2025-04-15 Hamlet Net - Mobile Installs - Antennas

Announcements:

- Test Session Info
    - Next VE session is next Saturday, April 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. See the Licensing/Testing page on the club web site, https://w0eno.org/, under the Education menu.
- The April club meeting is tomorrow, Wednesday, April 16th. I will be presenting a talk titled "HF Hamlet Seminar" which covers getting started with and having fun using HF. As usual, the meeting is at the Clover Building at the Boulder County Fairgrounds. Doors open at 6:30pm for socializing, with the meeting and presentation beginning at 7pm.

  We're trying to encourage more members to attend in person to foster building interpersonal relationships, but if you are unable to make it, you can join via Zoom.
- Upcoming Club Volunteer Opportunities:
    - LARCFest - thanks to everyone who helped make LARCFest 2025 a success. Early estimates have the Club bringing in over $2500 of profit, and we got rid of a lot of stuff from storage.
    - Summer Field Day is our next large Club event and is June 28-29 this year. As with other events, the more help we get, the easier it is on everyone. We will need help with things like setup, teardown, food, running the GOTA station, completing activities needed for bonus points, etc., so please help out in any way you can.

      Our first Summer Field Day planning meeting is next Monday, April 21st from 7 to 8 pm on Zoom. If you can help out with any activities, or would like to get in on the planning, please plan to attend. Get in touch with Chuck or myself and we can forward you the meeting info.
    - HAMCON Colorado 2025 for Rocky Mountain Division is October 23-26, 2025 in Grand Junction. For more information and to register, see their web site at: hamconcolorado.com
- The final RMHAM University presentation this year is titled "Grounding and Lightning Protection." This topic always generates a lot of discussion and some disagreement, so come hear what Mike, K7AIH, has to say on the topic. It will be held on April 26th from 8:30 am to noon-ish.

You can attend live in Greenwood Village at the Cherry Creek Schools ESC. It's also being held on Zoom if you can't make it, and they usually record the sessions for later viewing as well.

To sign up, go to the RMHAM web site at: https://www.rmham.org/ and click on the "Sign Up for RMHAM University" link under the "RMHAM UNIVERSITY" menu item.

- If you are an ARRL member, remember that you have digital access to four magazines - QST, On the Air, QEX, and National Contest Journal.
- We have a new net on the LARC repeaters. It's run by Timothy Moss, KFØLAR, on the 22nd of every month at 6pm. The 22nd was chosen to highlight the average of 22 vets who commit suicide each day. While the purpose of the net is to connect veterans, non-vets are welcome to participate as most all of us have friends or family who are or have served.
- The ARRL Colorado Section Net occurs on the second Monday of the month from 7 to 8pm. The net is run by Amanda Alden, K1DDN, our Colorado ARRL section manager, and is open to hams and non-hams alike. This net is a place where Colorado hams can ask questions of ARRL leadership and request help, guidance, club support, and technical support. This net meets on the second Monday of each month at 7:00 pm Mountain time. The net is on the Colorado Connection, Rocky Mountain Ham Radio DMR Talk Group 700, The Fun Machine, WE0FUN, and the NCARC Buckhorn Repeater 447.700 – with 100 Hz tone.
- 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
- Time's up for this year, but you can earn your 2026 membership or future renewal by acting as NCS for at least 5 nets next 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!
- 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 2025. If you have any ideas, or better yet, would like to present, please let Chuck know and we'll get you on the schedule! We would like to get some presentations from club members on stuff they've been doing, projects they're working on, or just things that interest them.

- 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: Mobile Installs - Antennas

- Two weeks ago we talked about mobile installs and power wiring. The other main component of mobile installations are antennas.

- First, you must have a way of mounting the antenna on your vehicle

- Mounts can be temporary or permanent.

- The "best" antenna mounting system is typically thought to be an NMO mount installed in a hole drilled in the roof (high location, no metal blocking radiation, good ground plane under antenna)

    a. NMO stands for New MOtorola - these are used all the time on public service vehicles

    b. When installed properly, has two waterproof seals - one to protect the metal of the vehicle, and the other to seal the antenna-to-mount connection

    c. Requires a ¾" hole in the metal body

    d. Special hole saws exist to prevent the bit from penetrating too deep into the car (i.e. headliner, etc.).

    e. Have seen recommendations to install antenna over inside dome light so that you can temporarily remove the light and have space to run the coax without having to drop the headliner

    f. One concern (besides drilling into a brand new car!) is that it will affect resale value.

