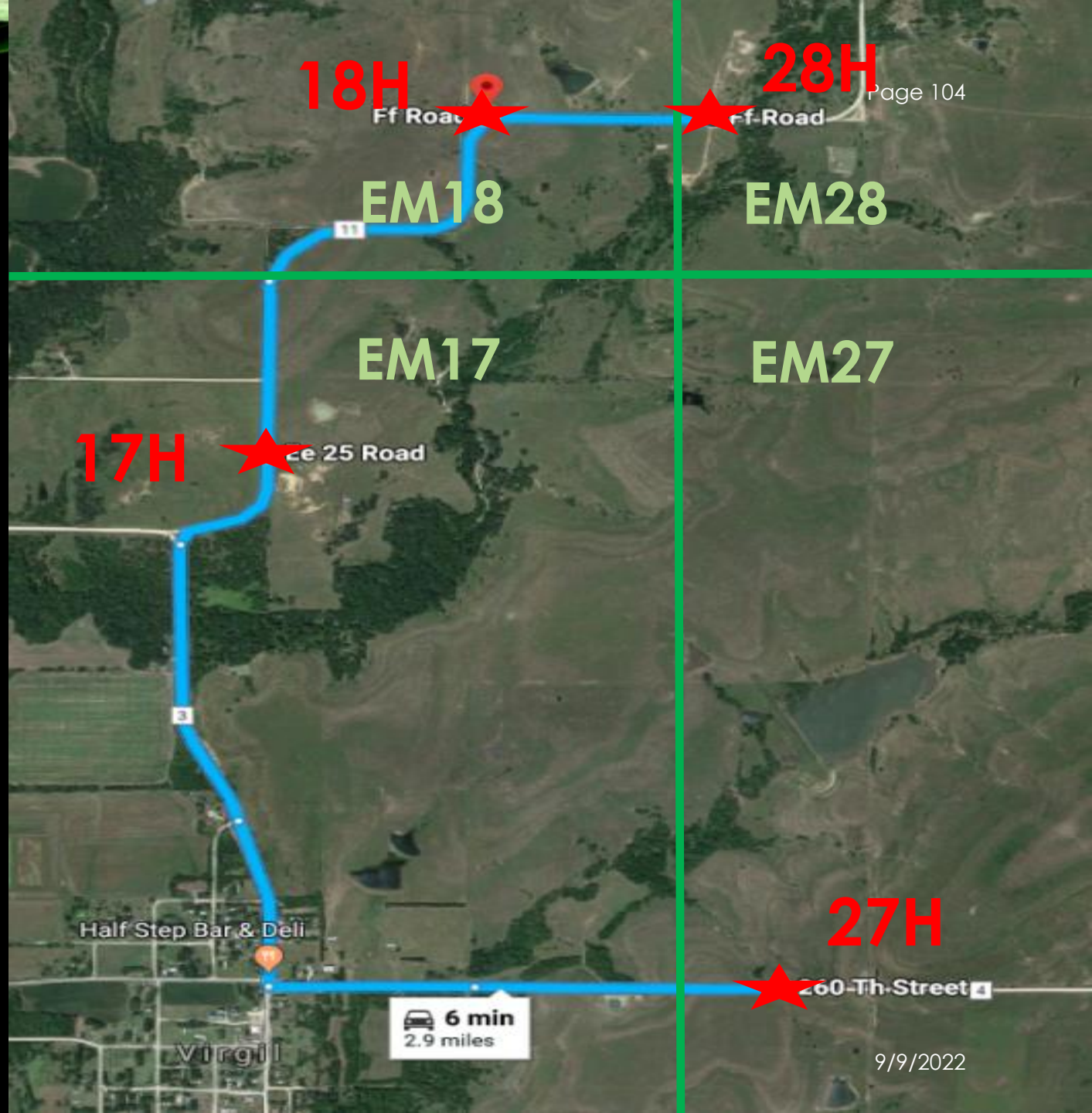
AFTER A BRIEF 5 HOUR NIGHT… WE TOOK OFF! SOUTH OF MAPLE HILL, KS ABOUT 10 MILES

Itinerary – Transition from Point I to Point H (Part 1 of 3)

- Depart Point I NLT 9:00 AM
- Drive west on Blazingstar Rd to Keene-Eskridge RD
- Turn left (south) on Keene-Eskridge Rd – travel 4 miles
- Merge with KS-4; travel on KS-4 to Eskridge; turn left (south) on KS-99; travel 35 miles; merge with Burlingame Rd
- Break stop in Emporia
- Follow KS-99 through Emporia
- Arrive NLT 11:00 AM at Point H

Itinerary – Point H (Virgil, KS)

