WINLINK Emergency Station Implementation (Discussion Part IV)

In Part III, I discussed setting up an emergency communication station using one of several modes available such as SSB, CW, PSK-31, and WINLINK. I believe we can and should use as many modes as we can to effectively provide communications for the community. However, I should note that the USGS article which spawned this discission makes exclusive use of WINLINK. Coincidently, I received an email which requested that I “map out a WINLINK system and how (I) you see it congealing into effective use.” In this part, I’ll spend some time detailing how I have created a WINLINK station and how it can be part of a community emergency communications package. I should note that a complete tutorial on how to use WINLINK with different radios, computers, and TNC’s is available through the WINLINK web site and the WINLINK users’ group.

The parent organization for WINLINK is the Amateur Radio Safety Foundation, Inc. “Winlink Global Radio Email®️ is an all-volunteer project of the [Amateur Radio Safety Foundation, Inc. (ARSFI)](https://www.arsfi.org/), a non-profit public benefit corporation with no beneficial owners.” Specifically, “Winlink Global Radio Email®️...is a network of amateur radio and authorized government stations that provide worldwide radio email using radio pathways where the internet is not present.” The WINLINK program can be downloaded free at <https://www.winlink.org/>. “The system is built, operated and administered entirely by licensed "Ham" volunteers. It supports email with attachments, position reporting, weather and information bulletins, and is well-known for its role in interoperable emergency and disaster relief communications. It is capable of operating completely without the internet--automatically--using smart-network radio relays. Licensed Winlink operators/stations use both amateur radio and government radio frequencies worldwide.”

The first step is to download the program and get a registration key. Without hooking up a radio, you can practice sending and receiving WINLINK messages. You’ll be using the features of the program through what they call TELNET. TELNET simply connects your computer to the internet using the WINLINK program allowing you to access the features of the program. Once you’ve understood the program features, you are then ready to connect your computer to your transceiver.

I assume you will have a station complete with an antenna, a power supply, a transceiver and a computer. The station can be an HF station or a VHF/UHF station. The transceiver to computer connection uses the audio input of the radio, the audio output, and the Push-To-Talk (PTT) lines to and from the radio into a Terminal Node Controller (TNC) then into the computer. This typically means connecting the radio lines to a sound card then into the TNC. Some radio’s have built-in sound cards making the interface quite easy. Other radio’s need to use an external sound card such as a Tigertronics SIGNALINK. The radio I first used for WINLINK was a 40-year-old Kenwood TS 430S. It worked great, in fact, I still have it and it still works! The bottom line is that almost any radio can interface to a TNC and use WINLINK.

The Terminal Node Controller can be an external device such as a PACTOR TNC like an SCS Dragon 4 on HF, a VHF PACKET TNC like Kantronics KCP-3, a virtual TNC like VARA which resides in the computer as a program or ARDOP which is inside WINLINK. VARA is free, although a donation gets you fastest speeds. The idea is that the TNC connects the radio to the computer and the WINLINK program provides the connection instructions that will be sent over the air to a Radio Mail Server (RMS) GATEWAY station.

You as a client station can connect to hundreds of RMS GATEWAY stations all over the world. RMS GATEWAY stations format and pass information to and from an amateur radio station TNC. Not all RMS GATEWAY stations can receive information from all TNC types. In fact, the list of possible stations that can be connected if you have VARA may be different from those using PACTOR. When you select the TNC in the WINLINK program, the list of possible stations will be presented. I should also note that it is possible to send WINLINK messages between client stations in what is known as peer-to-peer mode without using an RMS GATEWAY.

It's worth saying that you can send as well as receive radio emails via WINLINK. The format is almost the same as it is for email sent and received by Google or any other commercial email service. In fact, WINLINK makes it easy to format information by providing an operator with many forms that can be quickly accessed and completed. There is a drawback in that because of bandwidth, sending large files like pictures can take time, in fact several minutes.

Connecting to an RMS GATEWAY is facilitated by a feature in WINLINK that presents a list of stations based on the probability of making a successful RF connection. Simply select a station outside the doughnut hole and make a connection. Looking at the status information presented, you can confirm transmission success. The receiving RMS GATEWAY station will transfer your WINLINK message to the internet. You may need to use several RMS GATEWAY stations during your tour as an operator. Propagation plays a role as well as the RMS GATEWAY station itself. Most RMS GATEWAY stations only allow a fixed amount of time per 24 hours from a client. When a message is sent or received, the RMS GATEWAY station will record the information as will the sending and receiving (client) station. Thus, everyone has a record of what is sent and received.

The nice thing about getting the whole thing to work is that you do not need to be part of an organized net. The RMS GATEWAY stations connect automatically on demand. You don’t need to operate at specified times. When you have messages to send, they can be transmitted right away. Received messages will be presented to you every time you open a session. The other nice thing is that like commercial email, received messages will remain in your WINLINK in box until you open the program session and read them and then it remains in the “read” file until you delete it. You don’t need to be operating your radio when a radio email arrives as it will be held in the WINLINLK system until you open a session.

Gathering all the equipment needed to implement a WINLINK operation is not that expensive. It is most likely that you have a transceiver and a computer available to use for WINLINK. The TNC on HF can be VARA which is free. WINLINK is also free. If you need a sound card, they are available from many sources including Tigertronics for less than $150.00. You many need some extra cables to put everything together. While the WINLINK web site provides lots of information about station connections, there are many YouTube videos that describe how to get WINLINLK working in many different radios.

For my personal station, I use VARA on HF and a KCP-3 on VHF. My HF radio has a built-in sound card and my VHF radio has a data port that connects directly to the TNC. I use the same computer for both radios. As it turns out, the HF path is more useful than the VHF path here in the Treasure Valley. As far as I know there are no VARA RMS stations on VHF and there is only one, perhaps two PACKET RMS stations on VHF. As I have mentioned before, physics is physics. There are no WINLINK repeaters, so it’s all “simplex”. That means the range on VHF is limited. That may come into play when we try to get out of the doughnut hole.

