Topic 21:
Operations and Logistics

EC-001:
Section 6: Maintaining Readiness

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Objectives

Welcome to Topic 21.

This topic will introduce you to operating and logistical issues that arise during emergency communication operations.

Student Preparation required:

None.

Choosing Phone Net Frequencies

Unlike commercial and public safety radio users, Amateur Radio operators have a vast amount of radio spectrum to use in meeting the needs of an emergency. Most local and regional emergency communications communication takes place on 2-meter or 70-centimeter FM, or on 40-, 60-, or 80-meter SSB/CW. The choice made is based on the locations to be covered, the availability of repeaters, distance, terrain, and band conditions.

VHF and UHF FM are preferred for most local operations because the equipment is common, portable, and has a clear voice quality, and the coverage is extended by repeater stations. VHF and UHF communication range is determined by terrain, antenna height, and the availability

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of repeaters.

For larger areas or in areas without repeaters, HF SSB/CW/Digital may be needed. Most local emergency communications operations are on the 40- or 80-meter bands using Near Vertical Incidence Skywave (NVIS) propagation. For long-haul communication needs and international operations, 15- or 20-meter nets may be the best option. Many emergency communications groups will have preselected a number of frequencies for specific purposes. The complete list of these frequencies should be in your go kit and preprogrammed into your radios. Keep in mind that on weekends the bands may be quite crowded, so you may consider using 12, 17, 30, or 60 meters.

Know Your Resources in Advance

Become familiar with the coverage and features of each permanent repeater and digital message system in your area, and preprogram your radios with the frequencies, offsets, and Continuous Tone Coded Squelch System (CTCSS) tones. Ask your EC or AEC which repeaters are used for emergency communication in your area. Will they be available for exclusive emergency communications use, or must they be shared with other users? Information to find out includes:

- Call Sign of the repeater and how the repeater or system identifies itself
- Location of the repeater or system and whether there are any "dead spots" in critical areas
- How much power is required to reach the repeater with a clear, quiet signal from key locations
- Whether the repeater has a courtesy tone, and if it does, what it sounds like, and whether the tones change depending on the repeater's mode
- How long the "time-out timer" is
- Whether it is part of a linked system of repeaters or it is connected to EchoLink/IRLP
- What features it has, and which touch-tone commands or CTCSS tones activate them

For net frequencies that support digital communication systems, such as packet radio bulletin board messaging systems, PACTOR, PSK31, and RTTY:

- Which software they use
- Whether the digital systems have mailboxes or digipeater functions
- Which other nodes they can connect to
- Whether traffic can be passed over an internet link automatically or manually
- How many connections they can support at once

Network Coverage Concerns

Most emergency communications managers rely on simplex operation for backup when

planning their VHF or UHF FM nets for one reason — repeaters often do not survive disasters or are overwhelmed with the amount of traffic. Repeaters that do survive and are usable are considered a bonus. Since simplex range is limited by terrain, output power, and antenna gain and height, operation over a wide area can be a challenge. Almost any structure or hills can block signals to some degree. Don't overlook SSB on our VHF or UHF bands; it can support communication over surprising distances and over rough terrain.

To avoid last-minute surprises, your group should pretest all known fixed locations in your area for coverage. For instance, if you are serving the American Red Cross (ARC), test simplex coverage from each official shelter to the Red Cross office and the city's EOC or other key locations, and mobile coverage in the same areas. Don't forget to test coverage to key home-based stations. If needed, there are several ways to improve simplex range:

- Use an antenna with greater gain
- Move the antenna away from obstructions
- Use a directional antenna
- Increase antenna height
- Increase transmitter output power as a last resort
- In a fast-moving situation with poor simplex coverage and no repeater, it can be helpful to place a mobile station on a hilltop or office building where operators can communicate with, and relay for, any station in the net. A mobile relay station can also allow communications to follow a moving event, such a wildfire or flash flood. That station becomes, in effect, a "human repeater"

Although an expedient "workaround," this slow and cumbersome process can reduce net efficiency by more than half. A modern aid to this kind of operation is the "simplex repeater." This device automatically records a transmission and immediately retransmits it on the same frequency. Remember that FCC rules do not allow unattended operation of simplex repeaters and that you must manually identify it.

