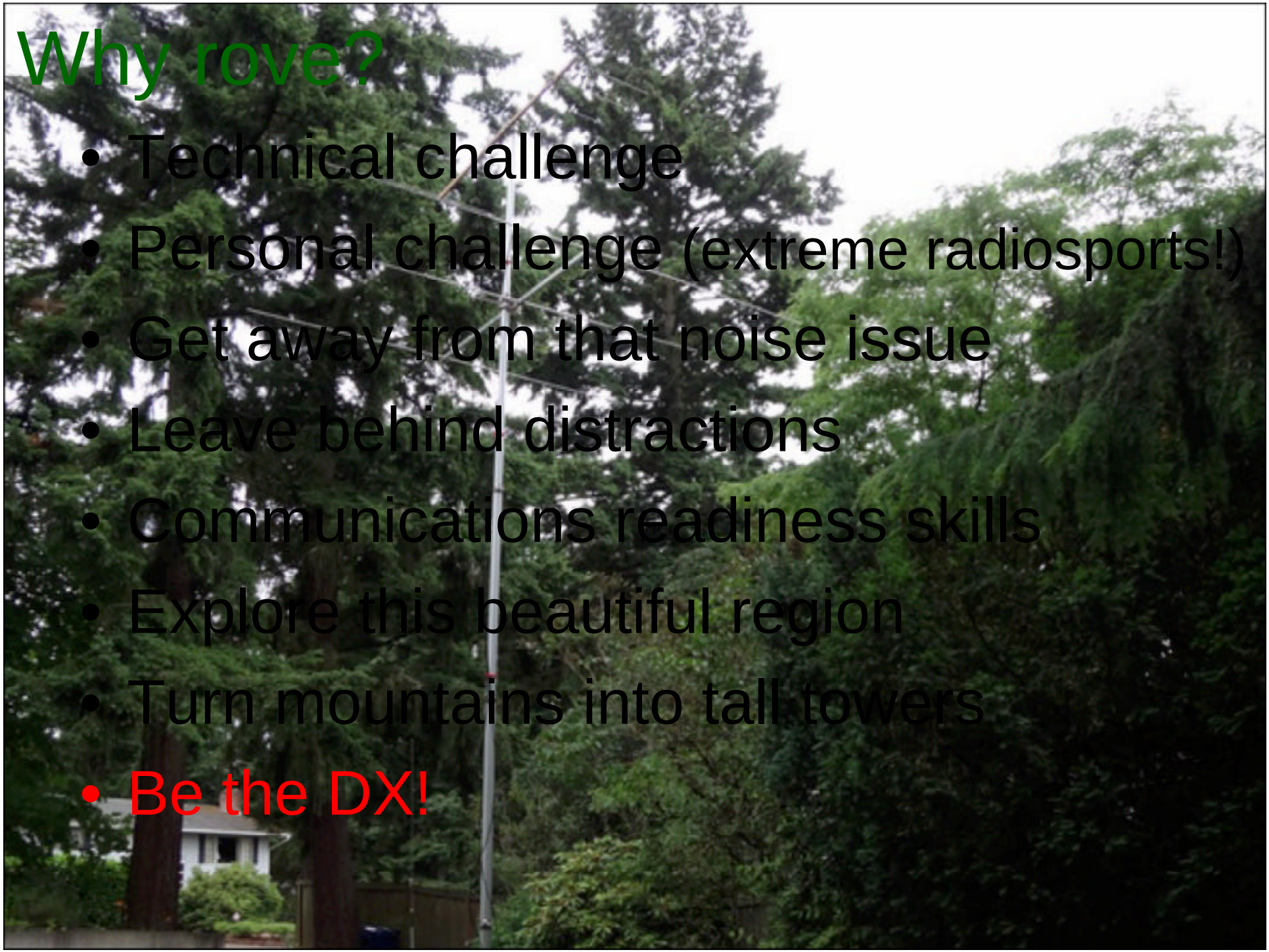
Developing a Limited Rover Station

Darryl Holman

WW7D



Why rove?

- Technical challenge
- Personal challenge (extreme radiosports!)
- Get away from that noise issue
- Leave behind distractions
- Communications readiness skills
- Explore this beautiful region
- Turn mountains into tall towers
- Be the DX!

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 **Limited Rover** (ARRL contests):

Entry-level rover class (cheaper, simpler)

Bottom 4 band only:

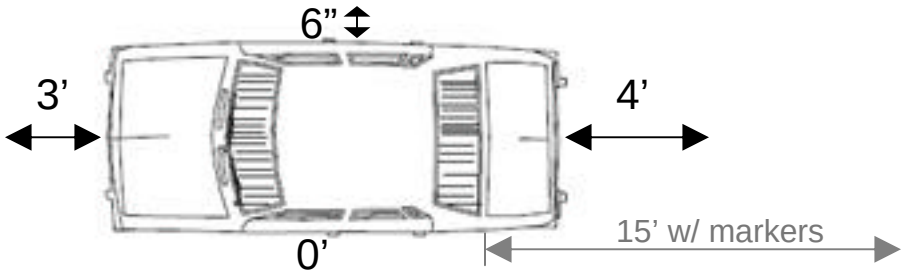
- VHF: 6m, 2m, 222 MHz, 432 MHz
- UHF: 222 MHz, 432 MHz, 902 MHz, 1296 MHz

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 with good equipment availability)
- Limited antenna complexity
  - ➢ While “in motion,” antennas limited by highway height and vehicle overhang laws



  - ➢ Stationary antennas are limited by set-up time, size and weight
- Result: a modest station CAN be competitive

Roving Contests

- ARRL January VHF
- Spring VHF+ Sprints (5 different dates)
- ARRL June VHF
- CQ WW VHF (July, *6m + 2m only*)
- ARRL August UHF
- Fall VHF+ Sprints (5 different dates)*
- ARRL September VHF