        - There are caps that screw onto the mount, or you can remove the mount and place a plug into the hole

        - Some hams have said they've told buyers that it was for a cell phone antenna
        - In most cases, hams have said that the buyer didn't mention or didn't care about the hole/mount
- Today's vehicles can make this difficult - aluminum or glass roof panels
- Another option is a trunk or hood lip mount - these usually have one or more small set screws that secure the mount to the lip
    a. These can damage paint or bend the lip
- Magnetic mounts are good for temporary use
    a. Useful for rental or company vehicles
    b. Can damage paint - the magnet collects metal particles from the air (such as from brake pads) which then scratch paint as mount is slid around
    c. May also dent the panel over time if they are tilted to remove
    d. Can also fly off car in the event of a collision
    e. There are multi-magnet mounts for more holding power / larger antennas
    f. There are NMO magnetic mounts - these can be used to temporarily mount an antenna with an NMO base
- Some mounts use existing bolts under hood to mount antenna through the hood seam
- There are mounts that fit into a trailer hitch receiver - these are typically used for stationary operation
- Through-the-glass mounts also exist
    a. Main problem is that tinted auto glass may contain metal particles to block UV rays. These act as an RF shield.
    b. Glass thickness is also a factor
    c. Glass does not provide a ground plane, resulting in much of the RF current flowing on the coax, causing it to radiate
- Have seen mounts for pickup trucks that mount using the third brake light screws
- Chuck even has a suction cup mount that he's using on his back window.

- There are antenna mounts that use SO-239 connectors - beware of these as they are not waterproof
- If drilling holes in the roof, hood, or trunk, be sure you know what is beneath and do not drill into support members, sunroof track, airbags, wiring, etc.
- When selecting an antenna, there are a number of characteristics you should look at:
    a. Bands, gain, sturdiness, weather resistance, power rating
- VHF/UHF antennas are typically ¼, ½, or ⅝ wavelength
    a. ¼ wave generally has highest elevation pattern - good for hitting mountain top repeater sites
    b. ⅝ wave generally has lowest elevation pattern - good for long-distance in flat lands
        ■ ⅝ wave does have an advantage of slightly longer length (i.e. height above vehicle)
    c. ½ wave antennas do not need a ground plane underneath them
- Have seen very stubby antennas - around 7" tall - performance is likely very compromised (same as with small HT antennas), but could be useful if you have height issues (parking garage, etc.)
- Gain should not always be a deciding factor - can vary up to 20 dB while driving (picket fencing) - a 3 dB difference between antennas will be negligible
- Some antennas have coils - either at the bottom or somewhere along the antennas length
    a. Middle-mounted coils can be a structural weak point - some antennas split the radiator into two parts and connect them with a coil and set screws
- There are some tri- and quad-band mobile antennas - generally these are very compromised antennas
- A very popular mobile dual-band antenna is the Larsen NMO2/70, which costs around $110

HF

- While the majority of hams who have mobile installs have a VHF or dual-band VHF/UHF radio, it is also possible to have a mobile HF station

- Antenna size is a large problem in mobile amateur radio
- A true, ¼ wave antenna for 160 meters would be roughly 40 meters long, or 131 feet - no way this would work on a moving vehicle!
- While there are mobile antennas advertised to support 160 meters, they do this by using a shorter antenna with a coil to add inductance
    a. This severely limits the usable bandwidth of the antenna, and reduces its efficiency - you may wind up with less than 1% efficiency on such an antenna
- One popular HF mobile antenna type is called the screwdriver antenna
    a. It is a shortened antenna with an adjustable coil that allows it to operate on different bands
    b. These antennas are generally around 9 to 11 feet in length, including both the coil mechanism and whip
    c. This system is similar to the Wolf River Coil HF antenna we have in the LARC Go-Box, but the coil in screwdriver antennas is electrically adjustable
    d. The names comes from the early antennas using electric screwdrivers to power the coil adjustment
    e. Some popular manufacturers of these antennas are Tarheel Antennas and Scorpion Antennas
- Another option are single-band helical loaded antennas, commonly referred to as hamsticks
    a. MFJ has a line of hamstick antennas - the MFJ 1600 series (for example, the MFJ-1640T is the 40 meter hamstick)
        ■ These antennas run around $30 - $40 each
        ■ They are also useful to make mono-band dipoles when used as a pair
        ■ MFJ also sells an "HF Octopus Base" for $160 that allows 4 pairs of hamsticks to be used to construct a multiband antenna with a single feedpoint (but this would not be usable while driving!)
- Another option if you plan to use your HF rig when stationary is to set up a larger wire dipole and run the feedline to your vehicle
- There are some additional issues that you have to take into account when installing an HF mobile setup - such as making sure all body panels and the exhaust system are

bonded together to reduce RF noise, and higher power demands of many HF radios as compared to VHF/UHF radios

