VHF Roving

and How to Have Fun Doing It

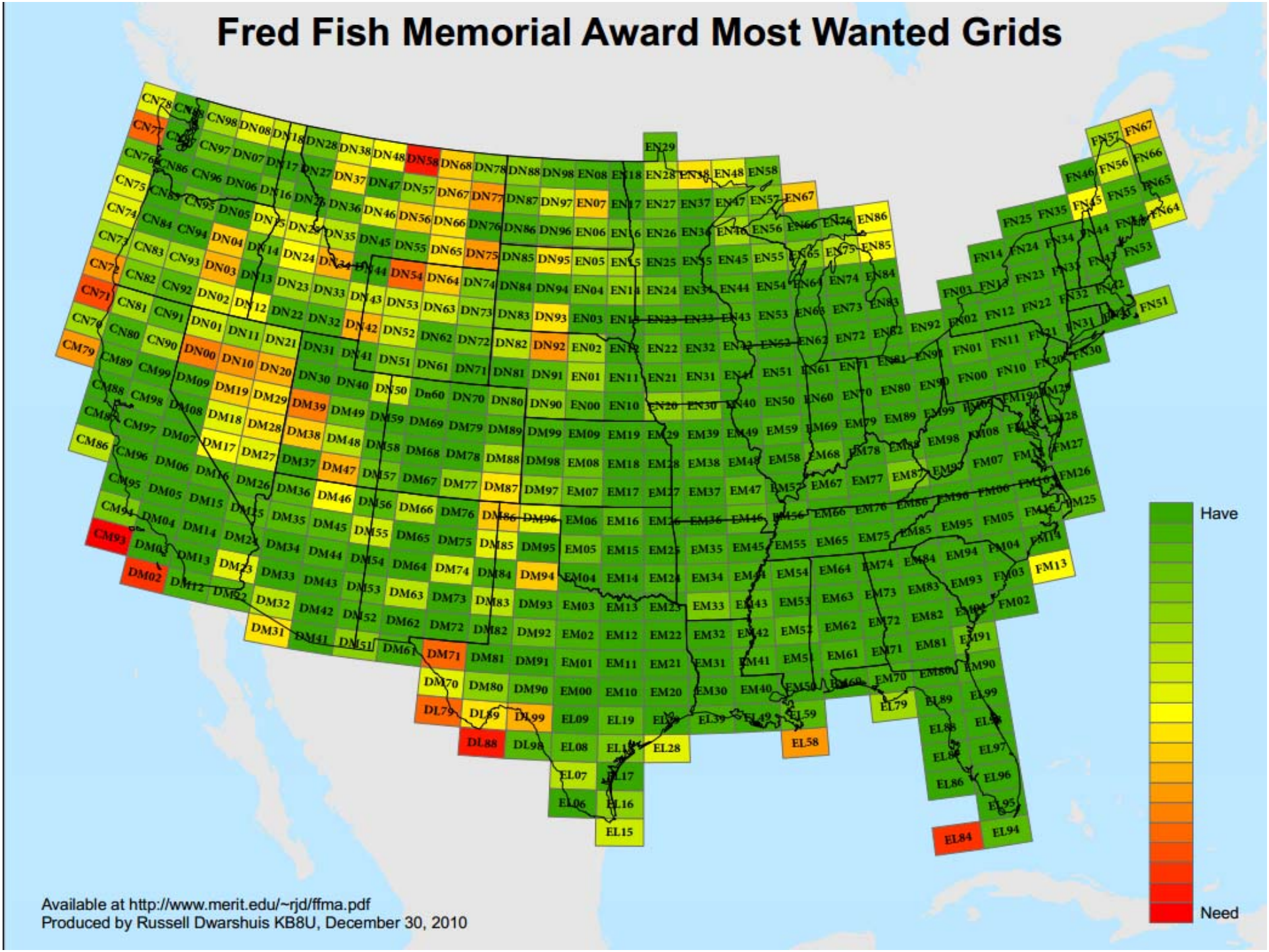
Darryl Holman

WW7D

Why rove?

- Technical challenge
- Get away from noise
- Leave behind distractions
- Emergency readiness skills
- Explore interesting places
- Elevation!
- Be the DX!

Fred Fish Memorial Award Most Wanted Grids



Available at http://www.merit.edu/~rjd/ffma.pdf
Produced by Russell Dwarshuis KB8U, December 30, 2010

Many grids will *only* be activated by rover

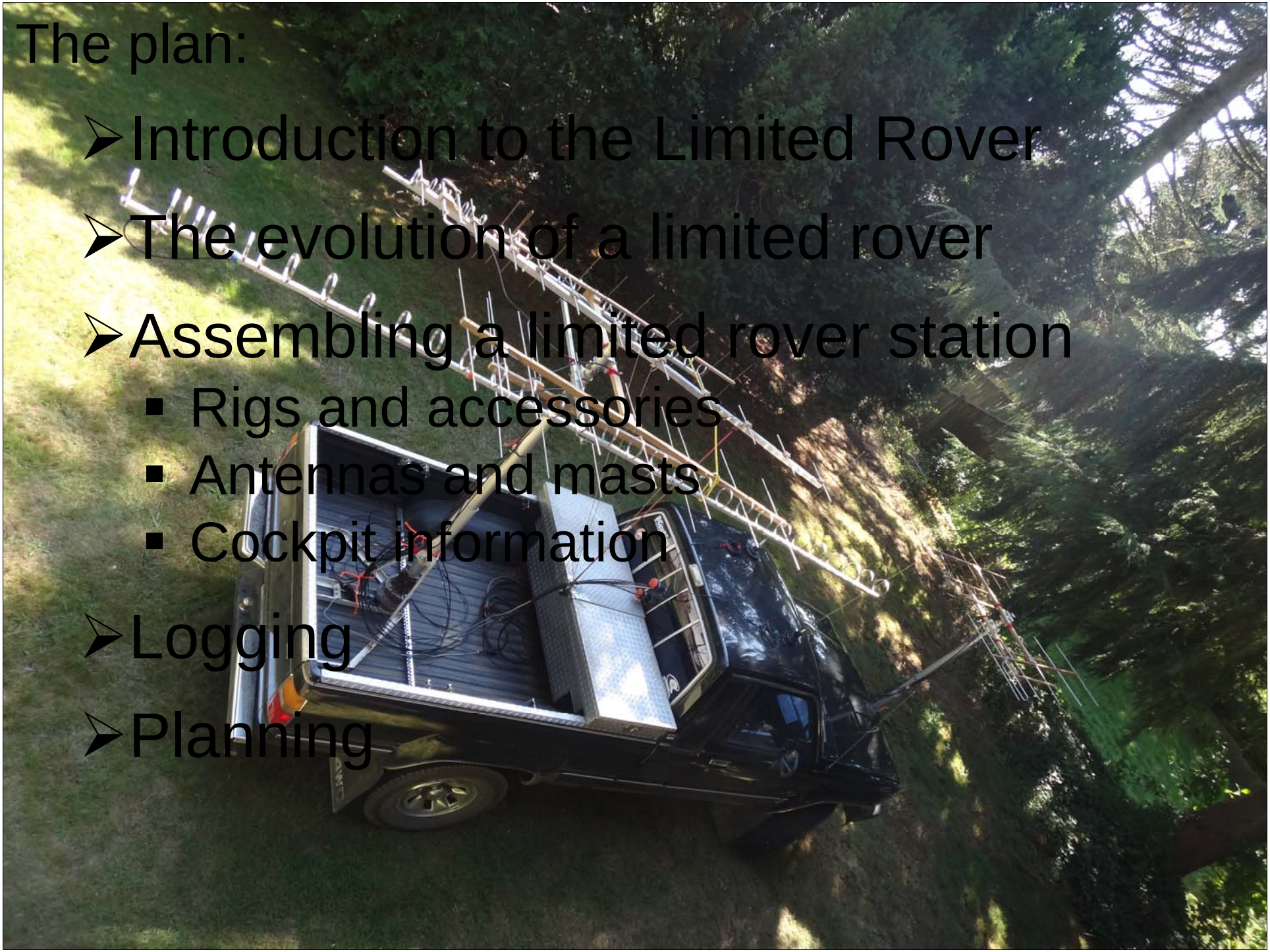
Rod, WE7X, and Barry, WA7KVC, (now K7BWH) Olympic Peninsula rove

ARRL January 2012 VHF Contest

KØMHC/R & W0JT/R

"The Texas Hill Country Rovers"

January 2013 VHF contest



The plan:

- Introduction to the Limited Rover
- The evolution of a limited rover
- Assembling a limited rover station
  - Rigs and accessories
  - Antennas and masts
  - Cockpit information
- Logging
- Planning

The Limited Rover (ARRL contests):

Easy entry rover class (cheaper, simpler)

Bottom 4 band only:

- VHF: 6m, 2m, 222 MHz, 432 MHz
- UHF: 222 MHz, 432 MHz, 902 MHz, 1296 MHz

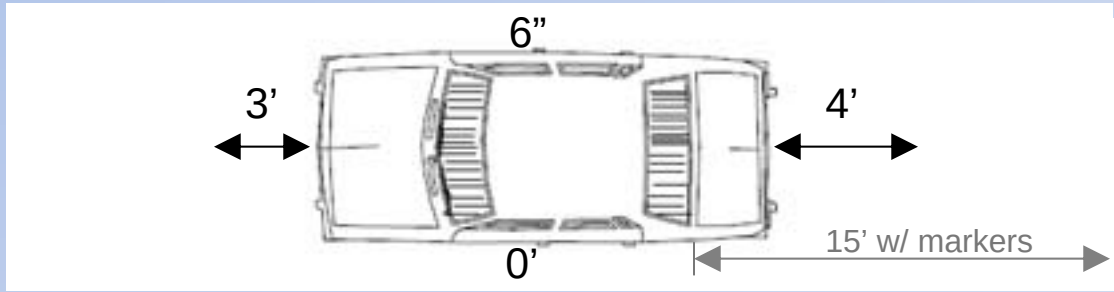
Limited power:

- 200 watts: 6m, 2m
- 100 watts: 222 MHz, 432 MHz
- 50 watts: 902 MHz, 1296 MHz

Limited Rover as The Great Equalizer

- Limited station complexity (4 bands only)
- Limited antenna complexity

"In motion" antennas limited by highway height and vehicle overhang laws



Stationary antennas are limited by set-up time, size and weight

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Roving Contests

- ARRL January VHF
- Spring VHF+ Sprints
- ARRL June VHF (next weekend!!!)
- CQ WW VHF (July, *6m + 2m only*)
- ARRL August UHF
- Fall VHF+ Sprints
- ARRL September VHF