*Microwave sprint (903 MHz and above) is next weekend

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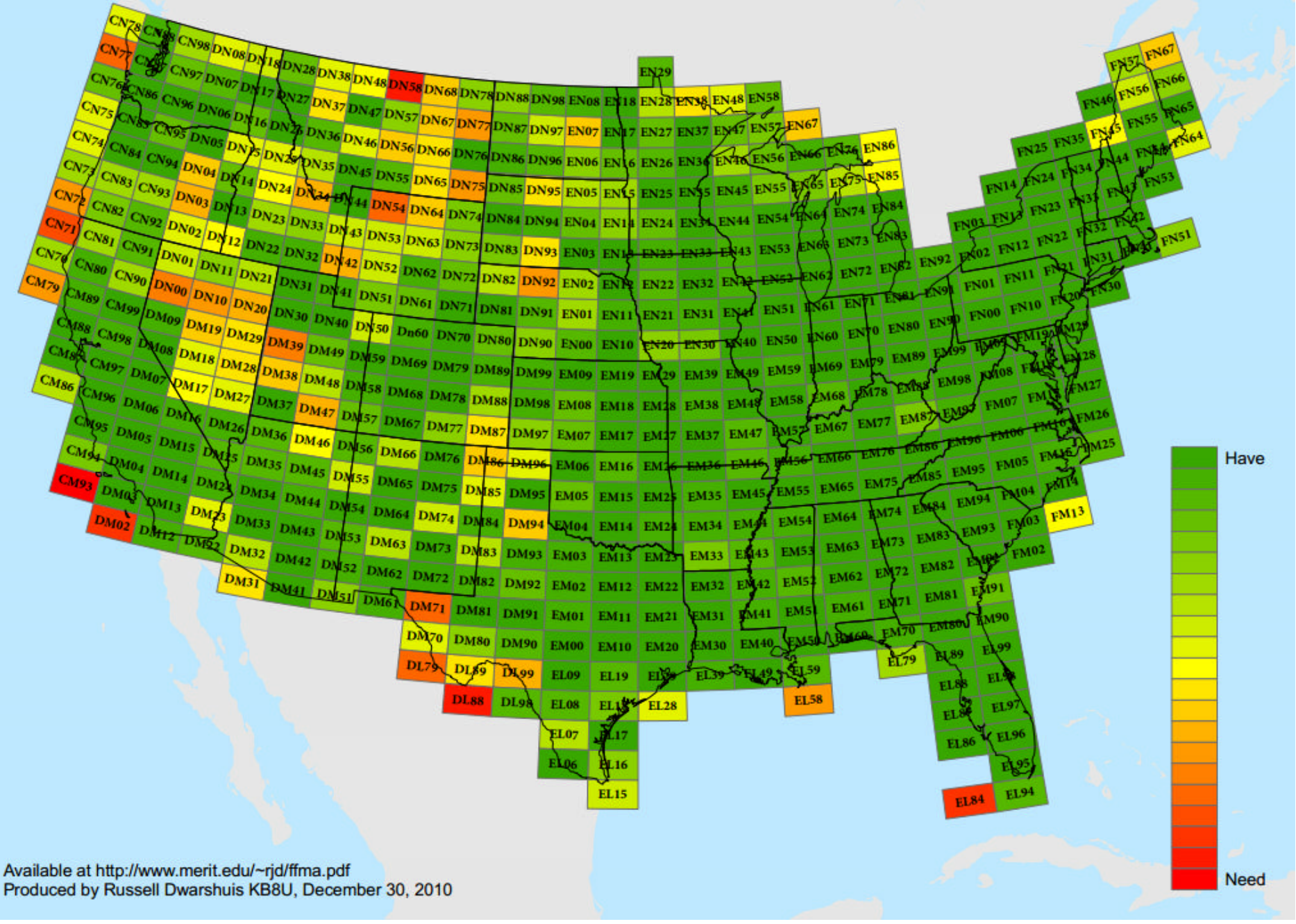
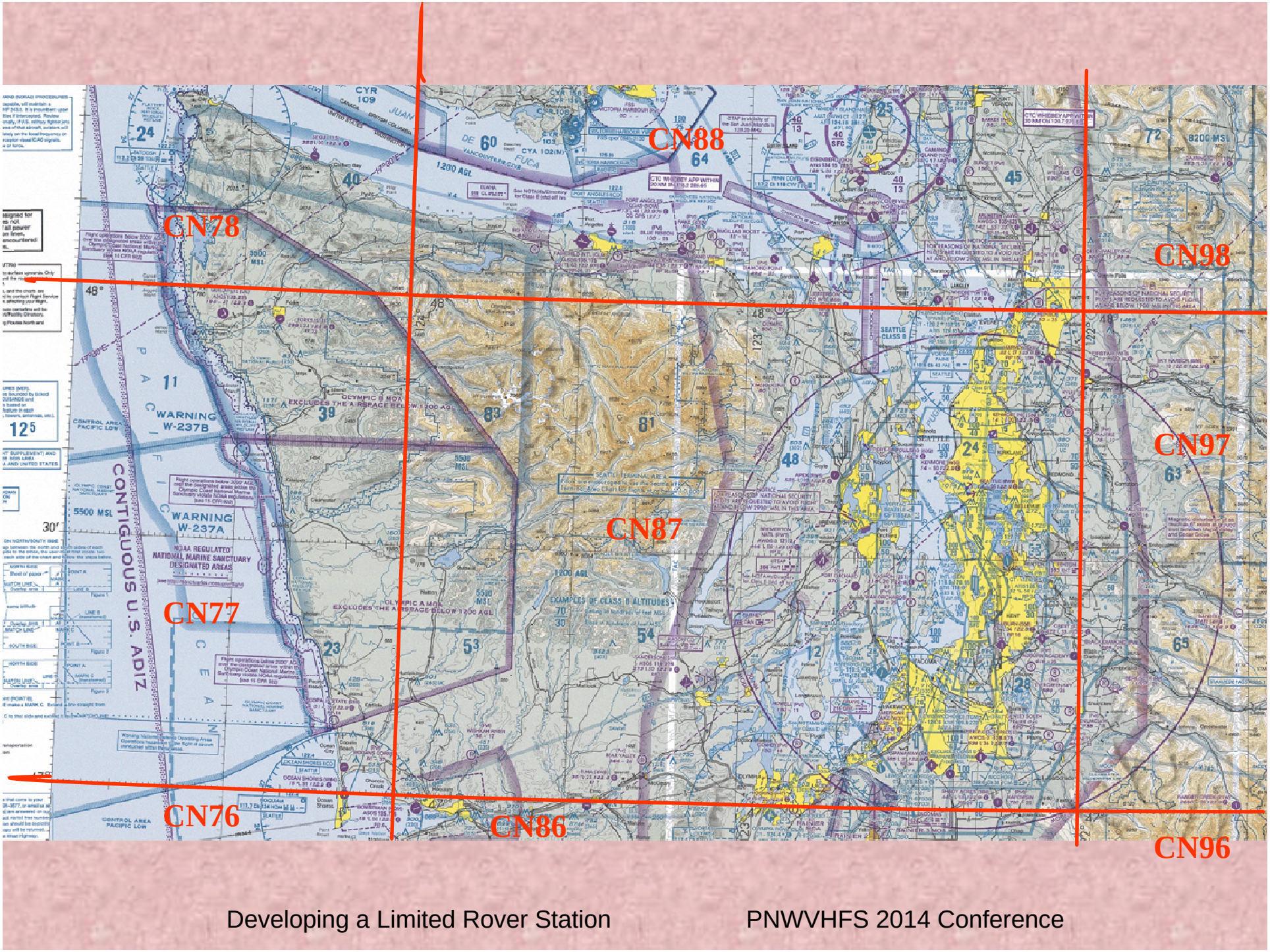
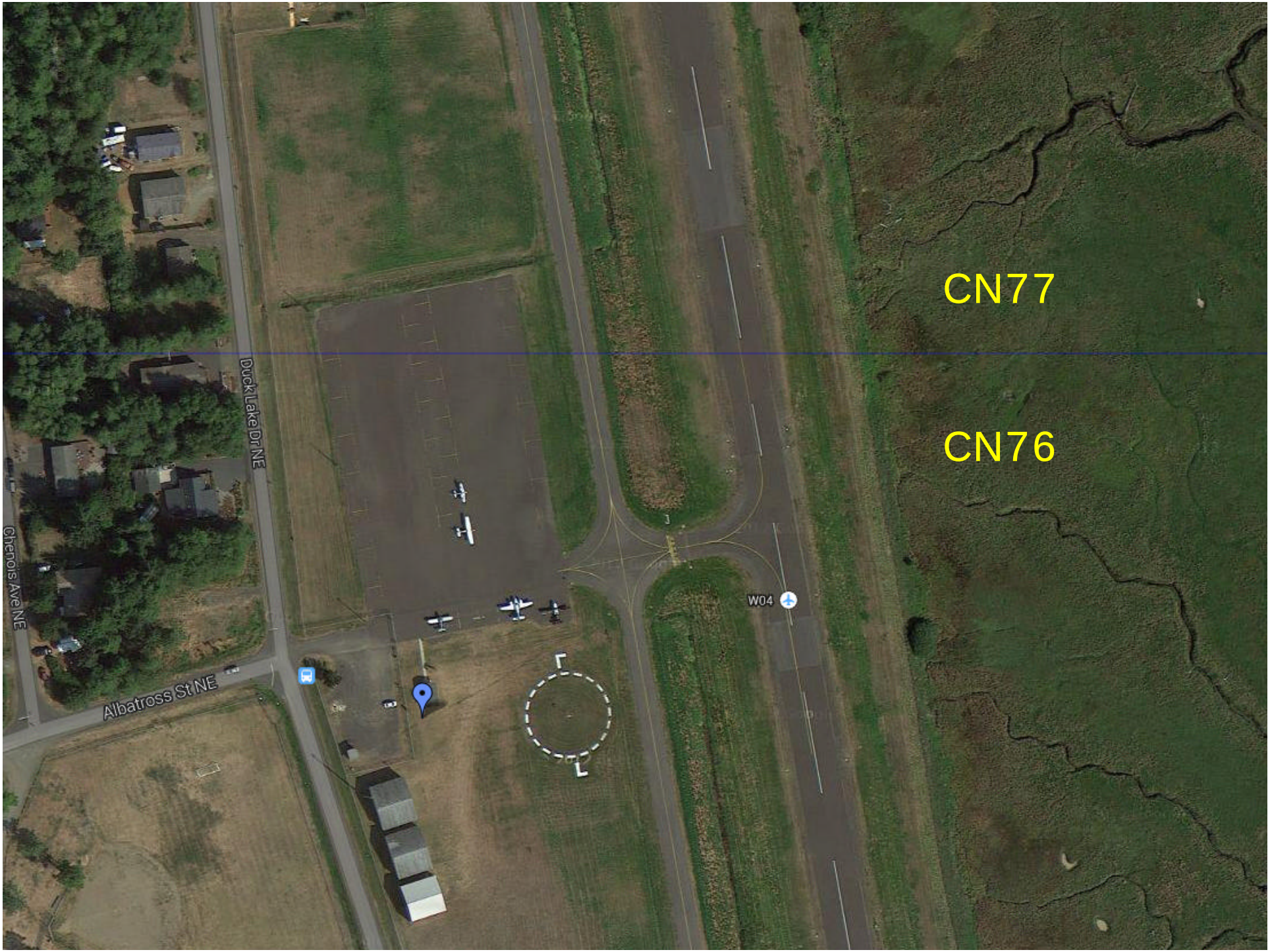
Fred Fish Memorial Award Most Wanted Grids



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

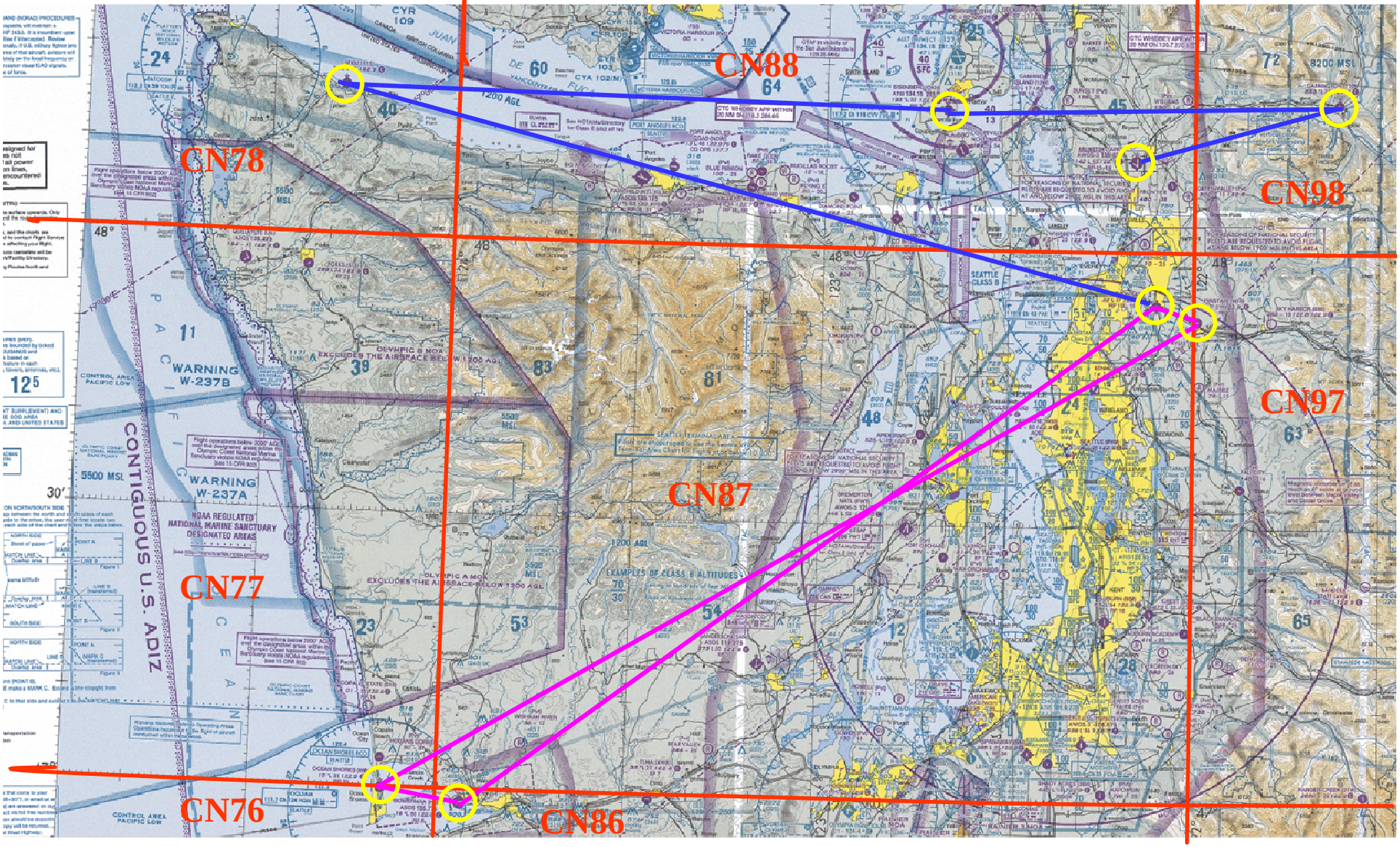

CN88
CN78
CN98
CN97
CN87
CN77
CN76
CN86
CN96
CONTIGUOUS U.S. ADIZ
WARNING W-237B
WARNING W-237A
NOAA REGULATED NATIONAL MARINE SANCTUARY DESIGNATED AREAS
OLYMPIC A MOA
SEATTLE CLASS B
SEATTLE TERMINAL AREA
EXAMPLES OF CLASS B ALTITUDES
CONTROL AREA PACIFIC LOW
5500 MSL
9500 MSL
1200 AGL