A better solution is a portable duplex repeater that can be quickly deployed at a high point in the desired coverage area. The coverage of this repeater does not have to be as good as a permanent repeater — it just must be accessible to the stations in your net. Portable repeaters have been used successfully from the back seat of a car, using a mobile antenna, and parked on a ridge or even the top floor of a parking garage. Portable masts and trailer-mounted towers have also been used successfully. Check with your local frequency-coordinating body if your plans include portable repeaters.

If all stations in the net have dual-band radios or scanners, a strategically located mobile radio may be operated in "cross-band repeater" mode. If you use your dual-band mobile in this manner for an extended period, use the low or medium power setting to avoid overheating and damaging your radio. Consider using a fan to further reduce the likelihood that your radio will be damaged from overheating.

For a permanent repeater to be useful in a disaster, it must have emergency power and be in a location and of such construction that it can survive the disaster. Agreements with repeater owners should be in place to allow emergency operations to the exclusion of regular users.

Frequency and Net Resource Management

While we may have a large amount of frequency resources, in actual practice our choices are limited to the available operators and their equipment. Net managers may occasionally need to "shift" resources to meet changing needs. In the early stages of an emergency, the tactical nets may require more operators, but in later stages, the health and welfare traffic might increase.

In addition to the main net frequency, each net should have several alternate frequencies available. These should include one or more "backup" frequencies for use in the event of interference, and one or two frequencies to be used to pass traffic "off net."

Message Relays

When one station cannot hear another, a third station may have to relay the messages. Although this is a slow and cumbersome process, it is often the only way to reach certain stations. If relays must be used, net control should move the stations involved off the main net frequency to avoid tying up the channel for an extended period.

Radio Room Security

To protect your equipment and the messages you handle, and prevent unnecessary distractions, it is best to allow only the operators who are on duty to be in the room. Avoid leaving the radio room and equipment unattended and accessible. It is never a good idea to allow members of the press to be in the room without specific permission from the partners.

Record-Keeping

Most served agencies will expect you to keep records of your operations. These records will certainly include original copies of any messages sent, station logs, memos, and official correspondence. Some may even require you to keep "scratch" notes and informal logs. Depending on the partner's policy, you may be required to keep these records in your own possession for a time, or to turn some or all records over to the partner at the end of operations. In some agencies, your station records are permanent and important legal documents and must be treated as such. It is important to know your partner's policy on record-keeping in advance so that you can comply from the very beginning of operations.

Your station operating logs should probably contain the following information:

- Your arrival and departure times
- Times you check in and out of specific nets
- Each message, by number, sender, addressee, and other handling stations
- Critical events — damage, power loss, injuries, earth tremors, other emergencies
- Staff changes — both emergency communications and site management, if known
- Equipment problems and issues
- Completed ICS forms

Every individual message or note should be labeled with a time and date. In the case of scratch notes, place dates and times next to each note on a sheet, so that information can be used later to determine a course of events.

If you expect to operate from the location for more than a day or two, establish a message filing system so that you can retrieve the messages as needed. A "portable office" type file box, expanding file, or any other suitable container can be used to organize and file the messages. This is also an efficient way to allow another operator to pick up where you left off, even if they arrive after you leave. Effective record-keeping allows them to come up to speed quickly.

Dealing with Stress and Egos

Any unusual situation can create personal stress — disasters create incredible amounts of it. Most people are not used to working under extreme stress for long periods and do not know how to handle it. They can become disoriented, confused, unable to make good decisions or any decisions at all, lose their tempers, and behave in ways they never would any other time. Nervous breakdowns are common among those who get overwhelmed and have not learned to manage stress and stress-causing situations.

Especially in the early hours of a disaster, the tendency is to regard every situation or need as an "emergency," requiring an immediate response. You might get a barrage of requests for action.

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You might not have the extra seconds required to fully consider the options and to prioritize your actions. The result is an overload of responsibility, which can lead to unmanageable levels of stress. While you cannot eliminate disaster-related stress, you can certainly take steps to reduce or control it.