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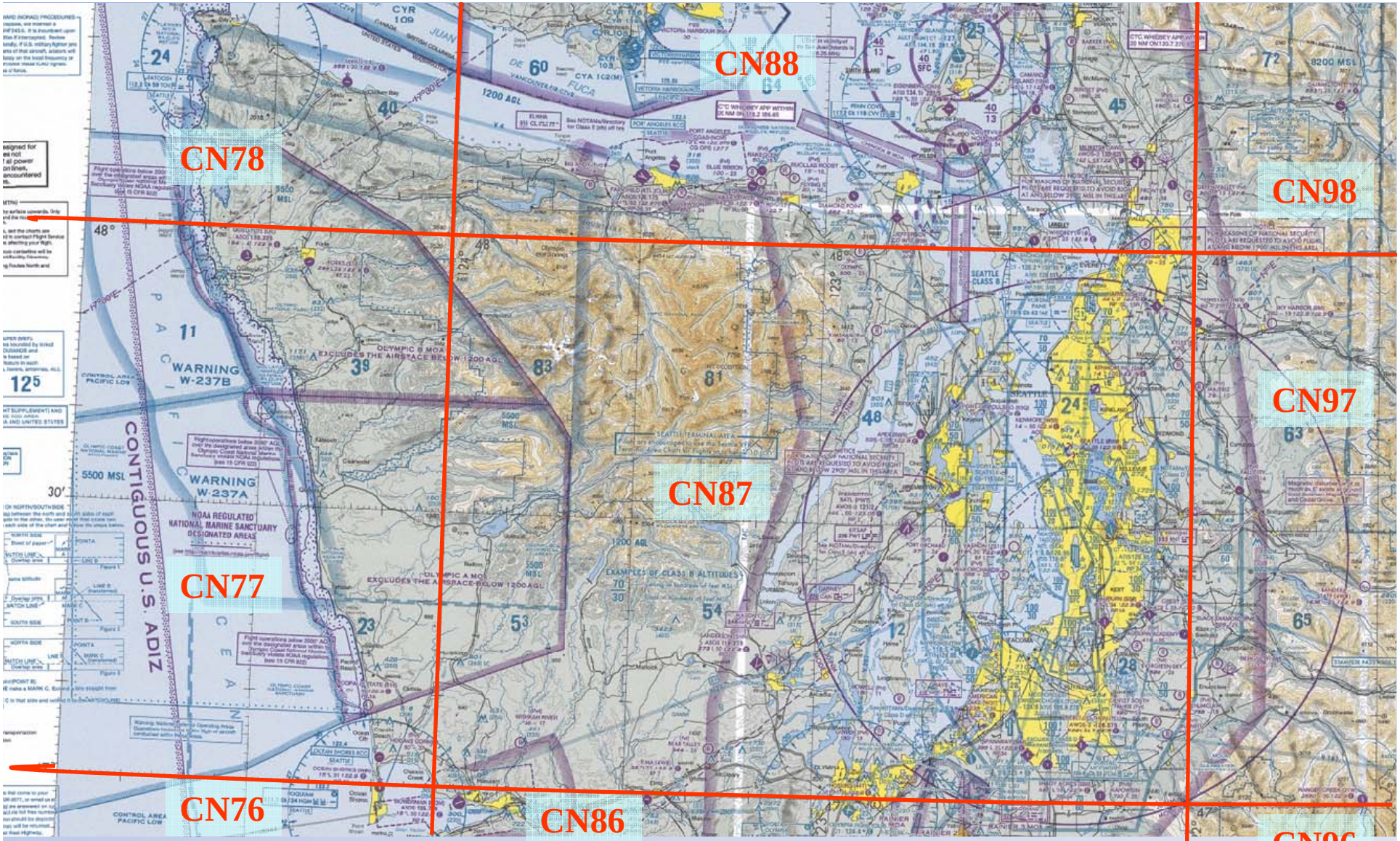

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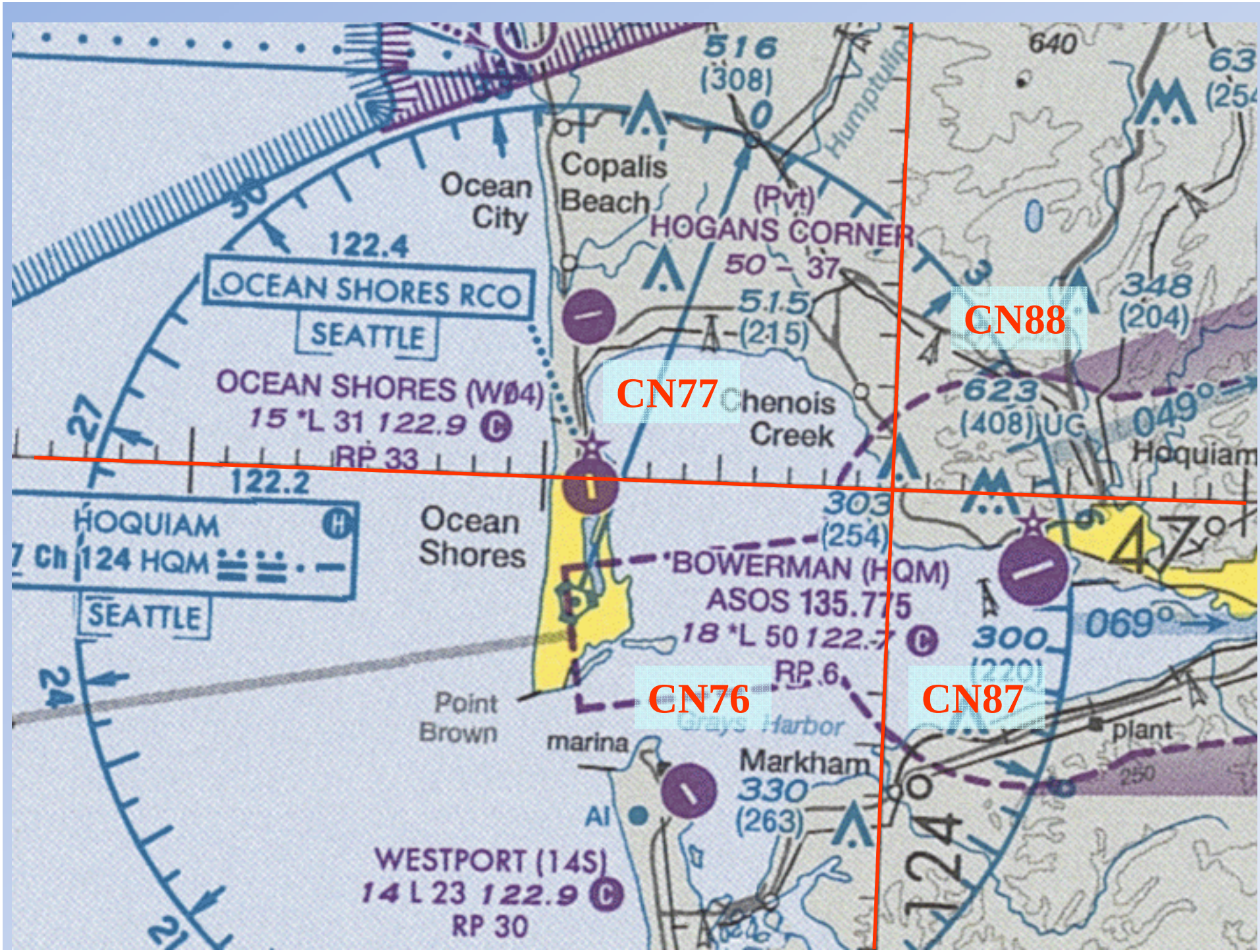
Ocean City
122.4
OCEAN SHORES RCO
SEATTLE
OCEAN SHORES (WØ4)
15 *L 31 122.9 C
RP 33
122.2
HOQUIAM
Ch 124 HQM
SEATTLE
Copalis Beach
516
(308)
(Pvt)
HOGANS CORNER
50 – 37
515
(215)
Chenois Creek
Ocean Shores
303
(254)
BOWERMAN (HQM)
ASOS 135.775
18 *L 50 122.7 C
RP 6
Point Brown
marina
Grays Harbor
Markham
330
(263)
Al
WESTPORT (14S)
14 L 23 122.9 C
RP 30
CN77
CN88
CN76
CN87
640
348
(204)
623
(408) UC
049°
Hoquiam
069°
300
(220)
plant
250
124


CN77
CN76
Duck Lake Dr NE
Chenois Ave NE
Albatross St NE
W04

CFR 17.7 Antenna structures requiring notification to the FAA.

A notification to the Federal Aviation Administration is required, except as set forth in § 17.14, for any of the following construction or alteration:
[...]
(d) Any construction or alteration on [...] An airport that is available for public use and is listed in the Airport Directory....

Among those exceptions:

§ 17.14 Certain antenna structures exempt from notification to the FAA.

A notification to the Federal Aviation Administration is not required for [...] Any antenna structure of 6.10 meters (20 feet) or less in height...

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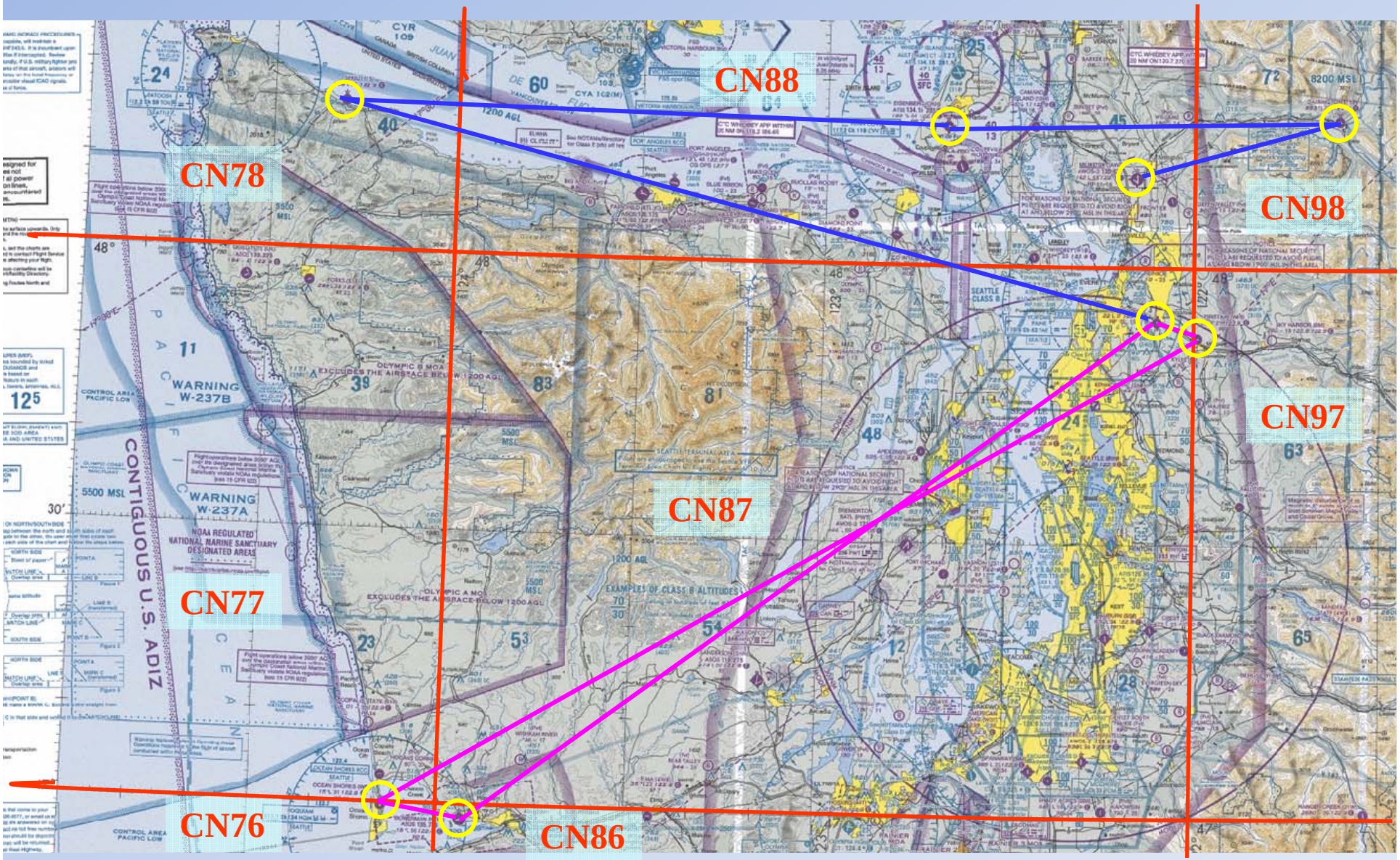
2011 June ARRL VHF Contest route

Day 1 (—) and Day 2 (—)



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Car rover was a modified version of the aero-rover

