

2023-12-19 Hamlet Net - Hotspots

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 2023. 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: Ham Radio Hotspots

- Perhaps you've heard the word "hotspot" mentioned in an amateur radio context and wondered what it meant - if so, you're on the right net tonight!
- A hotspot is a combination of hardware and software that allows an amateur to use their digital radio to connect to digital voice systems such as DMR and D-STAR via the Internet
- It is essentially a low-powered, Internet-connected personal repeater that allows you to talk to other operators around the world
- They are useful if you are not within range of an RF digital voice repeater, or if such a repeater does not support connections to systems, talkgroups or reflectors you would like to access
- For example, if you have a DMR radio and would like to access talkgroups on the Brandmeister network but do not have any nearby repeaters that are connected to that system, you can use a hotspot with your radio to connect to Brandmeister via the Internet.
 - a. If you're not familiar with DMR, this is a digital voice mode that typically operates over VHF or UHF
 - b. Brandmeister is a network of systems that are interconnected to allow users to make contacts throughout the network
 - c. Private (radio-to-radio) connections are supported as well as connections to talkgroups
 - d. A talkgroup is a way of grouping multiple radios into a single digital contact - similar to a conference room or shared repeater
- The term "hotspot" is confusing, as it is also used to refer to a cellular system device that provides WiFi Internet connectivity, although this bears some resemblance to a radio repeater
- There are many different implementations - some are standalone devices such as the OpenSpot by SharkRF, while others are boards that attach to small computers like the Raspberry Pi, such as MMDVM-based boards

- a. MMDVM stands for Multi-Mode Digital Voice Modem
- Some can handle many modes, some can cross-band between modes, and some are limited to a single mode
- Some support or include displays to show device status - others use LEDs
- They typically use a small, stubby antenna - remember, they are not intended for long-range use, but rather to allow you to communicate around your home or property
- Most are simplex, but some are duplex
 - a. Simplex means that the hotspot can either receive or transmit RF - but not both at the same time
 - b. Duplex means that it can simultaneously receive and transmit
 - c. Duplex allows you to control the hotspot while someone else is transmitting on a DMR talkgroup (otherwise, you would have to wait until the talkgroup is idle)
 - d. Duplex requires two frequencies - one for transmit, and one for receive
- Most hotspots include a web-based interface which allows you to configure and control the hotspot
- Hotspots may also allow cross-mode operation
 - a. For example, The openSpot Pro 4 supports D-STAR cross modes: use your D-STAR transceiver to access DMR, C4FM, and NXDN networks, or your DMR, C4FM, NXDN transceiver to access D-STAR network
 - b.
- Some hotspots have wired Ethernet connections, while others are wireless
- You can use a wireless hotspot powered off a battery pack along with a cell phone hotspot to have a truly portable setup (as long as you are in an area with cell coverage)!
- Building your own hotspot (well, assembling) can be a rewarding experience if you like tinkering (or a frustrating one if you don't!)
- Hotspots can be somewhat confusing to initially set up, but there are lots of web resources and YouTube videos to get started

- There are many different versions of MMDVM boards - make sure you do some research before purchasing to make sure you're getting a decent one
- As with any radio device, you will have to select one or two frequencies on which to operate your hotspot (depending on whether it is simplex or duplex)
 - a. Don't just choose any random frequency - at one point, there were hotspots interfering with amateur satellite communications
 - b. The Colorado Council of Amateur Radio Clubs, or CCARC, performs frequency coordination for the state of Colorado
 - c. They have put together a set of 70cm frequencies to be used by hotspots to keep them from interfering with other users at ccarc.net/hot-spots
 - d. You do not need to inform them when setting up a hotspot, but you should check to make sure the frequency(s) you use are not already being used by listening to them - you are still responsible for any interference you cause
- Remember, hotspots are intended to be low power devices (typically in the low milliwatt range)
 - a. Higher-power transmitters, amplifiers, and high-gain antennas are discouraged to prevent interference
 - It's also possible that the signal from your hotspot may not be "clean" - it might be splattering over a wider range of frequencies than you expect
 - Connecting such a device to an amplifier or an antenna with a lot of gain will amplify this "dirty" signal as well
 - b. There are MMDVM boards which do not include radios that you can connect to an external higher-powered radio, but remember, the purpose of a hotspot is to act as a digital gateway for local use, not a large-area repeater
 - c. This is one of the reasons you don't have to worry about coordination with the CCARC, as you are not expected to interfere with any actual repeater
- If you have multiple hotspots, be sure they do not use the same frequencies
 - a. Otherwise you can set up "loops" between hotspots if they share frequencies

- Some rough prices:
 - a. openSpot 4: \$173, openSpot 4 Pro: \$260
 - b. Zumspot Radio Mini: \$155 (includes Raspberry Pi Zero)
- Hotspots do rely on the Internet to function, so they may become unusable during an event that knocks out utilities
 - a. Note that this doesn't mean your digital voice radio useless - all three major amateur digital services, DMR, D-STAR, and System Fusion all support simplex operation for direct radio-to-radio communications

Questions:

- **The question for the week is:** Do you have a hotspot? If so, what type, and what do you use it for?
- **In my case,** I have the original openSpot. While it is old, it does have an external antenna and an Ethernet port. The newer openSpots are designed to be portable - they have internal antennas and batteries, and connect to the Internet via WiFi.

I've not used my hotspot very much - I have a DMR HT and a D-STAR mobile radio, but the openSpot 1 will only support one digital mode at a time.

More Info:

- ZUM Radio: <https://zumradio.com/index.html>
- Brandmeister: https://wiki.brandmeister.network/index.php/Main_Page
- TGIF Network: <https://tgif.network/>
- Pi-Star: <https://www.pistar.uk/>
- ClearNode: <https://www.node-ventures.com/buy-clearnode/>

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

NASA announces they have successfully transmitted a 15 second test video over 19 million miles via light.

Called the Deep Space Optical Communications experiment, it is part of a NASA technology demonstration aimed at streaming HD video from deep space to Earth.

The transmission took 101 seconds to reach Earth and was sent at a rate of 267 megabits per second with a 4 watt near-infrared laser.

The Psyche mission was launched on Oct 13th and was designed to transmit data at a rate of 10 to 100 times greater than the state-of-the-art radio frequency systems in use today.

In doing so, it paves the way for higher-data-rate communications capable of sending complex scientific information, high-definition imagery, and video in support of humanity's next giant leap: sending humans to Mars.

After receiving the video at Palomar, it was sent to JPL over the internet, and that connection was slower than the signal coming from deep space.

The ground-based receiver is a 200 inch telescope at Palomar Observatory. The transmitter has a high-power, 5 kW laser at JPL.

The team was able to download a total of 1.3 terabits of data during that time. As a comparison, NASA's Magellan mission to Venus downlinked 1.2 terabits during its entire mission from 1990 to 1994.

- 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. AE0DO - John - N of Longmont
3. W0DRZ - Chris - Lyons
4. KF0MXH - Art - Longmont
5. WB4FAW - Charlie - Longmont
6. KM6SJA - Steve - Longmont
7. AF0W - Bryan - El Paso / Echolink
8. KF0AGY - Steve - Longmont
9. WB0AFA - Jeff - Frederick

End: 7:50pm