

The VHF+ Reverse Beacon Network

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The Question

From Bob, K8TQK:

“Can we come up with a way to automatically monitor VHF/UHF beacons and report on propagation?”

Is there a wheel that's already been invented???



The Answer

Yes.

The Answer (From Finish to Start)

- **DXMaps** is a widely used web site that shows QSOs reported by Clusters and Reverse Beacon Network.
 - <http://www.dxmaps.com>
- **Reverse Beacon Network** (RBN) is a web site that collects data reported by Software Defined Radios feeding CW Skimmer (and other similar) software.
 - <http://reversebeacon.net>

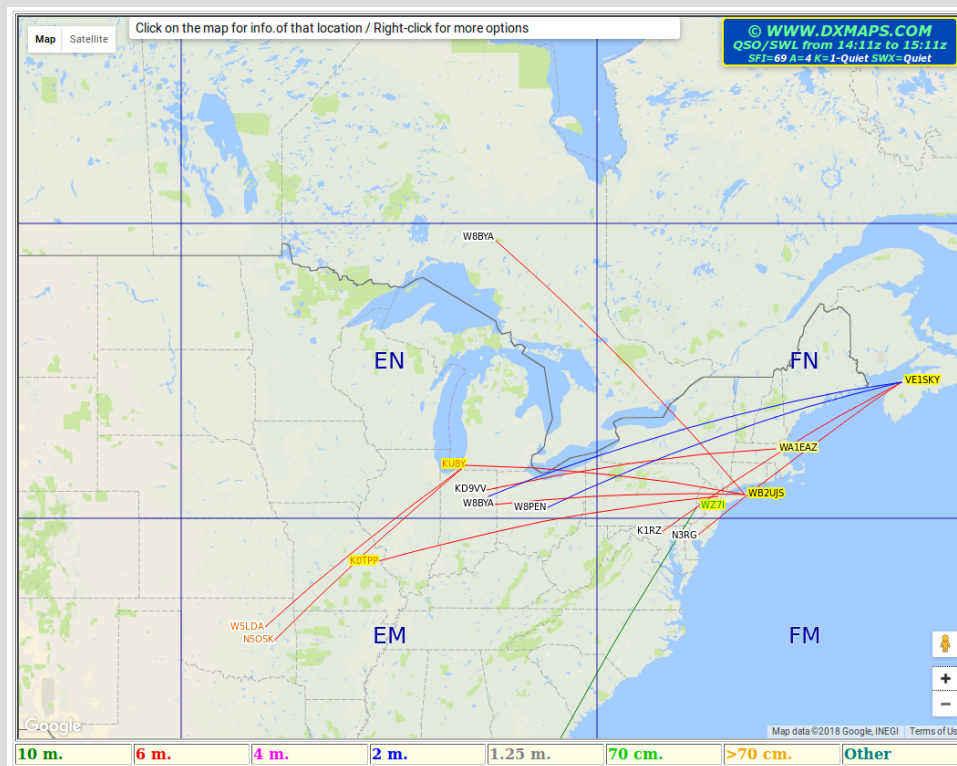
The Answer (From Finish to Start)

- **CW Skimmer** decodes CW signals, looks for CQing stations, and sends reports to the RBN.
 - Windows program by Alex, VE3NEA (\$75 license fee)
 - Spots include time, freq, speed, and ***signal-to-noise ratio***.
 - Supports up to 7 x 192 kHz band segments
- Skimmer does CW, and there are also versions that decode RTTY and PSK modes.
- Work is underway to integrate FT8 into RBN network; that will be very interesting for 6M.



**That's Great for the HF Folks,
but what about VHF?**

dxmaps.com



- DX Maps, Reverse Beacon Network, and CW Skimmer all support 6M and up
- But there are almost **no** VHF+ spots from the US!!!
- Why not?
 - No one thought of it?
 - Lack of Hardware?
 - Lots of relatively inexpensive SDRs that cover multiple HF bands.
 - But for VHF, need one RX per band; that gets expensive.
 - ???
- Let's solve the problem...

Low Cost VHF/UHF SDR

- USB “dongle” for \$20
- Tunes 500 kHz to 1800 MHz
- High sensitivity
- 1 PPM frequency stability
- But, limited dynamic range
- For \$20, no sweat to use one per band!
 - Full CW/beacon coverage on some bands requires 2 dongles.



Dongle-to-Skimmer Interface

- Skimmer doesn't directly support RTL-SDR dongle
- But N1GP "rtl_hpsdr" software on Raspberry Pi gives us a "shim" between dongle and Skimmer.
- Up to 7 dongles on USB
- Emulates HPSDR on Ethernet
- Makes multiple dongles look like one multi-band HPSDR.



The Complete Receiver



Antennas

- The goal is to copy stations that other locals can hear, so you don't need (or want) to be on a mountain top.
- Guidelines:
 - Horizontal polarization and omnidirectional
 - ~50 feet above ground from a decent location
 - Stacked halos a good choice for lower bands
- Best if node is located away from transmitters



Preamps and Feedline

- Low-cost preamps like “LNA4ALL” provide <1 dB NF and >20 dB gain for $<\$30$
- Can be powered from coax.
- RTL-SDR.com dongle provides power on coax.
- Put preamp at antenna and use cheap CATV coax (RG-6) for feedline.