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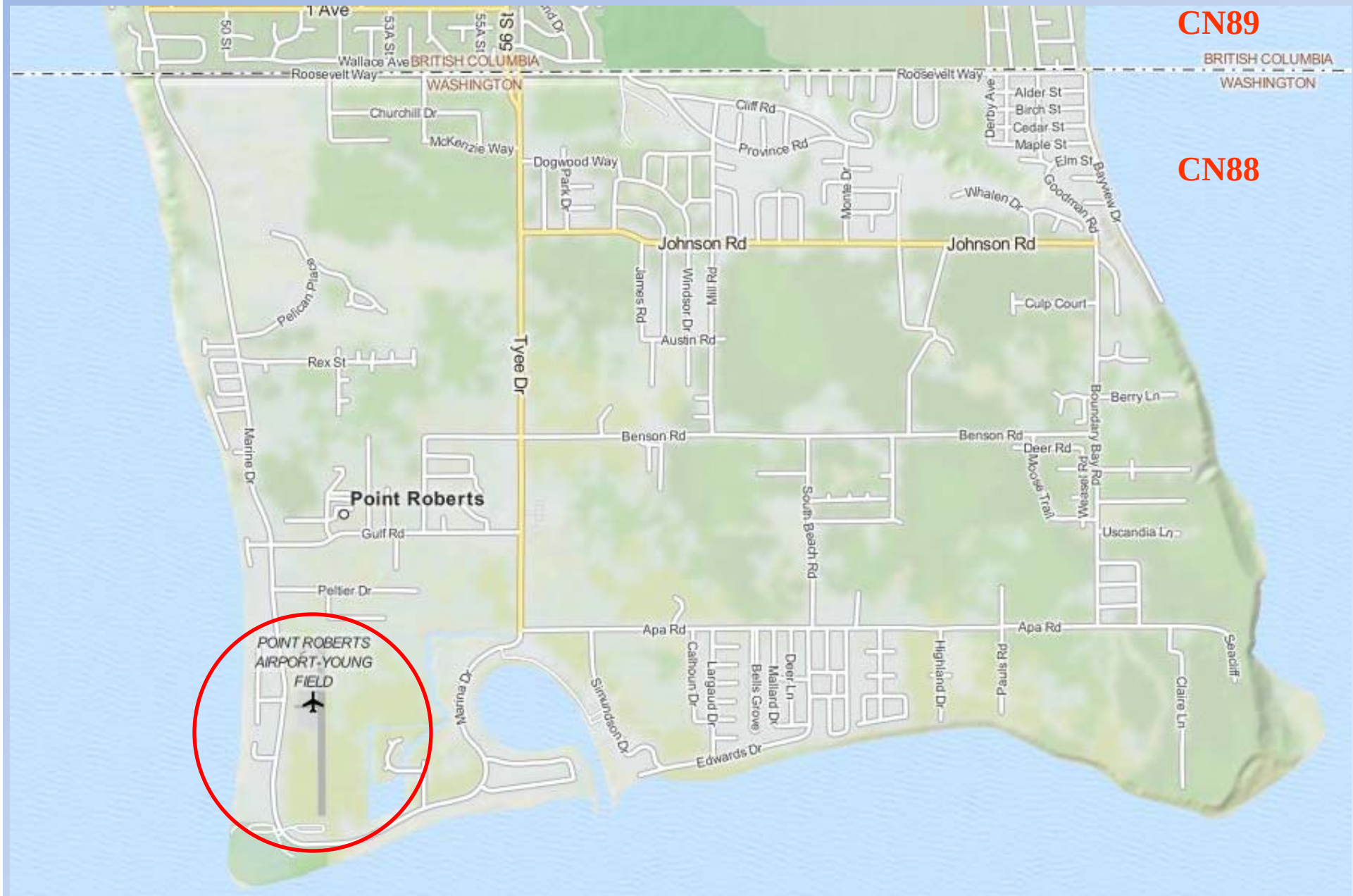
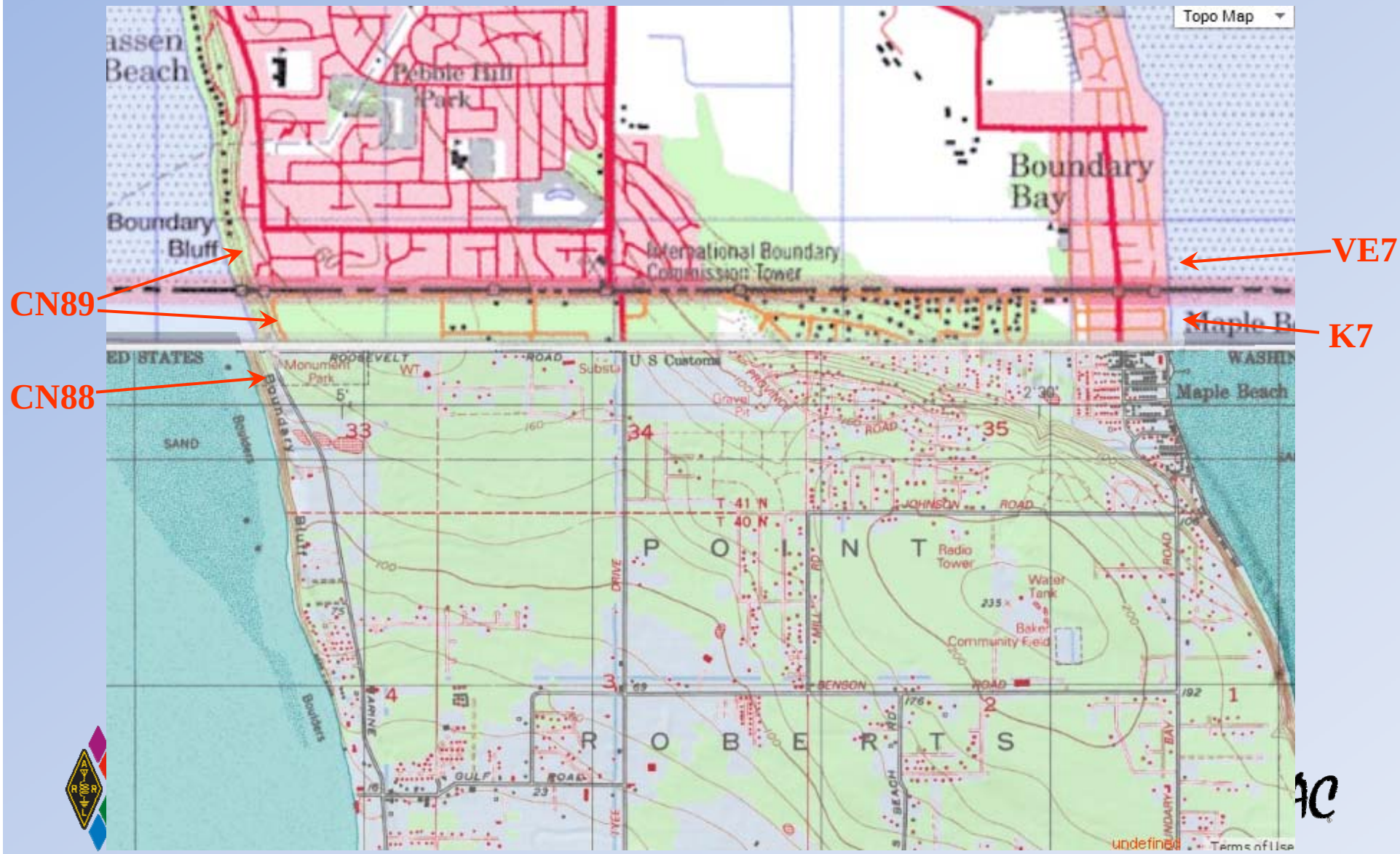
August 2011 ARRL UHF Contest (222 Mhz+)

New Challenge: Activating CN89 out of Point Roberts, WA



Point Roberts, WA extends about 800 feet *above* 49° longitude (i.e. 49th parallel)



CN89

CN88

VE7

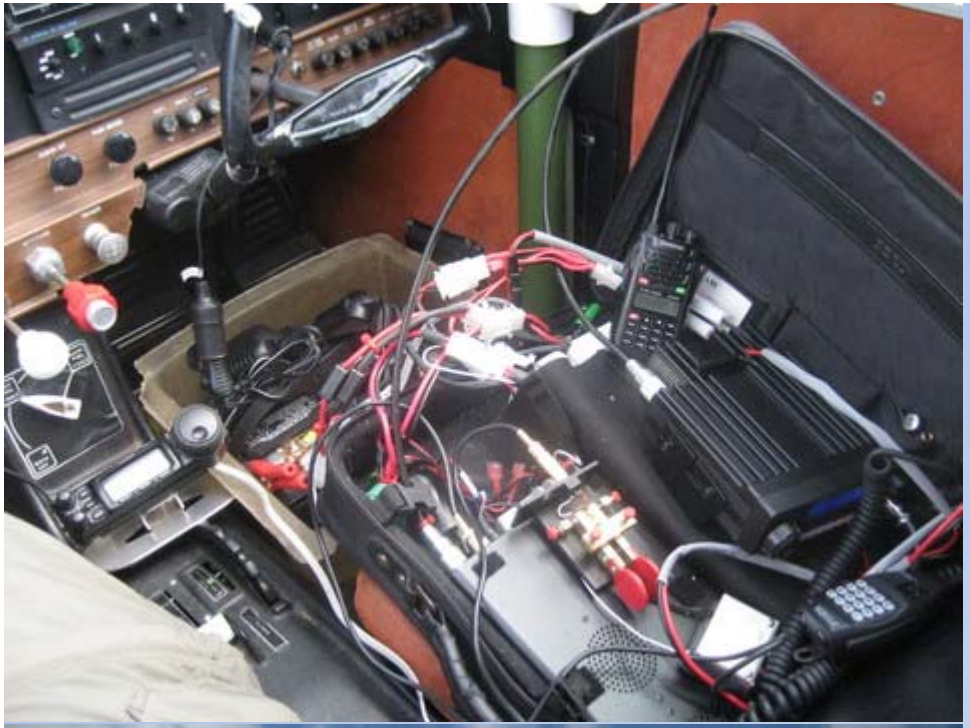
K7

30 minute hike from airport to CN89

Backpacked in with equipment

Added:

- FT-857D plus 222 MHz FM rig
- Foldable quagis



2011 September VHF Contest

Day 1 plan:

- Independence, OR (CN84)
- Scappoose, Oregon (CN85)
- Ocean Shores airport (CN76 and CN77)
- Sekiu, WA (CN78)
- Redmond (CN87)

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2011 ARRL September VHF Contest

Goals:

- 4 band limited rover
- Pair of stacked 11 element quagis for 432 MHz
- More distant grids

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AC

2011 ARRL September VHF Contest

Mast toppled on a gravel road…but light damage.

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2012 ARRL January VHF Contest

Goal: Develop a more specialized car rover

2012 ARRL June VHF Contest

- Added amplifiers
- Added Kenwood TS-480 for 6m
- Added an N8XJK Super Booster
- Added an K1EL WinKeyer
- Packaged everything in a rack

