

# Communications for CERTs

## *Introduction*

Communications systems can make or break an effective response for emergency teams. Without reliable communications systems, team leaders cannot insure the safety of team members, nor deploy team resources where they are most needed. A team without any communications is nothing more than a bunch of people running around with pry bars and extinguishers in utter chaos!

Communication is a very broad term which includes both receiving and transmitting information between the various units of your team, or other teams, or emergency centers nearby. Several Ham organizations exist that can provide excellent communications for your team and we would encourage you to recruit Hams for your team. Your team should always list Ham operators living in your neighborhood as resources in written disaster plans.

This article is not intended to make you a Ham Operator. Rather, it is designed to give an overview of the disaster communications systems, equipment and protocols that your team can employ during a response. It will also provide a basic communications plan that you can modify to fit your team's needs.

## **Section 1** **Disaster Communications Systems**

In the nineteenth century, before the invention of the "wireless" radio, communication during any situation was limited to audible and visual signaling methods, message runners and wired telegraphs. Many "codes" were developed to transmit messages, most notable among these being the "morse" code. Devices that were used to transmit these codes consisted of written messages sent by "runners", signal mirrors, the famous "smoke" signals, signal fires, signal flags, drums and bugles. Even the human body was used to communicate through sign languages.

One drawback of these visual or audible systems was that they assumed that the intended recipient of the message was able to see or hear the signal. Soldiers in the midst of battle often missed bugle signals because their "ears were stilling ringing" from the shelling. Visual signals may be useless during bad weather or in the smoke of a battlefield. This brings me to the first rule of disaster communications, "Never rely on only one form of communication!"

A good "system" always has a backup! We suggest that you choose one or two forms of communication as your primary method. Backup the primary method with message runners. Select a third method in the event the first two don't work well. Write these into your communications plan and practice the plan whenever possible!

## **Section 2** **Radio Systems**

Since the invention of the "Marconi Wireless", communications has become increasingly more complex. Amplitude Modulation (AM) was the beginning of radio communications. These radios transmit a carrier wave or signal and the voice or other device is used to add power to the signal which changes the amplitude. The receiver detects these changes and converts them to audible sounds at the speaker.

Some time later, scientists discovered ways to vary the frequency of the carrier signal and convert these changes to audible sounds. Thus was born FM radio. These systems were less susceptible to electrical or solar interference than the AM radios but required a larger bandwidth (the frequency range between channels).

Today, many different terms are applied to these two basic radio transmission technologies. Citizens Band (CB) and Single Side Band (SSB) radios are AM radios and are usually included in the high frequency (HF) band. Family radio service (FRS), aviation and business band radios are FM radios and are usually located in the very high frequency (VHF) band. Public safety (fire & police) radios are also FM radios, but these usually operate in the ultra high frequency (UHF) band. Amateur radio operators (HAMs) may use almost all the bands and frequencies and both modulation types given the proper equipment. Each band has it's benefits and drawbacks.

The HF band radios mentioned above do not require a license in the U. S., but may be difficult to use because of solar or electrical interference or just too many people trying to transmit at the same time. These radios are usually light weight and compact, operate on batteries and are easy to use. They can provide clear communications up to distances of twenty miles or more under ideal conditions. Because so many people have

access to these radios, it is difficult to transmit sensitive information in plain language without compromising privacy.

The VHF and UHF bands may, or may not, require a license to operate. Low power, limited range radios usually don't require licensing, whereas higher powered radios do! Most higher powered radios in these bands rely on "repeaters" to increase their range to many hundreds of miles. They have the benefits of battery operation, being very clear, transmissions can be "targeted" by use of tone encoded squelch circuits and can even transmit digital computer signals. The drawbacks are that repeaters may fail after a disaster and transmissions could be monitored by other parties.

Wireless telephones (often called cellular phones) are another example of UHF band transceivers. These phones are dependant on repeaters however, and will quickly become useless after a disaster because so many people will use them to call friends after a disaster that the repeaters become "jammed" with calls. Also, repeater stations may fail after a disaster, and common practice among EOCs is to establish and keep open, telephone or cell phone connections to other agencies.

### **Section 3** **Basic Communications Procedures for CERTs**

First of all, never transmit confidential information unless you know it is secured in some way. One typical security method used by most government EOCs is to assign a line or box number to each piece of information being reported. For example, a communicator might report "...item 5, one-hundred-fifty, break, item six, sixteen..." instead of saying the words "number of injured" or "number of dead" in the community. Every communicator should use standardized reports and forms between stations which are item number coded to improve data security and hasten scheduling reporting.

When the team communicator activates the radios, he or she pauses to listen for "traffic" before transmitting for example, "*11<sup>th</sup> Avenue CERT is in service as CERT-11-Alpha-Victor at 1602 local time.*" This transmission is entered into the station log book. If a government EOC has established a radio net control station on that frequency, that station will contact you to advise you of special protocols or procedures to be used. If contacted by a net controller, a message form should be used to note these and inform your team leader. For example, the net controller might give the scheduled time(s) for logistics or medical reports which need a certain standardized form. This also needs to be entered into the station log.

The unit communicator for each portable device (walkie-talkie) should have a unique designation such as "eleven-alpha-victor-one" for the team leader. A radio call is always initiated by someone to someone. When you begin a transmission, you say for example, "*eleven-alpha-victor-one to eleven-alpha-victor-five, over!*" The word "over" signifies that you have finished transmitting and are ready to receive other transmissions.

If there is a net control station, you must first ask net control for permission to transmit. In our example, you would transmit, "*eleven-alpha-victor-one to net control, I have priority (or routine) traffic for XYZ City EOC, over!*" Net control will respond either "*standby, over!*" if you are interrupting current transmissions or "*net control to eleven-alpha-victor-one, go ahead with your traffic for talorsville-eoc, over!*" if you are able to send your message now.

You need not include net control in every transmission. Keep your radio conversation brief and sign off with net control by saying "eleven-alpha-victor-one to net control, traffic complete, eleven-alpha-victor-one out!" The word "out" signifies that net control can allow other units to transmit their messages.

Remember that every transmission should be logged if you are a fixed station and to contact your net control for each message if you are a portable unit of the team or a lower echelon of net control. Learn the phonetic alphabet in case you have to spell things out on the air. Take a HAM Operators class if you can to learn more and prepare for the inevitable.