Packet Radio in Disaster Situations

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Abstract

Packet Radio, a mode of data communications over amateur radio frequencies, was seldom used during communications operations following Hurricane Andrew. This paper will detail the situation as found by a user who went there to help, and proposed suggestions for future disaster recovery packet radio operations.

Introduction

I volunteered to work in an Oakland Red Cross Shelter for one 8- hour shift 5 days after the Earthquake hit in 1989. When Hurricane Andrew hit South Florida, I was living in Clearwater on Florida's West Coast. With 8 hours of "time in grade" (more actual disaster experience than any other amateur in the county), I was asked by the Pinellas County EC (Amateur Radio Emergency Coordinator) to lead a team of radio operators who responded to a call for operators sent by the ARRL Assistant Director for South Florida. The EC issued ARES (Amateur Radio Emergency Service) credentials to those who didn't yet have them, and off we went. ARES was founded by the ARRL (American Radio Relay League - the national organization of ham radio operators) which has a Memorandum of Understanding with the Federal Emergency Management Agency.

We were loaded with radios and equipment for VHF, UHF, and HF operation, including packet terminals, and computers for PBBS operation. When we arrived at the Dade County EOC (Emergency Operations Center) we were told that operations would primarily be 2 meter voice operation. A terminal and a TNC were set up in one corner of the EOC ham shack, but was not very active.

Our volunteers were deployed in two person squads to food diistribution centers, shelters, and a government headquarters building in Homestead. One evening, after my food distribution site had shut down for the day, I pulled out my packet gear, and set up for some "recreational computing." I consider packet to be my primary mode of operation, and it is the reason I got my ham license in the first place.

Operating packet in the affected area

I set up my Radio Shack Model-100 computer, PacComm MicroPower- TNC (Terminal Node Controller - the device that acts as a "radio modem"), and an Icom IC-2AT HT (Handy-Talky, or "hand held") radio. As I connected the cable from the TNC to the radio, I did not push the plug all the way into the speaker jack, allowing a signal to go to the TNC, but not cutting out the speaker. This let me hear what (if anything) was on the air.

The first thing I tried to do was get on the frequency given for the Dade EOC, and connect to the packet station. No luck. I then tuned to 145.01 MHz in the middle of the major 2 meter "packet band" (144.91 to 145.09 MHz). I started reading a magazine, and every few pages, I would retune the radio. At 145.09 I heard the familiar "Brraaaaapp" of a packet transmission. I looked at the computer screen, and saw a beacon from the MIA7 NetROM type node from (I assumed) Miami. Ordinarily, the "7" would mean that the node was usually found on .07, but I figured that it was probably put on .09 for some reason due to the emergency. I tried to connect to it.

While timing out, I heard another "Brraaaapp" go by. After my Connect Request to MIA7 timed out, I typed "MHEARD" to see what callsign had gone by. I tried to connect to MIA7 via this new station, and Bingo! "*** Connected" appeared on my screen. I quickly typed "C HWD" to instruct the node to Connect me to the Hollywood FL Node by whatever convoluted route of IAN (Local Area Network) and Backbone circuits the Node decided to use. "### CONNECTED" came back to my screen. Now I knew where to go, since I'd been briefed by our PBBS (Packet Bulletin Board System) Guru back in Clearwater.

I then typed "C W7LUS" to Connect to the W7LUS PBBS. This board had a direct HF link back to the W4DPH PBBS in Clearwater. I sent two pieces of message traffic that night. One was a report of our deployment to our EC. The second was the only piece of NTS traffic I sent the entire week we were in the Homestead area. It said "Hi Mom, I'm OK". While my own family was safe, they knew I was coming into the affected area, and I didn't want them to worry.

Observations

It was amazing that for a communications based hobby, there was such a lack of communications. (My observation of Phone Phreaks of my acquaintance is that they are people who do not know how to communicate well with people, so they get into the technology of telecommunications to compensate.) I didn't learn until after I returned home that packet messages could have been left on the W7LUS PBBS, and they would have automatically been routed to the Mailbox in the TNC at the EOC. Lists of required items could have been dispatched by computer, and printed out at the EOC, or forwarded to the food distribution centers.

