



***EMERGENCY COMMUNICATIONS (EComm)  
CERTIFICATION TRAINING PROGRAM***



***REACT INTERNATIONAL, INC.***

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*REACT International, Inc.*  
Post Office Box 21064  
Glendale, CA 91221-5164

(866) 732-2899 / Toll Free (US Only)  
(301) 316-2900 / International  
(800) 608-9755 / Fax

# **REACT Emergency Communications (EComm) Certification**

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The *REACT* EComm Certification is a program to provide the public service community with trained radio operators who will have a consistent level of expertise in Emergency Communications no matter where they live.

This program is deliberately very similar to the ARRL Amateur Radio Emergency Communications certification program and, wherever possible, the two programs provide an identical or equivalent curriculum. Due to the multi-service nature of *REACT* emergency communications, the *REACT* program includes material that is not applicable to the Amateur Radio Emergency Communications program. *REACT* members who hold an Amateur Radio operator license are highly encouraged to complete both certification programs. (You will find this is very nearly ‘two for the work of one’ due to the significant duplication between these programs).

Due to *REACT*’s international nature we face differences in infrastructure, social institutions and customs, and especially laws and regulations, which may create significant differences in various countries where *REACT* is active. The basic principles described here will apply to almost any setting, but members in countries outside the United States should expect differences in specific procedures. A version of this program may be developed for *REACT* members in other countries as resources allow.

Neither your radio operator license nor this Emergency Communications certification is a substitute for local training. However, local training cannot succeed without foundations such as the appropriate licenses and technical background. To be successful, one needs all these components: (a) the appropriate licenses (b) the certification program and (c) local training.

We could do without the *REACT* certification program if every local Teams provided all of the same coverage in their training. However there are many Teams without any formal training program and this certification program provides a level of understanding, consistent across the nation. The *REACT* certification was never designed to replace local training. These two programs are complementary and neither will function as effectively by themselves as the two, working together.

*REACT* International, Inc., thanks the American Radio Relay League (ARRL) and the many ARRL volunteers who contributed to the ARRL Emergency Communications Certification Program as well as *REACT* members and others in the emergency management and emergency response community who have helped with our adaptation of the ARRL program to meet the needs of *REACT* as a multi-mode multi-service communications organization.

The following people/groups have been instrumental in providing valuable assistance to the program. This is by no means a complete list of contributors. We've gratefully received too many to name them all. Thanks to everyone who has assisted!

#### ARRL EmCom Advisory Committee

L.B. Cebik, W4RNL  
Dan Miller, K3UFG  
Pat Lambert, W0IPL  
Ron Hashiro, AH6RH  
Rich Slover, ND4F  
Bill Thompson, W2MTA  
Rob Foshay, W9VK  
Eldon McDonald, KE4OCW  
Taylor Davidson, N4TD  
Jeff Stidham, KC7FUY  
Richard Werner, K7UK  
Ed Harris, KE4SKY  
Randy Long, W0AVV

#### ARRL EmCom Contributors

Please note that the names and calls are in alphabetic call suffix sequence.

Patrick Taber, W5ABQ  
Terry Busby, W5ARS  
Art Feller, W4ART  
Perry Lundquist, W6AUN  
Randy Allen, KA0AZS  
Paul Cavnar, NN7B  
Kelly Bersch, KC7CSB  
Mark Jewell, KC6CUB  
Ben Green, WD8CZP  
Larry Dunn, N9HSW  
Brian Fernandez, KE6HKJ  
Tom McCain, N3HPR  
Randall Winchester, WD4HVA  
Ken Akasofu, KL7JCQ  
Scott Garrett, W8JSG  
Dave Waltrous, WD2K  
Max Soucia, N1KQS  
Fred Stone, W8LLY  
Ray Moody, AH6LT

Suzy Price, N2LZR  
Ruben Kafenbaum, WA2NBL  
Jim Andrews, WA0NHD  
Nick Leggett, N3NL  
F. Dale Williams, K3PUR  
Dannis Bodson, W4PWF  
Bob Josuweit, WA3PZO  
John Evans, N2QCE  
Len Koppl, KD0RC  
T.S. Bell, N2RSI  
Ken Goetz, N2SQW  
Paul Drother, WO4U  
Robert Lunsford, KB8UEY  
Peter Laws, N5UWY  
Jim Fuller, N7VMR  
Mike Manes, W5VSI  
Ed Bixby, AK0X

Organizations that provided input to the ARRL EmCom program:

Please note that the names are in alphabetic sequence.