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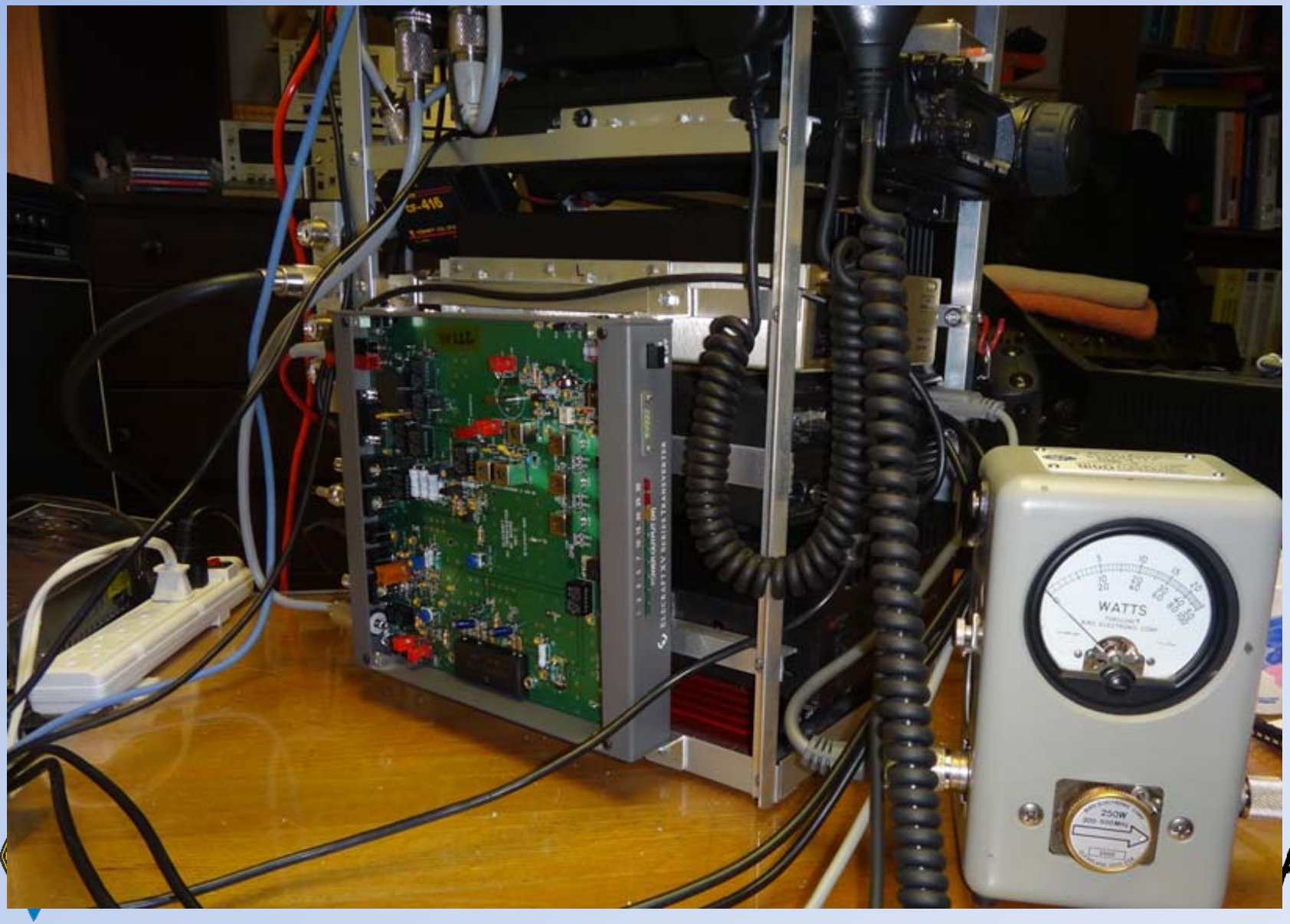
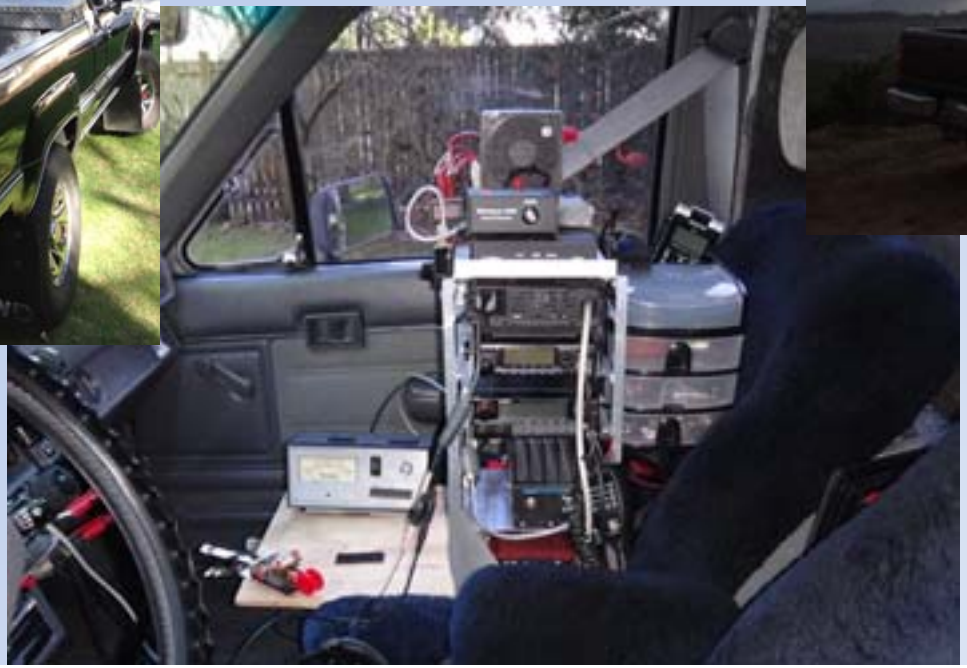
2012 ARRL September VHF contest

New: 20 watt Elecraft XV222 transverter for 222 MHz



2013 Spring VHF Sprints:

- New truck (1988 Toyota 4WD)



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2013 ARRL June VHF Contest:

- Front rotor added for use in motion (antennas < 3’ from bumper)

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August 2013 ARRL UHF Contest
Finally…all 4 bands!

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Assembling a limited rover station

Minimal station: A single all mode rig with 6m, 2m, 432 MHz rig

ICOM IC-7000

Yaesu FT-100

Yaesu FT-857

ICOM IC-7100

ICOM IC-706mkii

Kenwood TS-2000(X)

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The next step: Add 222 Mhz FM (yes…FM)

Jetstream JT-220M (~$200)

TYT TH-9000 (~$180)

Alinco DR-235TMKIII (~$250)

Adding 222 MHz FM to my rover added more points per dollar than any other single investment!

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Alternatively (or additionally):

Add a 222 Mhz Transverter (for SSB & CW)

Elecraft XV-222 kit ($400)

Down East Microwave L222-28CK kit ($380)

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Bricks:

Typically:

- 160-170 watts for 6m and 2m
- 100 watts on 222 MHz and 432 MHz
- Used from $150 to $250 each

TE Systems 0510G, 6m
10 w in, 170 w out

RF Concepts rfc4-110, 432 MHz
10 w in, 100 w out

Mirage B3016, 2m
30 w in, 160 w out

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Next Step:

Add dedicated 6m, 2m and 440 FM rigs

My experience in the Pacific Northwest:

- 6m FM is *NOT* currently worth doing (but used rigs are inexpensive)

Alinco DR-06T, 6m

✓ 2m FM has produced modest additional QSOs

✓ 440 MHz FM has resulted in some extra QSOs

Alinco DR-600, 2m + 440 MHz

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902 MHz & 1296 MHz for the UHF contest (and sprints)

- SSB/CW: Transverters ($200+)

Microwave Modules 1296 MHz transverter

SSB Electronic LT 33 S, 902 MHz

- 902 MHz FM: Commercial equipment Motorola, GE, Kenwood
- 1296 MHz FM: ham rigs

ICOM IC-1201

Alinco DJ-G7

Kenwood TK-981 commercial radio easily programmed for 927.5 MHz FM, ~$130

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Rig accessories

- Keyer

K1EL Winkeyer

HamGadgets MK-1

- Paddle
- Headsets
- Microphone switch?
- Audio mixer?

W5JH portable paddle

LDG SLS-2 RJ-45 Mic switch

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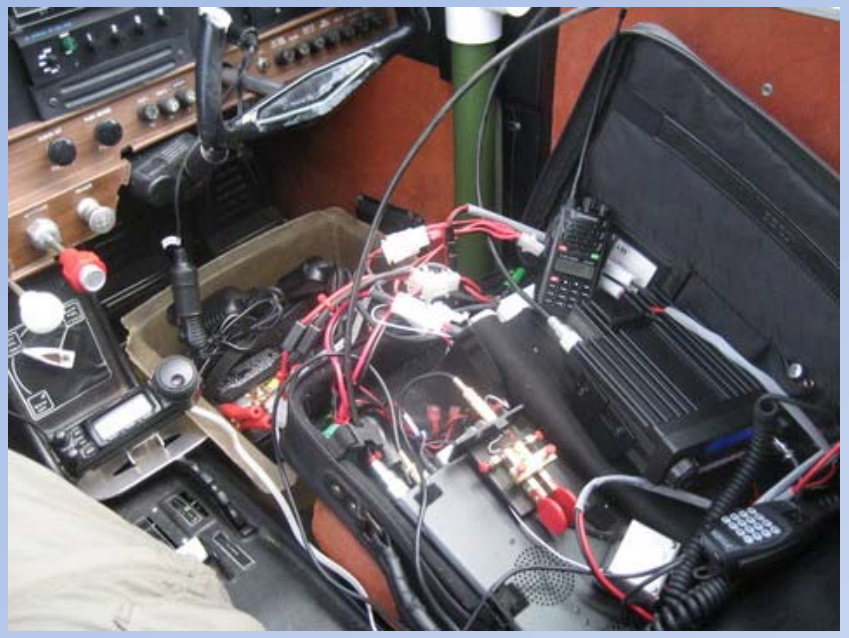
Tip:

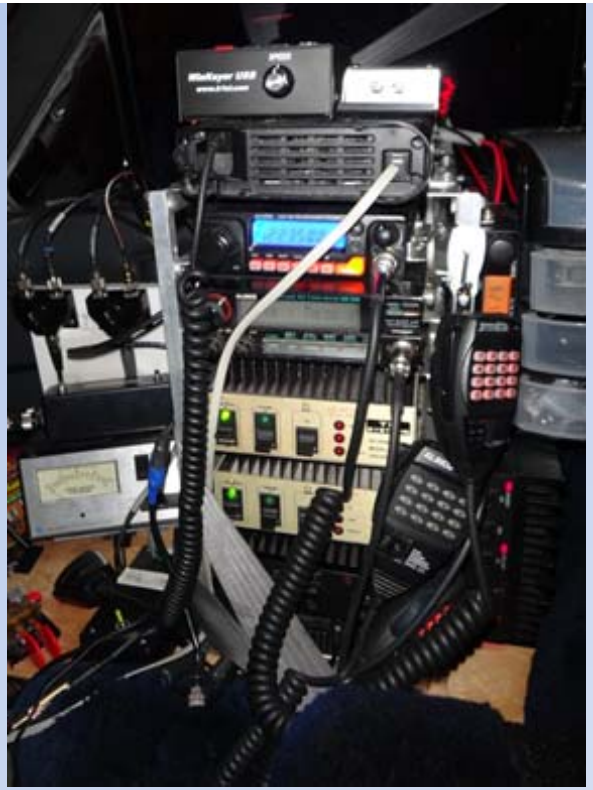
Use memory chaining for the Winkeyer

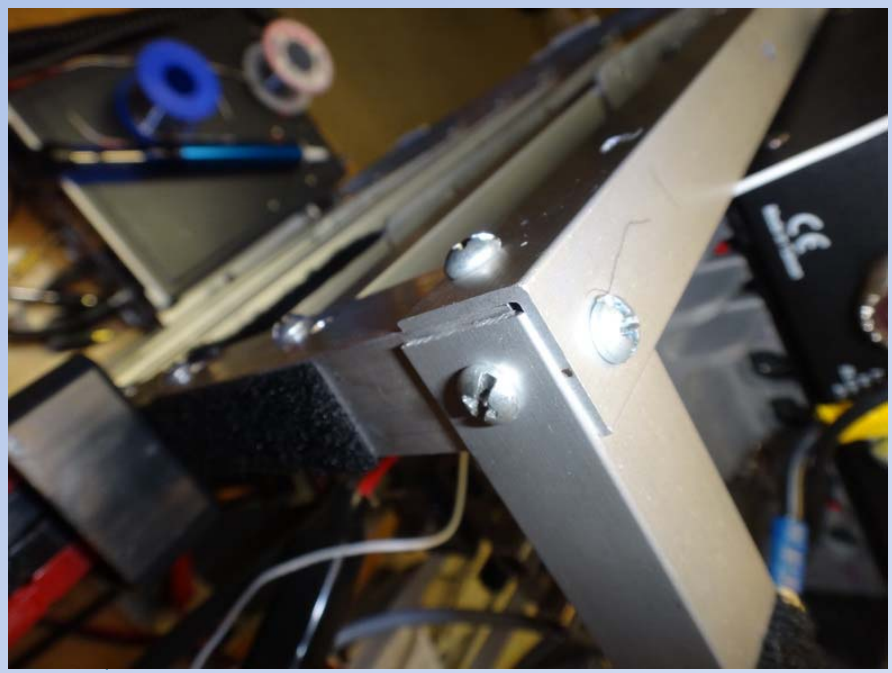
M1: WW7D//R	**# WW7D/R**
M2: CN96	**# Current Grid – Change as required**
M3: TU /C2 K	**# Reply: TU <call M2> K**
M4: R 73	**# Salutation: R 73**
M5: CQ CQ DE /C1 /C2 K	**# CQ CQ DE <call M2><call M1> K**
M6: QRZ DE /C1 /C2 K	**# QRZ DE <call M2><call M1> K**

