

## 2023-07-18 Hamlet Net - APRS

### Announcements:

- Test Session Info
  - We had a good test session on Field Day. 2 new technicians, and one new general.
  - Next VE session is Saturday, July 22nd in the Clover Building at the Boulder County Fairgrounds, and starts at 9am. It is an PVET VEC exam session, so you will need to pre-register at hamstudy.org. For more info, see the Licensing/Testing page on the club web site, <https://w0eno.org/>, under the Education menu.
- The LARC July General Meeting is tomorrow, and features Paul Simmonds, VK5PAS, discussing QSL cards. The meeting will be in-person at the Clover Building at the Boulder County Fairgrounds, and via Zoom. The event starts with socializing at 6:00pm, followed by the meeting itself at 7pm.
- Chuck is putting together a special event to celebrate the 105th anniversary of the Peak-to-Peak highway involving multiple area radio clubs on September 30th. They're currently looking for volunteers to work this special event. They will be operating HF SSB voice, CW, and FT8 stations from 8am to 4pm with three operators at each station. There is a signup link on the club web page at <https://w0eno.org/>, or contact him for more information!
- 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
- There's an interesting operating event this weekend
  - The Maritime Radio Historical Society is transmitting a coded message on Saturday, July 22 at 1300 Pacific time.
  - The message will consist of 5 letter groups, and must be decoded using an Enigma machine - an electromechanical device invented in Germany at the end of World War I.

- Since you may not have one of these devices at home, you can also use one of the many simulators available on the web to decode the message
- The message will be sent in CW followed by RTTY
- One big difference about this event is the transmission of encoded traffic.
- **What license class do you need to have to transmit coded messages via amateur radio in the US?** (trick question - amateurs can't - the stations in this event are using maritime frequencies)
- This does mean that you must have a general-coverage receive that can receive frequencies outside of the amateur bands
- If you don't have such a radio (or don't have an HF setup at all), you can still participate by utilizing a web-based SDR, such as those listed on the [websdr.org](http://websdr.org) site
- For more info on the event, go to: <https://www.radiomarine.org/mrhs-events>
- If contests are more your thing, and you want to try something different, the Maidenhead Mayhem contest is also this weekend.
  - It is an HF contest on all the non-WARC bands using CW, SSB, and digital modes
  - There are two main things that make this contest unique:
    - First, there is the use of a "difficulty factor" - this is meant to reward participants for making contacts which are typically more difficult due to propagation conditions.
      - For example, contacts within your grid square give you a difficulty multiplier of 1. Those to surrounding squares get a multiplier of 2, and those to squares beyond get a multiplier of 2.
      - These values change for some bands - for example, a contact to the same grid on 20 meters will get a multiple of 3, since close-in contacts are difficult on that band.
      - Don't worry about all the complex math - when participating in the contest, if you use DXLog.net, all of this will be handled by the software. They also have a few other loggers (including those for the Mac) that they are working with the authors to get support added for this contest.

- The second difference is that there are actual, physical prizes awarded in this contest!
  - So far they have prizes totalling over \$1800 dollars to be awarded to 26 "winners"
  - For details, see the contest web site at: <https://w9et.com/>
- 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 2023 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](mailto:elmer@w0eno.org)

**Presenter: Bryan, AF0W**

**Topic: APRS**

- APRS
  - a. Frequently referred to incorrectly as Automatic Position reporting System
  - b. While position reports are part of it, it actually stands for a Automatic Packet Reporting System

- Developed in the late 1980s
- In the US, it primarily operates on 2 meter FM at 144.390 MHz
- Uses 1200 baud AFSK (audio frequency shift keying) - same tones as computer modems - also used to provide CallerID info
- There is HF APRS on 30 meters at 10.1 MHz at 300 baud
  - a. Intended primarily for mobile users in remote locations with no 2m coverage
  - b. Wide coverage area plus low data rate severely limits capacity
  - c. Entire packet must be received correctly before it is acted upon - difficult with HF
- There is even an APRS digipeater (digital repeater) on the ISS at 145,825 MHz
- While a common use of APRS is to transmit GPS coordinates of a station, this is not the only purpose
- According to its inventor, Bob Bruninga, WB4APR, It is a "two-way tactical real-time digital communications system between all assets in a network sharing information about everything going on in the local area"
  - a. Transmissions can include weather station information, short text messages, telemetry data, short email messages, bulletins, alerts, meeting information, etc.
- Transmissions may be received directly (radio-to-radio), may be forwarded via "digital repeaters" called "digipeaters", and can be gatewayed to the Internet by nodes called iGates
- When configuring APRS on your device, you specify a path - this is used to control where and how far a packet will be repeated (also called the number of hops)
- APRS is meant for local use - you don't want your weather station information broadcast nationwide via RF!
  - a. In fact, some groups operate using the APRS protocol over non-standard frequencies specifically to keep from disrupting the local APRS environment
- When configuring your callsign, you typically add a SSID (secondary station ID)
  - a. This has two purposes - to allow an amateur to simultaneously run multiple APRS stations and to identify the type of application that is using APRS
  - b. Typically represented by different icons on web sites and many devices