Once you are successful operating WINLINK, it is a good idea to get proficient using the system. In our case, that’s easy. There is a WINLINLK Wednesday net hosted by the Clearwater County Amateur Radio Club KC7VBT in Orofino, ID. The idea is that each week you send a message to the net control. They read your message then answer, perhaps the next day, via WINLINK. Thus, you get to practice sending and receiving radio emails via WINLINK. By the way, the WINLINK Wednesday net is managed by Don Gardner W7PJ who is the ARRL Section Emergency Coordinator for Idaho and is the Clearwater County Emergency Manager.

As I noted in Part III, when you are set up during an emergency, you must make it known either through signage and/or word of mouth that you are there to provide (third party) communication services. Unless you or someone has done a great deal of “advertising” ahead of time, people most likely will not know your capabilities. That means the time to advertise is…now, before an emergency. I can suggest a few things, but you might be more creative than I to find ways to get into your community. Here are some suggestions. First, make a capabilities handout then:

* Have a regularly scheduled open house at a central location and send holiday greetings via amateur radio. The holiday can be Mother’s Day, Father’s Day, Easter, Thanksgiving, Christmas, or even New year’s.
* Send WINLINK messages to people you know and seek a reply.
* Find a way to get the media to help you tell your story to the community.

You need to become part of the community fabric. Once you educate the public that you and your group are not only a resource in normal times, but will be available when there is trouble, they may be more likely to seek you out in times of need.

Once you are operating, you’ll need a procedure for recording messages to be sent as well as recording, and delivering messages received. In some ways, you will be operating like an old time Telegraph station. Fortunately, a lot of those forms I mentioned earlier available in the WINLINK program can help. How long you operate in one sitting depends on your stamina or support you have from other operators; you may need to set up shifts.

I am now going to wax philosophical for a bit. You should know that there is some reluctance with hams especially of my generation (the more seasoned operators) to cross into the digital realm. I grew up with tubes, large transformer power supplies producing hundreds if not thousands of volts for the plates and analog everything. You needed to know how to peak the grid and dip the plate. The transistor was a new invention that appeared after I had been licensed for over a year. My General Class license test had nothing about solid state components or computers on it. In fact, there were no personal home computers. AM and CW were king and SSB was just getting started. Imagine!

There is also a reluctance for some to use anything for communications that does not involve a pure RF path. Two arguments I hear are: How could using the internet that may fail be an option for communicators in an emergency? And: The internet is too susceptible to eavesdropping. I used to think that way about emergency communications. However, lately I’ve come to the conclusion that sticking to those notions not only removes some impressive modes now available to us, it actually may tie our hands in an emergency. The USGS recognizes that the internet will exist somewhere no matter what. Further, it is my understanding that the internet world-wide is extremely robust. Consequently, I believe that while there may be communication failures in a local area (the doughnut hole), the internet will exist somewhere in the doughnut. We need to take advantage of that. Finally, a review of 47 CFR Part 97 reveals that our transmissions are made in an open environment without obscuration where people can listen to our communications with impunity.

It’s interesting that many of the digital modes used today are considered “weak signal” modes and that includes WINLINK. It doesn’t take much power to be effective and receivers today are very sensitive. Coupled with modern error correction schemes, it’s clear a digital signal will get through when an analog signal may not. All this means this old guy has turned the corner. While I’m not a big fan of some digital modes, I can see the utility (and in some cases fun) of using a few of them to complete an effective amateur communications suite.

I’ve recognized that times have changed for the amateur radio operator in the 21st century. Remember, I started my amateur radio journey in the mid-20th century. Emergency response practices by hams as few as ten years ago has changed because of equipment development and improvement, first responder equipage, new modes of operation, and changing community needs. Although many amateur operators got their license mainly for the emergency communications aspect, I see our usefulness as “auxiliary communicators” for first responders continue to diminish especially in places like our urban area. Consequently, as an amateur operator, I no longer consider myself primarily an “emergency communicator” rather I’m a guy who can help with community communications needs if the situation calls for it and oh-by-the-way enjoy the other aspects of the hobby.

Amateur radio is a regulated technical hobby that I believe also involves a great deal of social interaction. Many of us enjoy being associated with like-minded people who are involved in amateur radio. As a bonus, being a group of people who can benefit the community using our hobby is appealing on many levels.

For review, the five fundamental principles embodying purpose of amateur radio are:

“(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communication and technical phases of the art.

(d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.

(e) Continuation and extension of the amateur's unique ability to enhance international goodwill.”

Thus, we have many paths to explore as amateur operators. If you enjoy preparing for an emergency, then I would suggest you include WINLINK as part of your repertoire and prepare to pass third party traffic. I would also suggest you adopt the USGS model of the doughnut hole. However, if you are more interested in exploring the technical realms of all that is associated with what has been called the “radio art”, then I believe you have a wide range of technical avenues to explore. Maybe you like to meet other people across the nation and across the world with a common interest exploring the radio art. Finally, if you think you can be successful at perusing multiple paths, then by all means do so. All that said, it’s clear we must recognize the dynamic nature of amateur radio today, understand your needs and wants along with that of the community, and then engage accordingly. Dive in…the water is fine.

**Late Breaking News**:

Earlier this month, on 11/13/2923, The FCC removed the symbol rate restrictions in Part 97 for data communications in favor of a bandwidth limit of 2.8 kHz. This means among other things PACTOR I through IV will be allowed once it is published in the Federal Register. That also means that any lingering questions about the legality of WINLINK are eliminated.