

RBN – Reverse Beacon Network – a short introduction

Update: 20th July, 2016 (see down at [call sequence](#))

Beacons serve to indicate the band conditions through the signal strength received from many different parts of the world.

Generally, beacons are automatic transmitting stations on fix frequencies, mostly in CW. By listening on these frequencies, one detects the actual band conditions. As example, the NCDXF Beacon Network, which operates worldwide 18 different stations that transmit every 3 minutes on the same frequency. E.g. By listening on 14.100 Mhz one note the band conditions on 20m.

The **RBN** (Reverse Beacon Network) works just in the opposite way.

Instead of operating a number of transmitting stations, a number of automatic receiving stations are used to monitor the CW stations on several bands. They receive a broad bandwidth, decode the heard stations and communicate the heard call signs over the Internet to a central point.

An intelligent software allows to decode the callsigns, measure the signal strength, and filter the received data. This way, very conclusive information about band conditions is obtained. The automatic receiver stations are called Skimmer, and consist of an SDR receiver, an intelligent software and the required Internet connection.

showing spots for DX call: HB9ABX/M							rows to show: 100
search spot by callsign							
de	dx	freq	cq/dx	snr	speed	time	
W3LPL	HB9ABX/M	14037.5	CW CQ	18 dB	19 wpm	0920z 23 Oct	
GW8IZR	HB9ABX/M	14037.5	CW CQ	28 dB	19 wpm	0920z 23 Oct	
LA5EKA	HB9ABX/M	14037.4	CW CQ	37 dB	19 wpm	0920z 23 Oct	
DL8LAS	HB9ABX/M	14037.4	CW CQ	31 dB	19 wpm	0920z 23 Oct	
HB9DCO	HB9ABX/M	14037.5	CW CQ	40 dB	19 wpm	0920z 23 Oct	
RZ3DVP	HB9ABX/M	14037.5	CW CQ	9 dB	19 wpm	0920z 23 Oct	
SE0X	HB9ABX/M	14037.5	CW CQ	14 dB	19 wpm	0920z 23 Oct	
DL9GTB	HB9ABX/M	14037.4	CW CQ	36 dB	19 wpm	0920z 23 Oct	
K3MM	HB9ABX/M	14037.5	CW CQ	12 dB	19 wpm	0920z 23 Oct	
SK3W	HB9ABX/M	14037.5	CW CQ	33 dB	19 wpm	0920z 23 Oct	
S50ARX	HB9ABX/M	14037.5	CW CQ	24 dB	19 wpm	0920z 23 Oct	
AA4VV	HB9ABX/M	14037.5	CW CQ	9 dB	19 wpm	0920z 23 Oct	
OH6BG	HB9ABX/M	14037.5	CW CQ	34 dB	19 wpm	0920z 23 Oct	
HA6PX	HB9ABX/M	14037.5	CW CQ	11 dB	19 wpm	0920z 23 Oct	

Therefore, one can transmit a CQ call and look up on the RBN server , where and with what signal strength the call was heard.

The columns have the following meaning:

