

2024-01-02 Hamlet Net - Beacons

Announcements:

- Test Session Info
 - Next VE session is Saturday, January 27th in the Clover Building at the Boulder County Fairgrounds, and starts at 9 am. It is a Patriot VE team session, so pre-registration is recommended. For more info, and to pre-register, see the Licensing/Testing page on the club web site, <https://w0eno.org/>, under the Education menu.
- We have some volunteer opportunities available where you can help out LARC:
 - Photographer / videographer - record team activities and upload to web site / YouTube
 - LARC Fest Coordinator -
 - Newsletter Editor - put together the monthly Splatter newsletter
 - Activities Chairperson - member of the Board of Directors.
- Our sister club up in Nederland is looking for some help with events they are running. They have a weekly Monday night net with no predetermined agenda, so you can lead it however you want. They are also planning a Field Day site at Golden Gate State Park and are welcoming anyone who wants to participate. Finally, they are looking for operators for the Ned Gravel run on July 8th. They have signup links for all these events, so head over to their web site <https://w0ned.org/> for more information!
- You can start earning your 2024 membership or future renewal by acting as NCS for at least 5 nets this year. You can run either this Tuesday night net or the Thursday night net (or both). We have scripts available for both, so all you need is a good connection into the repeater, and somewhere to keep track of names and call signs as people check in. If you're going to be on the net anyway, why not save some dough at the same time! There are four free memberships available for 2023, so don't wait to get started!
- Chuck has set a goal for the Club of running at least one activity a month. This can be a hands-on construction activity, an operating activity like Field Day, a fox hunt, or a special event station. The goal is to get people together to have fun with amateur radio! We have multiple locations at our disposal, as well as lots of Club equipment, so if you have an idea for something you think others hams would like to do, please let us know, and if you're willing to run it, even better!
- The Club is also looking for presentation topics for 2024. If you have any ideas, or better yet, would like to present, please let Chuck know and we'll get you on the schedule!

- All club activities are open to anyone - members and non-members. If you have questions, ask them on a net or **send email to elmer@w0eno.org**

Presenter: Bryan, AF0W

Topic: Beacons

- If you've done any HF operating, you know that propagation plays a major part in where and when you can communicate with different areas around the world
- There are computer programs and web sites that can help in this area, but what if you are on a SOTA or POTA activation and don't have a computer with you - is there some way you can get a rough idea of propagation conditions on a band?
- The answer is yes - you can use radio beacons!
- Beacons are transmitters that are set up at fixed locations that transmit signals either continuously or on a schedule to allow radio operators to determine whether a band is usable at that moment to the location of the beacon
 - a. You may hear them referred to as propagation beacons for this reason
- For example, if there was such a beacon in Paris, France transmitting on 20 meters and you were able to hear it, there is a high likelihood that conditions are such that a signal from your station could make it over there as well
- Of course, your success will depend on a number of factors - your antenna, power level, noise floor at the receiving station, etc.
- So while not a guarantee of a contact, it at least provides an indication that such communication is possible on that frequency at that time
- So can't you just tune across the band and see if it is open by listening for other stations?
- Well, you can, but the problem is that if everyone is doing that, then no one will hear anyone else, and assume the band is dead. Since beacons transmit regularly, you will always have something to listen for.

NIST

- One set of beacon-like signals that everyone has probably heard of is WWV which is operated by NIST and transmits time and frequency information 24 hours a day, 7 days a week

- WWV is located right up the road in Ft. Collins, Colorado, where it moved in 1966 from its previous location in Greenbelt, Maryland
- The station transmits on multiple frequencies - 10,000 W on 5, 10, and 15 MHz and 2500 W on 2.5, and 20 MHz
- Each frequency carries the same information, and serve to raise the chances that at least one frequency is usable at all times
- The antennas are half-wave verticals that radiate with an omnidirectional pattern. They are mounted about half a wavelength tall, meaning the 2.5 MHz tower is almost 200 feet tall.
- The signals are amplitude-modulated, double-sideband suppressed carrier - basically, an AM signal with the center carrier reduced as much as possible, or suppressed.
- There is a similar setup in Hawaii operating as WWVH
- You can tell which one you are hearing by listening to the voice used for the announcements - if it is male, then you are hearing WWV, while a female voice indicates you are receiving WWVH
- The announcements are slightly offset, so if you are in a location where both signals are strong, like California, they won't overlap
- One use of this service is to check the calibration of your indicated VFO frequency by a process called zero-beating
 - a. Some radios like the ICOM IC-7300 have features enabling you to use just that radio, but any HF receiver can use the two-radio process
 - b. In this process, you use a second radio tuned to the WWV frequency, and then adjust the frequency on your first radio until the sound and tone pitch of the signals on each receiver match.
 - c. It is called zero-beating because as you stray from the WWV frequency, you will hear a pulsing signal caused by interference between the audio waves output by the two radios
 - d. When you are exactly on-frequency, this effect will go away because the two signals are in sync
- Ok, so this will give us a picture of the propagation conditions between your station and Ft. Collins and/or Kauai, but what about the rest of the world?