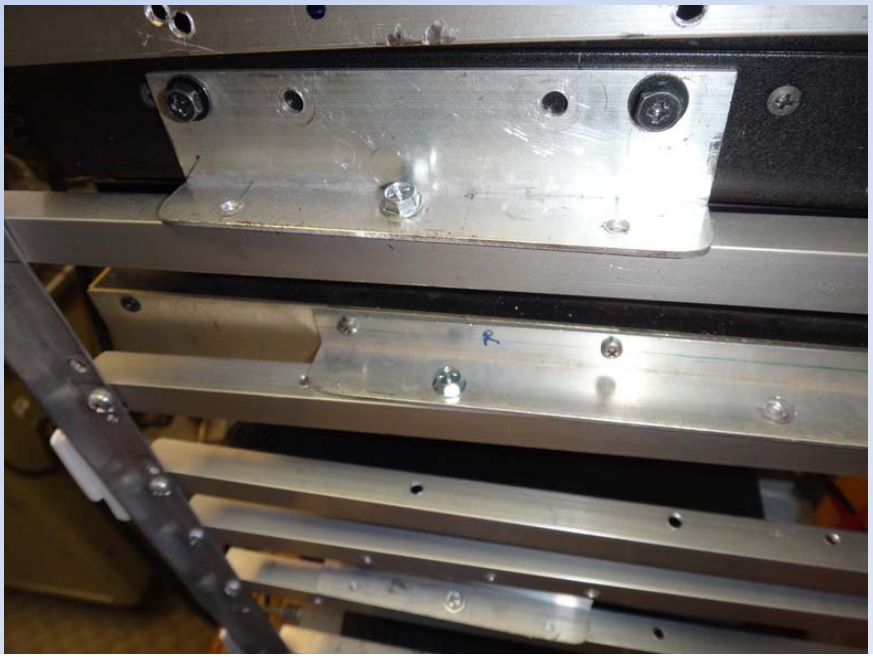
- Only change M2 during the contest
- Speed up (/Y5) and slow down (/Z5) CQs, QRZ etc.

Racking:

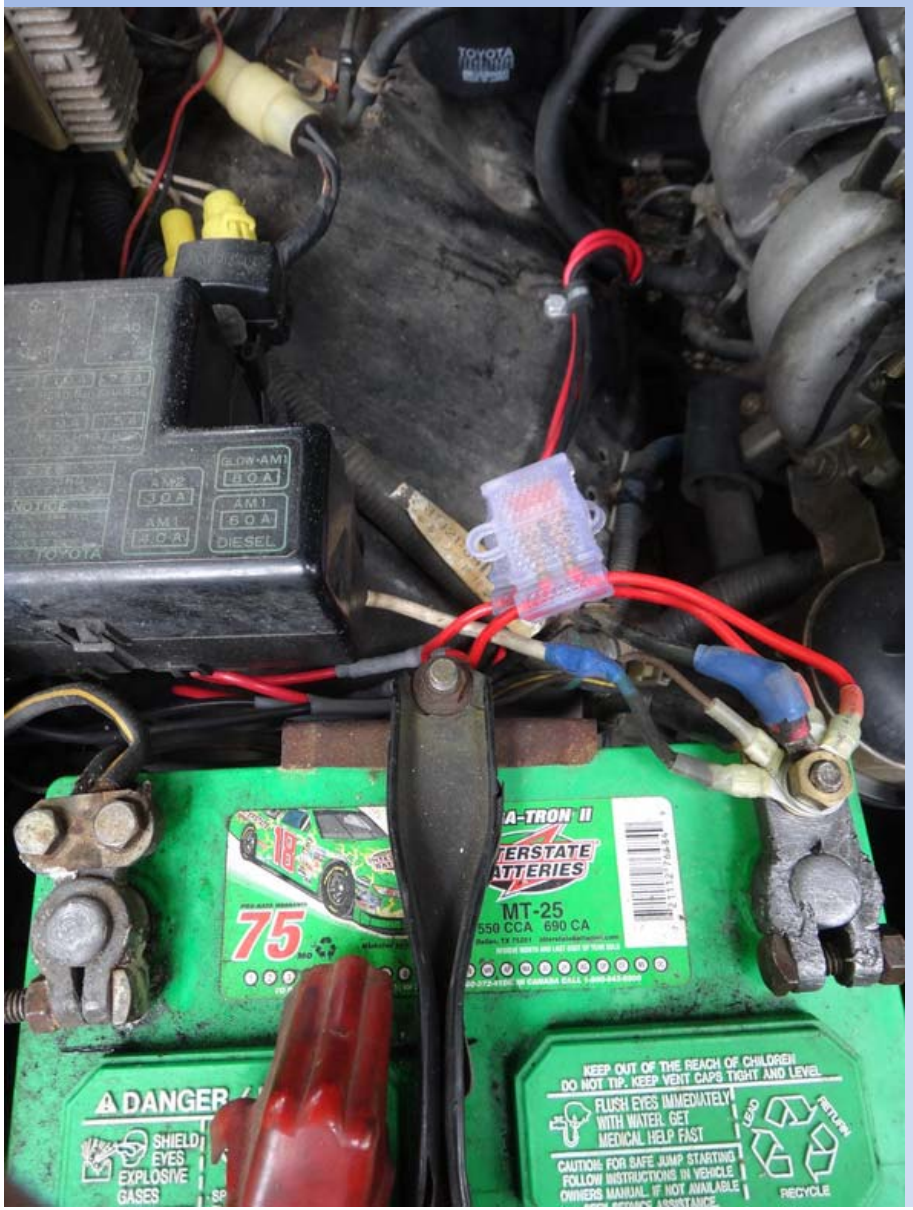


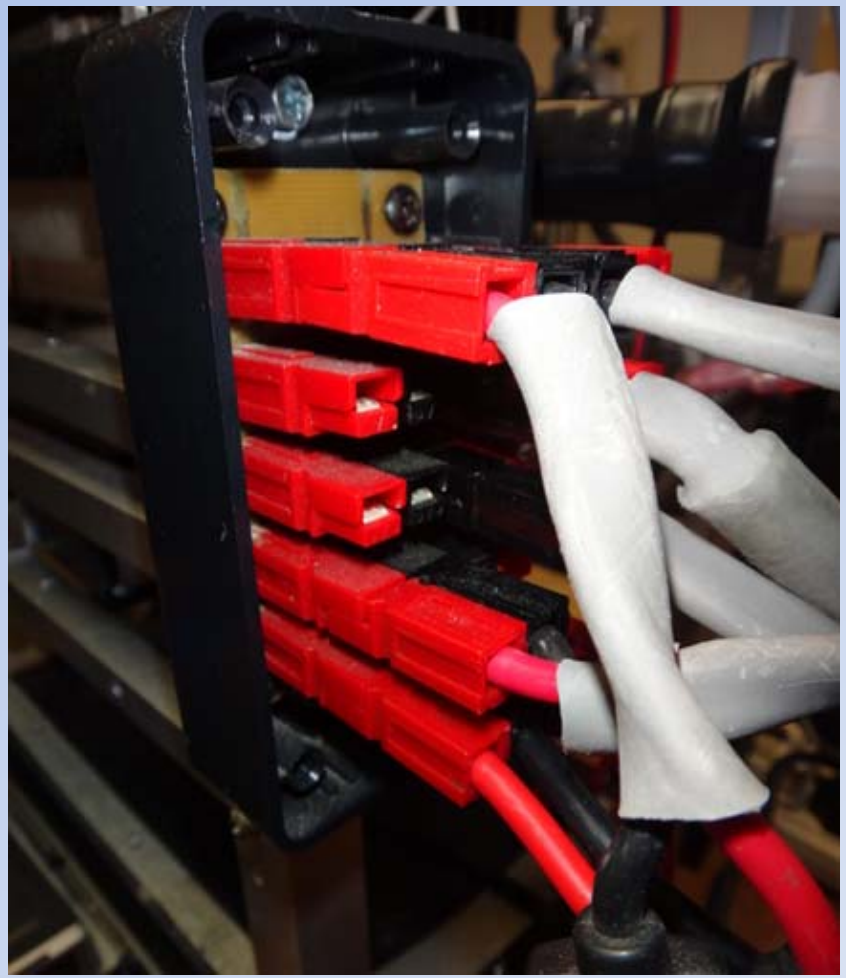






Getting power into the cab:





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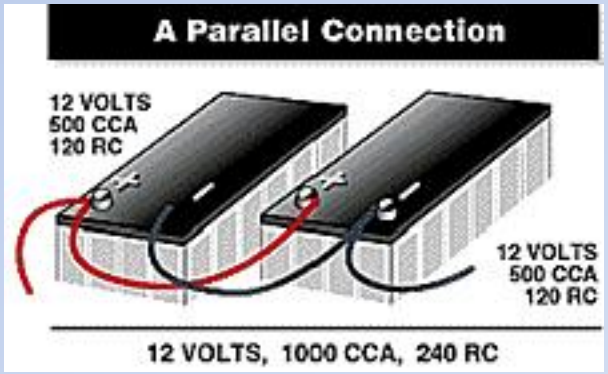
More advanced power:

- Parallel second battery
  - Safety: Contained, secured, properly fused
  - Ordinary automobile battery is usually fine
    - Reserve capacity (× ~2 to 4) will be longer than your stops!
    - e.g. My truck's *Interstate*: RC=100 mins at 25A



  - Use similar batteries (capacities, age)

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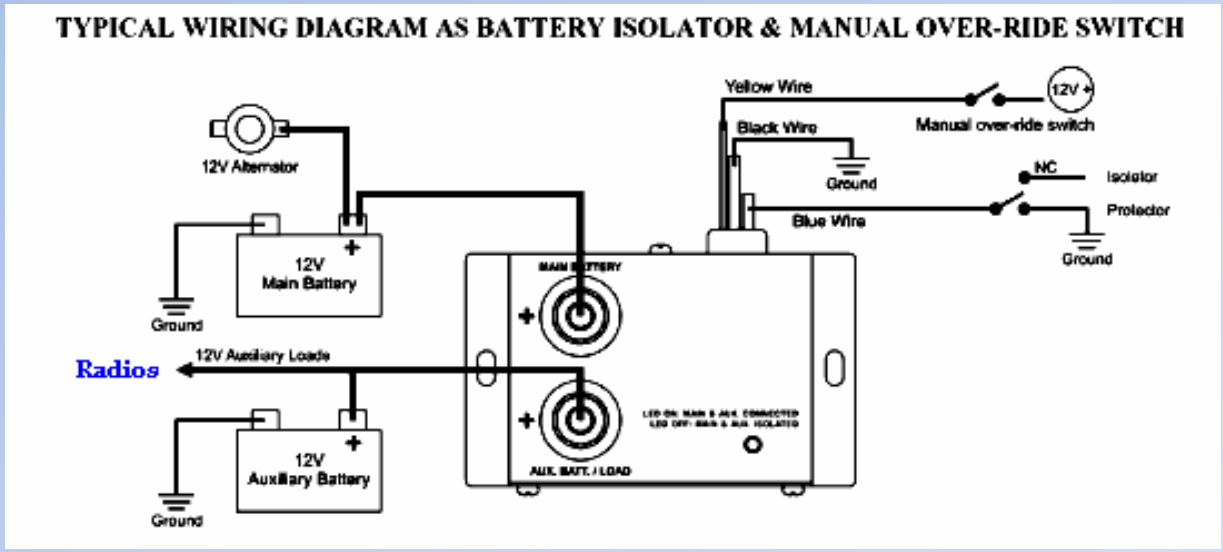
More advanced power systems:

- Isolators:



- Power boost regulators:

  e.g. N8XJK Super Booster, 40 amps, RF enabled

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Antennas:

- Most stations use horizontal polarization (exceptions: FM on 6m, 2m, 432 MHz, 927.5 MHz)
- Vertical antennas will work (but down some db). Use what you have.

