2024-10-15 Hamlet Net - DMR

Announcements:

- Test Session Info
    - Next VE session is Saturday, October 26th in the Clover Building at the Boulder County Fairgrounds, and starts at 10 am. It is an ARRL session, so there is a $15 fee to test. For more info, and to pre-register, see the Licensing/Testing page on the club web site, https://w0eno.org/, under the Education menu.
- Tomorrow is the October LARC General Meeting. This month's presenter is Carl Luetzelschwab (K9LA) who will discuss sunspot cycle and propagation. The meeting will be in person at the Clover Building at the Boulder County Fairgrounds, and also via Zoom. There will be a period of socialization before the start of the meeting at 6:30pm, with the meeting starting at 7. Hope to see you there!
- We now have a VHF voting receiver located at the Firestone Public Works which is at a decent height.so much higher. If you are in that area and were having trouble getting into the 2m repeater, give it a try now and let us know if it's working better for you.
- We are still looking for volunteers for Santa on the Air - we can use elves who act as net control, as well as Santas. We've got a script for the elf, and a list of questions for Santa to keep the net going when Santa doesn't have anyone to talk to. No experience is necessary. You can even participate over Echolink as well.
- Rocky Mountain Ham Radio is starting their 2024-2025 Ham Radio University series of presentations with a DMR Programming Workshop given by Mike Lozano, K0NGA. He will cover concepts, CPS differences and practical examples with special attention to the popular Anytone brand of radios.

  The session will take place at the Cherry Creek Schools Educational Services Center in Greenwood Village, and may also be attended via Zoom.

  Upcoming Ham Radio University titles are: Direction Finding Workshop, Solar Power: Planning and Design, Designing Objects for 3D Printing, Antenna Workshop, and Grounding and Lightning Protection, as well as their Nerdfest, which is "An eclectic assortment of talks on topics of interest to hams."

  For information on the Ham Radio University presentations, see their web site at: https://www.rmham.org/ and click on "RMHAM University" in the menu bar.
- If you're on social media, the HamCon Colorado organization group is running a "Key the Mic" challenge. They ask that you record a short video of yourself sendito the ARRL Rocky Mountain Division and Hamcon Colorado 2025, and why ham radio is important

for you. Finish up by challenging 2-3 licensed hams or friends to do the same by name and callsign.

For more info on this event, go to:
https://www.hamconcolorado.com/key-the-mic-challenge/

- HamCon Colorado 2025 is the ARRL Rocky Mountain Division Convention.

  It is a fantastic networking and learning event that gives you nearly 60 hours of forums on topics relating to amateur radio! It will be held October 23-26, 2025 at the Doubletree Hotel in Grand Junction, CO.

  Many well known national radio speakers will be in attendance as well as national vendors selling commercial wares.

  DX University will be held all day on Thursday October 23, 2025 supported by some of the best contesters and DXers in the USA. This will be a full day of learning how to tune up your DXing skills.

  There will be non-ham events scheduled for the family and XYLs to enjoy what Grand Junction and the surrounding area has to offer.

  It will include:

  - W1AW/0 Special events station
  - DXCC Card Checking
  - Static Displays
  - Communications vehicles will be on display
  - EOSS Hospitality suite
  - Complimentary ARRL Affiliated Club Tables
  - Fox Hunts
  - Many hours of learning

  For more information, see their web site at: https://www.hamconcolorado.com/

- We have some volunteer opportunities available where you can help out LARC:
  - Photographer / videographer - record team activities and upload to web site / YouTube

    - Newsletter Editor - put together the monthly Splatter newsletter
    - Event Coordinator

- 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: DMR

- One of the first purchases of many hams is an analog HT or mobile radio.
- There is another type of radio, and that is a digital radio.
- In a digital radio, audio and sometimes data is encoded digitally for transmission
    a. An audio "codec" converts analog voice to and from digital
    b. Digital data can be sent directly
- Digital information can be compressed (by having redundant information removed), use error correction, and also multiplexed to combine several data streams into one signal
- Unfortunately, unlike analog radios where every radio can transmit and receive to and from every other radio, in the digital voice world, there are multiple competing standards or implementations, including System Fusion, DMR, and D-STAR, none of which are compatible with the others
- There also aren't any current radios which support all of these modes.

