Objectives

Welcome to Topic 24.

After reading this topic, the emergency communications volunteer will know the pros and cons of using alternate communication systems. This topic discusses a variety of communication options that do not depend on Amateur Radio, and some circumstances in which they might be used.

Student Preparation required:

Read the FCC Rules (www.arrl.org/part-97-amateur-radio) on emergency communications before beginning this lesson.

Introduction

Amateur Radio may not always be the only or the best radio service for the job. Sometimes it is better to hand an official a radio he or she can use to stay in contact with the ARES team on site, and not saddle him or her with a ham radio "shadow." This is particularly true for officials who must regularly deal with sensitive issues. Other voluntary agencies may use these radio services in their own operations.

The radio services discussed in this chapter are commonly available and are in general use. Other volunteers may already own radio equipment in these services, and amateur emergency communication groups should be equipped to communicate with them.

Legal Considerations

Some radio services require licenses, whereas others do not. FCC rules permit the use of "any means necessary" to communicate in order to protect life and property — *but only when no other normal means of communication is possible*. Please do not assume that this means you can just modify your radio and call for help on the local police frequency the next time you see a car crash on the highway. Law enforcement agencies are not bound by the FCC's rules. Ham radio operators who have called for "help" on police frequencies have been convicted of "interfering with a police agency" under state and local laws, even though the FCC had taken no enforcement action. In one case, a judge ruled that by modifying his radio in advance, the amateur had committed "premeditated" interference, a serious charge. If you are in a position to save someone's life or property, be sure you are ready to defend your actions — and possibly lose — before pressing the mic button.

Other services, such as General Mobile Radio Service (GMRS), require a license that is relatively easy to obtain, although not free. If your group is planning to use licensed radios, obtain your license well before any emergency and keep it current. If you own a radio but no license, a lawyer could claim pre-meditation if you use it and disturb licensed users.

Using Modified Ham Radios

While it is easy to modify some VHF and UHF Amateur Radio equipment for operation in nearby public service and business bands, it is not legal to do so for regular "emergency" use. Radios used in those bands must be "Type Accepted" by the FCC for the purpose, and Amateur Radio equipment is not. If you plan to use other radio frequencies discussed in this unit, it is better to purchase the proper radio. However, if the need arises and your ham radio equipment is all you have, the FCC will probably not prosecute you for using it — if the use falls within its strict rules for emergencies (see above).

Citizens Band Radio Service (CBRS)

As a widespread system of casual communication for the public, CB radio is still quite popular among the public and truckers. Since the 1950s, CB has been available to anyone for the purpose of short-range business and personal/family communication. No licensing is required, and tactical or self-assigned identifiers are acceptable. *Do not use your amateur call sign!*

CB radios operate in the 11-meter band, on 40 designated channels from 26.965 to 27.405 MHz, with a maximum output power of four watts for amplitude modulation (AM) and 12 watts for

single side band (SSB). Most use AM but a few also offer SSB. The effective range between two CB mobile stations averages between two and eight miles. Depending on antennas, terrain, and propagation, base to mobile communication is possible up to 25 miles. The use of SSB can significantly increase range, but SSB use is not widespread due to the extra cost. FCC rules permit communication to a maximum of up to 250 kilometers.

In many remote areas with little or no telephone service, families rely on CB radios for basic day-to-day communications. Many rural police and sheriff's organizations still monitor CB traffic. In a number of states, highway patrol officers install CB units in their patrol cars with the blessing of their agencies. However, many departments that used to monitor Channel 9 have given up the practice. Radio Emergency Associated Communications Teams (REACT) groups in the area may still be monitoring.

In disaster situations, great emphasis is placed on the timely movement and distribution of supplies by truck. By far, the largest group of CB users is the trucking community. Channel 19 has been the unofficial "trucker" channel since the late 1960s, and in some areas is as good as Channel 9 when calling for assistance. Channel 9 is reserved for emergency and motorist assistance traffic only. Aside from REACT, organizations in many parts of the world monitor Channel 9 and other designated distress channels. In some countries, Citizens Radio Emergency Service Teams (CREST) teams serve the same functions as REACT.