Our messages were sent by voice, and hand written onto pads, and dispatched into "The Pit", or Operations Center of the EOC. The agency the message was addressed to would receive the message, and that agency would handle the contents of the message

from there. One major drawback seemed to be that messages coming from the ham shack were not handled with dispatch, until things seemed to get critical (either through shortages, or lack of support personnel). My opinion is that people and agencies are not used to message based communications systems any more.

Our message handling skills are based on the telegraphic message systems which had their heyday in the 40's and 50's, and declined with the affordability of the telephone into every home and office, to the point where the Western Union Telegraph Company seems to only have the "telegraphic money order" business left. People no longer expect that a message is "authentic" unless it came up through a "proper chain of command". Ham radio did not appear to have that "level of authenticity" to our user community. Our users did not understand that any message sent by an operator had (or should have had) an "original" of any message written down in a log, with the signature of the originator on file should followup after the event be required.

Had packet radio been in active use, there would have been that one magic element added to the message. It would have been a printout, and it is a modern myth that anything printed out by a computer is Gospel. A printout would have that certain "cachet" that might have gotten a message through. Particularly a list of needed supplies in a computer format.

Recommendations

With laptop computers becoming more common at reasonable prices, teams planning to provide packet radio capability for their Quick Response Volunteers (The acronym turns me on, while the acronym for Quick Response Team turns me off) should have with them TNC's with EPROMS for NetROM type operation. While I personally prefer ROSE switch type operations, configuring a ROSE switch in a disaster area seems impractical. NetROM type nodes are self- identifying, and configure themselves into a network. The thing is that if a QRV team arrives with the intention of providing networking capability, they should also have UHF equipment with them so that their VHF Node can operate their own Local Area Network in the affected area, and be linked back into a UHF backbone to link LANs in the area.

PBBS operators who are operating in or near the affected area should have log-in bulletins pointing to message numbers and text files for users to read, such as:

"Hello N4SCY, Welcome to the W4XYZ PBBS. For instructions on sending messages to the EOC, read message 12345. For a map of the LAN in the emergency area, type 'D EMERG.MAP'. To volunteer to help, call Net Control on the 146.64 repeater."

In the Hurricane Andrew operation, we operated all day, and our sites shut down in the evenings. Our teams usually slept on-site, and near their equipment. This meant that in the evenings, a voice net could have been called for operators to swap information, allowing our people to have insight as to the situation at other locations. The Pinellas County squads did this informally among ourselves, and off the regular net frequencies.

Besides keeping our team in touch with each other, this information on the status of other sites was usually invaluable to our site managers during discussions the next day.

Another thing that would have been very helpful would have been another command in the TNC. Besides the MHEARD list, a DHEARD (Digipeaters HEARD) would have been invaluable. The J L command (Just heard, Long) command in KaNodes is similar to what I'm looking for here. When not connected to a station and monitoring a frequency, an Asterisk shows up next to the call sign of the station you actually heard, as in:

N4SCY > W4XYZ > K4ABC* > ORL7: < UI > This is Ouie in Titusville.

In the example, the packet sent by N4SCY was heard when it was retransmitted by K4ABC. Since K4ABC was the Digipeater heard by my station, it would then appear in the proposed DHEARD list. This would allow a user in a disaster area to quickly find out what digipeaters are active, even when he's been operating, and too busy to monitor activity to find the digi's himself. They say, "If you can't hear 'em, you can't work 'em". Well, if you don't know you've heard them, you can't work through them.

Conclusion

There are many things that the packet community can do to help provide communications for our communications clients during a disaster. The users need to be made aware of the capabilities, and demonstrations need to be made to Emergency Management officials so they know what those capabilities are, and how useful they can be to disaster relief operations. Before all this can happen, the operator community needs to be up speed on what to bring to a disaster, and how to use what the operator brings.

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