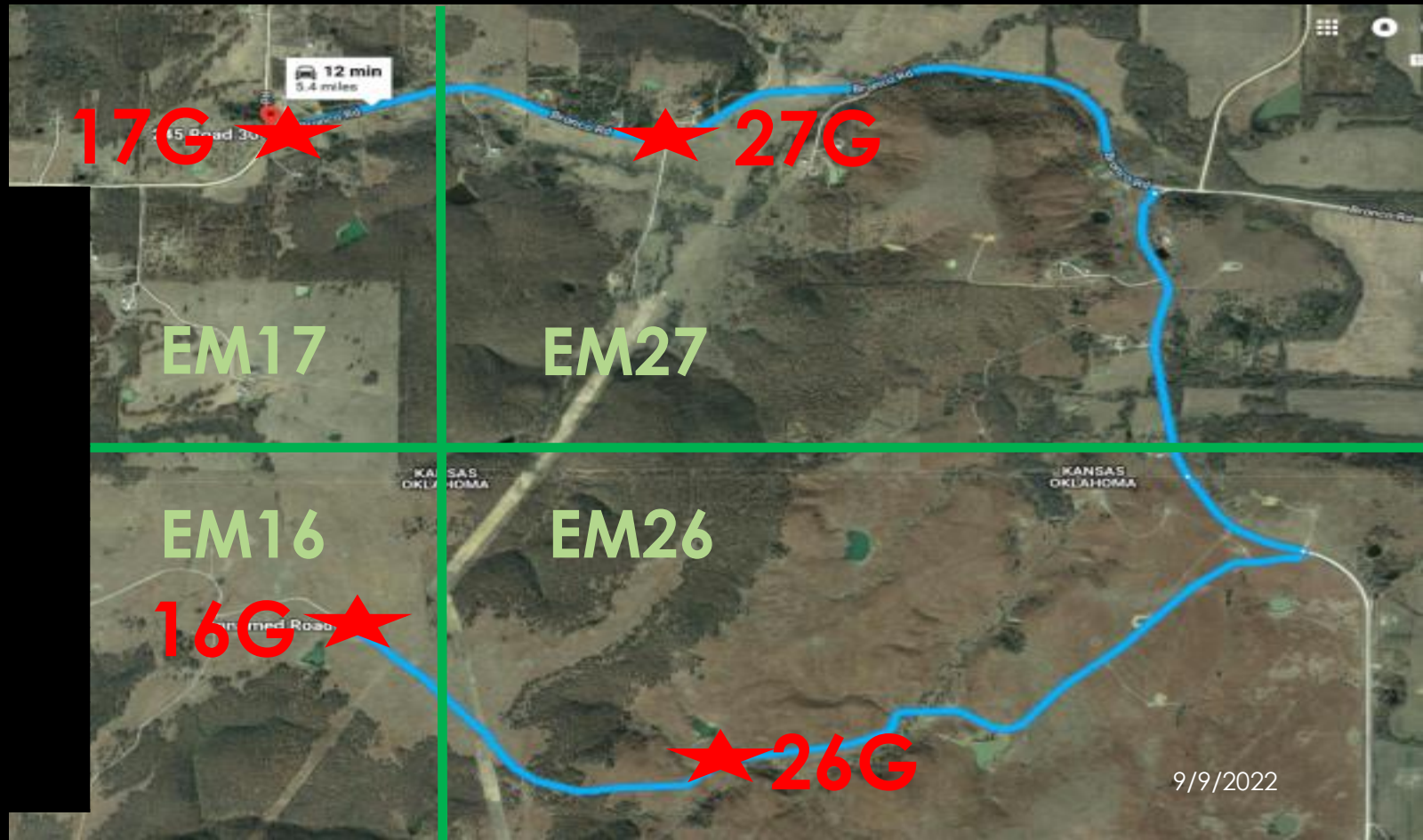
- Arrive 11 AM
- N0LD/R: Arrive Point 17H
- K5SRT/R: Arrive Point 27H
- Attempt contact with everyone we made a contact with at Point I
- Depart NLT 12:30 PM



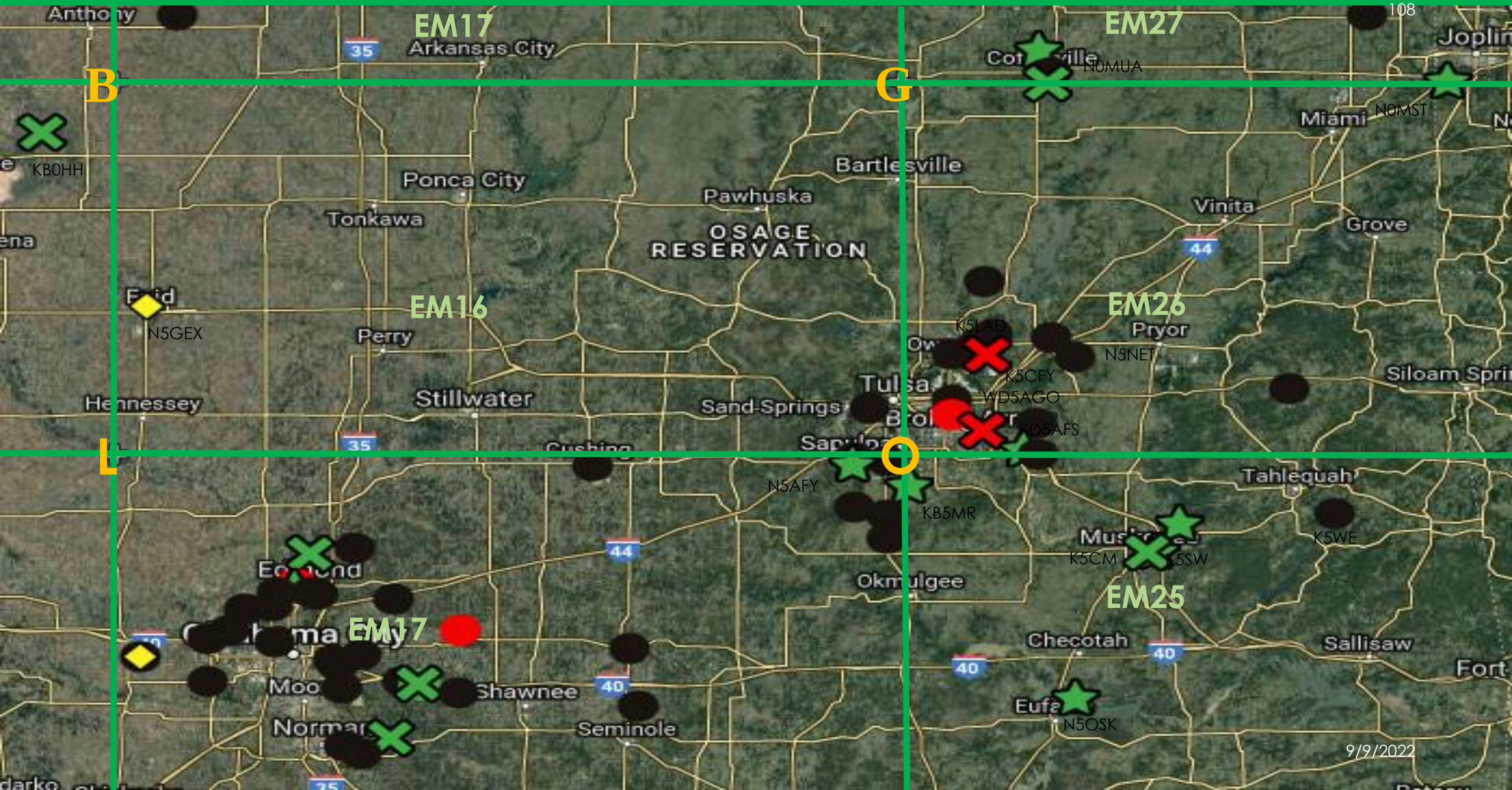
EM17 (17H) - NEAR VIRGIL, KS

Itinerary – Point G (West of Caney, KS)