Colorado Section ARES  
Erie County PA, SkyWarn  
Fairfax County WV, RACES

*REACT* International ad hoc working group:

Tom Currie, N4AOF  
Stuart DeLuca, KC5CFQ  
Charles A. Thompson, N5IAG

Additional contributors to the *REACT* EComm program:

Anthony Whobrey, KC4JTV  
Ron Dodson, KA4MAP, Ky SEC  
Pat Spencer, KD4PWL

## Introduction

Before you begin the technical material involved in earning a certification in Emergency Communications (EComm) it is imperative for you to understand that your knowledge in EComm is not actually as important as your attitude during emergencies.

Yes, technical ability will enable you to do a far better job of communicating. But your attitude will determine the success of the overall *REACT* emergency communications effort. The person who brings a “know it all” or “I’ll really show you just how good I am” attitude will only hamper the relations with served agencies.

The people you will be *serv*ing (remember that word) are professionals who have seen far too many people who are more interested in impressing someone than in getting the job done. You will actually impress them far more by being as quiet as you can and doing your job in the best way possible. Results - without interference to served agency people - will cement relations with your served agency.

Please consider these definitions:

Attitude: manner, disposition, feeling, position, etc., with regard to a person or thing; tendency or orientation, esp. of the mind

Service: an act of helpful activity; help; aid

Positive: explicitly stated, stipulated, or expressed

Or, more simply, an explicit mental commitment to help others.

Please read that again: “A commitment to help others.” Are you really ready to commit yourself to this effort? It will take time, a lot of time, if you are to be successful. If you are willing, then WELCOME!

Please remember the following:

Experience is the *worst* teacher; it gives the test before presenting the lesson

*REACT*ers are patriotic, independent people and we are volunteers. There is an attitude among a few that, “Volunteers don’t have to take orders.” That is absolutely correct. We don’t have to take orders. But if you are not ready to follow instructions, you may want to do something outside of *REACT* and especially outside of emergency communications.

And, one more general comment right from the start:

Never adjust, play with, or fiddle with any piece of equipment in use for an event, during that event, unless it is malfunctioning and you are the one responsible for its operation.



## What is a Communications Emergency?

The easiest way to think about a communications emergency is to begin by using the definitions in the Incident Command System (ICS): “We will define an incident as any planned or unplanned occurrence or event, regardless of cause, which requires action by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.”

We can see that during a large scale event it would be possible to have enough information (traffic) flow that the emergency service communications could become overloaded to a level that it would fail to function as required by the incident.

### What Defines a Communications Emergency?

When normal communications processes are inadequate to handle the information flow required to service an incident as defined in the ICS

### The Role *REACT* Serves:

Our primary role is to support the emergency management community (responders, relief and recovery agencies) with communications during times of emergency and disaster when normal communications are unavailable or overwhelmed.

Please understand that we are *not* a direct emergency response agency. If you happen upon the scene of an emergency just as the sirens are quieting, keep your mouth shut and get out of the way! Follow instructions – including clearing the area if so directed. We provide communications support when public service systems are overloaded. We do not provide first aid, transport victims, provide traffic control or any other function normally provided by public service agencies, unless specifically requested; and even then our ability to provide such additional services will be based on training, equipment, personnel, and whatever arrangements have been made with the appropriate authorities.

If you find yourself at the scene of an emergency when the appropriate response agency is not there yet, initiate the call and provide whatever immediate assistance you have the training to provide. Keep in mind that in doing so you are acting as an individual citizen and have no official status. As an individual, you may or may not have any legal protection depending on the laws in your state. You should be aware of the laws covering “Good Samaritans” in your particular area and conduct yourself accordingly.

*REACT* Teams provide services to government agencies and non-government organizations in accordance with specific requests from those agencies or organizations. In many cases there may be standing agreements covering specific situations where our support is thereby requested in advance. But in all cases, support is provided only when and as requested. Even the Skywarn group does not activate until the National Weather Service or local emergency management agency has requested our help.

In many cases, we will do more than “just” communicate. You are free to do any work for the served agency that they request of you, so long as you are comfortable that you have the training and ability to do that work. Generally you should limit other work so it does not hinder your ability to communicate. What other tasks are reasonable will depend on where you are working and what function you have been assigned. There will occasionally be tasks that *everyone* present is expected to pitch in – you should do so cheerfully, unless it interferes with your assigned function.

Some operators think of *REACT* as a simple extension of the talk time in the radio hobby. This is not true. *REACT* is an organization that continually needs more trained operators who are willing to learn to communicate rather than just talk. Do you have the time and the drive to do it well?

It’s not just that the trained operators are willing to learn to communicate. It’s that the trained operators *have learned* to communicate – accurately, in a timely fashion, regardless of the obstacles in the event.

