The Wisconsin
Emergency Coordinator

Wisconsin EC

Specialized modes in Amateur Radio emergency communications

By Jerry Boyd, K6BZ

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HISTORY. Much has been written over the years concerning the important roles we as amateurs play in emergency and disaster communications. It is a fact that today in many regions of the United States one of our long-standing roles is becoming obsolete. Historically, most of the communications assistance we have provided in support of clients such as police, fire and emergency medical agencies has been voice communications. Generally, with some exceptions, we have assisted "served agencies" by use of VHF/UHF repeaters or, in some cases, simplex operations.

The primary reason for our use of VHF/UHF voice modes has been the inadequacy of public safety radio systems. Too few assigned police and fire frequencies coupled with "dead spots" in their coverage areas have resulted in the need for what we as Amateur Radio operators do well. In addition, the need for interagency coordination without common public safety channels over which to communicate has also resulted in calls to the amateur community for assistance. Granted, there are sectors of the country where our FM voice capabilities are still needed - perhaps they always will be. In an increasing number of locales, however, the situation has changed or is in the process of change.

Public safety entities over the past ten years in particular have gained more spectrum. Thus, a shortage of frequencies, even in an emergency or disaster, is not the problem it once, was.

Common channels (NALAMARS - the national law enforcement mutual aid radio system as an example) now allow for inter-agency coordination. The switch by many to 800 MHz trunked systems with its mandated mutual aid channels is becoming more common in larger urban areas. While cellular and PCS telephone systems will not always function following a disaster (due primarily to system overload rather than system failure) they actually perform quite well. In several recent wide area disasters cellular did remain available for public safety use.

Amateur high frequency voice circuits will, for a long time to come, continue to be utilized for health and welfare traffic. Tactical, administrative, operational, and logistics traffic will, however, more and more frequently be handled by self-sufficient public safety circuits, and, I predict, less and less by amateurs. Does that mean we are nearing the point of obsolescence when it comes to emergency and disaster communications? No! - not if we more fully utilize the technology available to us as amateurs. We possess technologies and are authorized the use of modes which are very attractive to our clients. Some of the modes we are authorized are, except for Amateur Radio, generally unavailable to our public safety clients. What are these technologies and how do we use them on behalf of the agencies we have historically served? Can we begin to use them, or expand their use, so that our hobby can remain a significant player in the disaster response arena? Lets explore a few possibilities, all of which are

being used today in some parts of the country.

PACKET. Packet as a mode has been around for quite a while. It is extremely popular particularly among the growing number of Technician Class licensees. Its nodes and clusters as well as keyboard to keyboard capability and "error checking" make it ideal for emergency and disaster use. For the nation as a whole, however, it has been underutilized in disaster situations. Packet can and should be heavily used in support of public safety agencies. It is simply a matter of insuring that your ARES or RACES group has an adequate Packet capability and then demonstrating to served agencies how that capability is advantageous.

Packet is ideal for supporting the logistical aspects of emergency and disaster response. Anyone who has been involved in a disaster response knows that logistics is a major part of the effort. Lists of personnel, equipment, and other resources can be sent via packet. A hard copy printout of messages can be handed to the client to read. Documentation in the form of files is automatically created and can be retrieved for later review. Packet eliminates the need for a separate chronological log of messages sent and received via that mode as each is automatically "time stamped" as it is transmitted.

Packet is also useful in documenting who is at a particular location. When evacuations are necessary public safety and Red Cross officials spend a great deal of time attempting to compile lists of who is where. A portable packet station at each evacuation center or shelter can be used to transmit lists of those present. Those lists can be printed at the receiving end, can be consolidated and updated, and referred to at the Emergency

Operations Center (EOC) or other appropriate place.

To facilitate information being sent by packet a series of message formats can be developed ahead of time and brought up on screen during the event. It thus becomes a matter of "fill in the blanks" which greatly expedites the information exchange process. The State of California Office of Emergency Services has developed just such a series of' formats for packet use.

APRS. APRS, the Automated Packet Reporting System, is another advantageous but underutilized capability, which we as amateurs possess. It is a refinement of packet that allows a visual on-screen display of the location of the location of packet stations which are connected. APRS software is readily available. The station location is sent with each transmission based upon latitude and longitude coordinates entered. However, a much more accurate location can be determined by use of the Global Positioning Satellite (GPS) Service.

Integration of a low cost GPS receiver, a transceiver; and TNC can result in extremely accurate location displays on a video terminal at the EOC. Direction and movement of mobile APRS stations can be readily seen.

How does APRS technology apply to serving public safety agencies in times of emergency or disaster? It is an ideal means of tracking important movements of personnel and equipment. Is a hospital damaged requiring the re-location of patients to another facility? In the Northridge earthquake in Southern California that is precisely what happened. Placing an amateur with a portable APRS station on board a bus used to transport patients solves the problem of knowing the location of those evacuees at all times.

