

## Community and “Prepper” Communications

By James Wades,

National Emergency Communications Coordinator, Radio Relay International

---

What would you do if our daily telecommunications tools suddenly became inoperative? It’s hard to imagine a situation in which cellular data networks and the Internet simply stopped working. Yet, such a scenario is not out of the realm of possibility. Shown below is a photograph of desperate cell phone users taken in Puerto Rico during the aftermath of Hurricane Maria:



Of course, the infrastructure in the Continental United States is more robust, but surprising vulnerabilities exist within our nation’s infrastructure, the very existence of which is largely invisible to the average American. Equally invisible to many citizens is the army of thousands of technicians and engineers who ensure reliable operation every day.

While the concept of a catastrophic event resulting in widespread disruptions to commercial telecommunications common carrier networks typically results in cognitive dissonance and denial, this doesn’t change the fact that potentially disruptive hazards and vulnerabilities exist.

### **How would you communicate in the absence of cellular data networks and the Internet?**

At the minimum, the loss of such familiar, addictive services would have a profound psychological impact on millions of Americans. Those under the age of 40 raised with instantaneous access to friends, family and information, would likely suffer from a profound sense of isolation and disorientation. This alone might result in some rather unpredictable behaviors or civil unrest.

Of greater importance might be the lack of access to critical situational awareness information and the ability to coordinate with family members, relatives or associates. Communications can be essential to your security and perhaps even your survival. Therefore, the development of an alternate communications strategy and its regular use is essential to a successful preparedness strategy, the key components of which include:

1. Basic communications tools, which may include, but are not necessarily limited to, one or more of the following:
  - a. CB Radio
  - b. FRS Radio
  - c. GMRS Radio
  - d. Amateur (“ham”) Radio
2. Proper training and knowledge of standardized communications methods.
3. A layered network approach with gateways designed to facilitate short-range, medium-range and long-haul messaging.

It is important to understand that a successful communications strategy is predicated on all three components above, including the proper tools, training and the layered approach. We will discuss these three components in order to aid individuals or prepper groups in their efforts to build out a basic, survivable communications strategy.

### **Technologies:**

Intelligence can be conveyed in many ways, from runners and carrier pigeons to the Internet. However, from the standpoint of preparedness communications, radio systems are often the answer and these radio services can generally be divided into two categories; those that require a license and those that do not. In this latter category, we have two primary candidates:

CB Radios: Back in the 1970s and ‘80s, CB radio was a national fad. It seemed every other automobile on the road was equipped with CB radio and an entire fashion statement of CB lingo was in widespread use. People wore “CB Radio” belt buckles, met at “CB Coffee Breaks,” and couples met and got married thanks to CB radio. It was all good fun until the combination of anonymity and myriad users populating the limited number of channels rendered the radio service virtually unusable.

The good news is that the cell phone killed the CB fad, but the radio service remains. In many areas, one can monitor a formerly popular CB channel such as channel-19 and hear almost no communications traffic. This is particularly true in deep suburbs and rural areas. Most CB communications today consists of long-haul truckers efficiently reporting traffic problems and speed traps. While there remain some “hobby users” of CB radio, the radio service has mostly reverted to its pre-1970 status. Because of this, some of the benefits of CB radio are re-emerging:

- Good serviceable CB radios suitable for both mobile and base use are ubiquitous on the used market. Furthermore, units of new manufacture are quite inexpensive. The author recently purchased a very nice Realistic TRC-455 base-station unit at a garage sale for \$ 5.00! On another occasion, the author was given an older high-quality 23-channel base unit for free, which, after some basic repairs, proved to be a “Cadillac” quality vacuum tube CB base unit.

- Multiple CB base-installations can communicate within a 15 to 20 miles when coupled with a roof-mounted antenna or a simple wire antenna and transmission line hung in a tree at a height of 40 or 50 feet above ground level. In the latter case, the antenna will be almost invisible to one's neighbors, a potentially desirable situation in a SHTF scenario.
- An inexpensive CB radio installed in one's vehicles can also prove surprisingly useful on a day-to-day basis. The author has found that information provided by commercial truckers adds greatly to the utility of a GPS or similar navigational aids during long trips. Information found on Channel 19 is often more timely, more accurate and often quite useful for locating alternate routes and the like.

The low cost and ready availability of equipment and the basic utility of CB radio makes it a useful option for linking a local prepper network together. With the open nature of CB radio, the lack of the requirement for a license, and so forth, a prepper network will blend well into the background. Let's call it the "gray man" of prepper comms.