- Arrive 2:30 PM
- N0LD/R: Arrive Point 26G
- K5SRT/R: Arrive Point 17G
- Attempt contact with everyone we made a contact with at Point H and the people who answered the phone call
- Depart NLT 4 PM



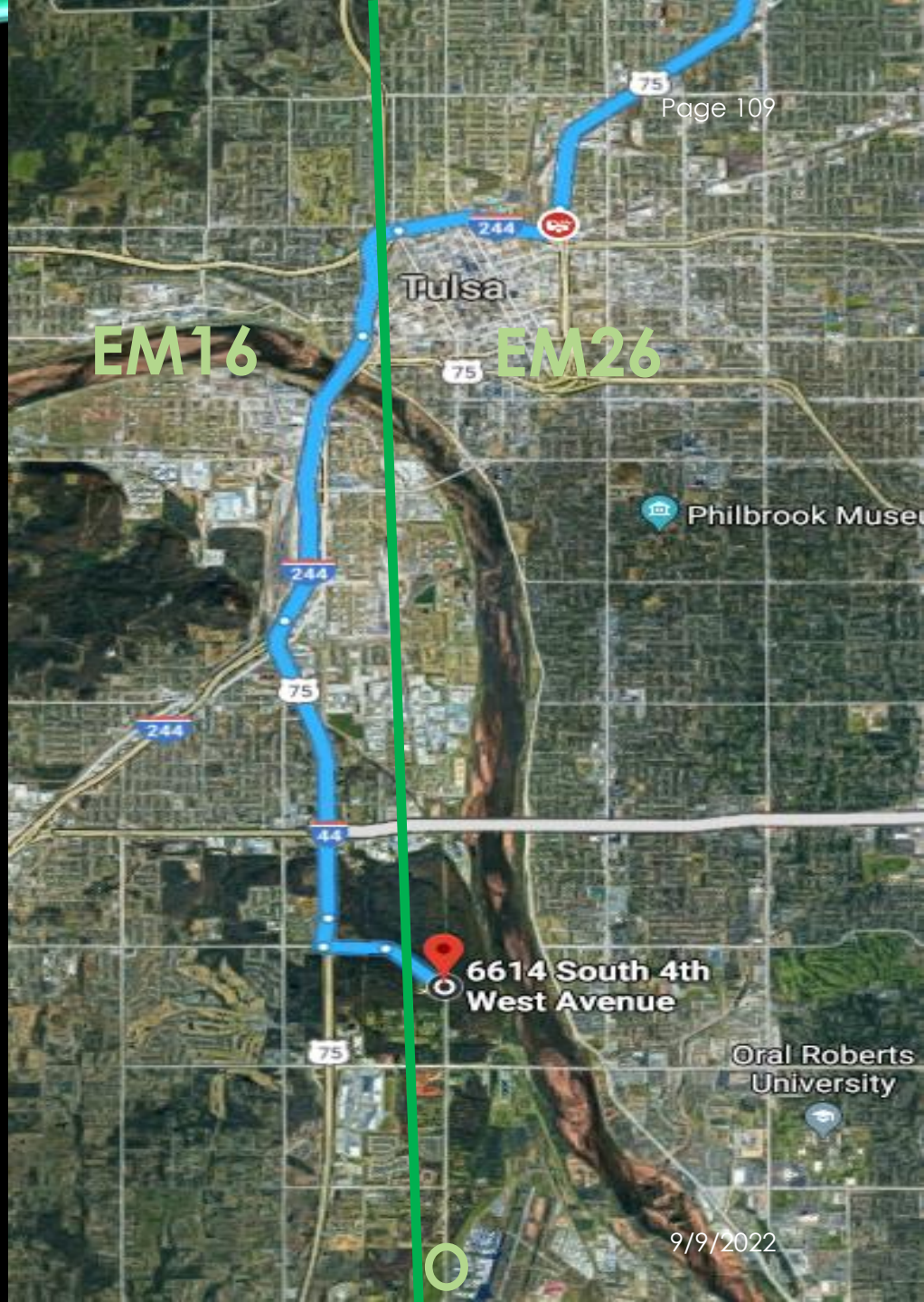
Stations we might reach from eastern Oklahoma



Itinerary – Transition from Point G to O (Part 2 of 2)