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

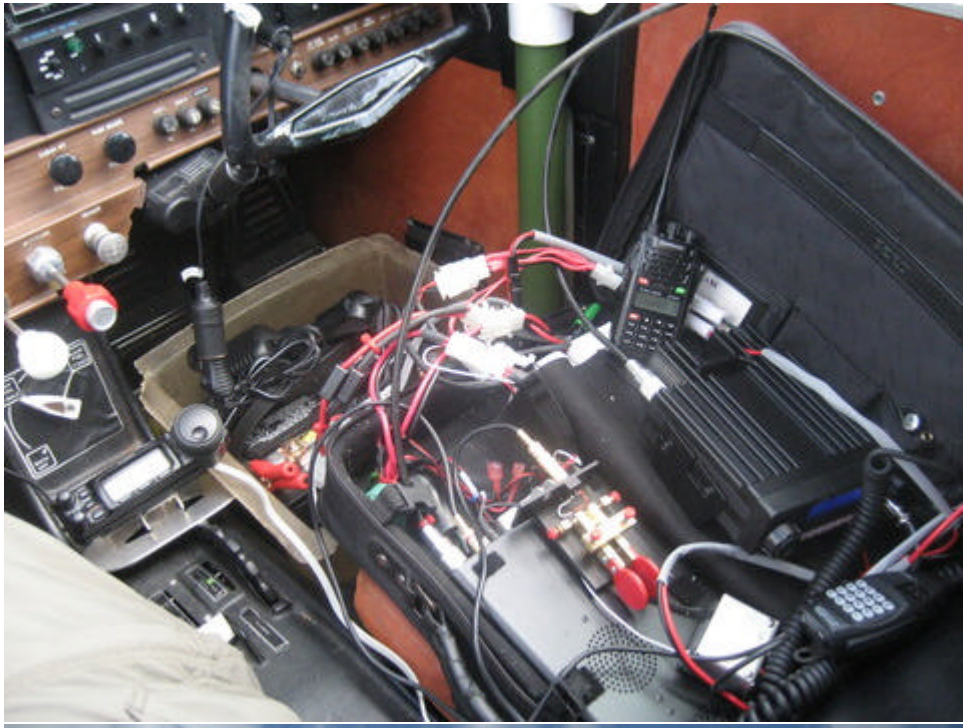

CN77
CN76
Duck Lake Dr NE
Chenois Ave NE
Albatross St NE
W04

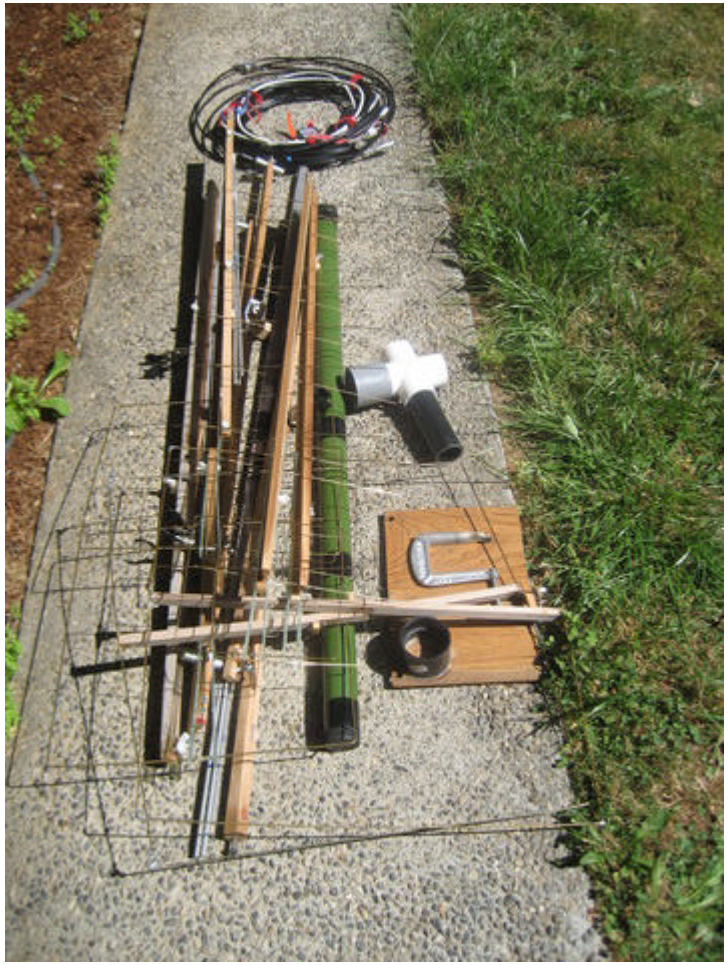
2011 June ARRL VHF Contest route

Day 1 (—) and Day 2 (—)



Car rover was a modified version of the aero-rover





Developing a Limited Rover Station

PNWVHFS 2014 Conference

2011 ARRL September VHF Contest

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

2011 ARRL September VHF Contest

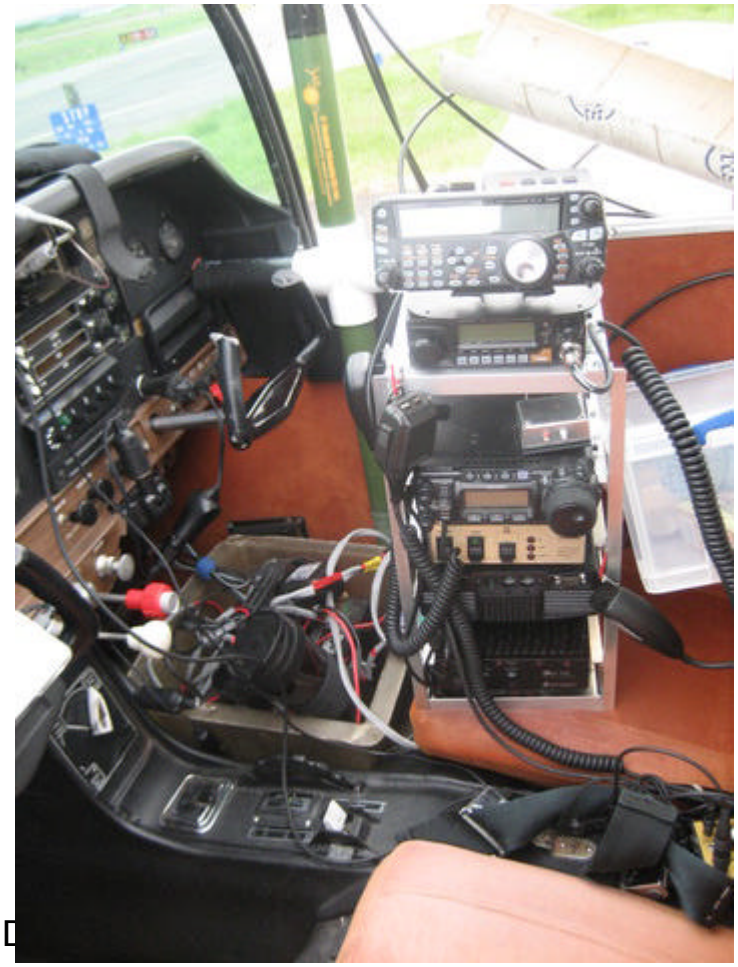
Mast toppled on a gravel road…not too much damage.

