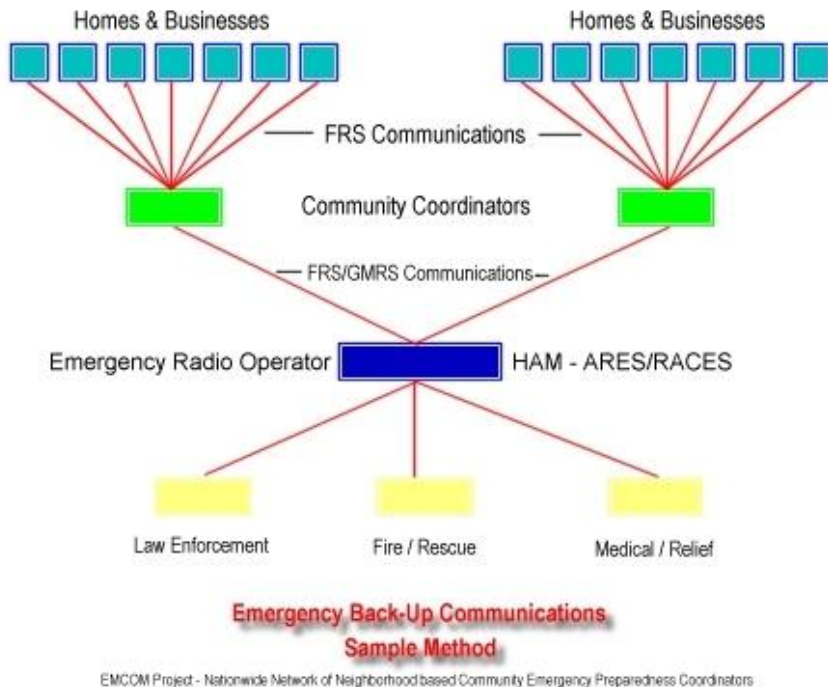


# Handout #1

## Emergency Communications Information

<http://www.emcomus.org/commwp.html>



<http://www.nationalterroralert.com/communications/>

During emergencies – local, state, and national – the importance of our country’s communications system, including telecommunications, broadcast, cable, and satellite systems, becomes clear. We use our phones to call 911 or to call our family members to make sure they are safe. We turn on our televisions and radios to get information updates.

While there is no doubt that our country has one of the world’s most extensive and dependable communications systems, unusual conditions can put a strain on it.

The following information will help you better understand what happens with our communications system during an emergency and how best to use the various components of our communications system during a crisis or disaster.

When the power is off, phones go out and the internet is down, when police, fire, and hospital services are overwhelmed, amateur radio operators are there to take up the slack as emergency communications volunteers. They have, in fact, been there in virtually all disasters in recent memory. Hurricanes, fires, ice storms, earthquakes, floods and so on.

With a little forethought and a few bucks, you can prepare yourself for similar events in the future and avoid being incommunicado when you need information the most.

### **Here are some criteria for setting up an emergency communications system:**

- 1) It should be easy to operate
- 2) have effective range
- 3) have a modest amount of protection against interference
- 4) be inexpensive (i.e. low initial cost, low maintenance and no monthly fees)
- 5) be readily available
- 6) be able to operate “off the grid”

There are at least five communications systems that more or less meet these criteria. Some have big drawbacks, others minor ones. In making your choice, you should examine your own needs and match them with the appropriate system.

### **Cell Phones**

When operational, cell phones have a big advantage meaning, their distribution is widespread, excellent coverage, most people know how to operate and it is instant bi-directional communication. Text messages are an excellent method of communication. Texting requires limited bandwidth, and will continually try to send the message until it is successful, battery goes dead, or the message times out in cyber space. Verify that your out of state "In Case of Emergency" contact (ICE) must be knowledgeable of phone and text messaging.

Disadvantages of cell phones is the wireless phone network was never designed for 100% of users to simultaneously use the network limited network traffic, susceptible to power outages.