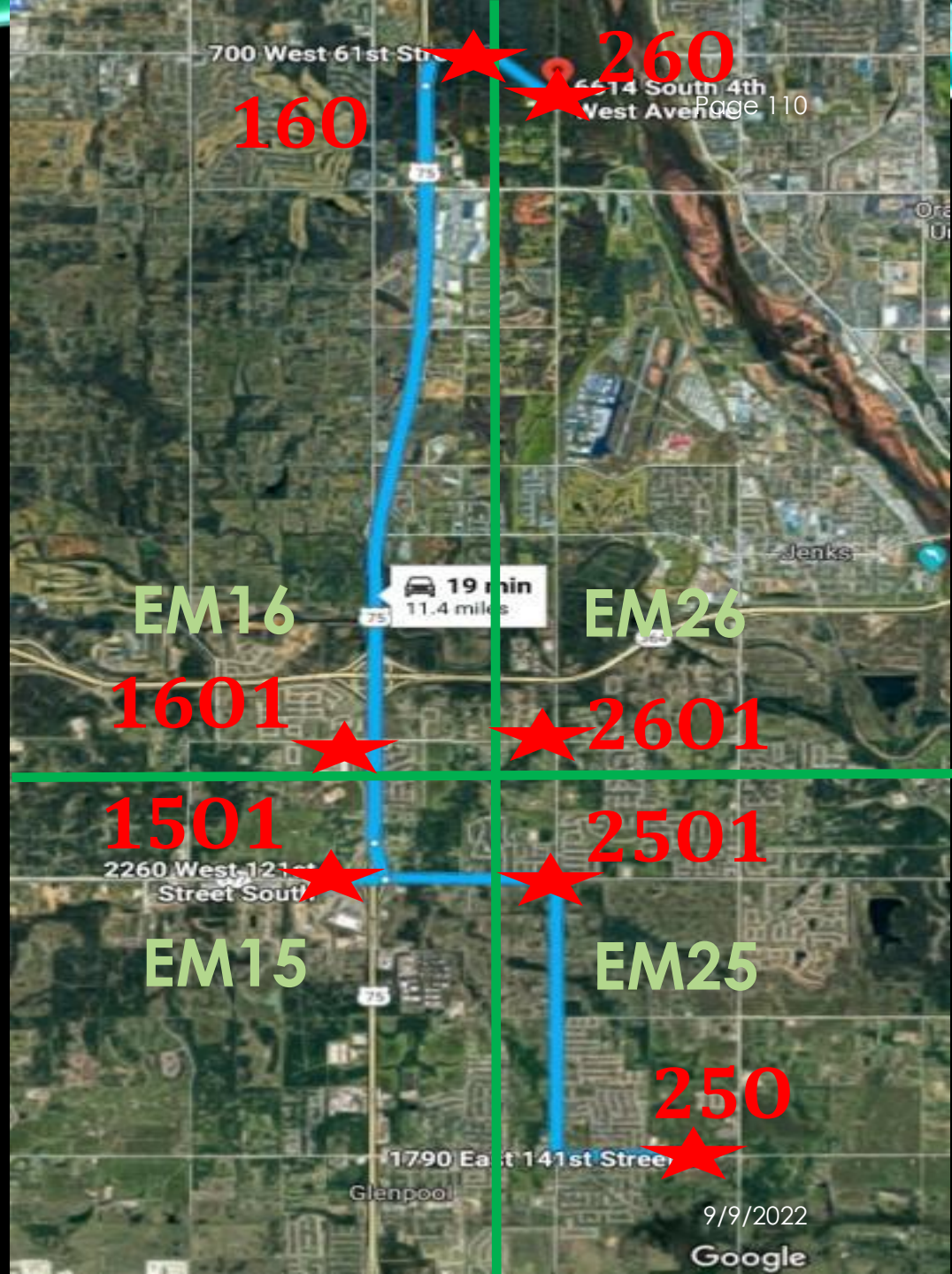
- West of Owasso:
  - Contact Owasso and Tulsa repeaters
  - Status Facebook and check position reporting website
- Crossing into EM16:
  - Contact Tulsa repeaters
  - Contact Sapulpa repeaters
- Arrive NLT 5:30 PM at Point O

Turkey Mountain is a high bluff over the Tulsa area



Itinerary – Point O (Tulsa, OK)

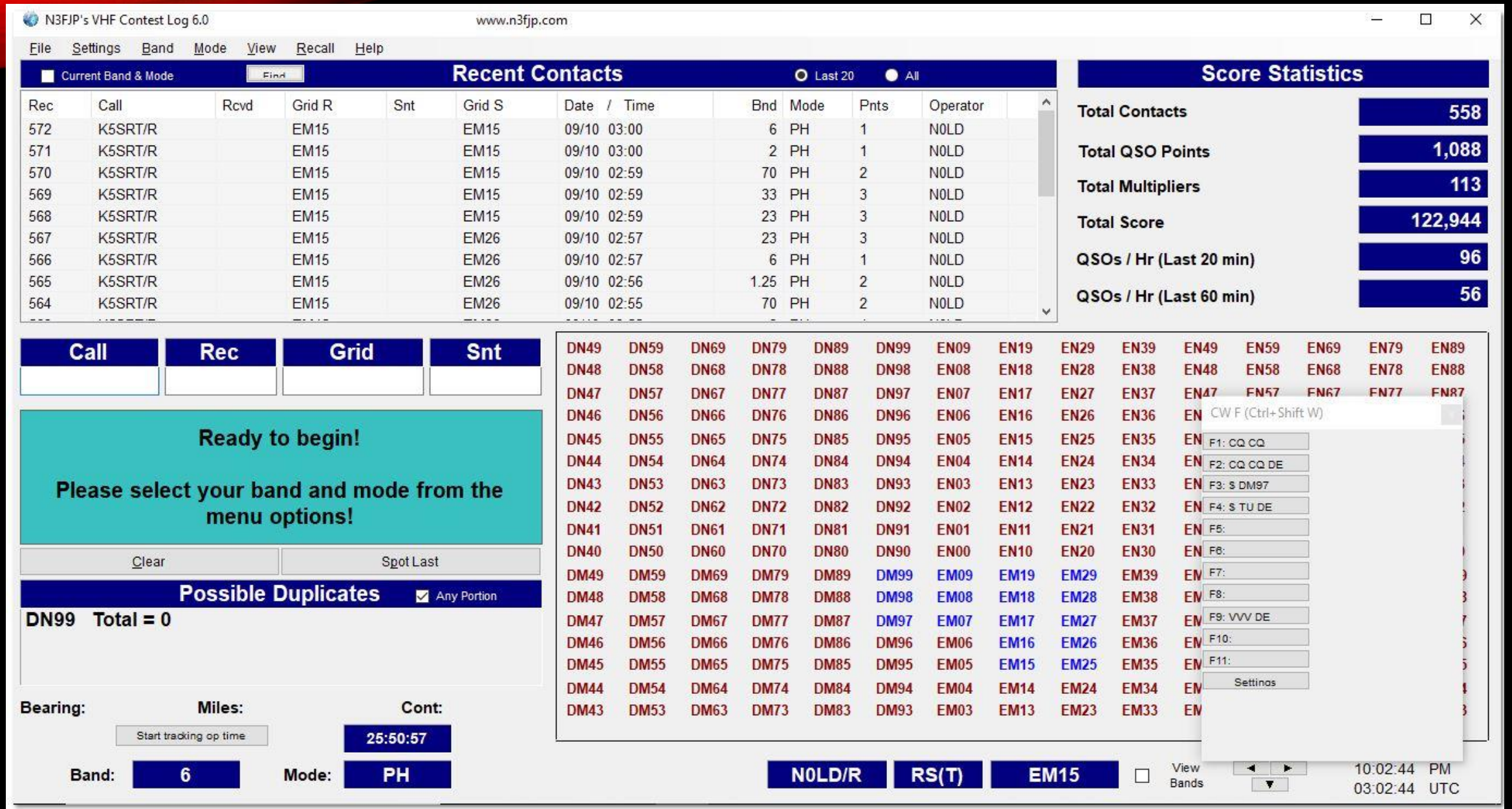
- Traverse Outside Points
- Traverse Inner Points
- Traverse Inner Points for other rovers
- Depart NLT 7:15 PM for Edmond OK