There are of course, some disadvantages to CB, which may be summarized as follows:

1. CB radio was allocated a portion of the spectrum, which is prone to "skip" during periods of moderate to high sunspot activity. There will be times during which distant stations fill up the available channels and raise the "noise floor."
2. Some hobby CBers use illegal amplifiers, the result of which is "dominance" of a channel. Fortunately, many of these types are "aging out" of the CB hobby.
3. In some urban areas, such as Detroit and Chicago, there is an entire CB "underworld," which makes CB radio a less desirable option in major urban areas.
4. As with any social media, the anonymity of the user creates the classic "invisible man" scenario in which social norms, decorum and courtesy are occasionally tossed aside. One may hear profane language, unpleasant topics or plain old foolishness now and then. After all, it's a public space and one will eventually encounter the usual range of social ineptitude.

Despite its drawbacks, CB can be a very useful daily tool for use on our nation's highways while simultaneously serving as an inexpensive and utilitarian non-corporate, non-government, wireless communications service.

#### FRS Radios:

FRS or "Family Radio Service" walkie talkies are the low-power cousin to GMRS ("General Mobile Radio Service") units, which we will discuss later. FRS is designed to provide families and small community organizations with convenient, short-range two-way radio capabilities. These small walkie-talkies operate

in the UHF spectrum at low power levels, typically in the range of one-half watt. External antennas are not permitted by law.

Manufacturers of FRS hand-held radios will often advertise wildly inaccurate range, such as 15 to 36 miles. These claims are unrealistic and misleading. In a typical suburban environment, the range is typically limited to a quarter or perhaps half mile. In flat open country, one might expect upwards of three quarters of a mile. If two people equipped with FRS radios are each standing atop a 15-thousand-foot mountains with no obstructions, precipitation or fog, then 30 miles is a possibility. Of course, the latter scenario is quite rare!

FRS radios are quite useful on hikes, while camping, or the like. Advantages include:

- Small and compact. They can be carried in one's pocket or clipped to one's belt. The use of frequencies in the UHF spectrum means a short, stubby antenna can be reasonably efficient, unlike CB walkie talkies that require a 20 to 25 inch long antenna for equivalent range.
- The radios can be "fed" with simple AA batteries and will operate for long periods of time on a pocket full of alkaline AA cells.
- The radios have reasonably effective building penetration.
- Like CB radio, the channel being used is like a "party line." This is advantageous because one can overhear various information being passed, often resulting in spontaneous problem solving.
- The radios can be used to request assistance, or they may be used to originate a long-haul message via the *Radio Relay International* "National SOS Radio Network" provided a licensed radio amateur is nearby.
- The radios are incredibly inexpensive. Forty to eighty dollars will buy anywhere from two to six walkie-talkies.

Of course, FRS radios come with disadvantages as well:

1. Many adults purchase them as "toys" for their children. When one is attempting to use them for something purposeful, he occasionally finds that a couple of toddlers in the neighborhood are belching or playing "secret agent" on a channel. Radios shouldn't be toys, but the relative simplicity of the device compared to a smart phone leads some adults to perceive them that way.
2. Again, the range is quite limited. They are not a viable option for direct connectivity to a fellow prepper located five or ten miles away.

3. The advertised “privacy codes” do not provide “privacy.” Rather, they simply mask communications on the channel that one does not want to hear. As with CB, do not expect “privacy.”

Falling into the category of licensed radio services, we generally have two options, one of which is the *General Mobile Radio Service* and the other of which is the *Amateur Radio Service*.

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

A good synonym for GMRS is “business band radio.” This *licensed* radio service shares several channels with FRS, but it has a variety of advantages:

- Higher power levels are authorized, with mobile units up to 50-watts and handheld units up to 5-watts being available.
- “Repeaters,” which receive and retransmit signals from a very high location, such as atop a tall tower, can be established and used to cover a wide area.
- Like FRS radios, GMRS operates in a portion of the spectrum that offers good building penetration for hand-held radios.
- Crystal-clear narrowband FM results increases the odds of a quiet, interference-free channel.
- Range, without repeaters, can be similar or better than that of CB radio, but without “skip” and interference problems that sometimes arise at certain times of day.
- As with FRS radios, a GMRS radio can be used to access the *Radio Relay International* “National SOS Radio Network” provided an Amateur Radio operator is nearby.