### **Nextel: direct connection (like a walki-talki)**

### **CB Radio**

In the late '50s, the FCC took a set of frequencies from the Amateur Radio service and designated it as the Citizen's Band. The rules were simple: a rubber stamp license, low power, ease of operation and channelized tuning. But the service was a relative sleeper 'til the '70s when movies like "Smokey and the Bandit" and popular tunes like "Convoy," with their "ratchet jawin'," truck drivin' cowboys, captured the American imagination. That sent a stampede of otherwise respectable Americans onto the airwaves and the Interstate and overwhelmed the sluggish FCC which promptly abandoned the band to the mayhem that ensued. The Commission's only response to the millions of yahoos yelling at each other over CB was to expand the band to 40 channels.

If you haven't used a CB in the last 20 years, a few things may surprise you: 1) The units themselves are virtually unchanged (which leads one to wonder if they're still selling off excess inventory from the initial craze). 2) Prices for complete systems are cheap. 3) In many areas, the CB channels are relatively quiet. Advantages of using CB radios for emergency communications are considerable. Aside from the low price tag, lack of licensing and fees, they are operated on your car's 12v. electrical system and can be easily operated from home using a small, cheap motorcycle battery. Their range, depending on antenna type and placement, can be anywhere from one to fifteen miles.

Disadvantages of CB's are few, but persistent. Antennas tend to be large (4' to 8' on vehicles and larger for "base" or home stations). While much smaller antennas are sold, their effective range is drastically reduced. Transmissions tend to "leak" into all kinds of other electronic devices. In the home, CBers will often be heard on TV speakers, corded telephones, electronic keyboard speakers, etc. This was an aspect the FCC came to regret as the Commission was faced with hundreds of thousands of complaints from frustrated neighbors. Another problem is that sometimes, during favorable atmospheric propagation, range can be as great as several thousand miles. Thousands of people all hitting their mike buttons at the same time sets up an unearthly squeal and nobody gets through.

Prices for CB radios range from US\$50 to \$150 for full-sized mobile-mount radios to \$230 for handheld portable units with AM/Single Side Band (SSB) capabilities. I recommend units with built-in Weather Radio receivers. Antennas are sold separately and range from \$28 to \$75 and usually have attached cables and connectors to simply plug into the back of the unit.

### **49MHz Personal Communicators (Kids walki-talki):**

After the CB fiasco and before the Family Radio Service was established, manufacturers took advantage of FCC rules regarding transmissions in the 49MHz band. They built small, lightweight, self-contained, low power systems which featured a single headset with boom mike attached to the transmitter/controller which could be clipped onto the user's belt or pants pocket. Usually single channel operation only, some models are sold with as many as five frequency channels. All feature PTT (push-to-talk) mikes as well as VOX (voice operated) transmitters. The VOX feature makes them ideal "hands free" systems for cyclists, joggers or motorcyclists. Without speakers, the audio is heard only through the earphone. Early cordless phones, baby monitors and a few other devices share this band.

The advantage of this system is the extremely low power drain. Most sets are powered by only 2 or 3 AA batteries and can be in service for months. Their size makes them perfect for traveling light and taking up very little space. The big disadvantage is limited range. Expect under a quarter mile coverage with these systems. This can be seen as an advantage when you don't want to battle hundreds of other people on your frequency.

Prices for 49MHz Personal Communicators range from \$30 to \$50 each.

### **Family Radio Service (FRS)**

Once again, the FCC has tried to give the average citizen a chance to use the airwaves with a new scheme they call the "Family Radio Service" (FRS). Here the Commission sought to re-dress the problems of the first citizen's band. They assigned the band frequencies in the UHF region (around 462MHz) which limits the propagation-induced range. They also limited the output to one-half watt and transmissions use Frequency Modulation (FM). All are small, battery-powered "handi-talkies" which can easily fit into a pocket. The Commission has again chosen channelized operation and this time has allowed 14 channels for use.