POINT O INNER CIRCLE

THE WAY TO MAKE FAST POINTS ROVER-TO-ROVER

N3FJP NETWORKED VHF CONTESTING



N0LD/R TEAM

W0HGJ
Harvey
2015 ARRL FIELD DAY
HAM RADIO
N0LD
Randy
AB0RX
George

K5SRT/R TEA

9/9/2022

FINAL SCORE

	QSOs	Points/QSO	Total Points	Multipliers	Total Score
6m	87	1	87	16	
2m	117	1	117	16	
1.25m	95	2	190	16	
70cm	100	2	200	16	
33cm	76	3	228	16	
23cm	87	3	261	16	
activated				16	
	562		1,083	112	121,296

VHF TAKE-AWAYS

- Start with a decent 6m all-mode radio with modern radio interfaces
- Start with a moxon or loop on 6m
- Operate in the VHF contests – it is lonely without that!
- Expand into 2m all-mode with modern radio interfaces
- Start with a moxon or loop on 2m
- Upgrade to longer Yagi antennas and rotators
- Master your equipment, then try something new every 6 months or so

BACKUP CHARTS

Randy Wing, N0LD

9/9/2022

A PERSONAL INTRODUCTION

- Grew up in NE Iowa on a dairy farm – interest in astronomy and technology; discovered AM dxing when given an old radio
- Iowa State University – NROTC, degree in computer science
- Have worked for Boeing since 1984, software/systems eng, mgmt, sales
- I've been a ham since August 1996
- Enjoy VHF and HF operation - casual contesting, Dxing, satellites, SKYWARN, exploring digital, kit building – working on microwave radios

"I cannot predict what I will like until I try it!"

CALLING FREQUENCIES

- **Important per-band frequencies:**

Band	Call Freq	QSO Freq	FM Freq
6m	50.125 USB	50.145 USB	52.525 FM
2m	144.200 USB	144.220 USB	146.52 FM
1.25m	222.100 USB	222.120 USB	223.5 FM
70cm		432.100 USB	432.120 USB	446 FM
33cm		902.100 USB	902.100 USB	902.125 FM
			903.125 FM
			915.000 FM
23cm		1296.1 USB	1296.120 USB	1294.5 FM

Common VHF/UHF FM Simplex Frequencies

2-Meter Band	1.25-Meter Band
146.52*	223.42
146.535	223.44
146.55	223.46
146.565	223.48
146.58	223.50*
146.595	223.52
147.42	
147.435	**70-cm Band**
147.45	446.0*
147.465	
147.48	**33-cm Band**
147.495	906.5*
147.51	
147.525	**23-cm Band**
147.54	1294.000
147.555	1294.025
147.57	1294.500*
147.585	Every 25 kHz to 1295
* National simplex frequency	* National simplex frequency

CALLING FREQUENCIES

- **Important per-band frequencies:**

Band	Call Freq	QSO Freq	FM Freq
6m	50.125 USB	50.145 USB	52.525 FM
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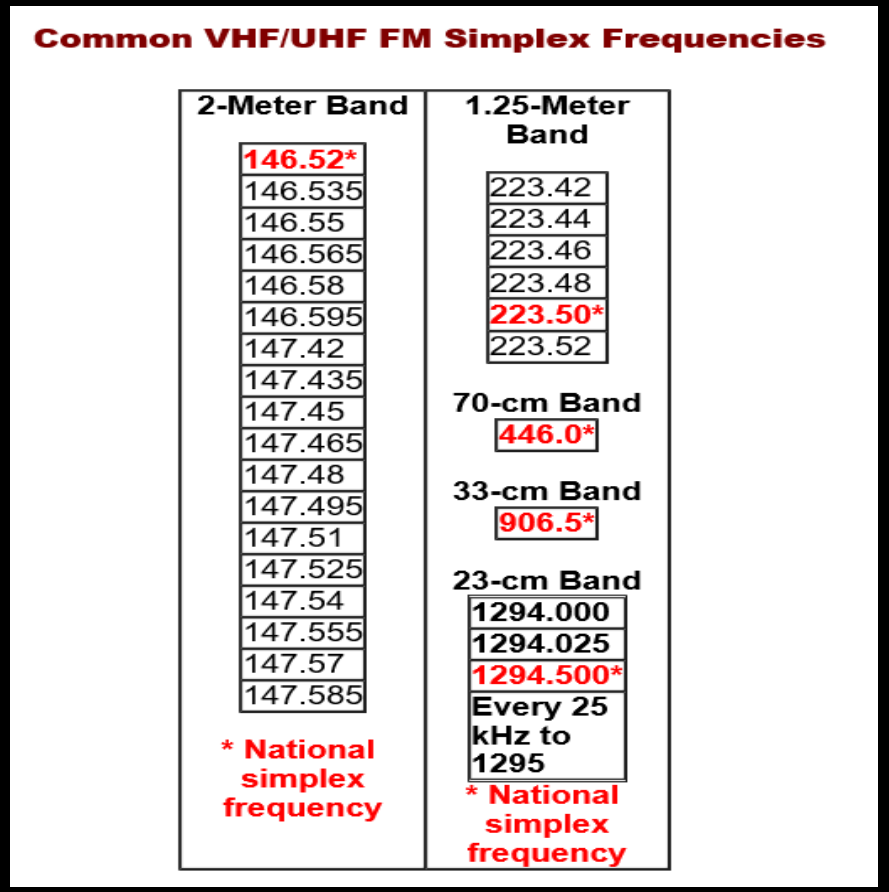
33cm	902.100 USB	902.100 USB	902.125 FM
		903.125 FM	
		915.000 FM	
23cm	1296.1 USB	1296.120 USB	1294.5 FM