GMRS radios are often used by land surveyors, construction crews, at large concert venues and the like. They offer the convenience of FRS radios with increased range and greater reliability. Dedicated GMRS channels also offer the advantage of isolation from children using a channel for “play.”

GMRS radios do require an FCC license to operate. However, the FCC license does not involve an exam and the fee is nominal. It’s more of a “registration.” Furthermore, a single license can cover an entire organization, whether that’s a family, a business or a community group.

Disadvantages include:

1. The cost of GMRS certified radios is considerably higher than CB or FRS units.

2. Some care in selecting an appropriate channel is essential to prevent harmful interference to nearby businesses or organizations using the same frequency.
3. Somewhat greater technical skill is required to properly install and maintain the radios.
4. Unlike CB radio, the use of the network will likely be limited to one's area and the specific purpose of the network.

GMRS is an excellent choice for any prepper network. A variety of manufacturers offer a range of two-way radio options worth investigating.

#### The Amateur Radio Service:

The "king" of *survivable* radio services is the Amateur Radio Service ("ham radio"). Ham radio has been around since the beginning of wireless communications. It gave birth to the broadcast industry, police radio dispatching and laid the foundation for modern military communications. Ham radio is survivable and extremely flexible. Its advantages include:

- Efficient mobile radio coverage at VHF and UHF frequencies courtesy of the thousands of ham radio clubs around the country, many of which provide "repeater" infrastructure to extend the range of mobile and hand-held radios.
- High-frequency (shortwave) allocations allow one to communicate with other radio amateurs all over North America (or the world) without commercial or government infrastructure.
- Direct access to *Radio Relay International* networks allows one to originate and receive telegram type messages addressed to third parties. For example, one can originate a radio-telegram ("radiogram") in Michigan addressed to a relative in California and it will be delivered by a volunteer RRI operator near the addressee; a nice service when the Internet and cellular grid is down.
- The ability to communicate using voice, Morse Code ("CW") and various digital modes.
- Direct access to local public safety agencies via *Amateur Radio Emergency Service* networks in time of emergency. This can be of great benefit in a life-critical situation.

Amateur Radio would also be a great source of situational awareness information should a major catastrophe strike the Continental United States. No other radio service offers the survivability, flexibility and universality of the Amateur Radio Service. However, there are some requirements, which may be considered disadvantageous by some:

1. One must study and pass an FCC examination covering basic electronic theory and operating rules to obtain a license.

2. The radio equipment and antenna systems can be somewhat complex for the non-technical person or beginner.
3. One must use the equipment and interact with networks such as Radio Relay International regularly to learn and develop the standardized communications methods and practices to use the resource effectively.
4. An inexpensive Amateur Radio handheld transceiver offers few advantages over an FRS or GMRS handheld radio. The technology is nearly identical. Rather, it's the repeater infrastructure and high frequency networks maintained by radio amateurs that serve as the primary "force multiplier."
5. If one plans to use local Amateur Radio VHF or UHF repeater networks to expand the range of communications, one is ethically (but not legally) obligated to join and occasionally participate in the local Amateur Radio club to aid in the maintenance of that infrastructure. Users of repeaters and ham radio nets should not be "freeloaders."

The great diversity of ham radio technology, frequencies and networks is far beyond the scope of this article. Suffice to say, it takes a couple of years to become a minimally proficient and knowledgeable ham radio operator. Furthermore, "ham radio" is not a "noun." It is not something one "buys." Rather, ham radio is an "activity," a skill, which is developed over time. Just as one doesn't become a skilled athlete overnight, one does not become a proficient radio amateur in a few days. One cannot buy an Amateur Radio transceiver and expect to effectively communicate as soon as it is taken out of the box.

For those willing to invest a bit of time and effort while having some fun in the process, ham radio is an excellent choice. However, it is probably unrealistic to expect everyone in a prepper group to become an experienced radio amateur. Therefore, the best option for most preppers is to get to know a like-minded radio amateur in one's area and get him involved in your group.

### **Building your layered network:**

For most prepper groups, an effective communications plan calls for "layering" networks. For example:

#### Basic Family/Neighborhood Layer:

Inexpensive handheld FRS radios are an excellent choice for use within a family, at the neighborhood level or during an outing, such as when camping and hiking or participating in a training activity. These short-range, convenient radios can link those in a neighborhood together. They are inexpensive and, if lost or damaged, the cost of replacement is minimal.

### Community Layer:

*CB Radio Option:* Citizen's Band (CB) base-station radios can be used to build a simple, inexpensive community network. A CB base station can be installed in the home office, on the kitchen counter or in another "common area" with a suitable outdoor antenna used to provide longer range and better reliability. Using a common channel, such as the *AMRRON* channel 3, CB can facilitate the creation of a community "party line."