de = Name of the Skimmer station

dx = Name of the heard station

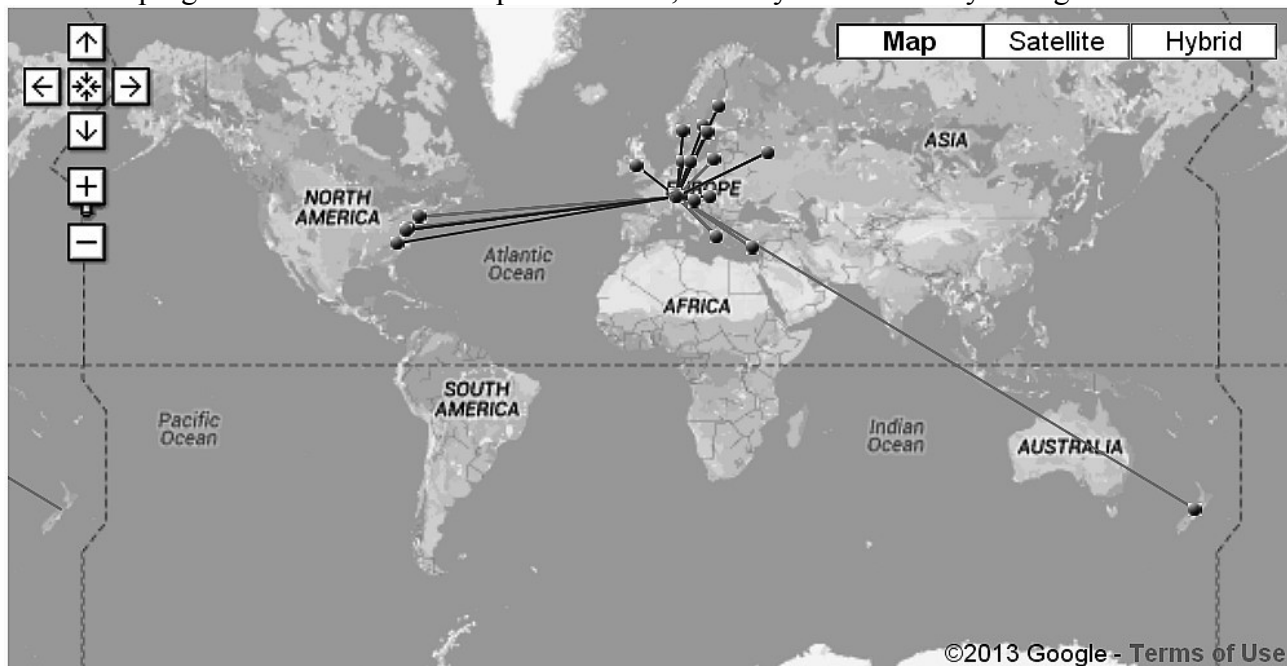
freq = frequency on which the signal was heard

snr = signal strength = signal to noise ratio in dB

speed = keying speed of CW in wpm (word per minute)

time = time and date in UTC of reception

The RBN-programs can show on a map the location, where you was heard your signal:



This graphic says nothing about the signal strength, which may vary strongly. The map display can be switched off/on under „options:“ **show/hide** map.

Worldwide, there are always abt. 80 to 150 Skimmers in operation, while each Skimmer is monitoring between 1 to 7 bands simultaneously.

You may get access to the RBN network, by entering the following address into the address field of the Internet browser: <http://www.reversebeacon.net>

There, you click „spot search“ below „dx spots“, and enter the desired callsign under „spot search“ for which you want to obtain reports, and click „search“.

The picture above has been obtained this way.

(Callsign may be entered e.g. hb9* , then you see all HB stations on the list)

The field "rows to show" set it to 100, then you see sufficient stations.

If the function "search" blocks (may appear some times), click the "reload" key in the address line.

You can make a normal CQ-call in CW, and the a Skimmer can log your signal. However, this is not the best way to be logged by RBN.

I recommend the following call sequence to obtain the most reports through RBN network by using this text in CW: (CALL = your callsign)

„e vvv test de CALL test de CALL +“

This sequence should be saved as a CW text. To be sent at a constant speed between 20 to 35 wpm. This call should not be used during a CW contest.

IMPORT:

The spacing between all words has to be a single word space,

and not a double space, or longer. Otherwise, the detection of the call by the RBN-Sytem is much worse!

You want to see what stations were heard by a Skimmer, you click „spot search“ unter „dx spots“, enter the callsign of the skimmer, set the point to „DE“ and click „search“.

The active skimmers appear at the right side of the window, with the information, on what bands they scans. If you want to obtain details, click „detailed list“ below „nodes“.

Very interesting is the RBN network to **perform the comparisons of two stations** (or comparisons of two different antennas).

For that the comparisons, both have to send at the same time, (using the same power) using the recommended sequence.

The second station sends 5 minutes time difference to the first station.

Thereby we obtain, that the graphic presentation does not overlay the other station points.

The reports are varying caused by QSB, and you need 6 or more signal points per RBN station and per transmit station.. Then you see, what is the signal strength over the time in the analysis tool.

In this way you can make a correct comparison between 2 antennas, or between 2 stations. .