- c. -0 (or no SSID) is typically your primary, fixed station
  - d. -7 is an HT
  - e. -13 are weather stations
- You can also select an icon from a standard set to represent your callsign / SSID combination
  - APRS information that is gated to the Internet can be viewed at web sites such as [aprs.fi](http://aprs.fi) and [findu.com](http://findu.com)
  - APRS information can be directly injected into the Internet infrastructure as well, bypassing RF entirely
    - a. An example is using the APRSDroid application on Android to send position reports using the phone's GPS receiver. A non-licensed amateur can then track your location on the [aprs.fi](http://aprs.fi) web site.
  - The Internet database of APRS traffic can be accessed to provides various services to users:
    - a. You can send and receive short emails via APRS - allows an amateur to communicate with a non-licensed individual
    - b. You can send and receive Winlink messages
    - c. Satellite tracking, callsign lookups
    - d. Another use is to track amateur radio balloons for recovery
    - e. Return a list of nearby repeaters
    - f. There used to be a service that allowed you to send and receive SMS messages over APRS. Unfortunately, the service is currently offline due to FCC regulations pertaining to SMS messaging
    - g. You can even check your Winlink messages via APRS
  - APRS functionality is built into some radios, such as the Kenwood TM-D710 and TH-D72, the Yaesu FT1, 2, and 3DR as well as the FTM-400 and -500.
    - a. If you are looking to purchase an APRS-capable radio, note that some of them (such as the D710 and D72) provide direct access to the internal TNC in the radio, allowing you to interact with it from your PC, while others only allow interaction via the radio itself.

- Hardware is also available for computers and portable devices - can send and receive audio to/from non-APRS radios, such as the DigiRig and Mobilinkd
- Interesting that the tracking/position reporting was a hot feature back when it was developed, but now a lot of people have privacy concerns
- There are a number of APRS-based applications and web sites that can provide a map indicating positions reported by APRS-equipped stations
- This can be useful during a race to provide a picture of both fixed aid stations and mobile support vehicles
  - a. Since stations transmitting APRS information must conform to FCC licensing requirements, it is not something that could be used to track individual race participants (unless they're all licensed hams!)
- Our local ARES/RACES group, BCARES, has trialed adding a licensed ham with a mobile APRS radio and mag mount antenna to Red Cross volunteer vehicles to allow coordinators to see the locations of these volunteers on a real time map.
- We also had a student in one of our licensing classes who used the APRS to SMS gateway service to update his non-licensed wife when he was out hunting outside of cell phone range.
- As with all amateur radio communications, APRS messages are unencrypted and available to anyone via RF or web sites like aprs.fi

### **Voice Alert**

- When researching APRS, you may come across something called "Voice Alert"
  - This is not so much a radio or APRS feature, but a method to help amateurs running APRS in mobile situations make voice contact with each other
- When you are using APRS, you generally have the volume turned down on the VFO tuned to the APRS frequency (so you don't hear the information bursts)
- With Voice Alert, you instead configure an incoming and outgoing CTCSS tone on that VFO and turn up the volume (a tone of 100.0 Hz is standard for the US)
- When another amateur is within range, you will hear their APRS packet from your radio (assuming they are also using Voice Alert), as their transmitted tone will match your expected reception tone.
- At this point, you can either check your display to see if their station is transmitting frequency information and attempt to make a voice contact on that frequency, or you can make a quick voice transmission on the APRS frequency (which they will hear because

you are sending a CTCSS tone) and quickly propose a frequency for voice communications

- Keep your voice traffic extremely brief, as you will be blocking other stations in range from using APRS
- Be sure to "disable" Voice Alert (by disabling your outgoing CTCSS tone) if you are not at your radio