MODERN RADIOS

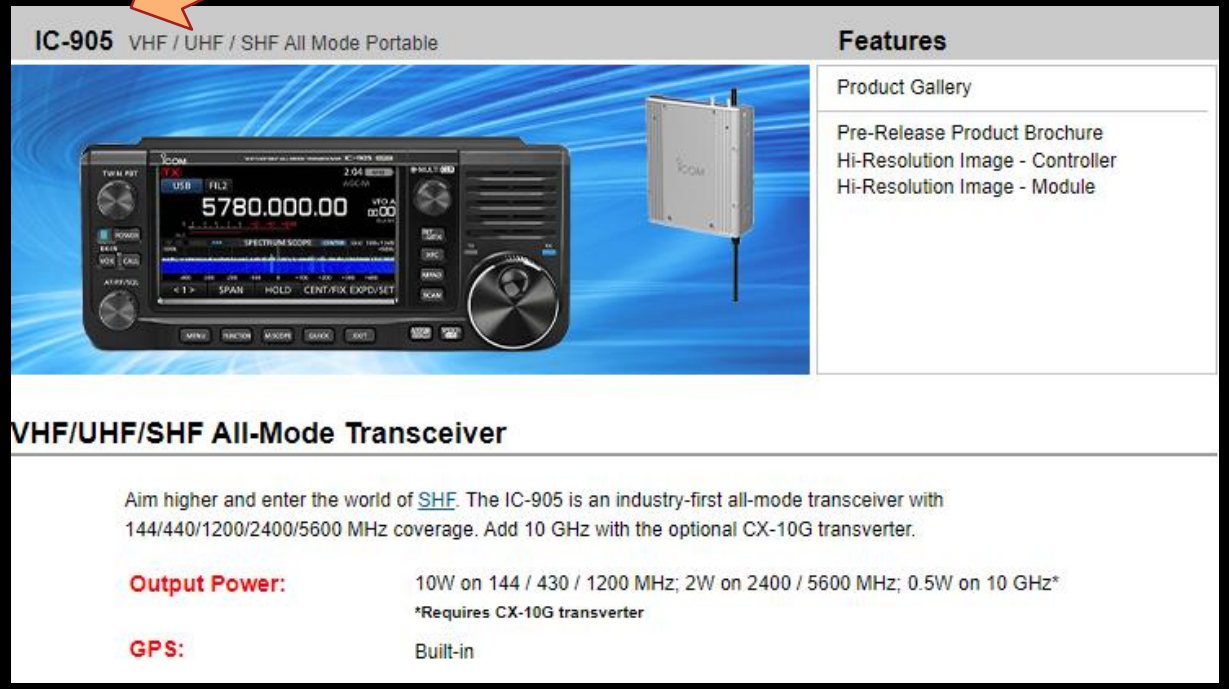
FT-991A

- FT-991A
- ICOM 9700

ICOM 9700

*** NEW – not released! ***

ICOM 905

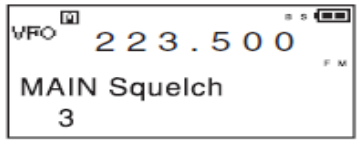


ALINCO DJ-G7T (1.25M/33CM) RADIO

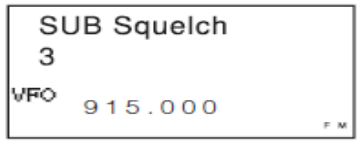
	Receive Frequency	Transmit Frequency	Offset Frequency	Offset Direction	Operating Mode	Name	Tone Mode	CTCSS	Rx CTCSS	DCS	Rx DCS	Skip	Step	Quick Memory	Comment
000-0	223.50000	223.50000		Simplex	FM	1.25m Simplex	None	88.5 Hz	88.5 Hz	023	023		20 kHz		Primary 1.25M Simplex
000-1	222.15000	222.15000		Simplex	FM		None	88.5 Hz	88.5 Hz	023	023		20 kHz		Secondary 1.25M Simplex (to be used if antenna has narrow bandwidth)
000-2	902.12500	902.12500		Simplex	FM Narrow	33cm Simplex	None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		Primary 33cm Simplex
000-3	903.12500	903.12500		Simplex	FM Narrow		None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		Secondary 33cm Simplex
000-4	902.15000	902.15000		Simplex	FM Narrow		None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		Alternate Primary 33cm Simplex
000-5	903.15000	903.15000		Simplex	FM Narrow		None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		Alternate Secondary 33cm Simplex
000-6	224.96000	223.36000	1.60 MHz	Minus	FM	Edmond KD5AHH	None	88.5 Hz	88.5 Hz	023	023		20 kHz		Edmond, OK KD5AHH
000-7	224.10000	222.50000	1.60 MHz	Minus	FM	OKC W5PAA	Tone	141.3 Hz	141.3 Hz	023	023		20 kHz		OKC
000-8	224.88000	223.28000	1.60 MHz	Minus	FM	OKC WN5J	None	88.5 Hz	88.5 Hz	023	023		20 kHz		OKC
000-9	927.91250	927.91250		Simplex	FM Narrow	OKC WP5AA 2	Tone	123.0 Hz	123.0 Hz	023	023		12.5 kHz		OKC
000-10	224.44000	222.84000	1.60 MHz	Minus	FM	Norman K9KK	None	88.5 Hz	88.5 Hz	023	023		20 kHz		Norman, OK
000-11	224.96000	223.36000	1.60 MHz	Minus	FM	Bethany N5USR	Tone	103.5 Hz	103.5 Hz	023	023		20 kHz		Bethany, OK
000-12	224.26000	222.66000	1.60 MHz	Minus	FM	Bart W5RAB	Tone	88.5 Hz	88.5 Hz	023	023		20 kHz		Bartlesville, OK