Mobile CB units installed in vehicles using a decent, center loaded antenna, magnetic mount antenna such as the Wilson 1000, or even a 102" CB whip can be used to access the network or intercommunicate while traveling in groups. They can even be used during the occasional family errand, such as checking in with one's spouse on the way home from work to see if groceries are needed or to let someone know the kids need to be picked up from soccer practice. Sure, the cell phone serves the same purpose, perhaps more elegantly, but by making regular use of the radio system, one learns how it works, becomes familiar with its range and limitations, and one can practice professional grade radio procedures so that this knowledge is intuitive when the radio system is really needed. Plus...it's fun to do something unique!

*GMRS Radio Option:* The same general approach applied to CB radio works for GMRS radios. The cost is higher, and the utility of GMRS for highway information is lost, but from a technical standpoint, GMRS radios are a high-quality option subject to minimal noise and interference.

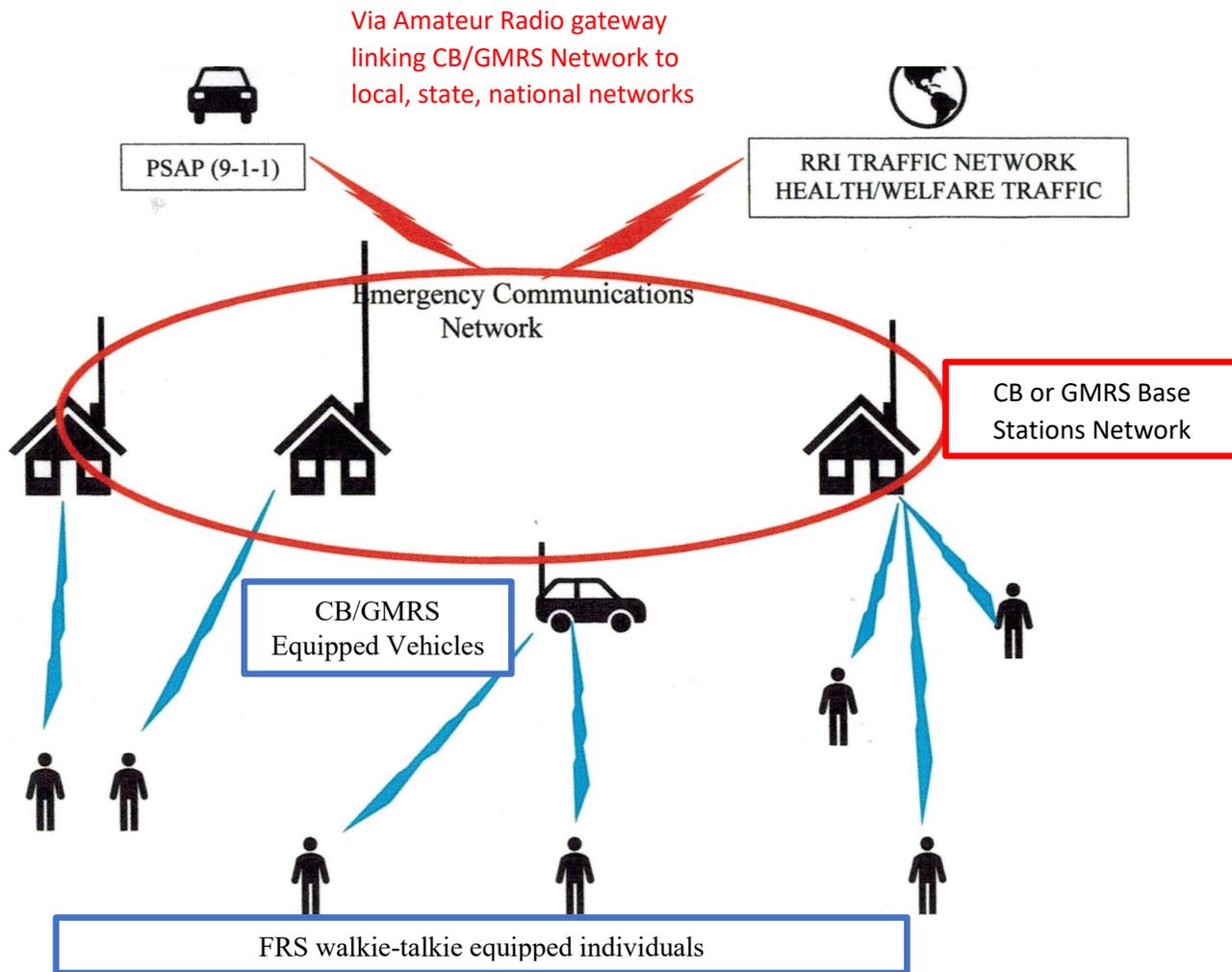
Once one applies for and obtains a license, suitable handheld and mobile radios can be purchased from several companies offering quality GMRS transceivers and antennas. With a configuration of a base radio in the home, a mobile radio or two in the family vehicles and several hand-held radios, one can establish a good quality community level communications network.