Almost any activity where the safety of the APRS operator is not jeopardized is a logical candidate for use of this technology. How about putting an APRS equipped ham with each search and rescue team on a major mission? That would enable the search coordinator to have up-to-the-minute and accurate information as to which areas are being searched or have been searched. As use of APRS technology becomes more widespread other emergency and disaster uses will, I'm sure, become evident.

AMATEUR TELEVISION. Fast scan UHF (or above) amateur television will be welcomed by almost any Incident Commander in almost any type of circumstance. For years amateur television has been used to assist in managing Pasadena, California's New Year's Day Rose Parade. This medium gives both the event coordinator and public safety officials a close up, first hand look at the event they are dealing with. An amateur television (ATV) equipped ham in a public safety helicopter or fixed wing aircraft can overfly almost any type of emergency/disaster and send back live "footage" to the command post. The footage can be videotaped off the air for later documentation and training purposes. The real time transmissions can help decision-makers determine the extent of the problems they are coping with as well as the effectiveness of the steps they are taking to deal with the incident.

SELLING THESE TECHNOLOGIES. When the proverbial "bad stuff" is hitting the fan it is not the appropriate time to tap an Incident Commander on the shoulder and say, "By the way did you know we can provide you with such and such." During an emergency the fire chief, triage officer, or police captain you are working for has only the time to use

resources he/she is familiar with, not time to pause for a cram course in something new.

The time to explain and demonstrate things like Packet, APRS and ATV is pre-event. If your group is equipped and proficient in the use of these technologies the local ARES (or RACES emergency coordinator should contact the agencies your group serves. Preferably the persons to meet with are those likely to serve as the communications group chief when an incident occurs. These technologies should be both explained and demonstrated. The client should be referred to other similar clients who have already used the "tools" you are offering.

If the client agrees that these modes of operation have some desirable application, a demonstration for as many of the potential end users as possible should be given. In the case of ATV, for example, if the agency believes that ATV from an airborne platform such as the local Sheriff's helicopter would be advantageous, a "check ride" in the aircraft should be taken. That serves a number of constructive purposes. First it familiarizes the aircrew (particularly the pilot in command) with Amateur Radio and the ATV resource. Second, it familiarizes the ARES operator with the aircraft and its operation. Third, it gives the amateur an opportunity to practice. Take it from one who has done it, shooting ATV from a helicopter is "different." If you want the transmissions you send to be clear and useful some practice is definitely necessary. Ideally you will want to demonstrate all of the technologies you will offer to your clients to all of the people you'll likely work with in the "real one." That may not be practical, but over time as many clients as possible should be given a first hand look at what you can do for them.

In conclusion, remember "Rule Number One" of amateur radio emergency/disaster communications - NEVER promise what you cannot deliver. You may have your hands full providing just "voice only" communications support to your served agencies. However, if you find that not to be the case some of the technologies discussed herein may prove advantageous to both your group and your clients. I encourage you to give them a try.

A Scenario

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Saturday was turning out to be a wonderful day. The Oak Leaf Trail in Milwaukee was crowded more so than usual for some unknown reason. The Milwaukee Brewers are playing the team that resides to the south in the place that is affectionately known as "The Windy City". This results in a stuffed-to-the-seams Miller Park. The roof is closed because of a mechanical problem in the transport system. Life is wonderful in Milwaukee except for one thing...

Off to the southwest, clouds are starting to build up. This is a normal occurrence for the afternoon. The National Weather Service in Sullivan issues a Severe Thunderstorm Watch for southeastern Wisconsin. Meanwhile, everyone is going about their business, unaware of the watch being posted. Some people do look up and see clouds building but they are passed off as a normal occurrence.

About an hour and a half later, Mother Nature decides to be herself and with a vengeance. By some freak of nature, the air is just right and a supercell thunderstorm starts roasting big time over Waukesha. Some people say that

you can hear bamboo grow when the conditions are just right but this supercell grows like there is no tomorrow. NWS Sullivan issues a Severe Thunderstorm Warning for Waukesha and Milwaukee counties because of the development. People on the outside see the massive supercell and its growth and decide to head for shelter. Meanwhile, it is the top of the 5th at Miller Park and the Brewers have the bases loaded, the count is 3-2, and there are 2 outs...

West Allis starts getting pelted with rain and hail. Golfers would be envious of the golf balls that are pelting down on the city. About two minutes later, this action stops. There are a few people aware of this drop off and start worrying. The vast majority of people are totally oblivious to the situation and unfortunately the Brewers struck out and Chicago is now knocking at the door and the go-ahead run is sitting at third base with a long lead off and longer legs...