### **Why *REACT* and Amateur Radio Both Work When Other Methods Don’t**

Since radio equipment does not rely on wires and communications facilities provided by common carriers and phone companies, it is immune to disruptions within the telephone system.

*REACT* is a “multi-mode, multi-service” organization. It includes Citizens Band (CB), General Mobile Radio Service (GMRS), Family Radio Service (FRS), Multi-Use Radio Service (MURS), Amateur, and other radio services. Not every *REACT* Team makes use of every service or mode, but Teams that are well prepared for the emergency communications mission must be ready to use the modes, services, and frequencies appropriate to the missions they expect to perform. Amateur Radio enthusiasts use a wide range of radio bands, each one with its particular strengths and weaknesses in overcoming the barriers to radio communications.

VHF (Very High Frequency) and UHF (Ultra High Frequency) radios are small and portable with lots of channels to handle a multitude of short-range communications. GMRS, FRS, and certain other radio services operate on UHF frequencies. MURS and some other radio services operate on VHF frequencies. These radio services provide performance very similar to UHF and VHF Amateur Radio, although generally with somewhat less flexibility in some radio services due to regulations about specific frequencies and modes.

Amateur HF (High Frequency) can propagate over mountains and valleys and between islands to provide coverage beyond VHF and UHF. While CB operates near the high end of the HF spectrum, the limited power and the technical specifications of CB radios generally make them inappropriate for long distance communications. Some military units and a few government agencies still maintain HF radio capabilities, but most have either eliminated long range radio entirely or rely upon satellite communications for their long range radio communications needs. In many situations, if long distance radio communications are needed, Amateur Radio is the only logical solution readily available.

Amateur Radio operators can use a wide range of communications modes, whether it's TV, data, voice, or Morse code to exchange messages. The very nature of the Amateur Radio service encourages amateurs to learn how to make contacts, regardless of the challenges that may abound. Many *REACT* members are Amateur Radio operators.

Operator availability may be a major concern, especially if an emergency lasts more than one or two days. Neither *REACT* nor organized Amateur Radio (ARES/RACES) generally has enough trained operators to maintain a major communications capability beyond the initial period. In a prolonged emergency, additional radio operators will be needed. Any organization planning to provide emergency communications must be prepared to meet the need for replacement operators.

One source of additional radio operators is Mutual Aid from similar organizations outside the area of the immediate emergency. With proper prior planning, Mutual Aid can be a source of trained operators who are ready to perform expected functions. Without detailed prior planning, Mutual Aid may still be an essential source of additional operators, but those additional operators will be less well prepared.

The second potential source of additional operators is cross-leveling within and among the organizations already involved in the emergency response mission. In areas where several organizations are involved in providing radio operators, some groups will run short of operators before others. Also other (non-communications) groups may have individual members who are trained radio operators. Many disaster volunteers are members of more than one group. Each group's leaders should be aware of these members, both to avoid double-counting them in planning and to make them available for cross-leveling when necessary. This sort of interagency cross-leveling is one of the most difficult tasks to carry out because each organization typically views its missions as the most important and wants to guard its resources, but it is very effective if the groups are really committed to working together to support the community. Remember, there is no room for "turf battles" in emergency services. Interaction between agencies prior to an emergency goes a long way to smoothing the process of working together. One structured forum for this sort of interaction is the state or local chapter of National Voluntary Organizations Active in Disaster (VOAD). *REACT* and ARES units should participate in the appropriate VOAD if one is active in their area.

Finally, the most common (and least satisfactory) source of replacement radio operators is additional local volunteers. As a "multi-mode, multi-service" organization, *REACT* theoretically has a much broader base from which to draw local volunteers compared to ARES or RACES, but in practice the difference is not great. Amateur Radio operators are distributed throughout most communities. They are already near the scene of the event and can respond. Licensed amateurs are generally the most available radio operators who have their own equipment. Regardless of license class or other experience, local volunteer radio operators who have not actively participated in an emergency communications organization should be considered at best only *partially* trained regardless of their technical skills.

Regardless of the specific brand and model of radio equipment, amateurs who use the same frequency and mode can communicate with each other. This is different from private companies and government, where communications are generally limited to each entity by their FCC license or their equipment. *REACT* Teams providing emergency communications support need to consider equipment capabilities and license limitations when assigning operators to various locations and functions. Although there are some limited exemptions in the FCC rules for each service concerning emergency operations for the *immediate* safety of life and protection of property, these exemptions are very narrow, only apply within each specific service, and generally apply only to stations licensed in that specific service. There is no generalized waiver of the FCC rules for “emergency” situations.