Tips to help manage stressful situations:

- Delegate some of your responsibilities to others
- Take on only those tasks that you can handle
- Prioritize your actions — the most important and time-sensitive ones come first
- Do not take comments personally — mentally translate "personal attacks" into "constructive criticism" and a signal that there may be an important need that is being overlooked
- Take a few deep breaths and relax. Do this often, especially if you feel stress increasing. Gather your thoughts and move on
- Watch out for your own needs — food, rest, water, and medical attention
- Do not insist on working more than your assigned shift if others can take over
- Get rest when you can so that you will be ready to handle your job more effectively later on
- Take a moment to think before responding to a stress-causing challenge — if possible, tell them you will be back to them in a few minutes
- If you are losing control of a situation, bring someone else in to assist or notify a superior
- Do not let a problem get out of hand before asking for help
- Keep an eye on other team members, and help them reduce stress when possible

Some personnel within the emergency response community have "big egos," and still others have a need to be in full control at all times. Both personality types can be problematic anytime but are far worse under stress. Take time now to consider how you will respond to the challenges they present. If your automatic response to certain behaviors is anger, make a conscious decision to come up with a different and more positive response strategy. Depending on the official position of the "problem" person, you might:

- Do your job as best you can, and deal with it after the emergency is over

- Politely decline and state your reasons

- Refer the issue to a superior

- Choose in advance to volunteer in another capacity and avoid that person altogether, if possible

Long-Term Operations

As soon as it becomes clear that the situation is not going to return to normal for a while, you and your group should make plans for extended emergency communications operations. A defined mission will help set necessary limits during extended operations. Be aware of "mission creep," as it can burn out volunteers and put them in difficult situations they may not be prepared to handle. Hopefully, your emergency communications group and partners have prepared contingency plans for this, and all you will have to do is put them into action. If not, here are some potential needs to consider:

- Additional operators to allow for regular shift changes, and those who go home
- Replacement equipment, as operators leave with their own gear or gear fails
- Food and water
- A suitable place to sleep or rest
- Generator fuel
- Fresh batteries, sanitation facilities (bring your own toilet tissue), shelter
- Message handling supplies, forms
- Alternate NCS operators, backups
- Additional net resources to handle message traffic

Accepting Specialized Assignments

In the world of modern emergency communications, you may be asked to handle other assignments for the partners that may or may not include communicating. At one time, most emergency communications groups had strict policies against doing other tasks, and this is still true of some. In the days when radios were difficult to operate under field conditions and required constant attention, this was important. The other common reason given is that you have volunteered to be a communicator, not a "bedpan changer." It is true that some partners' staff will abuse the situation when they are short of help, but if both the partner's staff and emergency communications group are clear about any limits beforehand, the problem should not arise.

Today, most emergency communications groups will permit their members to be cross-trained for, and perform, a variety of served-partner skills that also include communicating. Examples are SKYWARN weather spotting, Red Cross damage assessment, and many logistics jobs. If your group still has a "communication only" policy, are you really meeting your partner's needs? Is it necessary to have a damage assessment person and a communicator to do that job? What would happen to your partner if each driver also had to bring along a dedicated radio operator? Can one person do both jobs?

Look for opportunities to cross-train to other functions such as shelter staff, feeding, or muckout. Learning new disaster response skills will give you a broader view of the response and

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recovery process and possibly allow you to add Amateur Radio capability to an area that may not have it.

Review

Simplex operation is often preferred over repeaters because repeaters may fail in a disaster situation. Frequencies and operators are a resource that should be managed for maximum efficiency and effectiveness. Record-keeping is essential to an effective emergency communications operation. It allows messages to be tracked and preserves continuity when personnel change. Demanding situations like disasters can breed disagreements, especially when strong egos and short-fused tempers are introduced. Take steps to reduce the level of stress on yourself, and do not respond in kind to an angry person. When an operation looks like it will be an extended one, begin immediately to prepare for the additional people and resources necessary to sustain the operation. Arrange to charge batteries as needed. Use generators and power distribution equipment safely. Whether to leave your equipment behind is a choice only you can make. Think about this well in advance to be sure other arrangements are made before you leave with all your equipment. Modern emergency communications groups often accept other partner tasks beyond just communications.

Recommended Activities

1. Describe how you would help a new emergency communications group member deal with stress during an emergency.

2. Develop a list of at least five possible partners jobs that would also require your communication skills and share the list.

3. Build a list of frequencies your local ARES group uses when activated.