Multiple Use Radio Service (MURS)

With little fanfare, the FCC added a new, unlicensed "citizen's" radio service in 2000. Both personal and business operation is permitted, with a maximum power of two watts. The MURS frequencies are 151.820, 151.880, 151.940, 154.570, and 154.600. While base operation is not specifically prohibited, the service is primarily intended for mobile and portable operation.

For about 20 years, certain businesses have been able to obtain licenses for operation on what the FCC calls "itinerant" frequencies. These channels became commonly referred to as the "color dot" channels. (A color dot label on the packaging identifies the frequency of the walkie-talkie.) One of the former itinerant channels, 154.570 MHz (blue dot), is now a MURS channel. This means that a number of these low-cost 1- or 2-watt output "itinerant" radios (which are usually user programmable for itinerant channels only) could be utilized for MURS. This allows you to equip unlicensed volunteers with a VHF portable having much the same simplex capability as a 2-meter handheld.

Family Radio Service (FRS)

Almost anywhere, in most every situation, you can find FRS radios in use. Family Radio Service portables are useful, effective, and inexpensive. Like CB, the Family Radio Service is designed for short-range personal communications. Campers, hikers, vacationers, and families on weekend

outings use FRS units to keep in touch.

There are 14 available UHF channels, and 38 different Continuous Tone Coded Squelch System (CTCSS) codes to limit background chatter and noise. Output power is from 100 to 500 mw, depending on the model. In an effort to standardize the ability to call for help using FRS, REACT recommends the use of FRS Channel 1 (462.5625 MHz) with no CTCSS tone as an emergency calling channel. REACT is also lobbying the manufacturers of FRS equipment to suggest this plan in the user information packed with new radios. A petition to the FCC requesting that this be made official was denied in late 2001. Monitoring the channel is recommended to all persons in outdoor areas whenever possible.

The first seven FRS channels are shared with the General Mobile Radio Service. Although the original rules seem to prohibit it, a later FCC Report and Order explicitly permit communication between the two services. The chance of a distress call being heard on either service is greatly increased on these seven common channels.

Most FRS radios are available with two or 14 channels, although single channel radios can be found. It is important to note that the channel numbers on each radio are not always interchangeable between these units.

General Mobile Radio Service (GMRS)

The GMRS consists of 15 UHF frequencies between 462.5625 and 462.7250 MHz. Eight are paired with matching repeater inputs five MHz higher, as with amateur and commercial systems. Seven “interstitial” channels are shared with FRS, and operation there is restricted to simplex with a maximum of five watts. Power on the other channels is limited to 50 watts. GMRS stations have the option of working only simplex modes if desired, even on paired channels. There is no frequency coordination, and users must cooperate locally to effectively use channels. CTCSS codes are the same as for FRS, and the first seven channels are common to both services. FM voice operation is permitted, but digital modes and phone patches are not.

Operating a GMRS station will require a low-cost system license from the FCC. You can apply using the FCC’s online Universal Licensing System. System licenses are currently granted only to individuals. A system includes any and all radios operated by family members and may include fixed, mobile, and repeater equipment. Use under the license is restricted to members of the licensee’s immediate family. Licenses to entities other than individuals are no longer issued, but non-individual entities licensed before July 31, 1987, may continue to renew their licenses, and may not increase or modify their use.

The frequency of 462.675 MHz is recognized for emergency and travel information use, and is monitored by many REACT teams nationwide. Many teams operate repeaters on this and other frequencies.