### The Amateur Radio Service Gateway:

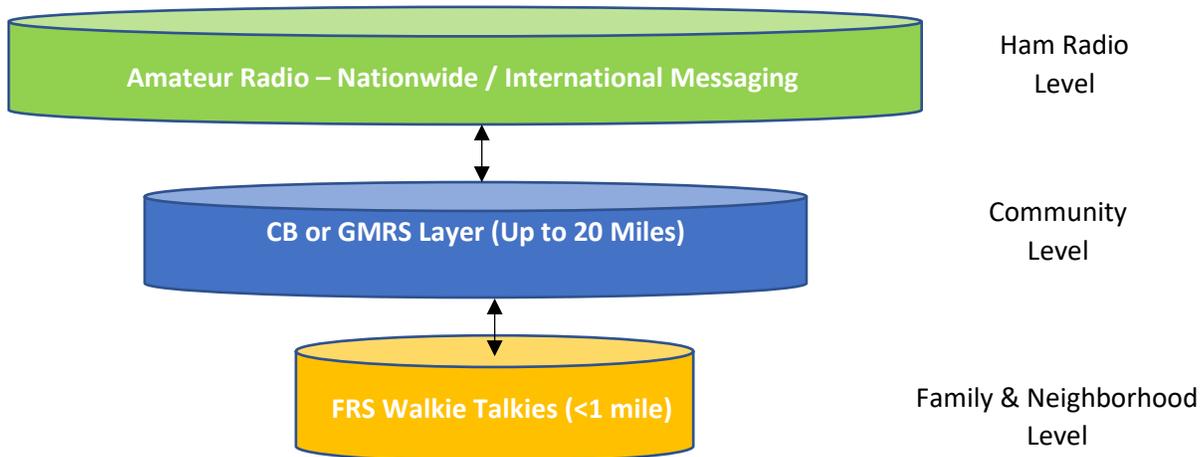
An experienced radio amateur is the key to accessing medium and long-haul communications networks. Using these networks, the ham radio operator can transmit and receive radiogram messages from across the state or across country in the absence of commercial telecommunications infrastructure.

The best option is to locate an experienced ham radio operator in your area that is skilled in RRI or NTS net operations (or willing to develop the skills) and who is also willing to become part of your community network with interface via CB or GMRS/FRS radio. As an added benefit, he can support his local neighborhood via the RRI "National SOS Radio Network."

While the amateur radio gateway is not essential to neighborhood or community preparedness, the involvement of a skilled radio amateur brings much to the table, not just in terms of connectivity to high-level messaging networks, but also in terms of technical knowledge. He can answer questions about antennas, radios and communications procedures.



Another way of looking at the network layers:



**For example:**

The “Shiawasse Prepper Team” has ten members. Their radio capabilities are structured as follows:

- Each family in the team has several FRS or GMRS radios for use around the neighborhood, on camping trips or the like. Spare alkaline AA-cells are kept on hand to ensure the radios remain operational in the event of a long-term power outage.
- Each family has also installed a CB base station installed at their home. Some have it located on a bookshelf in the family room within earshot of the family during waking hours. Others have it installed in their home office or basement workshop. Everyone is tuned to “channel 3” or some other mutually acceptable channel.
- Everyone has a tactical call sign in the form of unit number or name, such as “Unit 1” or “Unit Charlie.”
- Everyone has been briefed on basic radio procedures and the team has familiarity with formatting both tactical messages and radiograms. The radios are also used for occasional conversation and social interaction to ensure operational readiness. The CB base station allows team members to conveniently communicate between each other during normal times and, more importantly, in time of emergency.
- Each team member also has a CB radio installed in their automobile. During long trips, the CB is used to monitor Channel 19 for information on highway conditions, accidents and reports of speed traps. However, the CBs are also be used to keep in touch with home when running errands around town. In time of emergency, or when the team travels as a group, everyone has reliable, short-range communications available, even if the cellular grid fails.
- A couple members of the team have a strong interest in radio technology. They earned their ham radio licenses, became active in the local ham radio club, and developed the knowledge and skills needed to connect to Radio Relay International’s national messaging layer. These members are the “gateways” from the CB and FRS/GMRS channels to the long-haul networks of RRI. These are the individuals who can take message to that relative on the other side of the country, format it if necessary, and inject it in the network. When the reply arrives, the same ham radio volunteer can deliver it to you via the group’s CB network. Using this gateway concept, the simple CB or GMRS radio becomes a valuable tool providing access to a nationwide emergency communications infrastructure.