Putting It All Together

- i5 class PC with Windows 7 or 10 (~\$150)
- CW Skimmer Server software (\$75 registration)
- Raspberry Pi 3 and power supply(~\$45)
- Linux OS and rtl_hpsdr software (open source)
 - Available as plug-and-play SD card image from N8UR
- 1 dongle per 192 kHz band segment (\$20 each)
- USB hub, USB cables, ethernet cable (~\$50)
- Antennas, pre-amps, feedline (???)
- Internet connection (needs very little bandwidth)

RBN Spot Page

DX continent: NA - North America

www.reversebeacon.net/dxsd1/dxsd1.php

140%

Search

Download

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Fullscreen

Menu

REVERSE BEACON NETWORK

SSN:0 SFI:68 A:4 K:2 callsign lookup:

welcome | main | dx spots | nodes | downloads | about | contact us

show/hide my last filters

DX continent: NA - North America / DE continent: NA - North America / band: 2m
cancel filter selection / search spot by callsign

rows to show: 100

de	dx	freq	cq/dx	snr	speed	time
W8KSE	K8TQK	144190.7	CW DX	20 dB	18 wpm	1314z 04 Apr
W8KSE	KD4AA	144180.7	CW DX	21 dB	19 wpm	1218z 04 Apr
W8KSE	N4ASF	144180.5	CW DX [LoTW]	17 dB	19 wpm	1209z 04 Apr
W8KSE	KA1ZE/3	144205.7	CW CQ	10 dB	20 wpm	1054z 03 Apr
W8KSE	WA4NJP	144210.7	CW CQ	6 dB	19 wpm	0113z 03 Apr
W8KSE	WA4NJP	144210.7	CW DX	7 dB	19 wpm	0104z 03 Apr
W8KSE	N1GC	144185.7	CW DX [LoTW]	12 dB	12 wpm	1225z 02 Apr
W8KSE	KD4AA	144179.9	CW DX	23 dB	20 wpm	1119z 02 Apr
W8KSE	KD4AA	144276.3	CW DX	4 dB	21 wpm	1119z 02 Apr
W8KSE	KA1ZE/3	144205.7	CW CQ	9 dB	20 wpm	1109z 02 Apr
W8KSE	KD4AA	144180.2	CW DX	19 dB	20 wpm	1107z 02 Apr
W8KSE	W9ZIH	144205.7	CW DX	12 dB	21 wpm	1320z 01 Apr
W8KSE	KC9PQT	144224.5	CW DX	6 dB	18 wpm	1157z 01 Apr
W8KSE	KA1ZE/3	144205.8	CW DX	25 dB	18 wpm	1157z 01 Apr
W8KSE	W4TA	144180.7	CW DX [LoTW]	27 dB	18 wpm	1516z 31 Mar
W8KSE	K8TQ	144181.1	CW DX	27 dB	18 wpm	1509z 31 Mar
W8KSE	K8TQK	144149.7	CW DX	16 dB	18 wpm	1505z 31 Mar
W8KSE	W4TAA	144180.8	CW DX	31 dB	18 wpm	1503z 31 Mar
W8KSE	KA1ZE/3	144205.7	CW DX	26 dB	18 wpm	1232z 31 Mar
W8KSE	KD4AA	144274.8	CW DX	19 dB	21 wpm	1206z 31 Mar
W8KSE	KC9PQT	144200.7	CW CQ	12 dB	20 wpm	1805z 30 Mar
W8KSE	K8TQK	144180.7	CW CQ	14 dB	17 wpm	1303z 30 Mar

options:
show/hide

Do you enjoy the RBN?
Please consider supporting us!

Donate

we have 169 skimmers online

skimmers online:
3B8CW - 20m
3V/KF5EYY - 20m
7L4IOU - no spot last 15min
9A1CIG - 40m, 30m, 20m
9M2CNC - no spot last 15min
9V1RM - 40m, 17m
AA4VV - 80m, 40m, 20m
BD4WN - 20m
BD7JNA - no spot last 15min
BG4GOV - 40m
BG7IBS - 20m
BI4SSB - 40m
BL7IV - 40m, 20m
CT1BOH - 40m, 30m, 20m, 17m
CX7ACH - no spot last 15min
DF4XX - 60m, 40m, 30m, 20m
DJ2BC - 80m, 40m, 30m, 20m, 17m
DJ3AK - no spot last 15min
DJ9IE - 60m, 40m, 30m, 20m, 17m, 15m
DK0KK - 60m, 40m, 30m
DK0TE - 40m, 30m, 20m

Building a Network

- W8KSE (EN80ee) is up, but one site doesn't tell us much
- What if we had V+RBN nodes every 50-150 miles?
 - We'd see propagation across a wide area
 - We'd have a better idea of activity
 - We'd have local station testing tools (send CQ, observe SNR)

So, why don't ***you*** build a node, too?



Thanks!

For more information:
<http://www.febo.com/pages/V+RBN>