2012 ARRL January VHF Contest

Goal: Develop a more specialized car rover

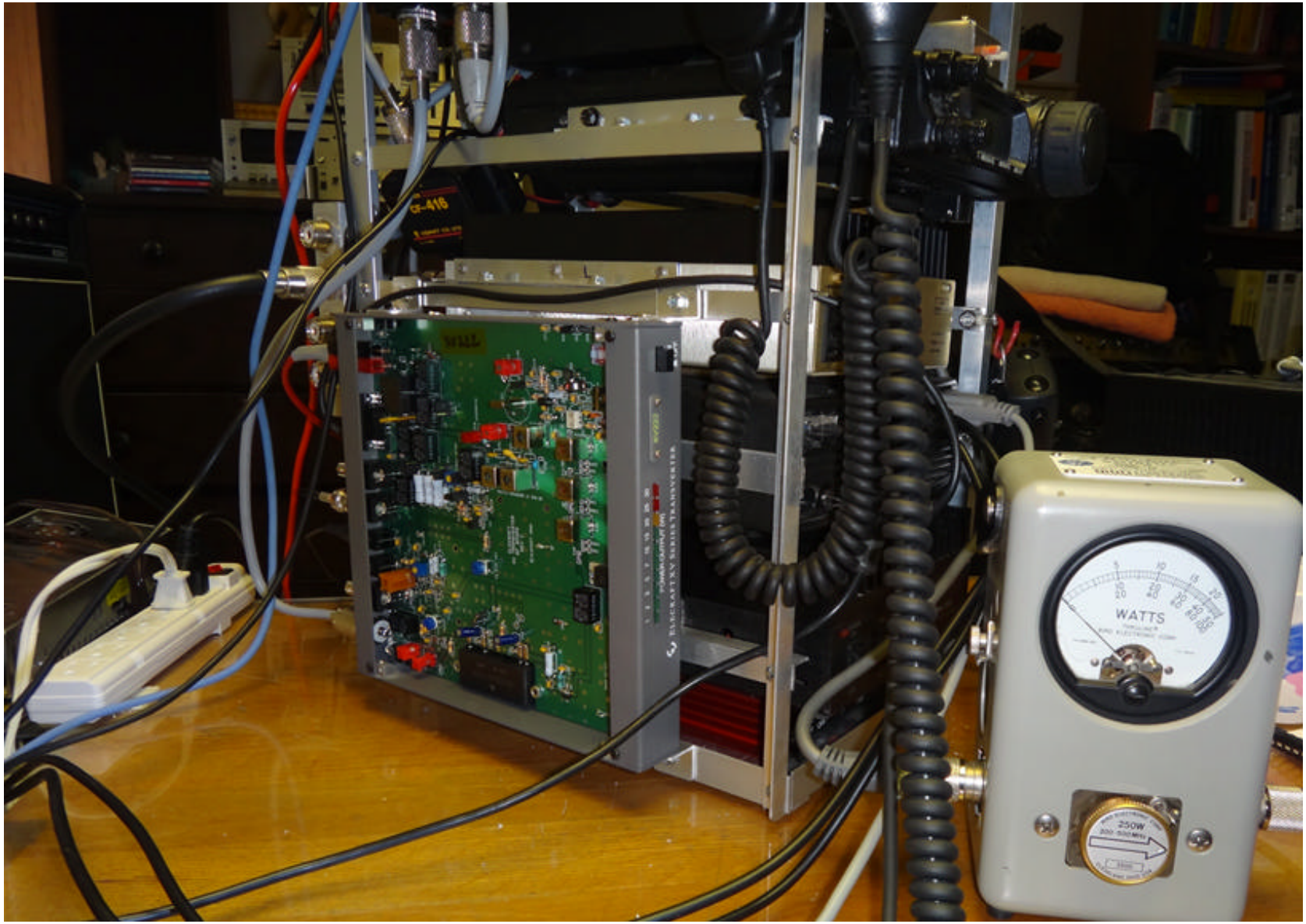
2012 ARRL June VHF Contest

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



2012 ARRL September VHF contest

New: 20 watt Elecraft XV222 transverter for 222 MHz



2013 Spring VHF Sprints:

- New truck (1988 Toyota 4WD)

2013 ARRL June VHF Contest:

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

August 2013 ARRL UHF Contest
Finally…all 4 bands!

PNWVHFS 2014 Conference


Building a limited
rover station

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)

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

Jetstream JT-220M (~$200)

TYT TH-9000 (~$180)

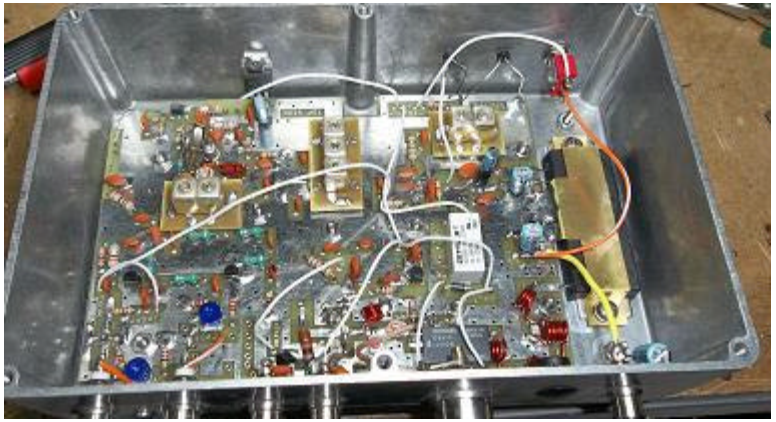
Alinco DR-235TMKIII (~$250)

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

Alternatively (or additionally):

Add a 222 Mhz Transverter (for SSB & CW)

Elecraft XV-222 kit ($400)



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

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

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

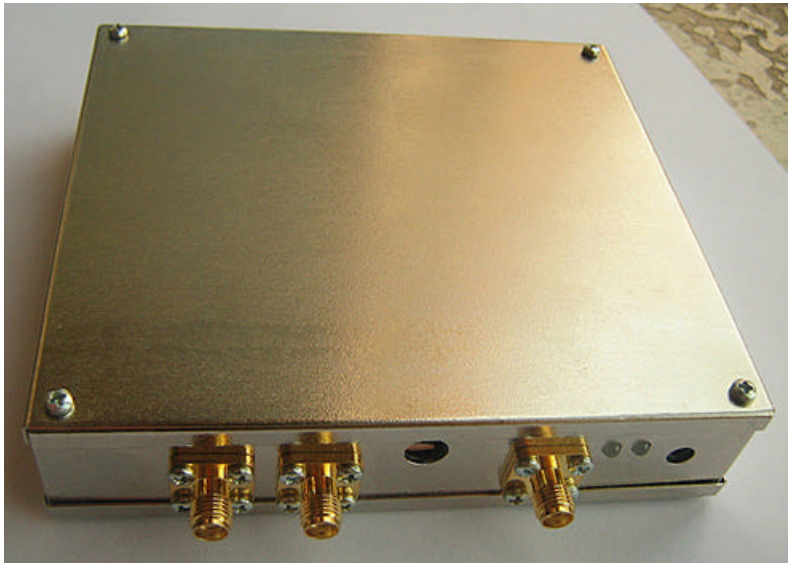
902 MHz & 1296 MHz for the UHF contest (and sprints)

- SSB/CW: Transverters ($200+)

Microwave Modules 1296 MHz transverter

SSB Electronic LT 33 S, 902 MHz

SG-Lab 1296 MHz Transverter



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

- 902 MHz FM: Commercial equipment Motorola, GE, Kenwood (927.5 MHz or, if possible, 903.2 MHz).

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

Motorola Spectra

Alinco DJ-G29T (902 Mhz + 222 MHz)

- 1296 MHz FM: ham rigs (use 1296.2 MHz)

ICOM IC-1201

Alinco DJ-G7 tribander with 1296 MHz

Rig accessories

- Keyer

K1EL Winkeyer

HamGadgets MK-1

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

W5JH portable paddle

LDG SLS-2 RJ-45 Mic switch

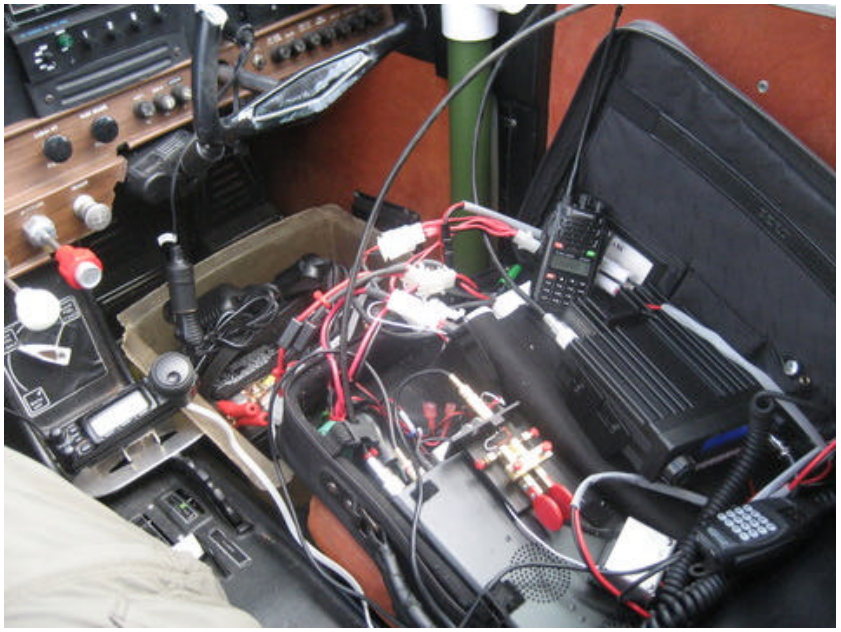
Tip:

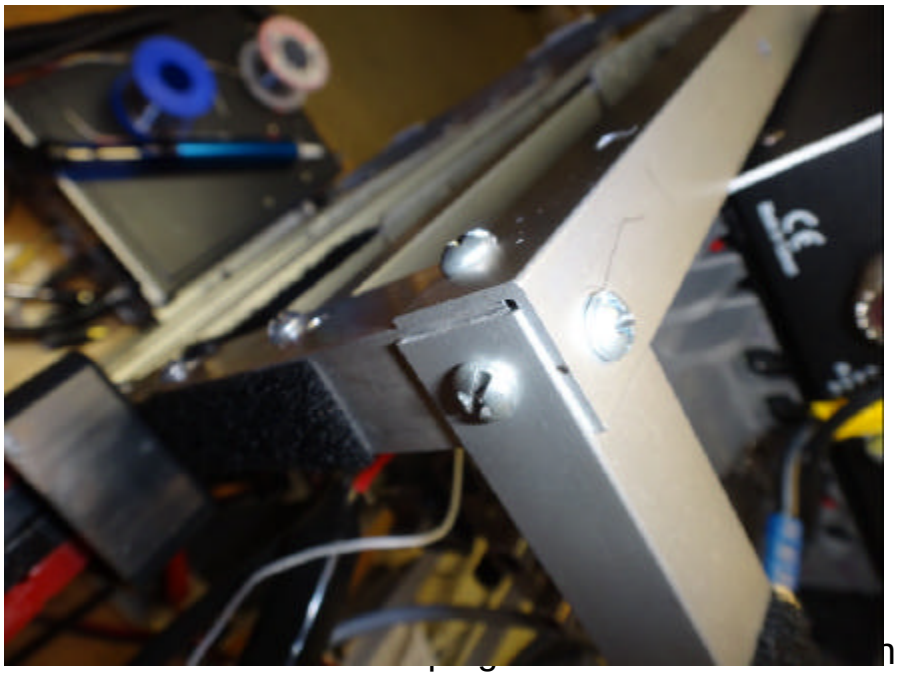
Use memory chaining for the Winkeyer

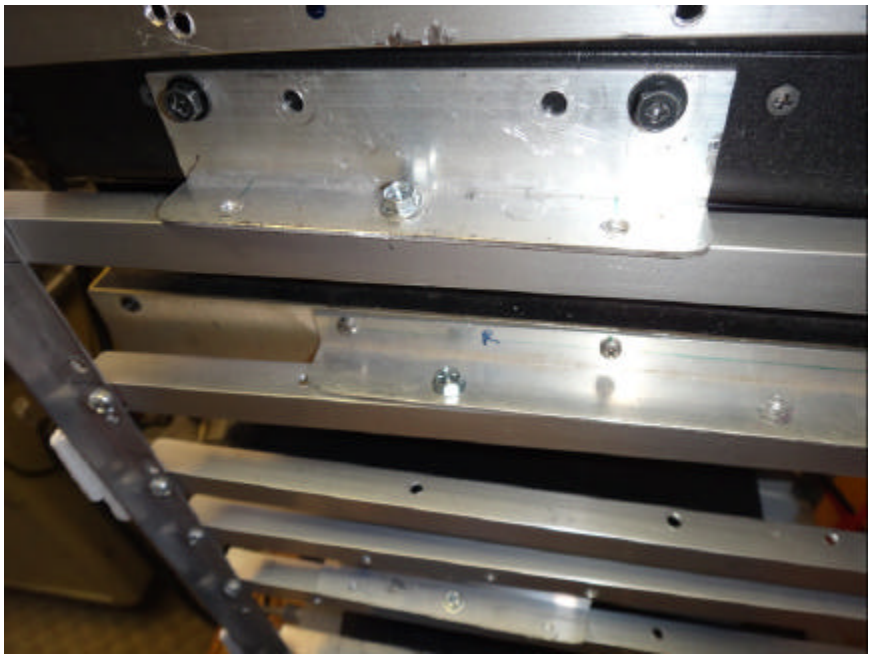
M1: WW7D//R	**# WW7D/R**
M2: CN96	**# Current Grid – Change as required**
M3: TU /C2 K	**# Reply: TU <call M2> K**
M4: R 73	**# Salutation: R 73**
M5: CQ CQ DE /C1 /C2 K	**# CQ CQ DE <call M2><call M1> K**
M6: QRZ DE /C1 /C2 K	**# QRZ DE <call M2><call M1> K**

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

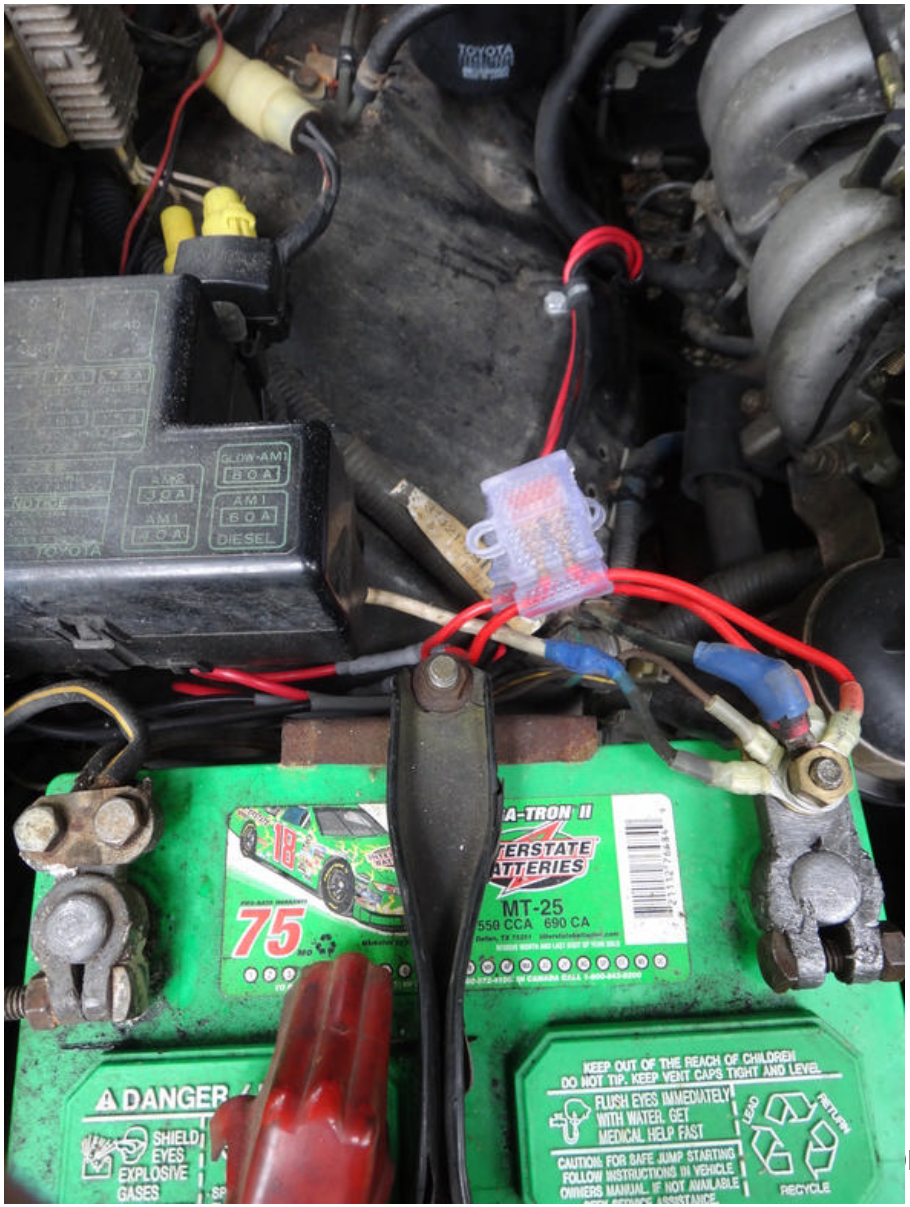
Racking:





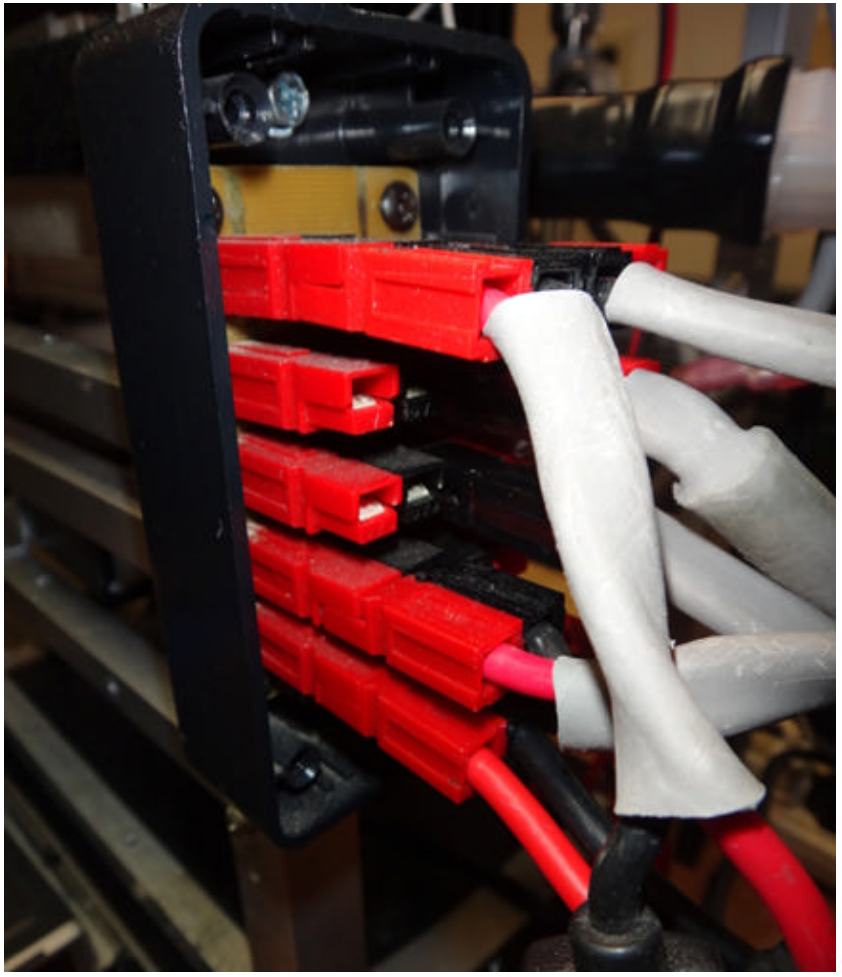


Getting power into the cab:



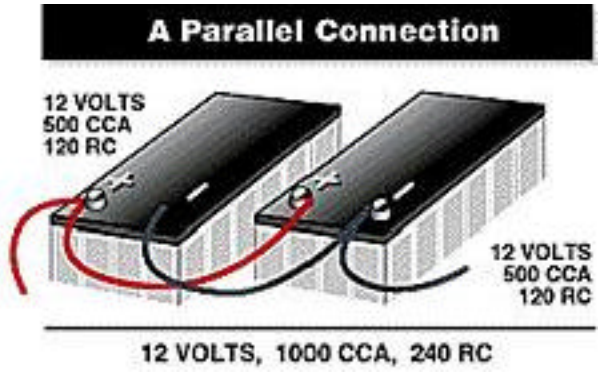

12V 120W
OUTLET
12V 120W
OUTLET


14.6



More advanced power:

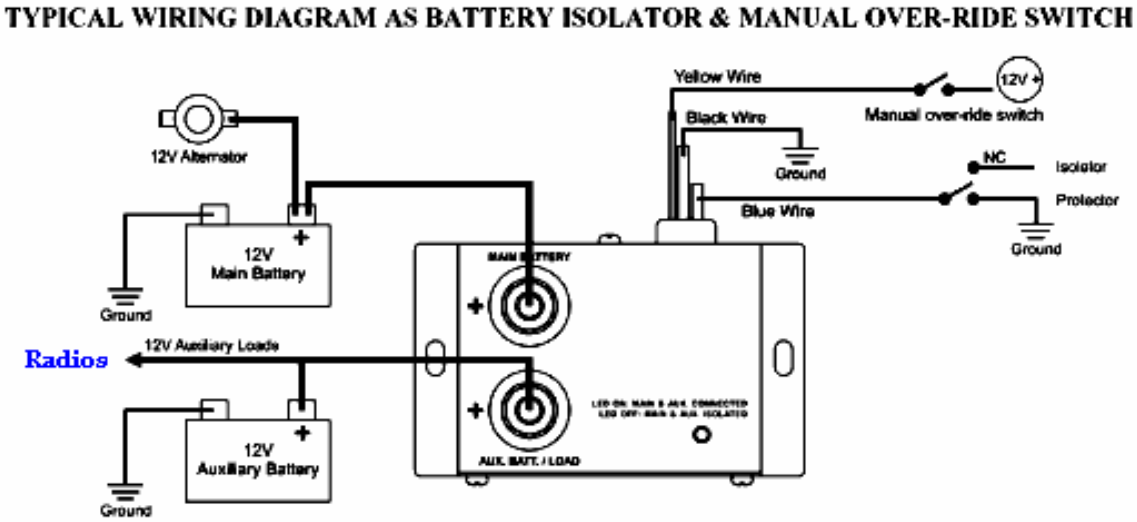
- Parallel second battery
  - Safety: Contained, secured, properly fused
  - Ordinary automobile battery is usually fine
    - Reserve capacity ($\times$ ~2 to 4) will be longer than your stops!
    - e.g. My truck's *Interstate*: RC=100 mins at 25A



    - Use similar batteries (capacities, age)

More advanced power systems:

- Isolators:



- Power boost regulators:

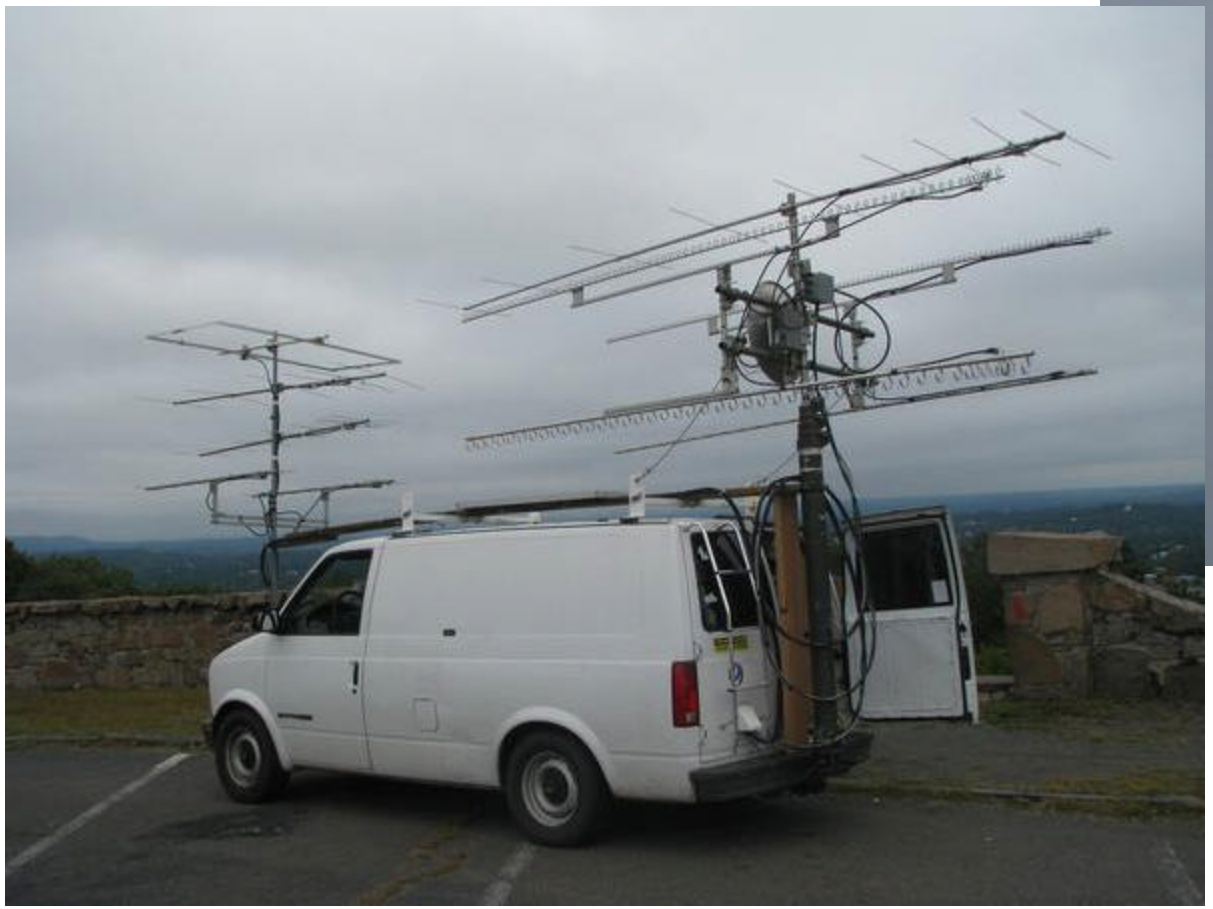
  e.g. N8XJK Super Booster, 40 amps, RF enabled

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.

Simple 6m directional antennas

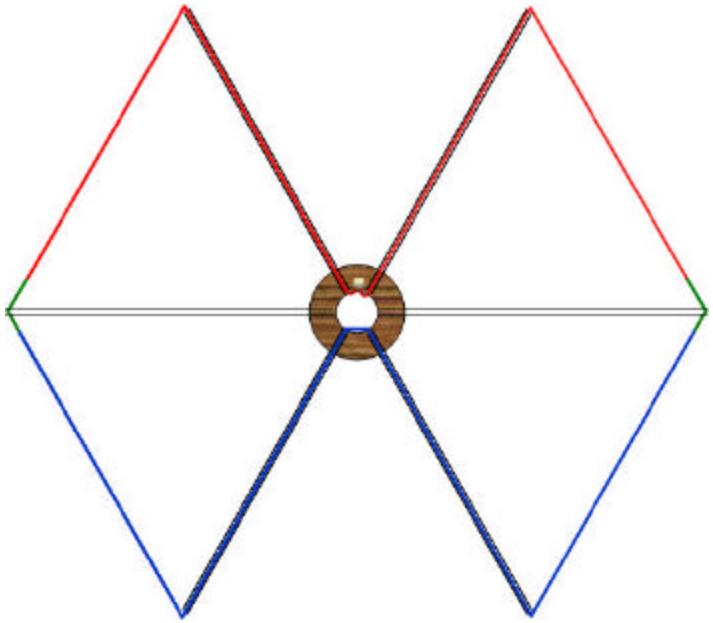
The Moxon (2 ele)

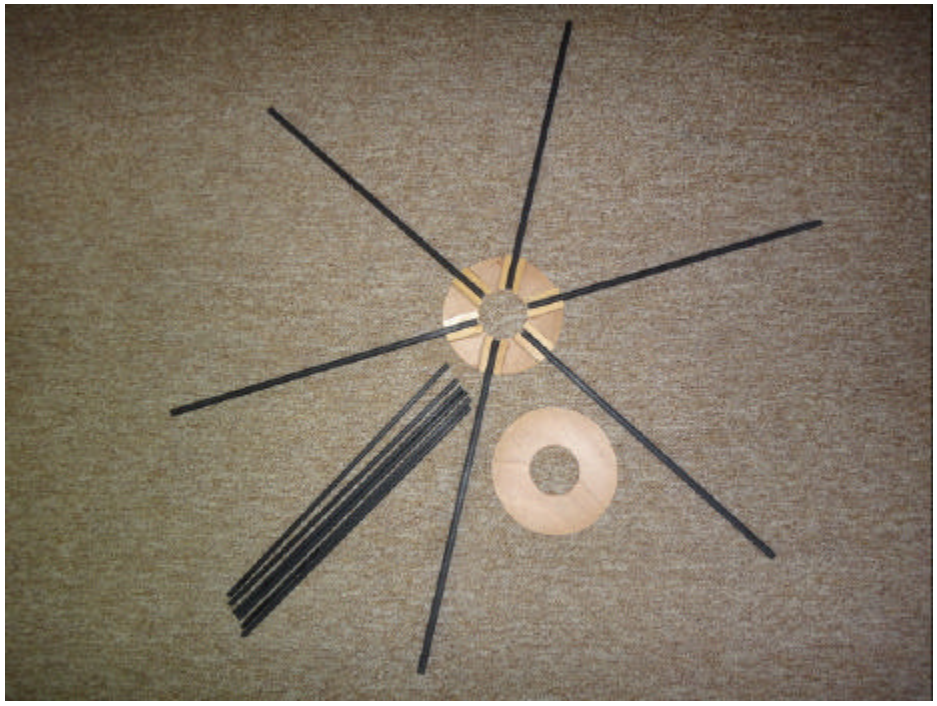


Simple 6m directional antennas

The Hexbeam (2 ele)

Small turning radius (< 3’)