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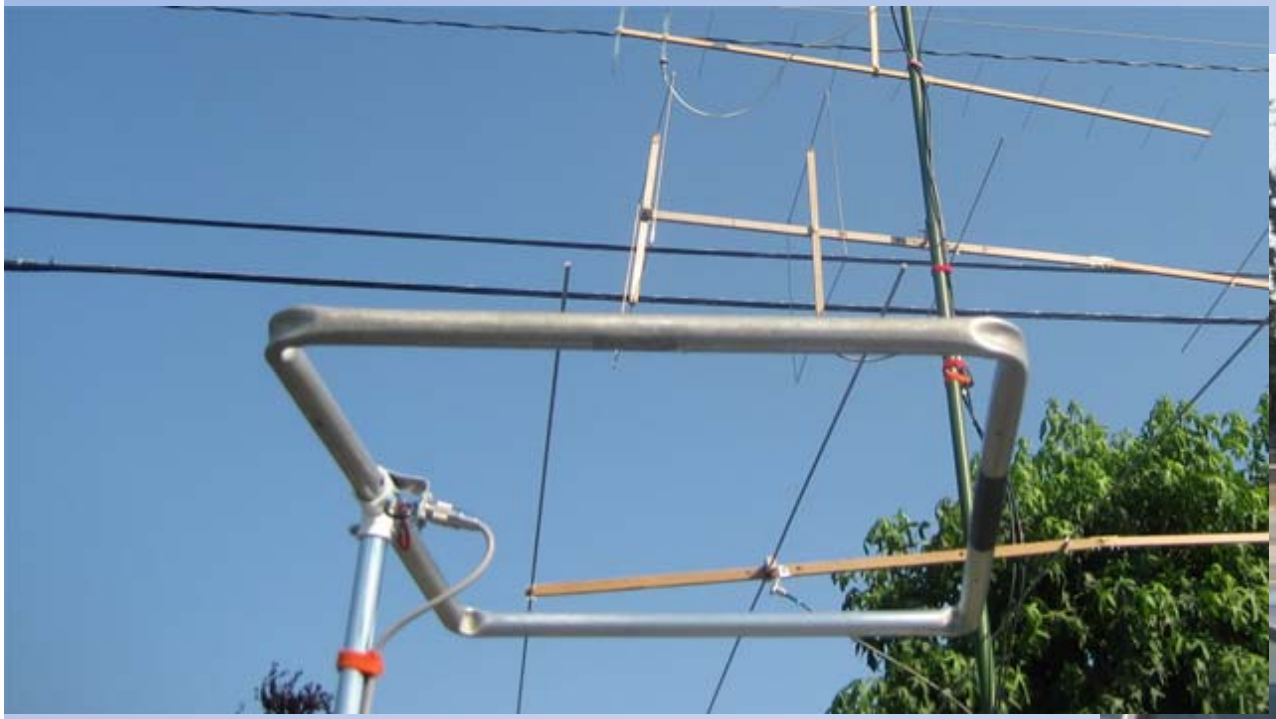
One evening project: 6m “lawn chair halo”



Halos and stacked halos are good omnidirectional, horizontally polarized antennas for 6m - 432 MHz

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Simple 6m directional antennas

The Moxon (2 ele)

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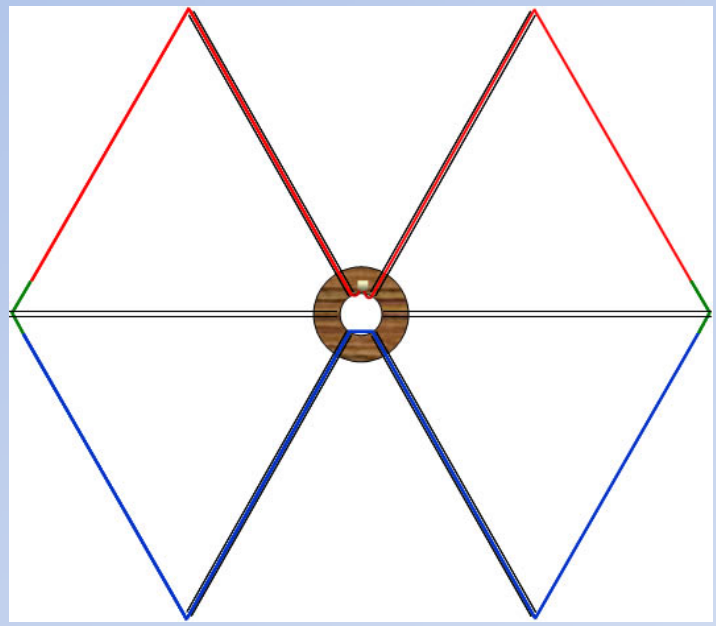
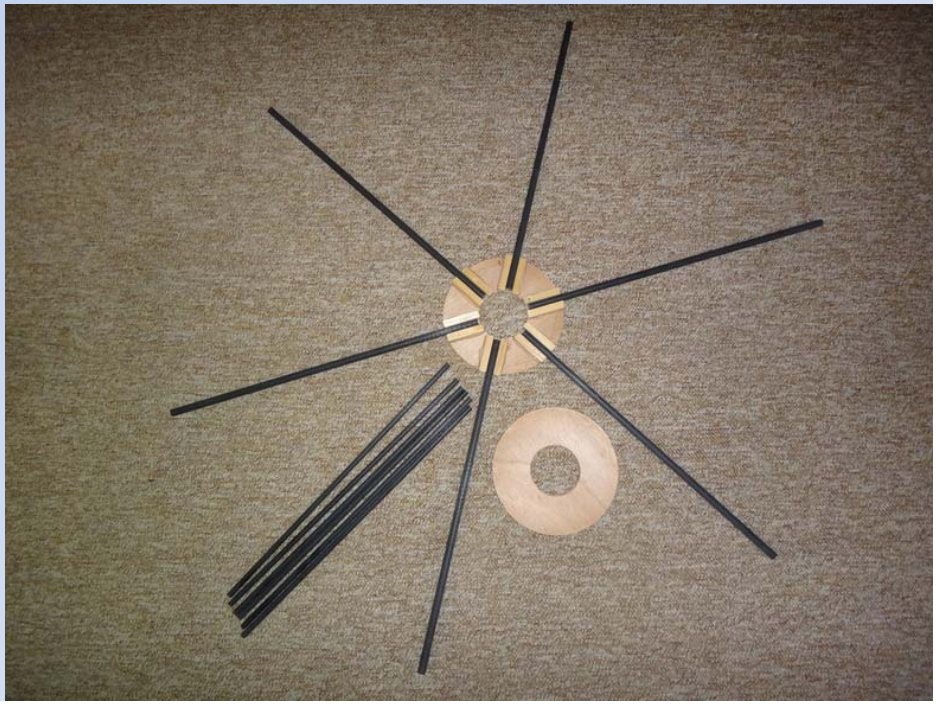
Simple 6m directional antennas

The Hexbeam (2 ele)

Small turning radius (< 3’)





Contact me for construction information

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Simple Directional Antennas 2m+

Quagi – Lightweight, portable

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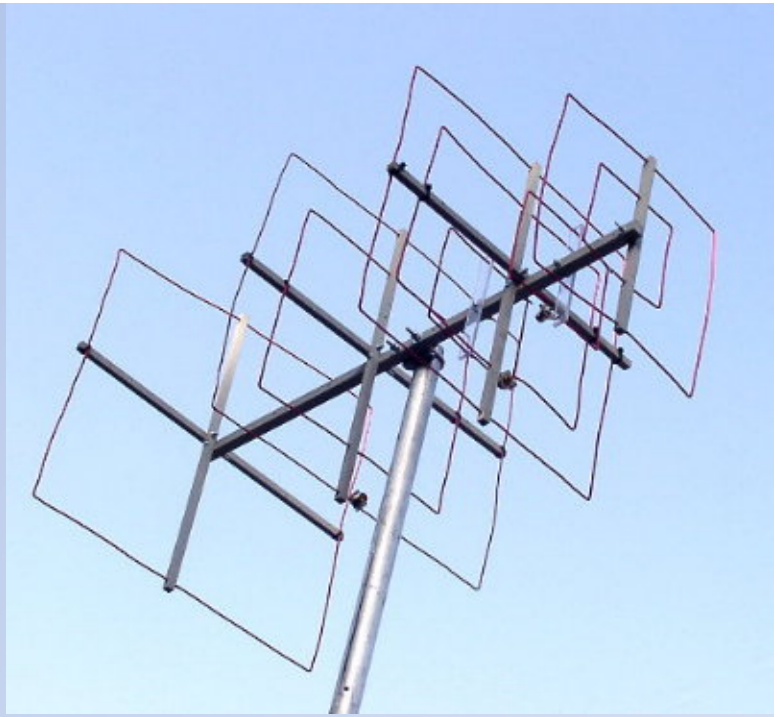
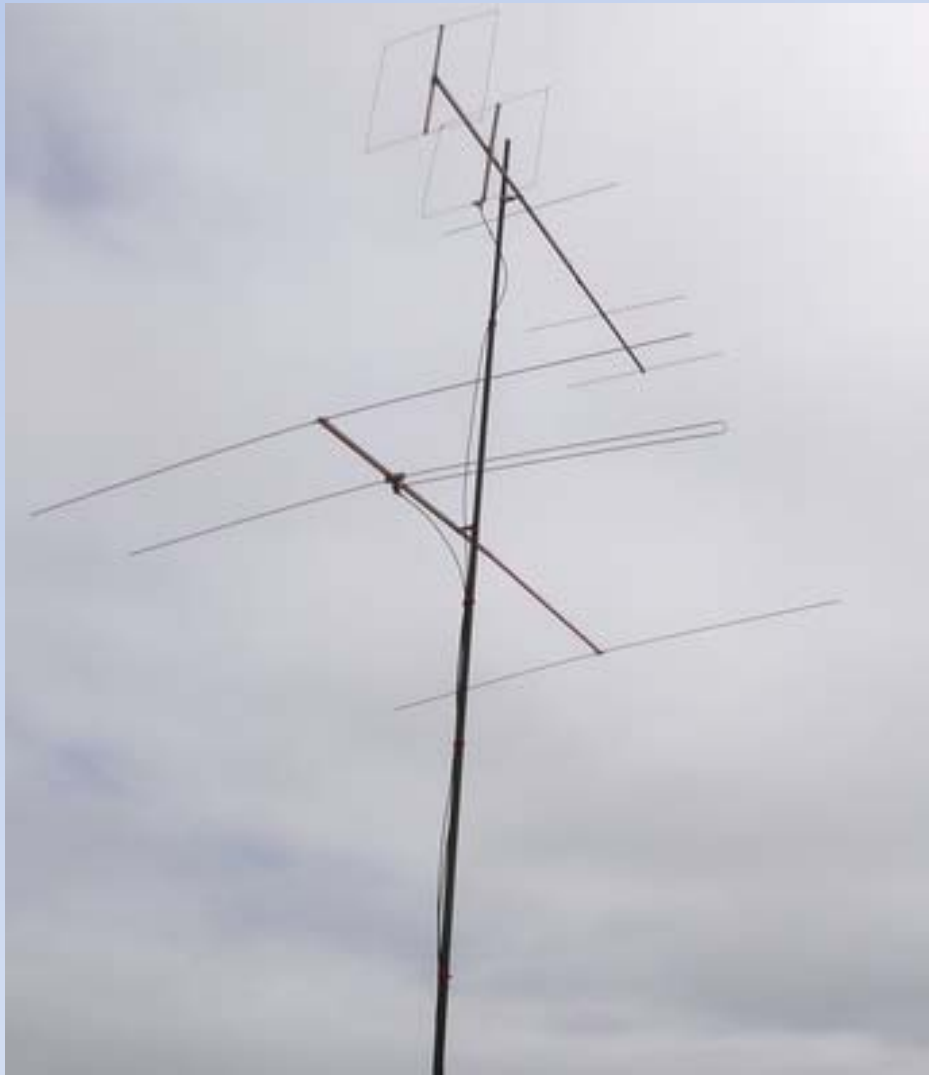
Simple Directional Antennas 2m+

The Quad:



Simple Directional Antennas 2m+

“Cheap Yagi” http://www.wa5vjb.com/yagi-pdf/cheapyagi.pdf



Or…Yagis

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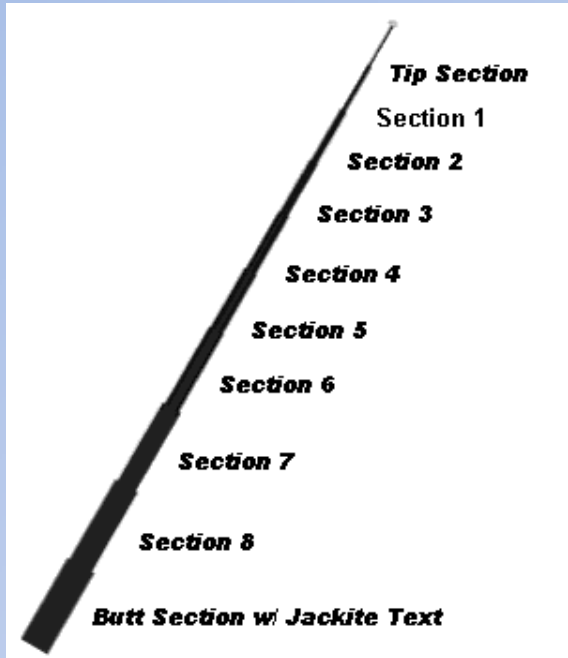
Masts: Fiberglass mast

Jackkite flag pole 31’ (~25’ usable) about $75



Telescoping antenna mast

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Cockpit Information

- Stand-alone GPS

  (Ideally, waypoints programmable via lat/long coordinates)
- Maidenhead grid (GPSTest app on old smartphone)
- Altimeter (phone app)?
- 24 hour UTC clock
- Suitable lighting
- Voltage monitor?