Amateur Radio operators are licensed and authorized to communicate internationally which may be an important consideration in some locations.

Amateur Radio operators are allowed to run higher power than other licensed and unlicensed personal radio services such as CB, GMRS, and FRS and have more flexibility with the equipment. When appropriate equipment is available, they can communicate over great distances.

*REACT* radio operators use their equipment regularly, which verifies that it’s maintained and operational. Some of the equipment includes handheld portables and mobiles installed in vehicles. *REACT* radio operators are familiar with the operation and capabilities of their equipment, and how to overcome obstacles to radio communications that may be within their neighborhood.

### **Why the Phone Company May Not Operate During Emergencies**

Communications between agencies and the general public are handled by common carriers such as telephone, paging, and Internet companies. Phone companies invest large amounts of money in equipment that generally provides reliable phone service, including durable and secure buildings, highly reliable phone switches, diesel generators, and large banks of batteries. Cellular, paging, and Internet companies in turn rely on communications services provided by the phone companies.

For business reasons, these phone systems are sized for the peaks in regular daily usage, not the more extreme peaks in emergency usage. Telephone systems usually rely on copper or fiber optic cables that are often exposed and prone to damage during high winds and storm conditions. Phone systems are usually not portable and reliable enough to respond to the demands of the emergency. These are the most common reasons why normal public communications needs are not met during emergencies.

## How Does Emergency Communications Compare with Other Radio Activities?

Both use basic skills and activities as a foundation. Operators will find that much of emergency communications borrows from existing aspects of the pastime. For example, each operator is authorized to operate under specific federal regulations and routinely uses that privilege to practice and build upon the ability to communicate via radio. These same rules generally apply in emergencies with only specific limited exemptions clearly defined in the rules for each radio service. Both monitoring and operating non-emergency public service events offer skill sets for receiving and passing traffic efficiently and accurately. Many *REACT* Teams participate in local drills that may offer the chance to practice operating in simulated emergency conditions. Public service events let us practice flexible communications practices while walking around serving a public event. These are some of the ways that regular *REACT* Team radio activities resemble skills used for emergency communications.

Emergency Communications extends upon this foundation. Emergency communications builds upon and extends this foundation in ways that normally do not occur in regular daily living, and are present only during times of emergency or disaster.

Unlike supporting public service events that are scheduled and planned in advance, emergency communicators are often activated with little or no previous warning to organize and coordinate field operations.

Unlike supporting public service events where the communicators serve primarily under the direction of one lead organization, emergency communicators often must handle several key organizations simultaneously.

Unlike repeaters and tower installations, emergency stations often must be portable and must be set up and operational in a matter of minutes or at most a couple of hours. Teamwork rules the day.

Unlike drills where one can plan on a single day of operation, emergency operations are likely to continue for several days.

Unlike hobby radio activities, emergency operations happen in real time. Things can't be delayed.

Unlike general *REACT* Team radio activities, which involve primarily other members of the same Team, emergency communications involves members and non-members alike, along with users in various radio services.

Unlike commercial communications solutions, where there is usually no reserve for handling a massive increase in communications needs, emergency communicators must have the equipment, skill, and knowledge to provide additional communications capacity in very short order.

In all this, leadership, teamwork, and initiative are key factors to success. Simply put, emergency communications offers a very rich, challenging, and rewarding environment to apply radio knowledge and skills in unique situations where no one else has a viable solution. *REACT* radio operators who have that knowledge and those skills have truly earned their certification.

## Public Service Communications

Public Service Communications refers to communications services that radio operators provide to organizations sponsoring a public event.

### Key Elements to Public Service Communications:

The event is a public community event, such as a parade, marathon, fun-run, block party, search-and-rescue operation, etc.

The purpose of the communications must be for the benefit of the public. *REACT* does not provide communications for hire. The status of the event sponsor is not the determining factor for *REACT* public service communications. The sponsor may be a non-profit organization, a unit of government, or even a commercial business. Even the purpose of the event itself may not be the determining factor. The event might be a community celebration, a charitable fund-raiser, or even commercial in nature. The critical element for “Public Service Communications” is the purpose *of the communications*, which may not be the same as the purpose of the event itself. A large commercial event may well create a need for public service communications for activities such as crowd management, first aid, lost children, etc., which are really independent of the commercial purpose of the event.

The rules concerning the use of Amateur Radio to support public service events are more strict than those for most other radio services. The rules for the Amateur Radio Service are often misinterpreted and those rules changed several years ago, but many amateurs still support the old stricter rules. There are many situations where Amateur Radio cannot be used to support an event that may be completely acceptable for other radio services. *REACT* Teams that utilize Amateur Radio as well as other radio services must be aware of the differences in the rules governing these different services and take care to ensure that each service is used only in accordance with the applicable regulations. Note also that these rules apply to the radio service (frequency) being used, not to the person performing the communications. When a licensed Amateur Radio operator is using a commercial radio on an appropriately licensed business band frequency, only the rules for the service actually being used apply.