IARU Beacon Project

- There is a world-wide set of HF beacons run by the International Beacon Project or IBP.
- It consists of 18 HF propagation beacons worldwide which take turns transmitting on 20, 17, 15, 12, and 40 meters.
- Each beacon site operates around the clock
- At each site, a beacon is transmitted once on each frequency, from low to high followed by a 130 second pause after which the cycle repeats.
- Each transmission is 10 seconds long and consists of the call sign of the station transmitted at 22 words per minute, followed by four dashes
- The call sign and first dash is transmitted at 100 watts, with subsequent dashes being transmitted at 10, 1, and 0.1 watts
- Stations are all offset from each other so that only one station is transmitting on a given frequency at a time
- This scheme means that at a given frequency, all 18 beacons are transmitted once every three minutes
- So does this mean you have to know Morse code to use this beacon system?
- Not if you have a computer or smart phone!
- The official web site of the network is at <https://ncdxf.org/beacon/> (november-charlie-delta-xray-foxtrot)
- It includes two tables - one that shows the currently-transmitting station for each of the 5 beacon frequencies, and one that shows the current status of each of the 18 stations (silent or the frequency on which they are currently transmitting)
- It also shows if any of the beacons are not operating due to maintenance or weather issues
- If you hear a beacon on a particular frequency, you can use this information to determine the location of that beacon without needing to understand Morse code
- There are three IARU beacon stations in the US located in New York, California, and Hawaii
- There are also cell phone applications that provide the same information

Other Beacons

- This is not the only beacon network out there, and there are many beacons that are not part of any coordinated network
- A quick internet search for "HF radio beacon list" turned up links to a number of sites with extensive beacon lists
- There are also VHF, UHF, and above beacons, although by their nature, these are typically shorter-range
- There is also a 50 MHz or 6 meter beacon list.
 - a. 6 meters is known as "the magic band" because it exhibits HF propagation characteristics under the right conditions, and can be used to make contacts using sporadic E as well as F2 layer, and meteor scatter, as well as ionosscatter and trans-equatorial propagation
- Since these conditions come and go for 6 meters, you may not be able to work anybody, or you may be able to work the world, hence the magic
- There is also a web site that uses APRS packet information to provide an up-to-the-minute view of VHF propagation conditions
- It does this by examining packets received by the APRS-IS Internet service and determining coverage by looking at the RF path the packet took through the system
- The site is <https://vhf.dxview.org/> (victor-hotel-foxtrot-dot-delta-xray-victor-india-echo-whiskey-dot-org). Note that you may have to zoom in a lot to see the coverage areas - remember, these are typically short-distance signals, not worldwide like HF
 - a. You can click on a station to bring up a list of the stations it has heard recently

Reverse Beacon Network and PSKReporter

- The Reverse Beacon Network turns the traditional concept of radio beacons around and instead of broadcasting a signal for reception stations, it consists of a network of stations that upload information on radio signals they receive
- Originally monitoring only CW signals, the system now also includes RTTY, PSK31, and PSK63
- It can be accessed at: <https://www.reversebeacon.net/>
- PSKReporter is another such site - it adds reporting on digital modes such as FT4, FT8, and about 20 other digital modes
- You can enable WSJT-X on your own computer to report to the PSKReporter site

- It can be accessed at <https://pskreporter.info/>

Summary

- There are a lot of beacons out there that can be used in many different ways
- If you have an HF radio, take some time to experiment and see what you can hear!

Questions:

- **The question for the week is:** Were you aware of the International Beacon Project beacon system, and have you ever used a beacon previously and why?
- **In my case,** We've used the worldwide beacon network as a demo during our ham training classes, but I've never really used it while operating to get a picture of propagation. I have used WSPR occasionally, just to see in what direction and how far my signal goes.

More Info:

- NIST WWV: <https://www.nist.gov/pml/time-and-frequency-division/time-distribution/radio-station-wwv>
- VHF/UHF Beacons by WZ1V: <https://www.newsvhf.com/beacons2.html>
- VHF Propagation Map: <https://vhf.dxview.org/>
- PSKReporter: <https://pskreporter.info/>
- Reverse beacon Network: <https://www.reversebeacon.net/>

Backup Questions:

1. What hobbies do you have other than ham radio? Do you (or could you) use ham radio in these hobbies?
2. Share an "a-ha" moment you had with amateur radio?

Ham-related gifts purchased or requested

- If you have ideas for net topics or general meeting topics / presenters, please let us know! Tell us on a net, or send email to k0itp@w0eno.org

Email to elmer@w0eno.org

1. K0ITP - Chuck - Firestone
2. KM6SJA - Steve - Longmont

3. AF0W - Bryan - El Paso Echolink
4. WB0AFA - Jeff - Frederick
5. KF0MXH - Art - Longmont
6. KF0DGA - Carl - Firestone
7. AE0DO - John - N of Longmont
8. KE0EE - Don - N Longmont
9. WB4FAW - Charlie - East Longmont
10. WA0JJC - Bob - Boulder
11. - Ian -
12. KF0ONR - Charles - Longmont

Don: Hidden Cafe for Breakfast at around 7:45 am Saturday.

Chuck: 3rd Wed of month is general meeting day - no topic yet
Ideas for keeping club active - building, foxhunting, field day, etc.

GoBox for IC-7300 for zero beating or POTA activations

POTA was mentioned - LARC has scheduled "club" POTA activations before - if this is something that interests you, let us know and we can

Can listen with web SDRs too

Think I saw some web sites or call phone apps that would alert you to band openings.

End: 8:00