

## 2024-07-23 Hamlet Net - Grid Squares and GridTracker

### Announcements:

- Test Session Info
  - Next VE session is August 24th 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 see the Licensing/Testing page on the club web site, <https://w0eno.org/>, under the Education menu.
- We are still looking for volunteers for Santa on the Air - we can use elves who act as net control, and 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.
- Boulder County Fair Parade this weekend. Check out web site to sign up to help out.
- 3rd Wednesday, Aug 21st is the general club meeting. It's at Rogers Park just north of the fairgrounds. We have a video presentation on amateur radio as well as pizza and soda.
- 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
- 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](mailto:elmer@w0eno.org)**

**Presenter: Bryan, AF0W**

### **Topic: Grid Squares and GridTracker**

- I came across an article that announced that an application called GridTracker won the 2023 Amateur Radio Software Award
  - First of all, I didn't even know such an award existed
  - Previous winners include:
    - Codec 2, which is a project for digital voice communication on HF and VHF that does not suffer from patent encumbrance like D-STAR and DMR
    - JS8Call
    - K3NG Arduino CW Keyer which is an open source [Arduino](#)-based Morse Code keyer with a lot of features and flexibility, rivaling commercial keyers which often cost significantly more.

### **GridTracker**

- But back to GridTracker, what is it?
- From its web site: "GridTracker is a tool that visualizes WSJT-X amateur radio traffic and contacts from log files, making it easier for radio amateurs to track their contacts and participate in contests."
- It does this by presenting the information in a map that is a visual representation of all of your radio contacts (QSOs) by Maidenhead grids

### **Maidenhead Grids**

- Before continuing more on GridTracker, what are these grids?
- They are part of a geolocation system called the Maidenhead Locator System or the IARU Grid System and are used in amateur radio for providing location information

- Named after a town outside London where the system was first conceived during a meeting of European VHF managers in 1980, it allows providing position information with varying degrees of precision
- Grid squares (also called grid locators) - are frequently used in VHF contests, as contacts are frequently scored by the distance of the communication, typically between the centers of the subsquares for each operator
- A Maidenhead locator compresses latitude and longitude into a short string of characters
- Locations are composed of alternating pairs of letters and numbers which represent longitude and latitude
  - The first letter or number represents the longitude, while the second represents the latitude
- The first pair of letters, sometimes called the "field" consist of the letters A through R and are written in uppercase. This divides the globe into 18 zones of longitude of 20 degrees each, and 18 zones of latitude at 10 degrees each, for a total of 324 possible fields
- The second pair of numbers, sometimes referred to as the "square" are encoded using the digits 0 through 9, and represent 1 degree of latitude and 2 degrees of longitude, or approximately 70 miles high by 100 miles wide - for a total of 32,400 grid squares
- This set of 4 characters is frequently referred to as a "grid square" and is part of the exchange for VHF contests
- This system allows for more precision by adding additional pairs of characters
  - Adding two more letters, called a subsquare, narrows it down to 3 x 4 miles
    - Two points within that subsquare are within 6.5 miles of each other
    - Subsquares are sometimes used for UHF and microwave contests
  - Finally, adding two more letters, called an extended locator, resolves down to 15 minutes of latitude and 30 minutes of longitude
- DN70kd is my grid square, Harbor Freight in north Longmont is DN70ke. Boulder municipal airport is DN70ja
- There are about 15 grids in CO (104,000 square miles) and 488 in the entire US
- Much easier to communicate a short sequence of letters/digits than it is to specify full GPS lat/lon coordinates

- If you were working a special event station at the Longmont Vance Brand Municipal Airport, what would be easier to communicate over radio:
  - 40 degrees, 9 minutes North, 105 degrees, 9 minutes West
  - DN70kd09
- You can find your Maidenhead Grid Square location for a callsign (including your own) by searching for that callsign on qrz.com and clicking on the Detail tab.

### **Projected Coordinate System**

- The Maidenhead Grid System is based on what is called a projected coordinate system
- This is a type of spatial reference system that represents locations on the Earth using cartesian coordinates (x,y) on a planar surface created by a particular map projection
- The Maidenhead Grid System uses a variant of the Mercator map projection that is also used by the GPS system and which has become the de facto standard for internet mapping applications
- One issue with such a system is that since the Earth itself is not flat, the actual size of a grid square depends on its particular location, as the 1° of longitude represents different distances at different latitudes; longitude lines are closer together at the Earth's poles than at the equator

### **Alternate Systems**

- Latitude / longitude and the Maidenhead Locator System are not the only games in town when it comes to specifying locations
- The military has their own world-wide grid system, and they probably spent millions of tax dollars on studies to eventually come up with its name: the Military Grid Reference System or MGRS
  - It also allows for varying the levels of precision - all the way down to a 1 meter square if using 14 characters for the locator
- France and the UK actually have their own nationwide grid systems
- One other interesting system I came across is the What3Words system
  - Launched in 2013, this system provides location resolution down to one of 50 trillion 3 meter squares using just three words (out of a total of 40,000 different English words)