If you look just the momentary report, the QSB may a accidental value. These are not useable for comparisons!

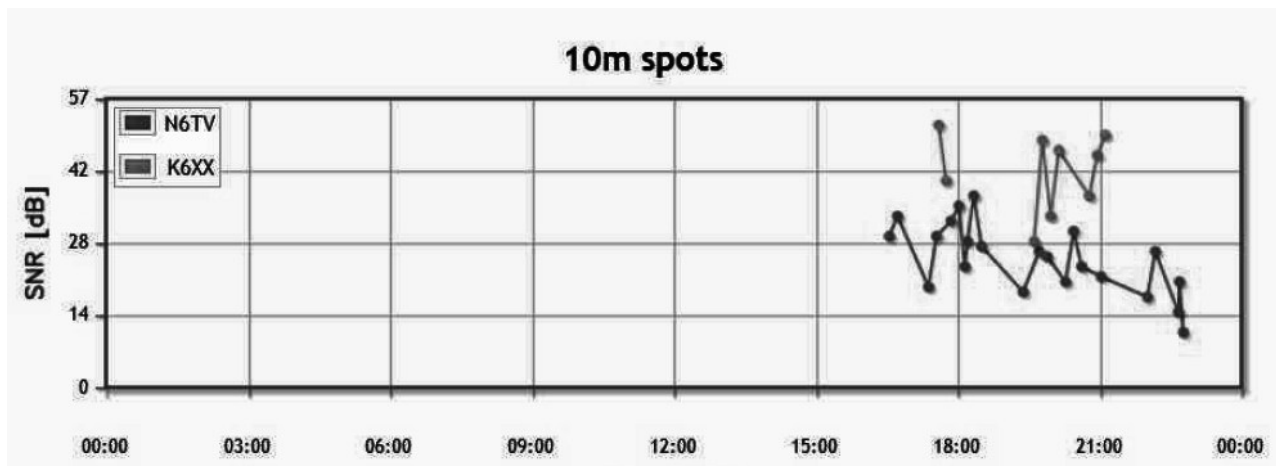
The **analysis tool** is used the follow way:

Below „dx spots“ click „spots analysis tool“, then select the desired date.

Then, select continent, and click the desired Skimmer station.

Then, enter the callsign and click „Add“, and enter the second callsign and click „Add“.

Then the graph is displayed as showed here:



The same analysis tool serves also to compare 2 different antennas used in the same QTH.

Here you have 2 different callsign, corresponding to each one to 1 antenna.

You need to have 2 stored CW text sequence, each one with his callsign.

To help that all calls are reported by a Skimmer, each call should be made on a slightly different frequency (1 Khz difference). And it is required to have a great number of measurements, as the QSB can influence a single measurement.

The RBN is also very useful to find out, at what time on what band there are conditions to a specific DX location.

Example:

If you want to know when you have the best conditions to Australia, then we do the following:
Below „dx spots“ select „create your filter“, and there:

Below „DX station“ set the point „dxcc:“ and in the next field select „VK-Australia“ .

Then, below „DE station“ select your country and set the point to this line.

Then, below „band“ click to „all“ and then click „proceed“.

Now follows a list of stations where you find the signal strength and band and time.

Please note, that not all countries have Skimmers.

There are many more uses for the RBN, as use during contests and much more, but this shall be sufficient as an introduction to the RBN.

Here somewhat about the construction of a Skimmer station:

As receiver, mostly a SDR receiver is used, from the simple Soft-Rock to the Quick Silver QS1R (see <http://www.srl-llc.com/>) , a suitable receiver antenna, and a Windows computer with Internet connection.

The Soft-Rock receiver can receive just one band, while the QS1R operates on 7 bands in parallel, and each band 192 Khz wide.

As software, the genius program „CW Skimmer“ from VE3NEA is used, which is able to decode up to 700 stations simultaneously, and to measure the SNR at a frequency resolution of 100 Hz.

In addition, the program „aggregator“ from W3OA receives the decoded data and transmits over the Internet to the RBN network.

Now I wish you a lot of success in testing and using of the RBN.

Felix, HB9ABX