- The topic of my presentation tonight is a brief overview of DMR
- DMR stands for Digital Mobile Radio
- It is a standard of the ETSI, which is the European Telecommunications Standards Institute
- It is used world-wide by professional radio services
- This is one of its weak points when used by amateurs - the system was designed with commercial radio systems in mind, making configuration more complicated than analog radios
- DMR has three different classes of usages, called tiers
- Tier 1 supports a single 6.25 kHz wide channel
    a. It is primarily used for unlicensed communications in Europe - similar to the FRS radio service in the US
    b. In addition to a single frequency it is also limited by output power to ½ a watt, and does not support repeaters
    c. Baofeng released a Tier I radio - the RD-5R. This radio was not compatible with DMR repeaters or networks
- Tier 2 uses narrow band digital FM with a 12.5 kHz channel bandwidth
    a. It is based on TDMA (time domain multiple access) technology providing two communication channels on a single repeater frequency pair or simplex frequency
    b. These channels are called time slots
    c. Each of these channels alternately occupy the 12.5 KHz bandwidth - each time slot gets 30ms out of each 60ms
    d. Each channel can carry voice or data (or a combination of the two)
- So if DMR is more complicated than analog radio, why use it?
    a. The primary benefit is that you can get two independent channels with a single repeater, antenna, and frequency pair
    b. The addition of data along with voice - one example is APRS. On an analog radio, you typically use one VFO for APRS and the other for voice - on DMR, both of these can run over a single frequency pair

    c. Clean digital signaling between devices - of course, this assumes no interference

    d. Ability to link repeaters over IP networks (both the public Internet and private networks)

- Another feature of DMR are talk groups

    a. Repeaters can support multiple talk groups on a single time slot

    b. You will only hear traffic from talk groups you are a part of

    c. You program your radio to subscribe to specific talk groups

    d. There is also the concept of a private call, which is a talk groups specific to two radios

    e. Talk groups can be extended over a wide area via linking

- We have a large, statewide DMR network managed by Rocky Mountain Ham Radio which supports Tier II and III radios

    a. It uses talk groups to allow users to select how wide their transmissions should go in the network.

    b. There is a Rocky Mountain Wide talkgroup that uses the entire system, as well as regional talkgroups covering smaller regions as well as specialized talkgroups that may be limited to a single repeater.

- DMR also supports zones

    a. Zones make it easier to organize repeaters and channels

    b. They can be used to organize by area (local, state, etc.)

    c. They can also be organized by activity (normal, field day, emergency use)

- Color Codes are also part of DMR

    a. These are similar to CTCSS and DCS on analog repeaters

    b. The repeater will only "hear" you if you use the right color code

    c. There are sixteen color codes available

    d. Despite the name, they are actually numbers, not "colors"

- Programming a DMR radio involves creating a code plug, which is where you define all the zones, channels and other configuration information.

    a. This is typically performed by software supplied by the radio manufacturer, frequency referred to as CPS or Customer Programming Software

    b. All the CPSs I've seen are Windows-based - generic applications such as Chirp generally don't support DMR radios

    c. RT Systems does have software that supports many DMR radios

    d. In the commercial world, radios are typically programmed by a radio group and locked to prevent users from making any changes

    e. This is quite different than your typical FM analog radio, where you can change the programming, add memory channels and more via the radio's front panel

    f. Since it was typically a dedicated and trained group that was responsible for programming the radios, most CPSs is not very end-user-friendly

    g. This is where a session such as RMHAM's DMR programming talk can come in very handy!

- You may have heard hams mention with disdain that DMR is not real radio as it requires the Internet

    a. This is not entirely true - DMR supports direct radio-to-radio simplex communications as well as repeater communications

    b. What does require the Internet is connections to other repeaters via networks such as Brandmeister and TGIF

    c. These networks provide a lot of additional talkgroups, but you do access them over the Internet, so if critical infrastructure is down, such as after a flood, you will likely not be able to connect to these non-local talkgroups

- Another benefit of DMR is that it has lower power requirements when transmitting, since it only transmits for around 27 ms out of every 60 ms.