Contact me for construction information

Cockpit Information

- Stand-alone GPS

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

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

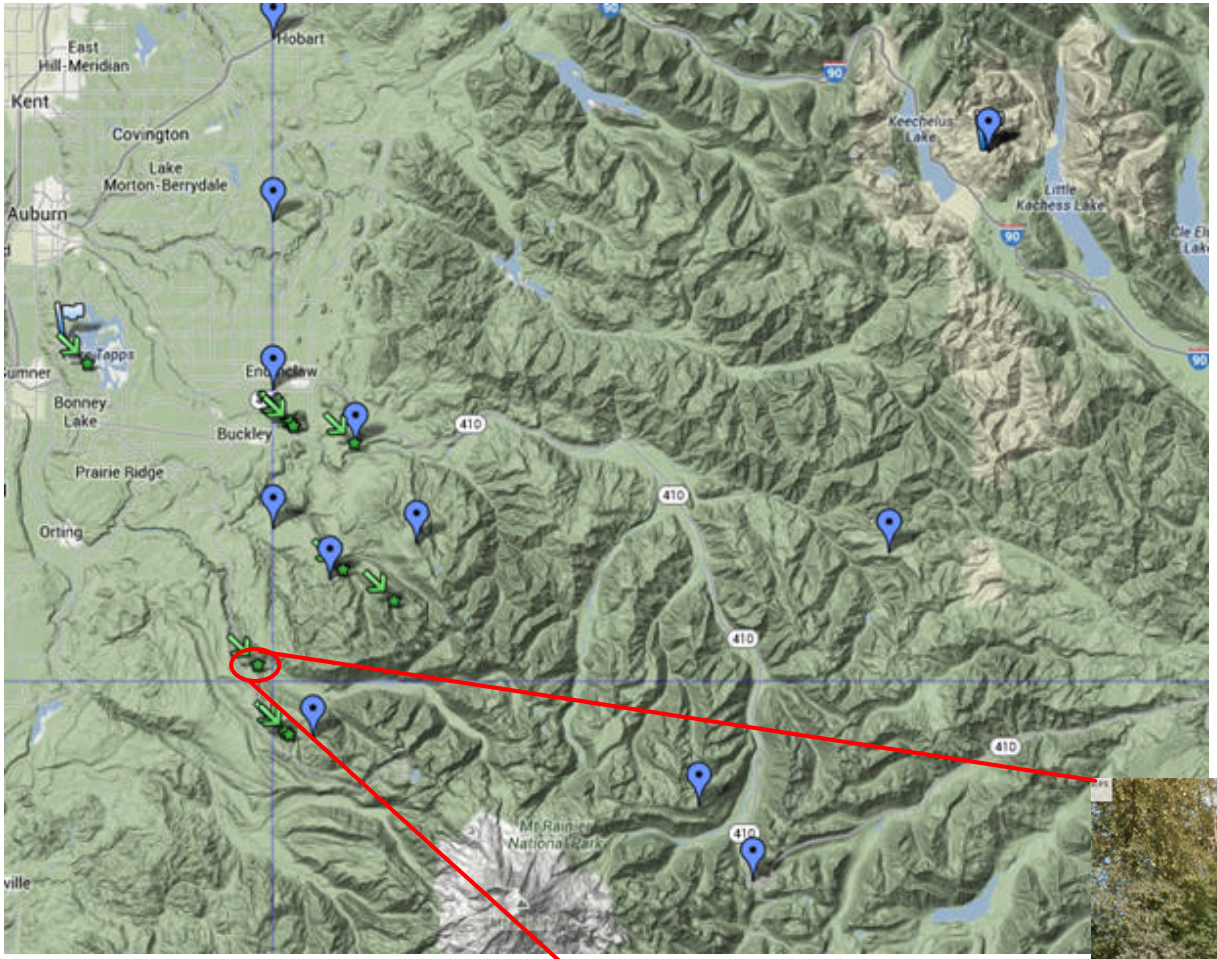
The REAL secret for successful roving…

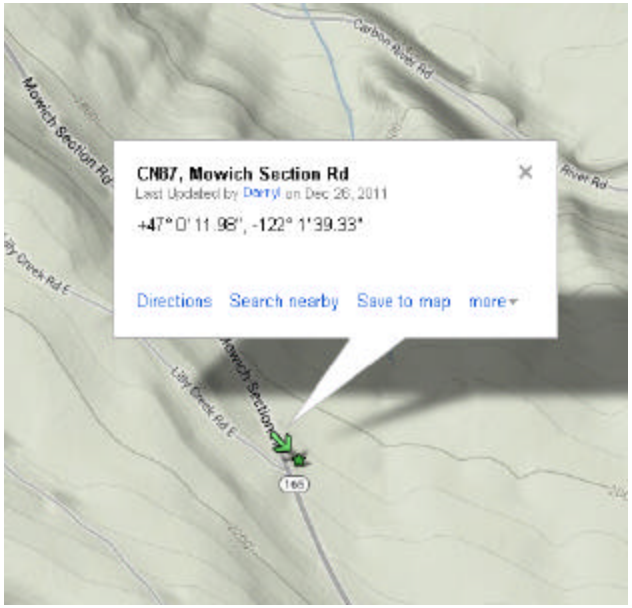
The REAL secret for successful roving…

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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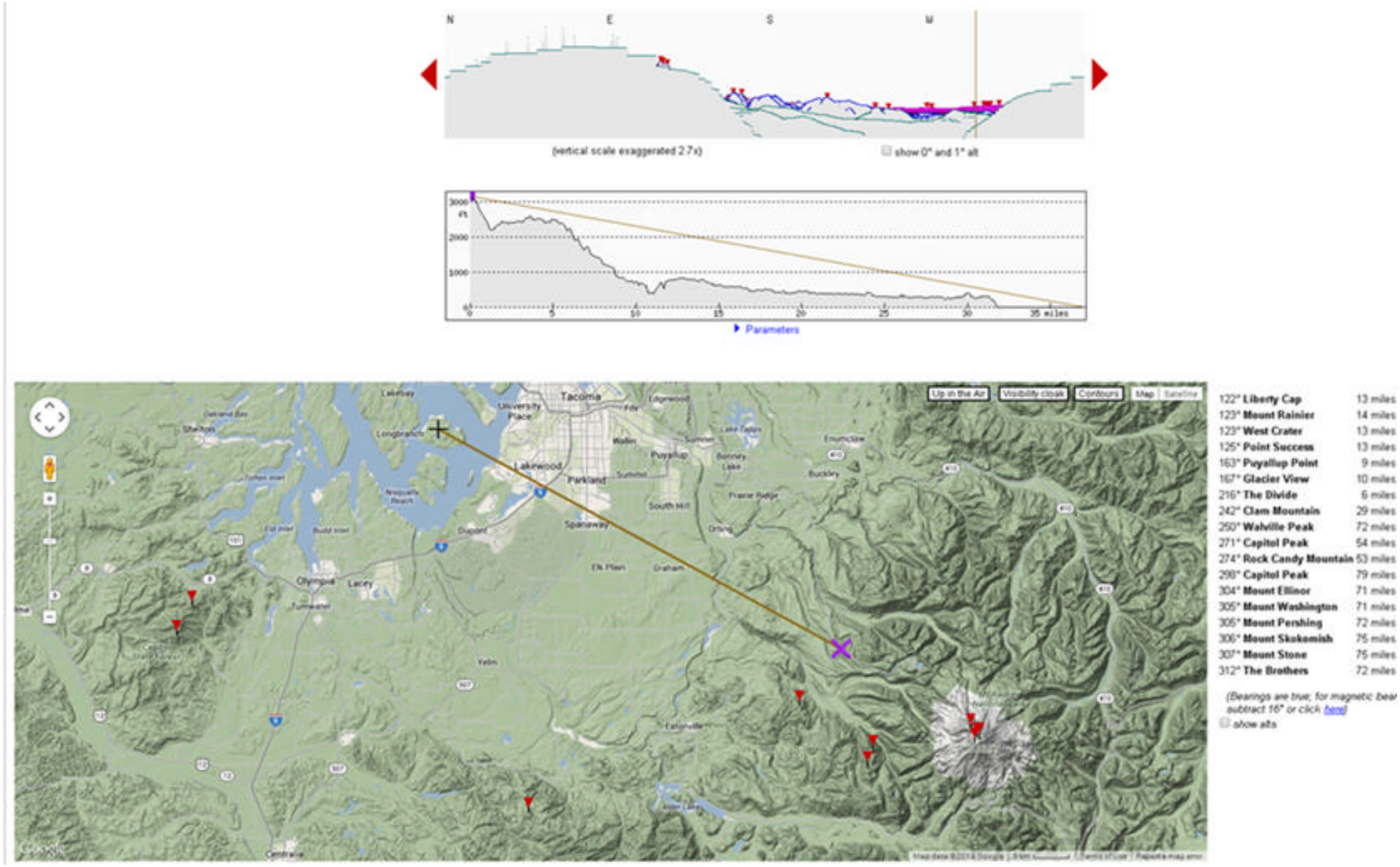
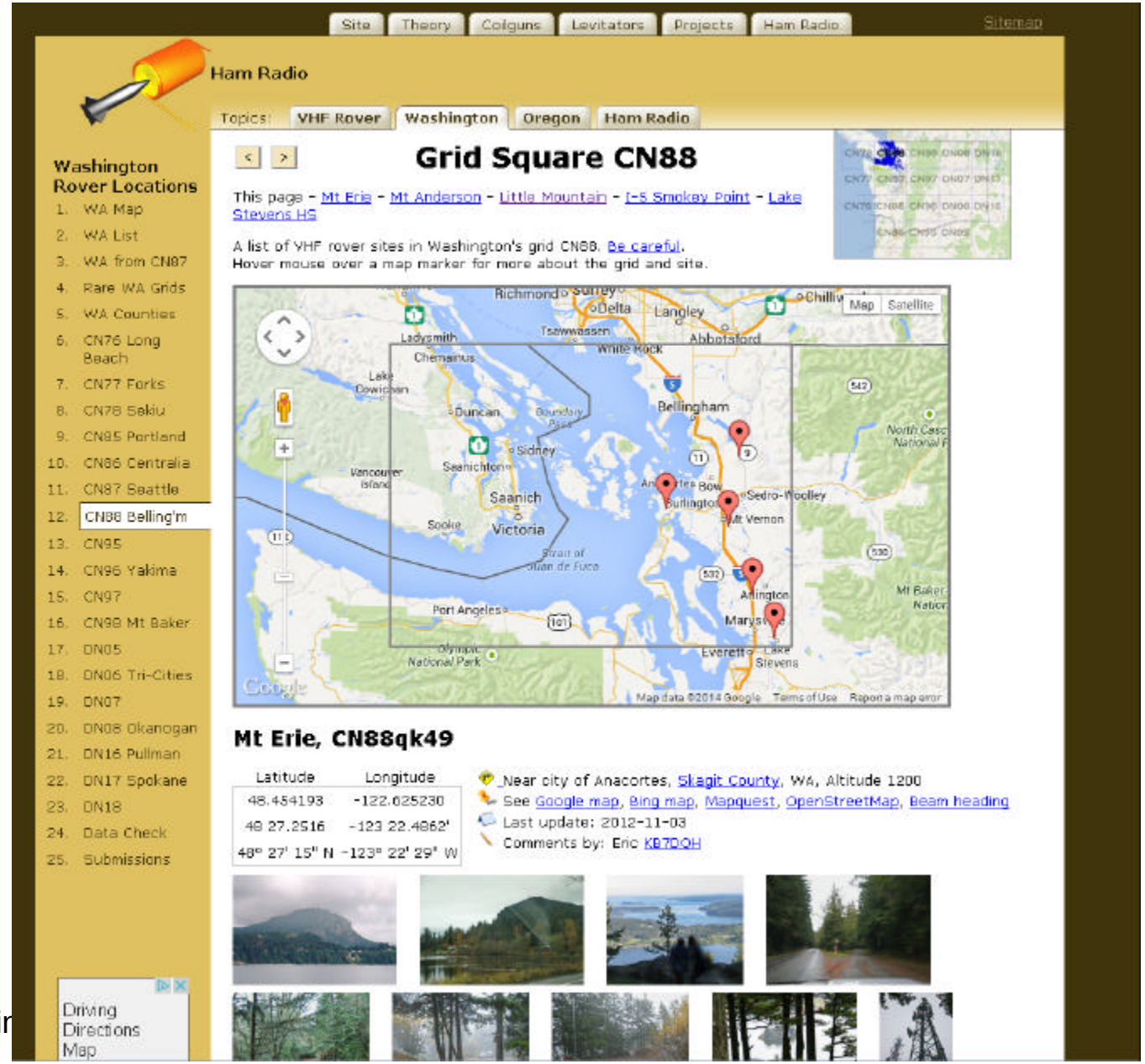
http://www.heywhatsthat.com/