Advantages of FRS units are that they are very compact (typically 4" h x 2.5" w x 1.5" d) and weighing 6-10 ounces. The UHF frequency means they have very short antennas (typically only a few inches). Some units also have such useful features as optional headset/boom mikes for VOX operation, audible low battery alert and transmit LED. Some units feature 38 "interference eliminator codes" which are sub-audible tones which let your unit respond only to other units transmitting a designated tone. Other notable features include a programmable scan feature and automatic "power off" (shuts down if not used after a certain period of time). The main disadvantage of these units is the relatively short range. While manufacturers claim up to two miles, don't expect more than a mile.

Expect to pay \$50 each for basic FRS models, \$90-\$190 for higher-end models with additional features.

### **General Mobile Radio Service (GMRS)**

The General Mobile Radio Service (GMRS) is like the FRS in that it operates in the 460MHz region, uses small handi-talkies and is intended to be used by individuals to communicate with immediate family members. The big differences are that GMRS requires an FCC license with a fee and users must be 18 years or older. In addition, the output of these units is considerably greater (1 to 5 watts), allowing a range of coverage from 5 to 25 miles, depending on terrain and antenna position.

There are 23 GMRS channels used on an unassigned basis and dependent on the cooperation of all users. The channels are split up for base, mobile relay and fixed station or mobile station use. Each license is assigned one or two of eight possible channels or pairs as requested by the license applicants. In order to avoid interference or conflicts in use, the FCC recommends monitoring existing frequencies in your area before making your application and requesting your channels.

The advantage of the GMRS is that this is the most useful of the previously listed services, but brings with it disadvantages of government oversight and stringent frequency assignment. GMRS radios are bigger than FRS units and have more features. Higher power means more batteries (as many as 6 AAs) and a higher price. Expect to pay \$200 for handheld 2 watt units and considerably more for 5 watt base station transceiver.

### **Amateur Radio (HAM)**

The great grandpappy of the two way radio scene is the Amateur Radio service whose operators are known as Hams and who have pioneered radio communications since the first decade of this century. AR is also the most regulated of the non-commercial services, it can end up being the most expensive, but it can also be the most versatile and powerful.

All hams and their stations must be licensed by the FCC, and in order to receive a license, you must pass a written exam.

There's no fee for the license (which is good for ten years), no age requirement and operators are allowed to use any frequency for which their license qualifies them.

A nationwide system of repeaters on the 144MHz and 440MHz bands allows nearly seamless communications as hams travel around the country. These repeaters are built, installed and maintained by active and well-populated local amateur radio clubs. Traditional amateur frequencies in the shortwave bands provide excellent coverage for local, regional, national, and even international, communications. Unfortunately, there's not one radio for all of these capabilities which is why hams typically have three or four separate radios and antennas.

The easiest way into ham radio is via the "Technician" class license which requires a written test based on a text available through many sources. This class allows the user to operate (among others) in the 2 meter band (144MHz). Small handi-talkies for 2 meters are relatively cheap and give a range of 20-50 miles depending on terrain, power and whether or not you're using a repeater. Many repeaters provide access to 911 services through the handi-talkie.

Expect to pay \$50-\$500 for 2 meter transceivers depending on features. If you're planning to use Amateur Radio for your family, each member needs a Technician license and their own handi-talkie.

## **Final Points**

The FCC has made it illegal to modify any of these radios to operate in any band other than the one for which they were intended or to make it possible to place telephone calls from the radios.

Despite what sales people might tell you, or manufacturers' claims, none of these services offer privacy. Anyone with a similar unit or a scanner can tune into your conversations. You don't need to buy any of these transceivers to find out what's happening in your area in an emergency. Any scanner capable of tuning the VHF or UHF bands can tune in and listen to the conversation. Any shortwave radio capable of tuning as high as 27MHz can monitor the Citizen's Band. This is particularly useful in winter when you need to know about road conditions in your immediate area.