### **Potential APRS Issues**

- One thing you need to keep an eye on if you are using APRS is to make sure your radio is tuned to the proper frequency whenever APRS is enabled.
  - a. If you've ever heard digital signals on a repeater, a possible cause is that the station owner has changed their frequency to the repeater, but forgotten to disable their APRS functionality. This results in AFSK signaling being transmitted to repeaters.
  - b. You can sometimes decode these messages to get the callsign of the transmitting station
- Baofengs can do APRS - must make sure squelch is open as the radio takes too long to "open up" on an incoming signal, and will corrupt incoming packets

You should also disable any "battery saver" functions on your radio, as these may cause it to miss parts of APRS messages

- If you are sending automatic, periodic position reports, make sure you are not sending them at an inappropriately-high rate
  - a. Doing so can clog the local APRS RF frequency, preventing others from using this shared resource
  - b. Many radios have a feature with a name like "Smart Beaconing" that attempts to adjust the position beacon frequency based on the vehicle's speed and course
    - For example, it will tend to reduce the frequency if the vehicle is traveling in a straight line, and increase it if it is making a lot of turns
  - If you are stationary (either in a vehicle or your home station), then there is no reason to beacon your position more often than once every 10 minutes (and you may even want to set the interval to 15 or 20 minutes)
- While many APRS-capable radios have monochrome displays, computer- and tablet-based software can use colors when rendering APRS objects on the map

- One convention is that green objects represent something that is normal / OK, yellow represents a warning, and red represents an emergency
  - At one APRS presentation, it was mentioned that one ham in Florida was setting up his APRS system, and since it was his home station, he selected a house icon from the set
  - The problem was that he didn't choose the green "OK" icon, but rather, the red icon, which happens to represent a shelter
  - When a storm hit, he apparently received many emails asking about the availability of shelter at his location (they weren't sure if he also received any unexpected visitors!)
- You can set a "station status" as well. This is a 42 character string that is sent along with your position packets
- Some radios, notably the Kenwood TH-D72 and T-D710 can include the frequency of their second VFO in this status field, enabling stations receiving their position reports to initiate a voice contact

### Summary

- As with many things in amateur radio, APRS is optional
- Some hams use it all the time, others don't even know what it is
- You can get a bit of an exposure by going to web sites like [aprs.fi](http://aprs.fi) before you invest any money in getting set up to handle APRS over RF
- You don't need a multi-hundred dollar APRS radio either - a simple 2 meter radio and a computer with a sound card input can get you started!

### Questions:

- **The question for the week is:** Is APRS something that interests you, have you used it before, and what would you use it for?
- **In my case,** I've used the built-in APRS capability of two of my Kenwood radios - a D710 mobile and a D72 HT - to send position reports and monitor APRS traffic. I used the HT both in a vehicle with an external mag-mount antenna, and also with a Signal Stick antenna at a POTA site.

### More Info:

- Original APRS homepage: <http://www.aprs.org/>



- APRS on Wikipedia: [https://en.wikipedia.org/wiki/Automatic\\_Packet\\_Reporting\\_System](https://en.wikipedia.org/wiki/Automatic_Packet_Reporting_System)
- WA8LMF's APRS page: <http://wa8lmf.net/aprs/>
- aprs.fi: <https://aprs.fi/>
- FindU.com: <http://findu.com/>
- DigiRig: <https://digirig.net/product/digirig-mobile/>
- Mobilinkd: <http://www.mobilinkd.com/>
- Winlink APRS: <https://winlink.org/APRSLink>
- PinPoint APRS: <https://www.pinpointaprs.com/>
- APRS Track Direct: <https://www.aprsdirect.com/> (<https://twitter.com/APRSDirect>)
- APRSISCE/32 (Windows, MAC (under Wine)): <http://aprsisce.wikidot.com/>
- UI-VIEW (Windows): <http://www.ui-view.net/>
- XASTIR (Linux): [http://xastir.org/index.php/Main\\_Page](http://xastir.org/index.php/Main_Page)
- QTH.app (Mac): <https://www.w8wjb.com/wp/qth/>
- SMSGTE APRS-to-SMS Service: <https://smsgte.org/> (service may be down due to SMS regulations)
- Repeater List via APRS:  
[https://www.reddit.com/r/APRS/comments/pnmqsw/aprsd\\_plugin\\_repeatr\\_service/](https://www.reddit.com/r/APRS/comments/pnmqsw/aprsd_plugin_repeatr_service/)
- 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](mailto:k0itp@w0eno.org)

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