Summary

- A good reference site for mobile installs is k-zero-bg.com - Click on the green "ABCs" button on the upper left of the page for a summary. Much of the page talks about mobile HF installs - there is a dedicated "VHF Options" button near the bottom for VHF/UHF specific issues.
- When it comes to HF mobile operating, don't blow your entire budget on the radio - make sure you can also afford an adequate antenna system to support it!

Questions:

- **The question for the week is:** If you have a mobile radio, what sort of antenna and mount do you have?
- **In my case,** I'm planning to install dual-band VHF/UHF radios in two of our vehicles.
    - **a.** In my Honda, I plan to mount an NMO mount in the trunk lid because I have a sunroof, and don't know if I have any space for an antenna in the roof.
    - b. In my wife's 4Runner, we're going to use a mount that utilizes an existing bolt at the top of the fender to mount an NMO antenna. I plan to use Larsen NMO 2/70 antennas for both vehicles.

More Info:

- K0BG ABC's: http://www.k0bg.com/abcs.html
- Screwdriver Antennas: http://wiki.hamtools.org/index.php?title=Screwdriver_antenna and https://www.onallbands.com/what-is-a-screwdriver-antenna/
- Tarheel Antennas: https://www.tarheelantennas.com/
- Scorpion Antennas: https://www.scorpionantennas.com/
- MFJ ham stick antennas: https://mfjenterprises.com/search?q=hf+stick
- MFJ-2100, HF Octopus Antenna Base: https://mfjenterprises.com/products/mfj-2100
- Larsen NMO 2/70 Antenna: https://www.dxengineering.com/parts/lsn-nmo2-70b

- Pulse LARSEN Antennas Catalog: https://www.pulseelectronics.com/wp-content/uploads/2021/01/Amateur_Radio_Catalog.pdf

Email to elmer@w0eno.org

- 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. KCØCT - Joe - Boulder
2. AEØDO - John - N of Longmont
3. N7CTM - Mark - Firestone
4. KFØTBE - CW - Johnstown
5. W7PGF - Philip - Frederick
6. AFØW - Bryan - Longmont

End: 7:55pm

The ARRL has provided feedback to the FCC, who had requested suggestions on deletions or changes to their rules and regulations, mainly for things that are archaic and which get in the way of using all of the radio services under the FCC's purview.

The ARRL has a summary of their proposed modifications on their web site - I'll put the URLs in the notes from this presentation. Their main points are:

1. Delete the LF and VHF/UHF symbol (baud) rate and bandwidth limitations
2. Update and modernize entry-level technician class license privileges to provide more access to HF data and phone communications with the hope that they will encourage operators to upgrade to a General class license
3. Modernize the 75 / 80 meter subband divisions to make more efficient and intense use of these bands
4. Delete and replace obsolete digital code limitations which refer to codes that are obsolete today and permit amateurs to freely experiment with new digital codes so long as such codes are publicly documented and decodable
5. Implement changes to third-party rules adopted by the ITU in 2003 that removed a treaty requirement for third-party communications
6. Delete amplifier gain limitations to allow the use of today's more efficient and powerful solid-state amplifiers
7. Remove non-current personal information in amateur ULS records
8. Delete requirement to ID using your call sign when operating with a special event call sign

9. Delete a paper license replacement provision (since the FCC no longer sends paper licenses)

ARRL Post: https://www.arrl.org/news/arrl-files-comments-responding-to-fcc-request-for-input

ARRL comments to FCC:
https://www.arrl.org/files/file/Advocacy/ARRL%2025-133%20Comments%2004_11_2025.pdf

Reddit comment on proposals:
https://www.reddit.com/r/amateurradio/comments/1jzgbsw/arrl_files_comments_responding_to_fcc_request_for/