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Logging

- Paper! (Almost necessary for solo operation)
  Build or buy a kneeboard
- Computer (with driver)
- Tape Recorder (tedious transcription afterward)
- Hybrid: Recorder + Paper
  (Possibly not legal for CQ contest)

Paper logging:

- Safety first…Don't do in-motion logging unless you have thoroughly trained for it
- Transcribed paper logs submitted through WA7BNM Cabrillo Web Form site

The REAL secret for successful roving…

Planning, Planning, Planning

The Internet has revolutionized rover planning

Google maps: an incredible resource

- Terrain
- Street view
- Myplaces personal maps
- Route timing

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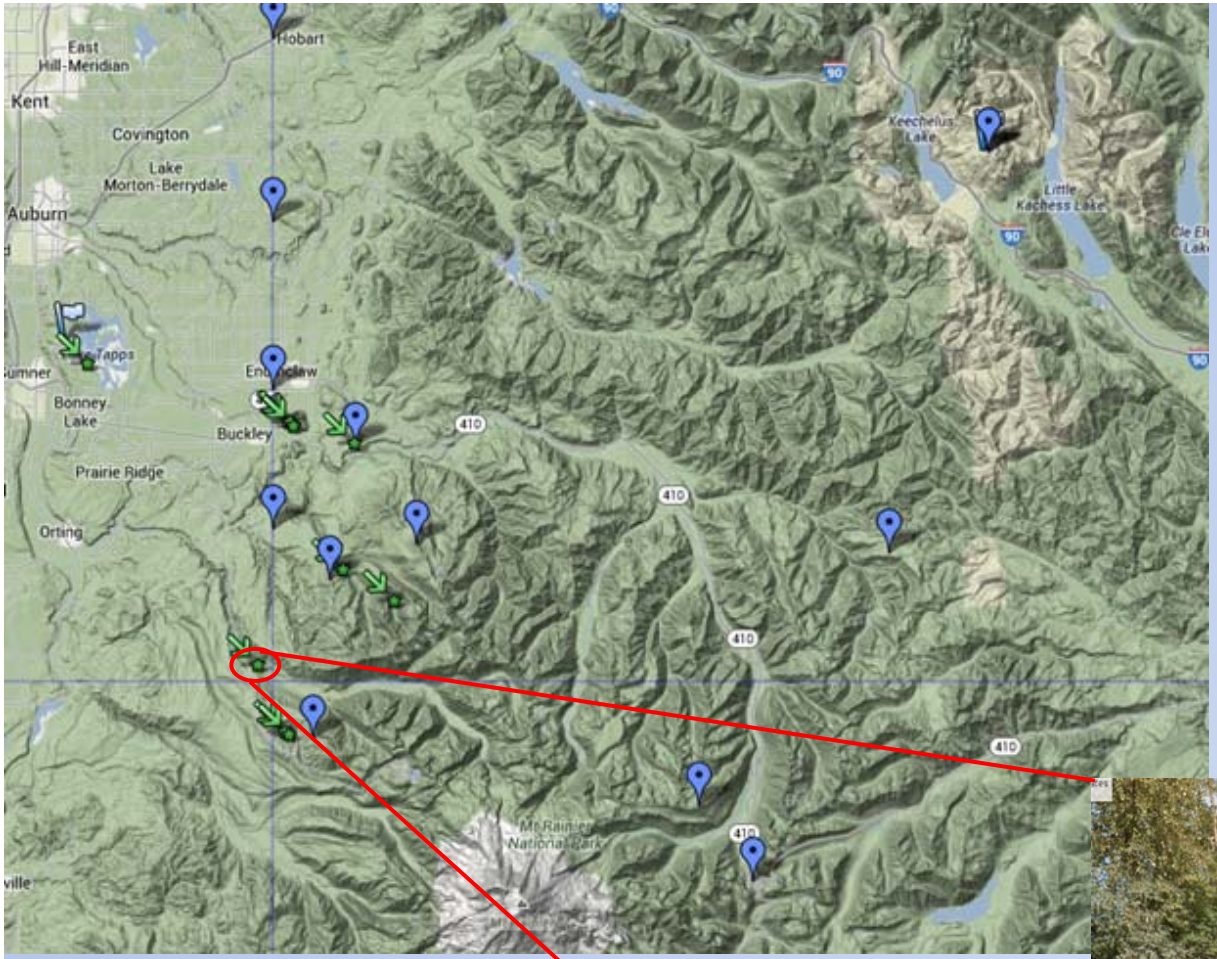

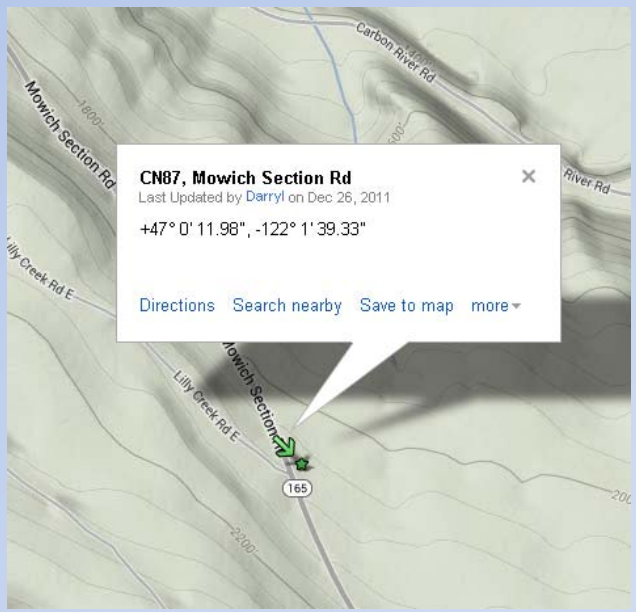

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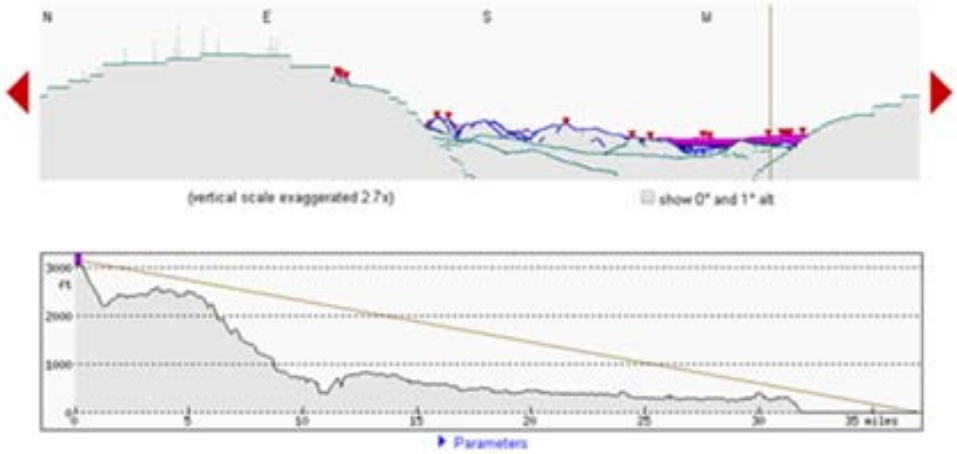
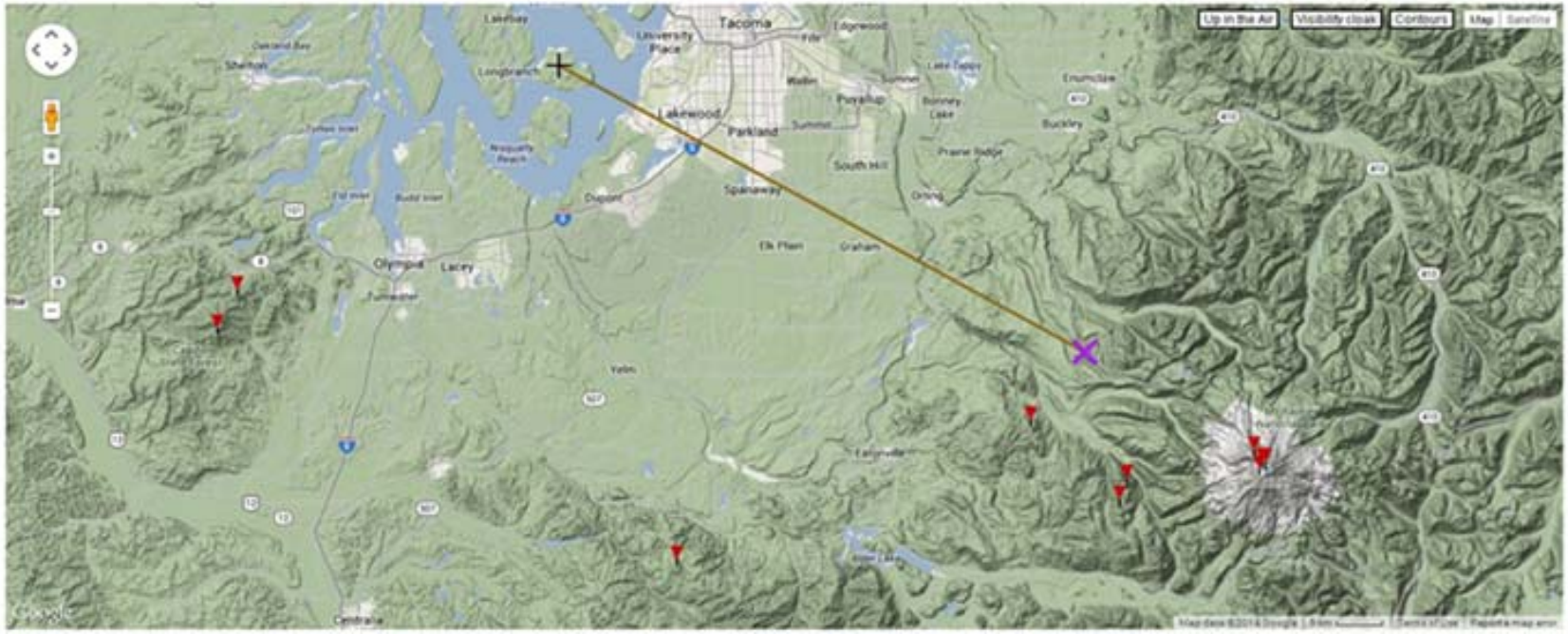
http://www.heywhatsthat.com/