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

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

Contribute new rover locations through a web form



Developir

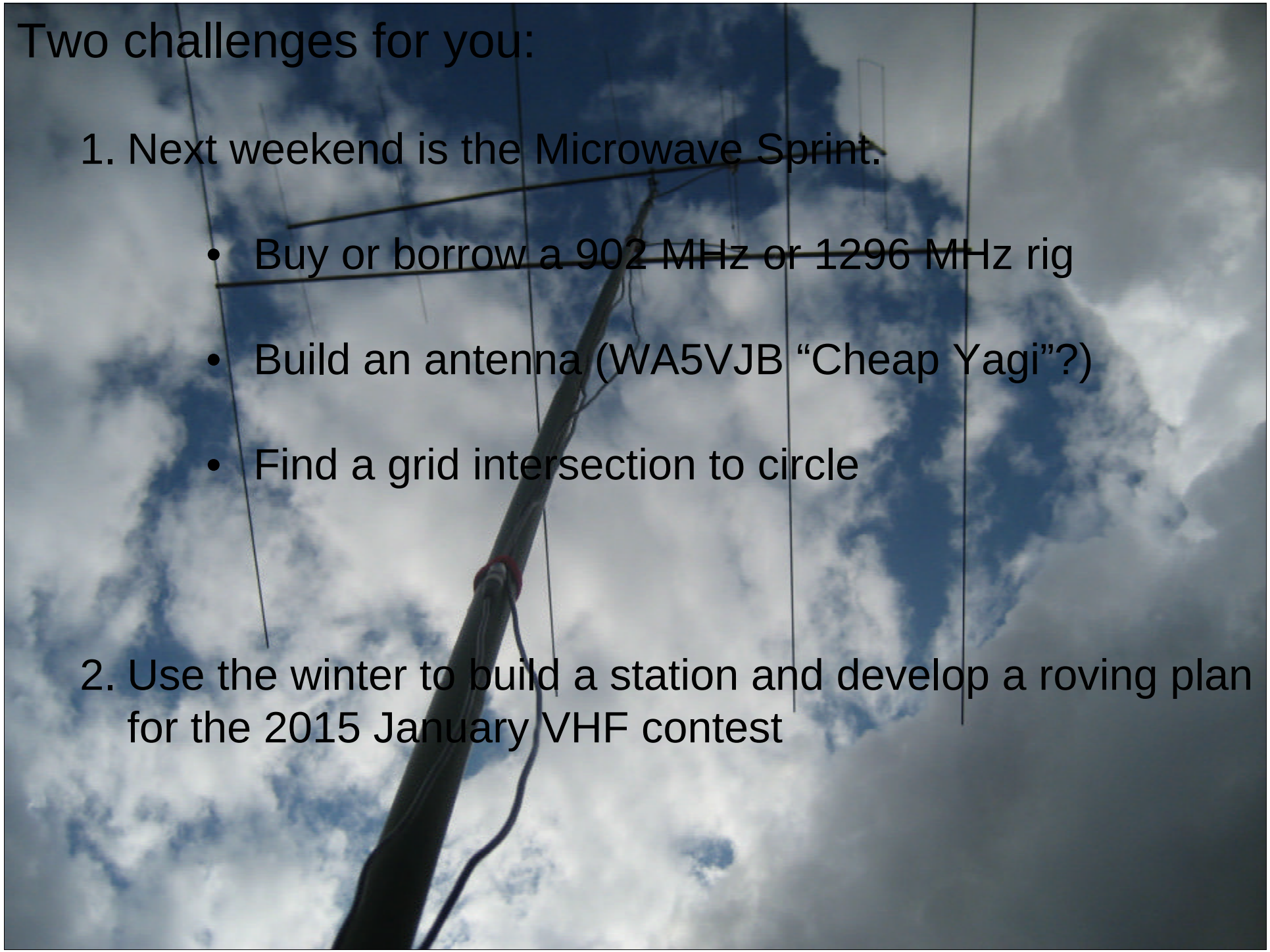
DAY 1:

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:

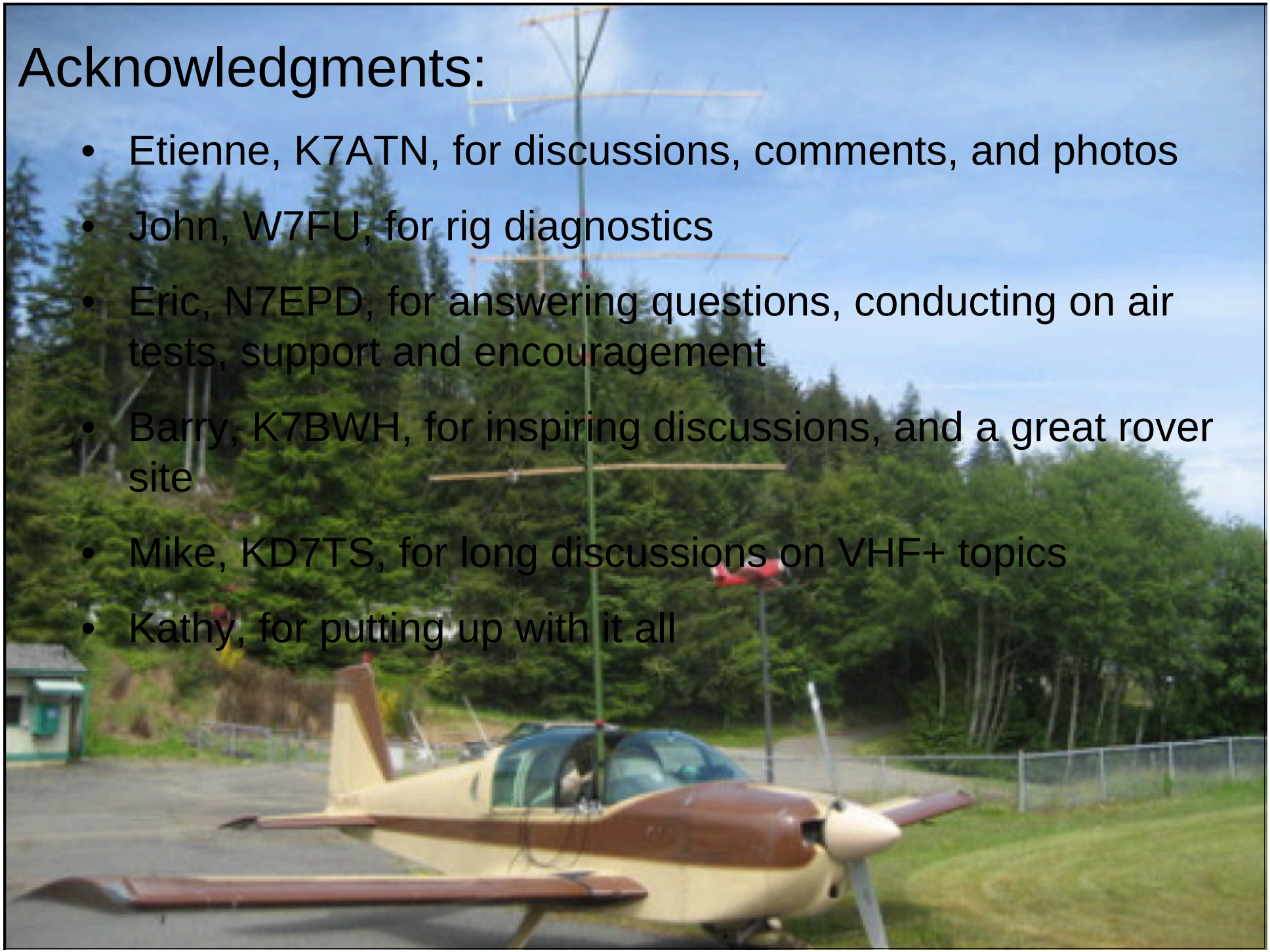
Motel 6 Centralia: 1310 Belmont Ave, Centralia, WA (360) 330-2057
14. CN86-CN87 border Tumwater @46.999690, -122.912342
CN87 Mowich Lake Rd @+47° 0' 11.98", -122° 1' 39.33"
15. **CN96 Mowich Lake Rd @ 46.951478, -121.983840**
CN86 Mowich Lake Rd @46.959528, -122.001302
CN87 Mowich Lake Rd @+47° 0' 11.98", -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**
21. CN98-CN88 Border Hwy92 @ 48.079742, -122.000011

			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 Diamc	--	02:35 PM	02:35 PM	0	0	0	70
CN87-CN88	Lake Stever	--	03:55 PM	03:55 PM	10	0	0	15



Two challenges for you:

1. Next weekend is the Microwave Sprint.
   - Buy or borrow a 902 MHz or 1296 MHz rig
   - Build an antenna (WA5VJB “Cheap Yagi”?)
   - Find a grid intersection to circle
2. Use the winter to build a station and develop a roving plan for the 2015 January VHF contest



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