

2024-05-14 Hamlet Net - Generators

Announcements:

- Test Session Info
 - Next VE session is this Saturday, May 25th in the Clover Building at the Boulder County Fairgrounds, and starts at 9 am. It is a PVET session, so there is no 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.
- ARRL was apparently hacked. Services like the Logbook of the World and the educational center are inaccessible, as are network devices at the Newington headquarters for their employees. I've not heard if or how this will impact their VEC functionality - they are the largest VEC out of the 13 authorized VECs, so that could really throw a wrench in things.
- There's a big hamfest going on in Dayton, so you might want to check out some of the Youtube ham channels to see what's new out there. I've been busy getting my parents moved in and haven't had time to check them out yet.
- 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
 - Social media manager
- There are several Board positions that will be available in October. Currently, the Treasurer and Secretary are planning to make this their last year of service. If you are interested in serving on the board of a 501(c)3 non-profit, please consider running for one of these positions. The current members would be more than happy to "show you the ropes" during the year, so you wouldn't start with zero experience.
- 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: Grey Line

- We had a question on a previous net about what greyline was.
- You've probably seen ham web sites that display the world map and include shading to indicate daytime and nighttime - one example is:
<https://dx.qsl.net/propagation/greyline.html>
- You may have even seen an electro-mechanical wall display called a GeoChron, which also shows this information and retails for over \$3000 - but why do they show this?
- The main mode of propagation for HF radio operation is ionospheric propagation
- This occurs when radio waves encounter the atmosphere and are bent or refracted back towards the earth
- Depending on conditions and properties of the waves, they may then reflect from the Earth and refract off the ionosphere again
- This behavior allows HF communications beyond direct line-of-sight between two stations
- There are several regions in the ionosphere, some of which attenuate the radio waves, and others which refract the signals
- This behavior depends on many things - the time of year (which affects the tilt of the earth by almost 50 degrees), the date in relation to the sun's roughly 11 year solar cycle, and solar activity such as sunspots and coronal mass ejections as well as the time of day and the frequency of the radio wave

- There are two terms that are used when referring to frequencies: MUF and LUF
 - a. MUF is the Maximum Usable Frequency, and represents the highest radio frequency that can be used for transmission between two points via reflection from the ionosphere (skywave or "skip" propagation) at a specified time
 - Transmitting at a frequency higher than the MUF will cause your transmission to pass through the atmosphere and continue out into space without being refracted
 - A website showing current MUFs is: <https://prop.kc2g.com/>
 - b. LUF is Lowest Usable Frequency, and represents the lowest frequency that can be used for transmission between two points
 - Using frequencies lower than the LUF will result in the signal being attenuated in the lower level of the atmosphere, preventing successful communications
 - The LUF is dependent upon the stations at either end of the path
 - Their antennas, receivers, transmitter powers, the level of noise in the vicinity, and so forth all affect the LUF
 - The type of modulation used also has an effect, because some types of modulation can be copied at lower strengths than others
 - In other words the LUF is the practical limit below which communication cannot be maintained between two particular radio communications stations
- Transitions from daylight to darkness or darkness to daylight result in fairly drastic changes in the ionosphere
- The sunrise/sunset line is referred to as the terminator, the twilight zone, and the gray line
- This gray line is actually a circle around the Earth
- For period ranging from minutes at low and high frequencies such as 160 and 10 meters to one to two hours at intermediate frequencies such as 20 meters, with suitable ionospheric conditions, stations on the gray line can communicate with any other station located on the gray line

- This is called "working gray line" and occurs because the maximum usable frequency, or MUF, is rising rapidly on the sunrise side of the line, and is simultaneously still high on the sunset side.
- The D layer of the ionosphere, which is the lowest layer and which attenuates radio signals passing through it, is rapidly dissipating on the sunset side, and is not yet energized on the sunrise side, meaning it has minimal impact on the signal
- These changes occur because sunlight does not start (or stop) hitting all layers of the atmosphere at the same time
 - a. The ionosphere is around 570 miles deep - when the sun starts to set, the lower layer (the D layer) stops receiving solar energy while the upper layers are still being energized
 - b. The opposite happens when the sun starts to rise - the lower layer is the last to become energized
- This gray line behavior can result in rare DX contacts which you may otherwise have difficulty achieving
- There are also effects called the sunrise and sunset enhancements which affect signals coming from the west and east, respectively
 - a. These do not occur on the gray line, and are thought to be due to a focusing effect from refractions from the E and F layers of the ionosphere
- Note that due to a variety of variables the gray line propagation does not exactly follow the day night terminator as seen on the earth's surface, but it can still be used as a rough guide
- One way you can observe gray line effects for yourself is to run WSPR (which is weak signal propagation reporter)
 - a. This is a digital mode that alternately transmits and receives
 - b. When transmitting, your station sends your call sign, grid square, and output power
 - c. When receiving, the sent information as well as received signal strength is reported to an internet database which is then used to generate a web page at wspn.net
 - d. You can go to that web page and see where your signal is being received around the world by clicking on the Map link

- e. You can also get a rough estimate of relative signal strengths at different locations
- For detailed greyline info, the <https://www.voacap.com/greyline/> performs three sets of calculations
 - a. By default, the page will show sunrise and sunset times for various locations around the globe (for US locations, scroll down to the W's - look for a W followed by the call area you are interested in (for example, Denver is W0)
 - b. To display sunrise and sunset times for a given 6-character grid square, enter it in the "Locator" field, enter any date in the desired year in the "Date" field, click the "Calendar" checkbox, and click the "Go" button
 - c. Finally, to calculate gray line conditions from your grid square to other locations around the globe, fill in your 6-character grid location, the date you want to analyze, make sure the "Calendar" box is not checked, and click the "Go" button
- So if you're looking for a new challenge, try operating HF in the twilight hours in the morning or early night and see if you snag any new DX!

Questions:

- **The question for the week is:** Have you ever utilized gray line propagation to make a QSO or listen to a remote station?
- **In my case,** while I've read about it and what it's supposed to do, I've never actually tried working the greyline to see it in action.

More Info:

- VOACAP Greyline User Manual: <http://voacap.blogspot.com/2016/11/voacap-greyline-user-manual.html>
- PSKReporter: <https://pskreporter.info/pskmap.html>
- WSPR: <https://www.wsprnet.org/drupal/wsprnet/map>

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?

- 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. AF0W - Bryan - El Paso via Echolink
2. WA0JJC - Bob - Boulder
3. KE0EE - Don - N Longmont
4. W7PGF - Philip - Frederick
5. AI7JW - Ian - Longmont
6. W0DPC - Donald - 2m NE of Longmont

End: 7:48pm