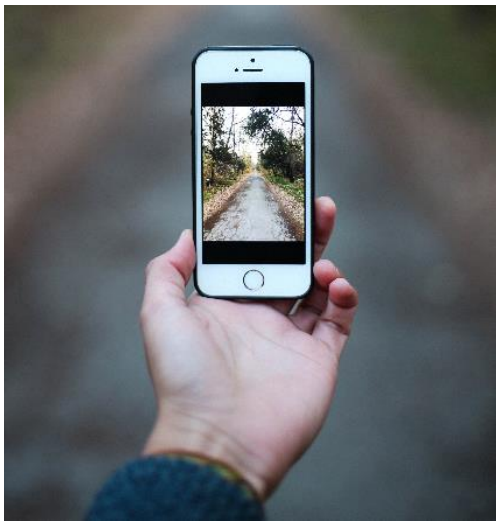
Current uses for GMRS involve mostly personal and family communications. Hiking, camping, and convoy travel are all common GMRS applications. GMRS use for emergency services is limited by the licensing requirements but could be pressed into service in a disaster situation. One or more members might wish to become licensed if use of GMRS is likely, especially for liaison with locally active REACT teams.

Public Safety Radio

There are instances when the use of police and fire radio frequencies is possible. The agency itself might allow and train you for such use, or an individual officer may ask you to use his radio to call for help when he cannot. Keep your transmissions short and to the point. Do not tie up the channel with long explanations, and cease transmitting if you are told to do so.

Cellular Phones

In a widespread disaster situation, these phone systems may become overloaded; however, networks are far more resilient and robust that they once were. If a message is too sensitive to send via any two-way radio, try your cell phone. Cellular phone transmissions, especially digital, are considerably more secure. In addition, it is possible to send photos, files, and even video over the cellular network. An important consideration is that text messaging utilizes less bandwidth on the network and often works when voice and data do not.



Marine Radio

FM marine radios operate on internationally allocated channels in the 160 MHz band. HF SSB radios operate on a variety of channels between 2 and 30 MHz Operation of FM stations for vessels in United States waters does not require a license, but operation on the HF channels does. Particularly in coastal areas along major rivers or the Great Lakes, it may be a good idea to

have a FM marine radio in your group's inventory. During major storms, you can monitor Channel 16, the distress channel. If you hear a vessel in distress whose calls are going unanswered by the Coast Guard, you may legally answer from an unlicensed land-based station under the FCC's "emergency communications" rules. If the Coast Guard is in communication with the vessel, do not transmit. Most other land-based operation is illegal, except where authorized by an FCC coast station license.

Aviation Radio

AM radios operating in the 108 – 136 MHz band are used in aircraft and in certain limited vehicles and ground stations. FCC licenses are required for all stations. Emergency Locator Transmitters (ELTs) are automatic devices that transmit a distress signal on 121.5 and 406 MHz

Marine Emergency Position Indicating Radio Beacons (EPIRBs) transmit digital ID codes on 406 MHz and a low-powered homing signal on 121.5 MHz

The land-based Personal Radio Beacons (PRBs) transmit on 121.5 MHz While it is unlikely that you will ever need to use an aircraft band radio except where it is provided by the partners, it is good to be familiar with the radio service. Monitoring these frequencies for ELT, EPIRB, and PRB signals and distress calls is always a good idea.

Couriers

Since pre-history, runners have carried messages from place to place. When we are asked to deliver a sensitive or lengthy message, and fax and phone lines are out of service, hand delivery might be the best choice if travel is possible. Acting as a courier does not necessarily eliminate the use of radio, since couriers need to be dispatched from place to place. Courier service is actually an excellent marriage of old and new technologies.

Review

Flexibility is important in disaster situations. Use of other communication systems may improve the overall effectiveness of the emergency communication response. Depending on the situation, trained Amateur Radio operators may have a variety of options from which to choose.

Recommended Activities

1. Develop a list of at least three potential uses for non-ham radios in public service or emergency communication efforts in your area. You may base this on past or potential events. Describe which alternate radio system(s) best meets the need of each situation on your list and explain why.