Public service events usually require radio operators to provide their own personal radios to be used during the event.

### The Role *REACT* Serves

- Provides a community reserve of operators and technicians who are trained and equipped in the art of radio communications.
- Sometimes provides communications where no cellular, wireline, or wireless phone service exists.
- Advances the general welfare of the community and public interest by volunteering in support of the public good.
- Provides visible community service by volunteers within the community.

### Similarities to Emergency Communications

- Often uses the same equipment (mobile, portable, and foot-mobile stations).
- Often uses the same operating techniques (controlled, informal, and formal nets).
- Provides an excellent simulation of conditions and techniques found in emergency communications situations.

### Differences from Emergency Communications

- It is scheduled, as opposed to an unscheduled emergency event.
- Does not require activation by an emergency management agency.
- Does not exercise an activation tree and the related deployment.
- Usually does not require reporting to and coordinating with more than one lead organization. There may be many organizations participating in the event, but the sponsoring organization usually has the key, lead role.
- Often, the Team takes operator sign-ups several days in advance, assigns them to operating locations, and provides the master list to the sponsoring agency for their records/actions. This does not happen in advance during emergencies.
- Usually does not require wearing a visible ID; however, the wearing of appropriate ID should always be highly encouraged.

### Some Types of Events and Their Unique Requirements

#### Parades

##### Operations

- Multiple fixed operating locations are usually required. Be prepared to deploy high power (25-50W) mobile radios with deep cycle, gel-cell batteries and a mast-mounted antenna, if the parade route is more than 1.5 miles. Sometimes repeaters may be needed to provide end-to-end coverage.
- Some mobile stations on bicycles may be needed.
- May need to shadow key parade officials.
- Operators need to show up ahead of time to assist in the organization of the parade.
- Some stations may be dismissed once the end of the parade passes their location.

##### Traffic

- Most of the traffic is tactical/informal in nature.
- Stations often need to relay changes in the parade line-up (participating or non-participating parade units, order of the parade) from the starting position to all review stands announcing the parade units.
- It is helpful to have an ambulance dispatch radio at the communications command post for expediting the call-in of medical emergencies.

#### Logistics

- It is very important to plan and allow for: water, food, relief operators, and restrooms. The longer the period of operations, the more attention is needed to logistics planning. Restrooms may be accessible at restaurants and other establishments along the parade route.
- Volunteering may result in a T-shirt, which serves as the uniform for the day. Someone will need to coordinate T-shirt sizes.

Marathons, Fun Runs - Similar in nature to parades, although they may be over a larger course and last longer. May require more fixed stations with high powered radios.

#### Operations

- The last runner is tracked and progress relayed to the race officials. Stations are often released individually when the last runner has passed their location.

#### Traffic

- Usually the first several runners are tracked and the progress is relayed to the race officials.

#### Logistics

- Aid stations are usually spaced throughout the course offering water, first aid, and transportation. Portable toilets may or may not be available.
- Transportation may or may not be provided for participants who are unable to complete the course.

Sporting Events, Block Parties and Community Gatherings.

#### Operations

- Usually have a higher proportion of foot-mobile stations deployed to observe and assist the crowd.

#### Traffic

- Traffic is usually routed to and from the communications command post.

Search and Rescue Support

#### Operations

- Usually have a higher proportion of foot-mobile and mobile stations, reporting to one or more operations command posts. Messages with the operations command posts are relayed to the central command post to guide the overall operation.

#### Traffic

- May include a mix of tactical and formal message traffic.

#### Logistics

- May not have strong logistical support from the sponsoring organization. Since the search-and-rescue effort often will be outdoors, away from ready access to commercial areas, operators should be prepared to be self-sufficient.



## Organizations to Meet Communications Goals

### The Local *REACT* Team

The basic unit of *REACT* emergency communications is the local Team. The local Team is a source of expertise in many areas of radio communications. By being actively involved with your local Team, you will meet and get to know the other operators in your area and you will learn their operating habits. The local Team also serves as a major point of contact with the public and many Teams are heavily involved in providing public service communications. Getting involved with your Team's public service activities allows you to make sure that your equipment is working properly and that you are practiced in operating in a net environment. These are two fundamentals to effective emergency communications work.