- For example, the DN70kd Vance Brand Airport location is represented by **cotton.soon.salon** in the What3Words system
- While this may seem like a much simpler way of communicating information, the huge problem is that the system is proprietary, and the algorithm of mapping locations to words is protected by copyright, and the company is known for vigorous legal action to protect them
- While there are apps available on Android and IOS, in addition to the web, this means that you're not going to have a paper map with these locations, or some way of calculating them by hand
- For example, the square to the North of the airport's **cotton.soon.salon** is **sung.dunes.oven** - no relation at all!
- I also noticed that there is a **cotton.soon.salons** located in Georgia, so there is still a need for very accurately communicating the location information when using this system
- Apparently, 75% of all What3Words addresses contain at least one plural form of a word that is also used singularly in the system
- Supposedly, the system is constructed so that similar-sounding words refer to locations spaced far apart from each other, although this likely only lets you see that a location is wrong, but you still don't know the proper location
  - It essentially provides error detection without error correction
- Multiple mountain rescue services in the UK have warned against using this system due to numerous incorrect locations encountered during rescues

### **Back to GridTracker**

- Ok, so this talk started with GridTracker
- Initially, the application's tag line was: "GridTracker listens to traffic from WSJT-X and displays it on a map."
- While still supporting that mode of operation, it has evolved into much more.
- GridTracker is not a logging program. Instead it displays your QSO log data from WSJT-X plus any combination of ADIF-formatted files you have stored on your computer, your network, or the internet.
- Some of the features of this free application are:

- Mapping of real-time and historical contacts on a highly customizable, interactive map
  - Many overlays are supported, such as Greyline, real-time award tracking, lightning strikes, Moon position and PSK-Reporter Reception Reports (Spots). Detailed State, Grid and County information is instantly accessible from the map
  - Customizable audio / visual alerts
  - 'Call Roster' table view of live activity, also highly customizable to support award chasers or special events. Easily initiate QSOs with a single click.
  - GridTracker integrates with many popular logging programs and web based systems, allowing you to see up-to-the minute progress for awards.
  - Complete DXCC, Country, Callsign Prefix recognition
  - 100% offline mode available for field-day, POTA, SOTA, and/or mobile use.
  - Packages exist for Windows, MacOS, and Linux
- If you use WSJT-X or have a log program that exports ADIF data, give it a try!

### **Award Committee**

- Finally, if you know of a radio-related application that you think could win the award, the award committee accepts award nominations at their web site at: <https://arsaward.com/>
- The winners for 2024 are OpenWebRX and OpenWebRX+,
  - OpenWebRX is an open source web-based software defined radio application that allows users to share access to one or more SDR devices using a browser.
  - OpenWebRX is designed to be deployed in locations with interesting receiving conditions. This could be a site with low-noise long-, medium- or shortwave reception, elevated locations for VHF, UHF or higher bands, or sites with special directional antennas for special purposes. Any site that would be able to receive something of interest for others.
  - OpenWebRX is designed for public shared access. The main purpose of this application is to allow users to receive signals remotely that they wouldn't otherwise be able to receive on their own.
- You can also volunteer to be part of the award selection committee, but there is a requirement of a \$100/year contribution to the award

### **Questions:**

- **The question for the week is:** Have you ever had to use some location system (other than a street address) to find something or summon help, and if so, which?
- **In my case,** my wife and I own a small parcel of land in New Mexico. As it and the area surrounding it are undeveloped, there is no traditional street address. We obtained "country directions" ("Take this road for two miles, and turn left, then go over the railroad tracks, and...") and surveyor markers to find it, and then recorded the GPS coordinates to make it easier to find next time.

I've also sent my station latitude and longitude via APRS and WinLink position reports.

#### More Info:

- Amateur Radio Software Award website: <https://arsaward.com/award-recipients.html>
- K3NG Arduino CW Keyer: <https://blog.radioartisan.com/arduino-cw-keyer/> and [https://github.com/k3ng/k3ng\\_cw\\_keyer](https://github.com/k3ng/k3ng_cw_keyer)
- CODEC 2: <https://www.rowetel.com/codec2.html>
- GridTracker: <https://gridtracker.org/>
- Maidenhead Grid System: [https://en.wikipedia.org/wiki/Maidenhead\\_Locator\\_System](https://en.wikipedia.org/wiki/Maidenhead_Locator_System)
- Maidenhead Grid Square Tools: <https://www.karhukoti.com/Maidenhead-Grid-Square-Locator/?grid=MM>
- Maidenhead Grid Square Map: <https://dxcluster.ha8tk.su/hamgeocoding/>
- Geographic Coordinate System: [https://en.wikipedia.org/wiki/Geographic\\_coordinate\\_system](https://en.wikipedia.org/wiki/Geographic_coordinate_system)
- What3Words: <https://what3words.com/>, and <https://en.wikipedia.org/wiki/What3words>
- 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)

#### Email to [elmer@w0eno.org](mailto:elmer@w0eno.org)

1. K0ITP - Chuck - Firestone via Echolink
2. AE0DO - John - North of Longmont
3. KM6SJA - Steve - Longmont
4. W7PGF - Philip - Frederick
5. N0XDA - Jim - N Longmont

**End: 7:45pm**