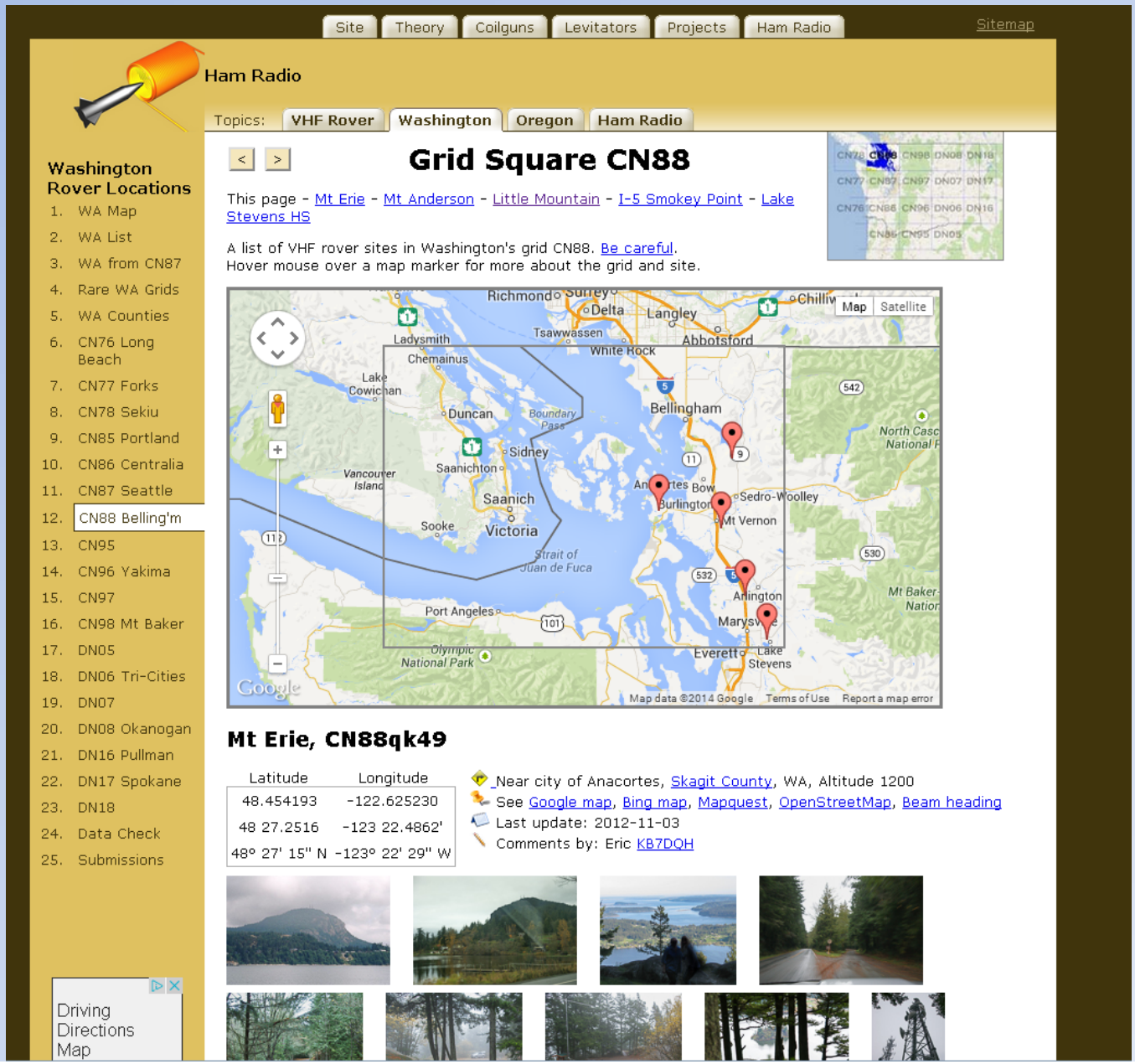




K7BWH's rover web site (for Washington and Oregon)

http://www.coilgun.info/rover_wa/

Contribute new rover locations through a web form



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DAY 1:

Home

1. **CN76 Ocean Shores @46.998841, -124.144098**
2. **CN77 Ocean Shores @47.012062, -124.147719**
3. CN77-CN87 Hoquiam (Alt) @47.057857, -123.999993
4. CN87-CN86 Hoquiam (alt) @46.999997, -123.904454
5. CN86-CN87 Elma @47.000012, -123.408272
6. CN87-CN86 border Tumwater @46.999690, -122.912342
7. **CN86 China Garden Road @46.019301, -122.782412**
8. **CN85 1785' spot (Larry's property) @45.979347, -122.753753**
9. **CN85-CN95 @45.635966, -121.999980**
10. **CN95 N. Bonneville spot 1 @45.642008, -121.985687**
11. CN85-CN95 @45.635966, -121.999980
12. CN85--CN86 (N) @45.999999, -122.842290
13. Motel 6 Centralia: 1310 Belmont Ave, Centralia, WA (360) 330-2057

DAY 2:

Motel 6 Centralia: 1310 Belmont Ave, Centralia, WA (360) 330-2057

14. CN86-CN87 border Tumwater @46.999690, -122.912342
    CN87 Mowich Lake Rd @+47° 0' 11.98", -122° 1' 39.33"
15. **CN96 Mowich Lake Rd @ 46.951478, -121.983840**
    CN86 Mowich Lake Rd @46.959528, -122.001302
    CN87 Mowich Lake Rd @+47° 0' 11.98", -122° 1' 39.33"
16. CN87--CN97 boundary @47.191987, -121.999925
17. **CN97--Mud Mtn pullover @47.154675, -121.921143**
18. Black Dia CN87-CN97 @47.301614, -121.999919
19. CN88-CN87 Border Hwy 204 @48.000016, -122.112954
20. **Lake Stevens HS CN88 @48.022941, -122.079263**

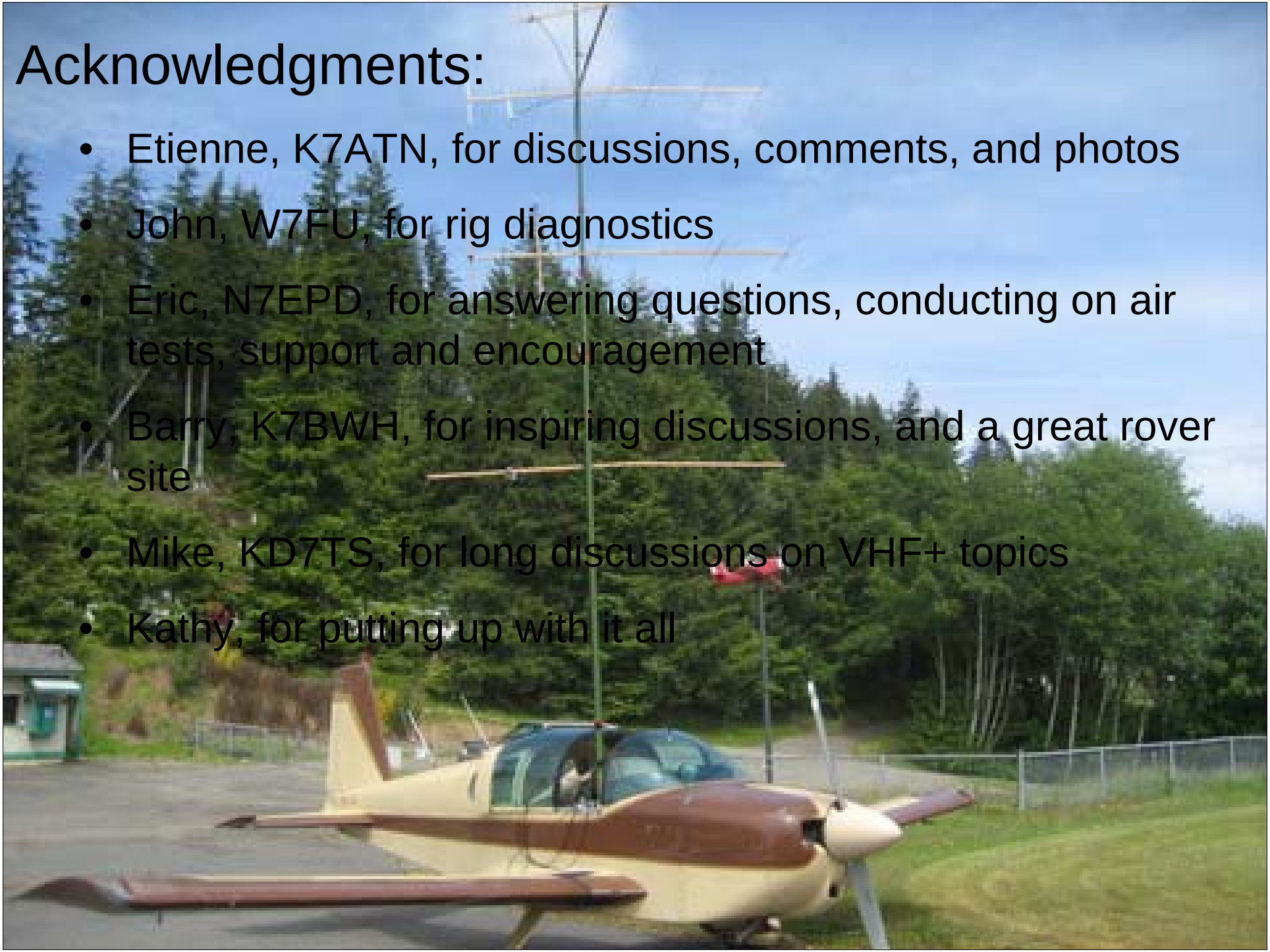
			Begin	End	Set-u	Op	dow	Next
Saturday		Start	09:00 AM					
--	Home		08:00 AM	08:00 AM	0	0	0	165
CN76	Ocean Shor	16'	11:00 AM	12:15 PM	15	75	5	5
CN77	Ocean Shor	15'	12:30 PM	01:45 PM	5	75	5	20
CN77-CN87	Hoquiam	--	02:10 PM	02:15 PM	0	5	0	10
CN87-CN86	Hoquiam	--	02:25 PM	02:25 PM	0	0	0	35
CN86-CN87	Elma	--	03:00 PM	03:00 PM	0	0	0	30
CN87-CN86	Tumwater	--	03:30 PM	03:30 PM	0	0	0	80
CN86	Kalama, WA	1700'	04:55 PM	05:55 PM	5	60	5	20
CN85	Kalama, WA	1785'	06:25 PM	07:40 PM	5	75	5	70
CN85-CN95	Bonneville		08:55 PM	08:55 PM	0	0	0	5
CN95	Bonneville	100'	09:05 PM	10:05 PM	5	60	5	5
CN85-CN95	Bonneville		10:15 PM	10:15 PM	0	0	0	65
CN85-CN86	Kalama, WA		11:20 PM	11:20 PM	0	0	0	50
Hotel	Centralia	--	12:10 AM	12:10 AM	0	0	0	
Sunday			06:15 AM					
Hotel (CN86)	Centralia	--	06:15 AM	06:15 AM	0	0	0	20
CN86-CN87	Tumwater	--	06:35 AM	06:35 AM	0	0	0	75
CN87-CN86	Carbonado	2050'	07:50 AM	07:50 AM	0	0	0	15
CN96	Carbonado	3200'	08:10 AM	09:35 AM	5	85	5	5
CN86	Carbonado	2800'	09:50 AM	10:35 AM	5	45	5	10
CN87	Carbonado	2050'	10:55 AM	11:45 AM	5	50	5	30
CN87--CN97	Enumclaw	--	12:20 PM	12:20 PM	0	0	0	15
CN97	**Buckley (M**	**1200'**	**12:40 PM**	**02:05 PM**	**5**	**85**	**5**	**25**
CN97--CN87	Black Diamo	--	02:35 PM	02:35 PM	0	0	0	70
CN87-CN88	Lake Steven	--	03:55 PM	03:55 PM	10	0	0	15

ARRL 100 YEARS

Two challenges for you:

1. Assemble a station & go roving next Saturday!!

2. Learn from your experience, make improvements, & rove again Saturday, July 19 (CQ WW VHF contest)



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- Kathy, for putting up with it all