## **911 Calls**

Emergency personnel and others often learn about emergencies through 911 calls. 911 is the official national emergency number in the United States and Canada. Dialing 911 quickly connects you to a PSAP dispatcher trained to route your call to local emergency medical, fire, and law enforcement agencies.

The 911 network is a vital part of our nation's emergency response and disaster preparedness system. This network is constantly being upgraded to provide emergency help more quickly and effectively. For example, most traditional wire-line 911 systems now automatically report to the PSAP the telephone number and location of calls, a capability called "Enhanced 911" or "E911." By receiving the telephone number of the caller, the PSAP is able to call back in the event the call gets disconnected. The PSAP is also able to determine the location of the caller by cross-referencing the telephone number against a location database. Traditional wire-line E911 is available in most parts of the country.

## **Public Safety Answering Point and Call Dispatch**

The emergency dispatcher uses location information to direct public safety personnel responding to the emergency to ensure the shortest possible emergency response time.

At the PSAP, the operator verifies the caller's location, determines the nature of the emergency, and decides which emergency response teams should be notified. Sometimes, a single primary PSAP will answer for an entire region. In most cases, the caller is then transferred to a secondary PSAP from which help will be sent.

Secondary PSAPs are sometimes located at fire dispatch offices, municipal police headquarters, or ambulance dispatch centers. Communities that don't have PSAPs rely on public safety emergency operators and communications centers to process emergency calls.

Once the call is processed, the PSAP operator or dispatch center alerts the appropriate emergency response team. During emergencies, radio systems frequently are used by emergency units and officers at the scene to coordinate activities among all emergency personnel – fire, rescue, police, dispatchers, etc. – with the emergency units on their way and with dispatchers at command bases.

## **Wireless and E911**

While new telecommunications technologies can be important tools for public safety, they sometimes create special challenges for public safety personnel. For example, the mobility of wireless telephone service makes determining a wireless user's location more complicated than is true for traditional wire-line services, which are associated with a fixed location or address.

In an effort to increase the ability of emergency personnel to respond to wireless 911 calls, the Federal Communications Commission (FCC) has adopted rules requiring wireless telephone carriers to provide Enhanced 911 (E911).

Wireless carriers have begun to deploy technologies to meet the FCC's E911 rules. When fully implemented, wireless E911 will provide PSAPs with information about the location of consumers dialing 911 from mobile phones. However, since wireless E911 will not be available everywhere immediately, it is important for consumers to follow a few basic steps when calling 911 from their mobile phones:

Tell the emergency operator the location of the emergency right away.

Give the emergency operator your wireless phone number so that if the call gets disconnected, the operator can call you back.

If your wireless phone is not "initialized" (i.e., you do not have a contract for service with a wireless service provider) and your emergency call gets disconnected, you must call the emergency operator back because he or she does not automatically receive your telephone number and therefore cannot contact you.

## **VoIP and E911**

The FCC also has imposed E911 obligations on providers of "interconnected" Voice over Internet Protocol (VoIP) services. Interconnected VoIP service allows you to make and receive calls to and from traditional wire-line phone numbers using any high-speed (broadband) Internet connection (i.e., DSL, Cable Modem). VoIP can be used in place of traditional phone service. Typically, interconnected VoIP technology works by either placing an adapter between a traditional phone and a broadband connection, or by using a special VoIP phone that connects directly to your computer

or Internet connection. While you may choose to use interconnected VoIP service from a single location, like a residence, interconnected VoIP services can be used wherever you travel as long as a broadband Internet connection is available. By the end of 2005, all interconnected VoIP providers must automatically provide E911 services to all customers as a standard, mandatory feature without customers having to specifically request this service. VoIP providers may not allow their customers to “opt-out” of E911 service.

Before interconnected VoIP service providers can activate a new customer’s service, providers must obtain from the customer the physical location at which the service will first be used so that emergency services personnel will be able to locate callers who dial 911. Interconnected VoIP providers must also provide one or more easy ways for all customers to update the physical location they have registered with the provider, if it changes.