- One limitation of DMR that is a product of its commercial roots is that it does not transmit your callsign at a digital level

    a. When you look at your radio, you may see a name and/or call sign displayed for the transmitting user, but these are based on a numeric "DMR ID" which is translated to a name/callsign on the radio from a database of contacts you upload to the radio

    b. This means that to satisfy the "every 10 and at the end" FCC ID requirements, you must still do this via voice as with analog radios

- Another limitation occurs when signals get weak
    a. On analog transmissions, many times you can still make out some of the audio on a weak incoming signal
    b. For digital voice modes, you're more likely to get good audio up to a point, and then have it drop
    c. The situation is similar to analog versus digital over-the-air TV
- So what do you need to use DMR?
- The first thing you may think of is a radio
    a. You can choose from commercial DMR radios (such as Motorola and Kenwood) or non-commercial radios such as (Anytone, and TYT / Tytera)
    b. Many commercial radios are more robust than non-commercial, but this comes with a higher price tag
    c. You also need to factor in the cost of the CPS for your radio, which may be pricey for commercial radios
    d. I'm not aware of any radios that support multiple digital modes (such as DMR and D-Star) - there was a project to develop one, but it never got released
    e. There is an app on Android called DroidStar that supports multiple digital modes - M17, Fusion, DMR, P25, NXDN, D-Star and Allstar. It uses IP versus RF, so is not a "real" radio.
    f. Many (most?) DMR radios also support analog voice
- In addition to a radio, you'll also need a digital ID
    a. This is associated with your callsign
    b. You only need one - it can be used on multiple radios
- There are numerous Youtube videos out there that discuss DMR programming - including those from NCARC and RMHAM
- If you want to use the RMHAM DMR network, they provide pre-made codeplugs for their network that can save you a lot of setup time
- You can also install a personal device that functions like a small repeater called a Hotspot, but that's a whole other topic

Summary

- Digital voice is a subset of amateur radio that provides some benefits over analog radio, but also has some downsides
- Here in Colorado, we are lucky to have the RMHAM DMR network that blankets most of the state, which makes DMR an attractive digital voice implementation in our area
- If you are interested in more information, check out the Ham Radio University DMR talk provided by RMHAM.

Questions:

- **The question for the week is:** Do you have a DMR radio, and if so, what do you use it for? If not, is this something that interests you?
- **In my case,** I have one DMR radio - a single-band VHF TYT MD-380. To be honest, the only communication I've used it for was during a DMR programming class put on by the Northern Colorado Amateur Radio Club, where they had us program two channels into our radios - one for a simplex communication, and one for a repeater.

  I took the class because after reading about DMR, the programming just didn't "click" for me. One thing you have to keep in mind is that this is not an implementation designed for amateur radio, rather, amateurs are trying to make use of a system designed for a very different environment, so things will not always make sense.

  I've only got one other digital voice radio - a mobile that supports D-Star. Since digital voice radios using different implementations are not compatible with each other, and I have no big need for digital voice at the moment, I'm waiting to see if one mode beats out the others rather than end up with a bunch of incompatible radios.

  If I did have to choose one digital voice mode to use in this area, I'd definitely choose DMR due to the RMHAM repeater network.

More Info:

- RMHAM DMR Site Information: https://www.rmham.org/dmr-site-information/
- Brandmeister:DMR Network: https://brandmeister.network/
- TGIF DMR Network: https://tgif.network/
- RT Systems DMR Support: https://www.rtsystemsinc.com/DMR-Radios_c_914.html

- DroidStar Android Digital Voice App: https://play.google.com/store/apps/details?id=org.dudetronics.droidstar&hl=en_US

- DMR Radio ID: https://www.radioid.net/register

Notes:

- 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. WA0JJC - Bob - Boulder
3. AE0DO - John - N of Longmont
4. AF0W - Bryan - Longmont
5.

End: 7:45pm

Chuck has asked the Board to come up with ideas for goals for 2025 for the club.