### The Council

Councils are an optional organization level within *REACT*. Councils are formed by the local *REACT* Teams throughout a geographic area (usually an entire state). The function of the Council is to provide a structured forum for the Teams within the area to work together. Councils are usually not operational entities in that they generally do not provide services either directly to the public or directly to other organizations. The Council may work to coordinate mutual aid among its Teams and to provide other services to the Teams. Councils serve as the point of contact between *REACT* and state level agencies and organizations, such as the state Emergency Management Agency, state VOAD, and Red Cross lead and key resource chapters.

### The Region

The Region is an established element in the organizational structure of *REACT* International, Inc. The Region is simply a geographic area that forms the election district for each individual on the Board of Directors. If there is no Council in a particular area, the Director elected from the Region that includes the area will generally attempt to provide some of the assistance otherwise provided by a Council. Obviously a single Director cannot duplicate the services that the Teams within a Council would collectively be able to provide.

### *REACT* International, Inc.

The parent organization, *REACT* International, provides the basic structure and overall guidance for the organization. The Board of Directors sets policy and appoints the officers who manage the daily affairs of the corporation and establishes committees that perform various functions in support of the entire organization. Through this system, *REACT* International makes available many services, including training materials (such as this EComm Certification program).

## **Other Organizations to meet communications goals**

### **Local Amateur and CB Radio Clubs**

Radio clubs can be a valuable resource to turn to when we need to establish emergency communications systems. Clubs are a potential source of radio operators. Even more importantly, clubs provide a structure that may support both recruiting and training emergency radio operators. A local club may be a source of expertise in many areas of radio. By getting involved with your local radio clubs, you will meet and get to know the other operators in your area and you will learn their operating habits.

### **Working with Amateur Radio Organizations**

The simple reality is that in most parts of the United States there is a lack of understanding between Amateur Radio organizations and organizations using other radio services. No amount of “top down” information is going to completely resolve this lack of understanding or change the attitudes of some individuals on either side.

Despite the negative attitudes of some individuals, *REACT* Teams and local Amateur Radio organizations *can* work together effectively, provided everyone is prepared to put aside their misconceptions and prejudices.

No amount of talking is going to change anyone’s mind on either side, but shared goals and a positive attitude will open the door to cooperation and demonstrated performance will make that cooperation a reality.

The primary Amateur Radio organizations involved with emergency communications are the Amateur Radio Emergency Service (ARES) and the Radio Amateur Civil Emergency Services (RACES). In some locations these are combined as a single organization. In other areas they operate separately.

### **ARES and RACES – Two Organizations: How Do They Differ?**

The Amateur Radio Emergency Service (ARES) is an organization sponsored by the American Radio Relay League (ARRL). ARES consists of licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service when disaster strikes. Every licensed amateur, regardless of membership in ARRL or any other local or national organization, is eligible for membership in ARES. The only qualification, other than possession of an Amateur Radio license, is a sincere desire to serve. Because ARES is an amateur service, only amateurs are eligible for membership. The possession of emergency-powered equipment is desirable, but is not a requirement for membership.

The Radio Amateur Civil Emergency Service (RACES) is a government program, administered by local, county, and state emergency management agencies, and supported by the Federal Emergency Management Agency (FEMA) of the United States government. RACES is a part of the Amateur Radio Service that provides radio communications for civil-preparedness purposes only, during periods of local, regional, or national civil emergencies. These emergencies are not limited to war-related activities, but can include natural disasters such as fires, floods, and earthquakes. As defined in the rules, RACES is a radio communications service, conducted by volunteer licensed amateurs, designed to provide emergency communications to local or state civil-preparedness agencies. It is important to note that RACES operation is authorized by emergency management officials only, and this operation is strictly limited to official civil preparedness activity in the event of an emergency communications situation.

Although RACES and ARES are separate entities, the ARRL advocates dual membership and cooperative efforts between both groups whenever possible for an ARES group whose members are all enrolled in and certified by RACES to operate in an emergency with great flexibility. Using the same operators and the same frequencies, an ARES group also enrolled as RACES can “switch hats” from ARES to RACES and RACES to ARES to meet the requirements of the situation as it develops. For example, during a “non-declared emergency,” ARES can operate under ARES, but when an emergency or disaster is officially declared by the local, state, or federal authority, the operation can become RACES with no change in personnel or frequencies. Likewise as a situation winds down, RACES operation will normally cease when the EOC stands down, but ARES may still be needed to support additional disaster recovery work such as Red Cross shelters that may still be open. This situation is still not well understood and accepted in some areas. In such areas, both ARES and RACES still exist separately and may even be seen as competing.