### **Network Damage and Black-outs**

If the telecommunications network is damaged in a disaster, your traditional wire-line, wireless, or VoIP phone and text pager may not work. If only your electricity goes out (a “black-out”), your traditional telephone may still work. In a black-out, you still may be able to use your traditional wire-line phone because electricity and telephone transmissions travel on different wires. If you keep the battery on your wireless phone and text pager fully charged, you should be able to use these, too, in a black-out. Unless you have a backup power supply, your VoIP phone will not work if your broadband connection is down or in a black-out.

Text pagers have a built-in radio transmitter/ receiver. Messages are transmitted over the wireless network, a nationwide network of radio towers that transmit data. Some text pagers can subscribe to the National Oceanic and Atmospheric Administration’s (NOAA) National Weather Service for any weather alerts.

### **E-mail May Work When Phone Lines Don’t During a Terrorist Attack, Natural Disaster or State of Emergency**

When a telephone call is completed on the public telephone network, transmission circuits are assigned and dedicated between the two users for the length of the call. The telephone network is engineered so that during normal usage there are adequate facilities that can be assigned and dedicated to handle the number of calls during the peak period. However, if during a disaster or emergency the number of calls exceeds that peak (or if the network transmission capacity is reduced), then some calls will be blocked. And, of course, if the phone being called is already in use, the call will be blocked.

The Internet backbone uses shared rather than dedicated transmission facilities so that even during heavy usage the Internet will work, albeit perhaps more slowly. However, if Internet traffic is heavy enough, VoIP phones may not work. Cable modem and DSL users who have dedicated Internet access can generally get through to their e-mail systems, although dial-up Internet users may experience some blocking when they try to dial their Internet Service Provider (ISP), either because the local telephone system is congested or all ISP’s lines are busy. E-mail itself is an Internet application which has the additional characteristic that the recipient doesn’t have to be available at the same time as the sender, and instead can connect to his or her own mail system at his or her convenience to retrieve messages that have been delivered there.

### **The Emergency Alert System Radio and Television Updates**

In the event of an emergency, many people rely on local radio and/or television stations to receive updates on what is happening and what to do.

There is a nationwide broadcast system in place for national disaster or other large-scale disasters. The Emergency Alert System (EAS) currently provides not only the President, but national, state, and local authorities with the ability to give emergency information to the general public via broadcast, cable, and wireless cable systems.

All broadcast stations and cable systems currently are required to broadcast emergency alerts and messages for national security emergencies initiated by the President.

All EAS alerts should be accessible by audio and visual means, or simple visual means, including closed-captioning, open-captioning, crawls or scrolls.

Exception: If your local television/radio tower or studio is damaged during a natural disaster like a tornado, you may not receive the signal. EAS was designed, however, so that if one link in the dissemination of alert information is broken, the public has multiple alternate sources of warning.

### **Accessibility of Emergency Information**

The FCC has separate requirements to meet the needs of persons with disabilities in cases of local emergencies. The FCC requires that any information that is intended to further the protection of life, health, safety, or property, such as immediate weather situations, civil disorder, evacuation orders, school closings, relief assistance, etc., be accessible to persons with disabilities. These rules apply to all local broadcasters, cable operators, and satellite television service providers. Critical details about the emergency must be provided in a visual format, such as open captions, scrolls, or even hand-lettered signs.

The critical details must also be provided in an aural format. If crawls or scrolls are provided during regular programming, an aural tone is required to indicate to persons who are blind or who have low vision that emergency information is being provided.