In the above scenario, most of the team can spend a small amount of money on basic CB and FRS equipment, but the network plan leverages a range of resources to transform those inexpensive basic tools into something far more flexible and useful. In a sense, the sum is greater than the parts. This is done by layering networks built around each technology, with each layer method incorporating a gateway to the next level:

*FRS talks to CB or GMRS; CB or GMRS talks to the local radio amateur; the local radio amateur communicates with the RRI national messaging layer and local Amateur Radio Emergency Service assets.*



*A simple, older 23-channel CB provides reliable communications throughout a community.*



*FRS walkie-talkies are inexpensive, ubiquitous and effective over short distances of less than one mile.*

## **Planning for the “big one.”**

The non-prepper probably believes that the active prepper has an overactive imagination. Likewise, the prepper probably believes the average person has no imagination. However, disasters do occur in which commercial communications networks fail. All citizens should consider this possibility, which has been witnessed in recent years during California wildfires, significant hurricanes and tsunamis. Does it not make sense to invest a few dollars and some time to develop some basic communications capabilities that do not rely on infrastructure? Does it not make sense to learn how to use them efficiently?

Basic communications technologies can be fun as well. Communicating via two-way radio creates a unique community and social network. Sometimes, two-way radio is simply easier to use than a smart phone. One just picks up the microphone and calls!

### **Skills needed:**

Without delving into the technical details, there are some universal skills that every communicator must have. These include:

- The ability to use the ITU phonetic alphabet.
- The ability to think ahead and format a concise tactical message.
- The ability to format a standard radiogram message and transmit it accurately.
- The ability to keep a basic radio log containing a summary of messages transmitted and received logged against time and network.

These things are easy and fun to learn and they will pay big dividends in time of emergency. These techniques are explained in the *Radio Relay International Public Service Communications Handbook*, available on the RRI Web Page.

### **Here are links to useful web information that will help you establish your preparedness communications plan:**

This slide presentation summarizes the *National SOS Radio Network* and *National Hamwatch* programs. While this presentation is built around the use of GMRS for the community layer, the same basic architecture can utilize a CB radio for the community layer as well. The same fundamentals of a layered network approach apply:

<http://radio-relay.org/wp-content/uploads/2019/06/NSOS-Hamwatch-PPT-TR-003-Final-Approved.pdf>

The Radio Relay International Training Manual is primarily designed for ham radio operators, but the chapter on “radiotelephone nets” and the chapter on the “radiogram format” are applicable to all volunteer networks:

<http://radio-relay.org/wp-content/uploads/2017/11/RRI-Training-Manual-TR-001-2017-Draft-for-Distribution.pdf>

A simple training document designed to train radio users to properly use the standard ITU phonetic alphabet:

<http://radio-relay.org/wp-content/uploads/2019/08/RRI-TR-005-Phonetic-Alphabet-Training-Rev-A.pdf>

CB Radio Magazine; A collection of articles and information on CB radios:

<http://www.cbradiomagazine.com/>

Right Channel Radios; useful information and products for CB communications:

<https://www.rightchannelradios.com/>

Family and Neighborhood Emergency Communications:

<http://radio-relay.org/wp-content/uploads/2018/08/FAMILY-NEIGHBORHOOD-EMERGENCY-COMMUNICATION-v2017.pdf>

Neighborhood Ham Watch; A variety of data for developing community emergency communications:

<http://radio-relay.org/emcomm/neighborhood-hamwatch/>

Getting licensed as a radio amateur courtesy of the American Radio Relay League, the national association for amateur radio:

<http://www.arrl.org/getting-licensed>

Visit the Radio Relay International web page for more information. Likewise, feel free to contact Radio Relay International at: [info@radio-relay.org](mailto:info@radio-relay.org)