000-13	927.65000	902.65000	25.00 MHz	Minus	FM Narrow	Bart W5RAB	None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		Bartlesville, OK
000-14	224.38000	222.78000	1.60 MHz	Minus	FM	Tulsa W5IAS	Tone	88.5 Hz	88.5 Hz	023	023		20 kHz		Tulsa, OK
000-15	224.66000	223.06000	1.60 MHz	Minus	FM	Tulsa AE5RH	Tone	88.5 Hz	88.5 Hz	023	023		20 kHz		Tulsa, OK
000-16	913.25000	913.25000		Simplex	FM Narrow	Tulsa W5IAS	None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		Tulsa, OK - transmit on 433.950, receive on 913.250
000-17	927.70000	902.70000	25.00 MHz	Minus	FM Narrow	Tulsa WA5LVT	None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		Tulsa, OK
000-18	927.70000	902.70000	25.00 MHz	Minus	FM Narrow	Tulsa WD5ETD	None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		Tulsa CityPlex Towers
000-19	224.68000	223.08000	1.60 MHz	Minus	FM	Tuttle WA7WNM	None	88.5 Hz	88.5 Hz	023	023		20 kHz		Tuttle, OK
000-20	224.50000	222.90000	1.60 MHz	Minus	FM	Med AF5Q	Tone	123.0 Hz	123.0 Hz	023	023		20 kHz		Medicine Park, OK
000-21	927.38750	902.38750	25.00 MHz	Minus	FM Narrow	Newc W5PAA	Tone	123.0 Hz	123.0 Hz	023	023		12.5 kHz		Newcastle, OK
000-22	224.94000	223.34000	1.60 MHz	Minus	FM	CR W0HUP	None	88.5 Hz	88.5 Hz	023	023		20 kHz		Cedar Rapids, IA
000-23	927.90000	902.90000	25.00 MHz	Minus	FM Narrow	WDSM KB0SL	None	88.5 Hz	88.5 Hz	023	023		12.5 kHz		West Des Moines, IA
000-24	224.98000	223.38000	1.60 MHz	Minus	FM	DSM WD0FIA	Tone	114.8 Hz	114.8 Hz	023	023		20 kHz		Des Moines, IA

5-4-1 Operation

●Adjusting the Main Band Squelch
Press the main dial once and rotate the upper main dial.



●Adjusting the Sub Band Squelch
Press the sub dial once and rotate the upper sub dial.



6-4 Directly Inputting Frequencies

Frequencies can be directly entered using the numerical keypad.

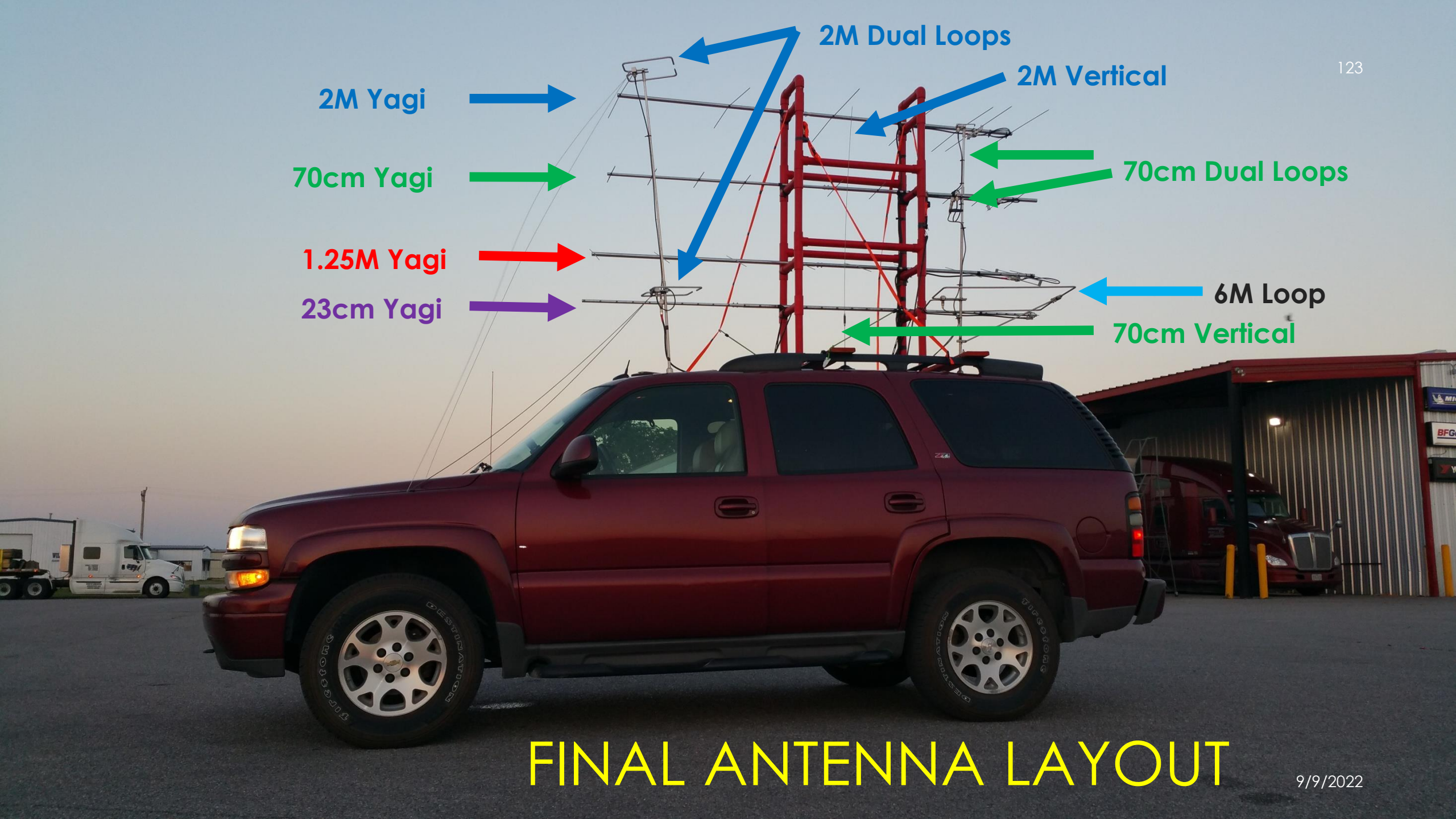
Example 1: To enter 232.000MHz, press the PO 2ABC, ATT 3DEF and PO 2ABC keys and press the #RPT ENT key.