To add yet another acronym to the situation, California and some other locations are moving from RACES to a more broadly-based program called the Auxiliary Communications Service (ACS). As first created by the California Governor’s Office of Emergency Services, ACS is a government program that includes the existing RACES operation but also provides for use of volunteer operators from other radio services and recognizes affiliation by other organizations in support of emergency communications.

### **Other Amateur Radio Organizations:**

The National Traffic System (NTS) is an ARRL program for systematizing amateur traffic handling facilities by making a structure available for an integrated traffic facility designed to achieve the utmost in two principal objectives: rapid movement of traffic from origin to destination, and training amateur operators to handle written traffic and participate in directed nets. These two objectives, which sometimes conflict with each other, are the underlying foundations of the National Traffic System.

NTS is not primarily an emergency communications system, but emergency traffic does take priority when it is passed within the NTS system. One aspect of NTS that has had a significant influence on emergency communications is the standardized format adopted by NTS for handling formal message traffic.

While NTS includes a local net component, its structure focuses on the capability to move traffic on a national basis. It is rarely involved with local emergency traffic, but NTS frequently handles significant amounts of “Health and Welfare Inquiry” traffic related to disasters and other emergency situations.

Although NTS is not directly involved in most local emergency communications, NTS operators may be an excellent resource for local emergency communications programs.

The Military Affiliate Radio System (MARS) is a Department of Defense sponsored program, established as a separately managed and operated program by the Army, Navy, and Air Force. The program consists of licensed Amateur Radio operators who are interested in military communications on a local, national, and international basis as an adjunct to normal communications. MARS operations are similar to the NTS but focus on handling traffic to and from US military personnel both in the United States and overseas. MARS operations are performed by licensed Amateur Radio operators but are not conducted on Amateur Radio frequencies. MARS uses government frequencies just outside the amateur frequency allocations. Like NTS, MARS is more likely to handle health and welfare inquiry traffic rather than local emergency communications. And, again, MARS operators may be an excellent resource of operators who may be recruited for local emergency communications programs.

Salvation Army Team Emergency Radio Network (SATERN) is a group of Amateur Radio operators who provide emergency communications support for Salvation Army operations in local, regional, and international disaster and emergency situations. SATERN has active groups in many locations as well as individual members in other locations. In an emergency where the Salvation Army is involved in the response effort, you may be working alongside or communicating with SATERN members. In a situation where the Salvation Army is not directly involved in the emergency response, SATERN operators may be available to augment other communications capabilities.

Several other emergency response organizations have programs for their own members who are amateur radio operators. These organizations include the American Red Cross as well as various faith-based denominational organizations such as Adventist Community Services, Baptist Disaster Relief, and others.

## Who Runs the Event? - The Primary Served Agency

When you are working any event, please understand that you are there to help the served agency with a communications shortfall. This, in and of itself, is embarrassing to some agencies. If you keep that fact in mind, you can eliminate confusion and problems by acknowledging that the served agency runs the event. Not just by your words, but by your actions.

The largest problem for any organization is operators who go into an event and try to take over. Cowboy and “wanna-be” behavior *will* discourage the served agency from ever using your services again. In some cases it has resulted in the radio operator involved being arrested and removed from the scene.

Most, if not all, public service agencies use some form of the Incident Command System as the model for operations during an emergency or major event. You will help your served agency and your Team if you understand how the ICS works.

In any emergency response situation, **someone** is always in charge (even if it doesn't look that way). Each individual radio operator assigned to work in any event must know who is in charge of his function and who is in charge of the location (these may not be the same person, or even the same organization). Sometimes the chain of command may break down and even the people you are working for may not seem sure who is in charge but the one thing that you can be absolutely sure of is that *you are not in charge*.

## Who Talks to the Media? - the Primary Served Agency PIO

Dealing with the media/public: During an emergency, do *not* make any statements to the media or public about the emergency! The Public Information Officer (PIO) for the agency being served will make *all* statements. You can discuss general information about *REACT* and your radio, if someone asks and you have time. Do *not* include mode, frequency, or information about the amount or kind of communications traffic.

If you encounter some very persistent media people, the following statement may help. Teams should check with your served agency before you use this statement. If you ask during coordination prior to an emergency, the agency PIO can often assist you in preparing a generic statement similar to this. One designated individual from the Team should coordinate with the PIO during the emergency to determine what (if any) information may be released.

“*REACT* is the Radio Emergency Associated Communications Teams. We are an organization of volunteer radio operators who are assisting [agency] with the current situation. We currently have [##] operators in locations where additional communications are required.”