## Websites for Emergency Training and Communication

South Jordan City	<a href="http://www.southjordancity.org">www.southjordancity.org</a>
South Jordan City VECC	<a href="http://www.southjordancity.org/vecc.asp">http://www.southjordancity.org/vecc.asp</a>
Oquirrh Lake Radio Club (Ham Radio)	<a href="http://www.k7olr.org/">http://www.k7olr.org/</a>
Be Ready Utah	<a href="http://www.beready.gov">www.beready.gov</a>
Utah Special Needs Registry	<a href="http://www.specialneedsutah.org/">http://www.specialneedsutah.org/</a>
Be Ready Campaign	<a href="http://www.ready.gov">www.ready.gov</a>
Agency for Toxic Substances and Disease Registry	<a href="http://www.atsdr.cdc.gov">www.atsdr.cdc.gov</a>
Centers for Disease Control and Prevention	<a href="http://www.cdc.gov">www.cdc.gov</a>
Citizen Corps	<a href="http://www.citizencorps.gov">www.citizencorps.gov</a>
Department of Commerce	<a href="http://www.doc.gov">www.doc.gov</a>
Department of Education	<a href="http://www.ed.gov">www.ed.gov</a>
Department of Energy	<a href="http://www.energy.gov">www.energy.gov</a>
Department of Health and Human Services	<a href="http://www.hhs.gov/disasters">www.hhs.gov/disasters</a>
Department of Homeland Security	<a href="http://www.dhs.gov">www.dhs.gov</a>
Department of Interior	<a href="http://www.doi.gov">www.doi.gov</a>
Department of Justice	<a href="http://www.justice.gov">www.justice.gov</a>
Environmental Protection Agency	<a href="http://www.epa.gov">www.epa.gov</a>
Federal Emergency Management Agency	<a href="http://www.fema.gov">www.fema.gov</a>
Food and Drug Administration	<a href="http://www.fda.gov">www.fda.gov</a>
National Oceanic and Atmospheric Administration	<a href="http://www.noaa.gov">www.noaa.gov</a>
National Weather Service	<a href="http://www.nws.noaa.gov">www.nws.noaa.gov</a>
Nuclear Regulatory Commission	<a href="http://www.nrc.gov">www.nrc.gov</a>
The Critical Infrastructure Assurance Office	<a href="http://www.ciao.gov">www.ciao.gov</a>
The White House	<a href="http://www.whitehouse.gov/response">www.whitehouse.gov/response</a>
U.S. Department of Agriculture	<a href="http://www.usda.gov">www.usda.gov</a>
U.S. Fire Administration	<a href="http://www.usfa.fema.gov">www.usfa.fema.gov</a>
U.S. Fire Administration Kids Page	<a href="http://www.usfa.fema.gov/kids">www.usfa.fema.gov/kids</a>
U.S. Geological Survey	<a href="http://www.usgs.gov">www.usgs.gov</a>
U.S. Office of Personnel Management	<a href="http://www.opm.gov/emergency">www.opm.gov/emergency</a>
U.S. Postal Service	<a href="http://www.usps.gov">www.usps.gov</a>
USDA Forest Service Southern Research Station	<a href="http://www.wildfireprograms.com">www.wildfireprograms.com</a>
<b>Non-government Sites</b>	
American Red Cross	<a href="http://www.redcross.org">www.redcross.org</a>
Institute for Business and Home Safety	<a href="http://www.ibhs.org">www.ibhs.org</a>
National Fire Protection Association	<a href="http://www.nfpa.org">www.nfpa.org</a>
National Mass Fatalities Institute	<a href="http://www.nmfi.org">www.nmfi.org</a>
National Safety Compliance	<a href="http://www.osha-safety-training.net">www.osha-safety-training.net</a>
The Middle East Seismological Forum	<a href="http://www.meieisforum.net">www.meieisforum.net</a>
The Pan American Health Organization	<a href="http://www.disaster-info.net/SUMA">www.disaster-info.net/SUMA</a>
LDS Church Personal Preparedness Website	<a href="http://www.providentliving.org/">http://www.providentliving.org/</a>
Official Partent HAM Radio Website	<a href="http://www.arrl.org/">http://www.arrl.org/</a>
Amateur Radio Emergency Services (Organized by ARRL)	<a href="http://www.arrl.org/ares">http://www.arrl.org/ares</a>