As the commercial used to state: "Nobody fools Mother Nature". This is now the case. Mother Nature decides to stir up the pot. The spatula in this case is a P4 tornado that touches down in State Fair Park. No visible debris column but now it looks like the State Fair can now remodel on the remaining foundations as this devil wind churns toward Miller Park at 30 MPH. Spotters realize what is happening and call it in to Sullivan to issue the Tornado Warning.

About 10 seconds before the tornado hits, Miller Park announces the "situation" and to stay calm as the directions are issued to move to safer locations in the facility. Now the tornado is a P5 and has its boresight aimed at Miller Park. The general thought was that the roof would keep the rain off the playing field to keep the game going.

In the ensuing mass exodus to safety, people are getting trampled on and the tornado slams into the stadium. After performing the hellish deed on the structure and the people in and around the facility, the tornado sets its boresight on downtown Milwaukee. By the time that it is halfway there leaving an antiseptically clean trail, the tornado withdraws into the cloud from whence it was born from and the whole cell moves over Lake Michigan heading for Michigan.

The aftermath brings staggering numbers, 28,000 injured, death count unknown. The normal county and city support services can't handle the logistics load and crumbles. The ARES system is activated and is swamped immediately at the scope of the disaster and lack of experience and practice with these large-scale situations. Now everyone is overloaded with the situation and managing the communications breakdown is a high priority. How could this problem be assisted and remedied?

This scenario can be assisted on several fronts. Training has to be an ongoing process and done on a regular basis but that is not what I am discussing here. Message traffic can be split into two groups: Strategic, which would consist of list traffic, support traffic, and traffic that is not life or death. Tactical traffic is traffic that is of a life or death nature or of high priority. The strategic traffic can be long, time consuming messages usually consisting of site status reports, supplies, lists of peoples names, etc.

How should these two types of traffic be best handled? Tactical traffic is best handled over voice links where the need for information or communication can be handled in a direct, expeditious manner. Strategic traffic is best handled over a circuit that can handle the information in an efficient manner. RTTY used to be used to handle lists and information that was bulky or had to be transcribed correctly. Nowadays, Packet Radio is used to handle the long traffic in emergency situations. The ability to pass many different forms of information and to be able to store information on a computer that is either received or sent by packet radio is a benefit to any emergency communications planner.

So, where did this packet radio come from, how easy is the mode to use, and what are the costs involved? These questions and many more will be answered in future columns.

73, Richard

New EC Roster

It is just about ready for mailing, and should arrive around the first of April. I plan to include a state map showing ECs and DEC boundaries. Please check both the map and roster for accuracy, and fire any corrections directly to Stan.

You will note that the map and roster indicate a number of vacancies. District Emergency Coordinator positions are vacant for North Central, NorthEast and South Central Wisconsin. EC positions are vacant for the following counties:

Ashland, Bayfield, Buffalo, Door, Douglas, Florence, Green, Iron, Jackson, Jefferson, Juneau, Kewaunee Lafayette, Langlade, Marinette (North), Menomonee, Oconto, Pepin, Portage, Richland, Rusk, Sheboygan, Trempealeau, Vernon.

The list consists of 24 counties out of 72, or 33%. Far too many! As I noted in a previous newsletter, a goal is to have an EC for every county in Wisconsin. Why? Simply to provide ARES coverage in the case of need in any site in the state. Accordingly, I ask your help in filling these DEC and EC positions.

Are you an EC of a county next to one with few hams? Would you be willing to assume the EC position of that neighboring county as well? That way, the few hams in the neighboring county would have a leadership person (you!) to deal with in the case of a disaster, and a way to get into the training pipeline (yours). Conversely, if your county has need for a call-up, you might use the services of those neighboring hams.

On the other hand, do you know of a capable ham in a neighboring county that would be a good candidate for the vacant EC position? How about a talk with that person to feel them out? Then check to see if your DEC agrees. If it looks good, ask your DEC to contact me, or do it yourself if there is no DEC in your district.

What about those vacant DEC positions? Willing to do it yourself? You will note that several DECs are also ECs of their home county. Fine business! Or, perhaps you feel a neighbor EC would be good for the position. Talk to that person. Let me know.

Would you like to see a complete list of the duties of an EC or DEC? Just let me know and I will mail one to you and/or your potential candidate. (By the way, plans are in the hopper for a Wisconsin ARES web site where all sorts of such documents are available to you on line).

Help me out here, folks. Lets work together to fill these vacancies. Doing so is to the benefit of each and every one of us in ARES, as well as to the public at large. Isn't that our ultimate goal, helping the public at large?

Thanks ahead of time, and thanks for **all** your efforts!