Example 2: To enter 915.000MHz, press the CALL 9WXYZ, WILD 1, and TONE 5JKL keys and press the #RPT ENT key.

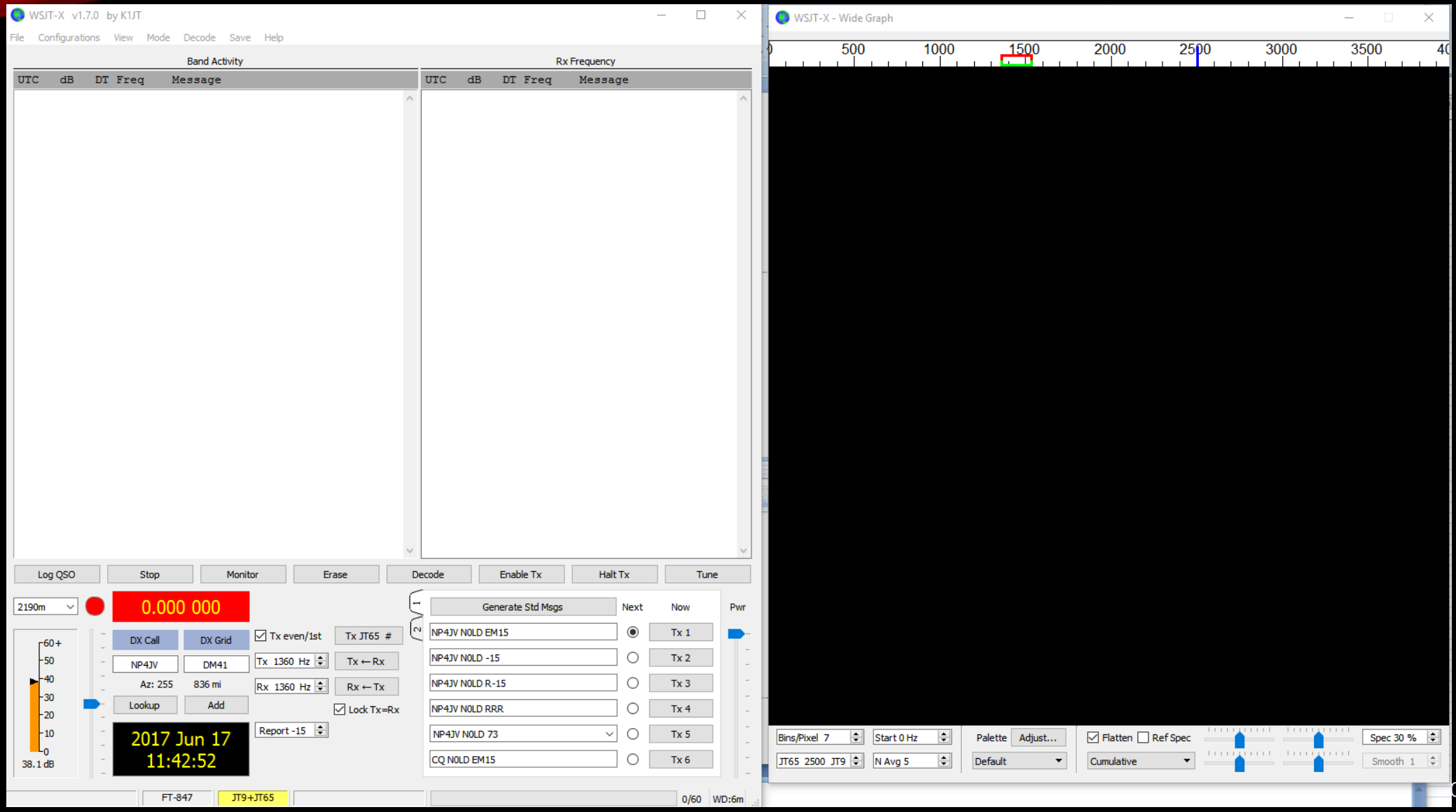
Example 3: To enter 232.100MHz, press the PO 2ABC, ATT 3DEF, PO 2ABC, * CLR and WILD 1 keys and press the #RPT ENT key.

Example 4: To enter 915.0125MHz, press the CALL 9WXYZ, WILD 1, TONE 5JKL, * CLR, PRIO 0, WILD 1, PO 2ABC and TONE 5JKL keys and press the #RPT ENT key.

If there is an error in selecting a frequency, press the [PTT] key or the F FUNC key and the process can be redone from the start.



FINAL ANTENNA LAYOUT

CURRENT N0LD/ROVER

WSJT-X – 6M DIGITAL OPERATION