## **How You Can Get Involved**

As a member of a local *REACT* Team, you should let the Team leadership coordinate with any agencies to be served. Make sure your Team officers know what training you have and what sort of functions you are (and are not) willing to perform. You need to be trained in the methods needed for appropriate communications. Specific agencies may require or recommend particular training. Often these agencies can provide training for the Team. Training in Emergency Communications *before* you are needed will help you develop the skills necessary to be an effective communicator.

During an event do your best to maintain a courteous, professional image. You may be working with several agencies including police, fire, first aid squads, National Guard, etc. Extend every possible courtesy to members of these groups. Make sure they know who you are, and what your communications capabilities are. But remember we are only there to communicate, not to tell them how to do their job. Avoid offering advice or offering assistance with other functions unless asked.

# Communications

## Basic Communications Guidelines

Within emergency communications you will have two different kinds of messages. The first is known as formal traffic. This is generally used in passing messages on behalf of a served agency, especially any instructions or requests for supplies or equipment. Under those conditions you pass traffic *exactly* as written. You change nothing. In some instances you will not understand what the message means. That is fine. Your job is to get the message to the destination as quickly as possible, not to understand it.

When you receive a message from a served agency, read it. If there is any part you cannot read, ask for clarification before accepting the message. You can't accurately transcribe what you cannot read.

When you transcribe a message from a served agency, *make no changes!* It does not matter if you do not understand the technical meaning. It *does* matter that you pass traffic exactly as written.

Let's revisit the last sentence.

### ***PASS TRAFFIC EXACTLY AS WRITTEN!***

- If you are the author, make your corrections before you are ready to send.
- If *anyone else* initiated the message, *make no changes!*

The second type of communications is where you originate the message, it is not written, and a written response is not required. This is commonly known as informal traffic. In that situation you control what the text of the message will be. Therefore phrasing is up to you.

Plan your communications at least as well as you plan what you say when you know you will be quoted. Whenever reasonable, write down what you will say before you say it.

"A loud voice cannot compete with a clear voice, even if it's a whisper" - B.N. Kaufman

In emergency communications it is important to say as little as possible, yet convey all of the meaning. How can we do this?

### **Brevity and Clarity**

The standing "rule of thumb" in composing messages is: if you can leave a word out without changing the meaning, leave it out. If a description of an item will not add to the understanding of the subject of the message, leave it out.

Another item to remember: *do not* use contractions within your messages. Words like "don't" and "isn't" are far too easy to confuse. Add to that the stress and confusion during an emergency and they *will* create problems.

**Do Not Editorialize**

Literally hours can be lost by people inserting their opinion on unrelated subjects. What someone thinks about a ball game or the weather is irrelevant unless weather or the ball game is the subject being discussed. And even then, the radio operator’s opinions still may not matter.

**Listen**

The first requirement for communications is the ability to listen. But, you say, I can tell someone what is required without listening. Not really.

Communications is the *two way* exchange of thoughts, ideas, or information. **Two way.** That requires listening. An old timer once told me, “A person has two ears and one mouth. Therefore he should listen twice as much as he talks.” Makes sense.

**Use Standard Phonetics**

While it may take little effort to speak into a microphone and listen, it does take some care to quickly and accurately convey exact information. Speak distinctly at all times. If the information is to be written, pace your speech accordingly.

For critical information, or under noisy conditions, spell words with standard phonetics. Unfortunately there are two common systems of “standard” phonetics: the phonetic alphabet used by most police departments, and the ITU phonetic alphabet used by just about everyone else, including all NATO military forces, federal government agencies, all pilots, and Amateur Radio operators. ITU phonetics were chosen by the International Telecommunications Union so that each word sounds completely different from all other words regardless of language. A list of ITU phonetics is available in numerous publications.

A – alfa (AL-fa)	B - bravo (BRAH-voh)
C – charlie (CHAR-lee)	D - delta (DELL-tah)
E – echo (ECK-oh)	F - foxtrot (FOKS-trot)
G – golf (GOLF)	H - hotel (HOH-tell)
I – india (IN-dee-ah)	J - juliet (JU-lee-ett)
K – kilo (KEY-loh)	L - lima (LEE-mah)
M – mike (MIKE)	N – november (no-VEM-ber)
O – oscar (OSS-cah)	P - papa (PAH-PAH)
Q – quebec (kay-BECK)	R - romeo (ROW-me-oh)
S – sierra (SEE-air-rah)	T - tango (TANG-go)
U – uniform (YOU-ni-form)	V - victor (VIK-tah)
W – whiskey (WISS-key)	X - x-ray (ECKS-ray)
Y – yankee (YANG-key)	Z - zulu (ZOO-loo)

If you are working specifically for an agency that uses their own system, obtain their list and use it. Otherwise, use the ITU phonetic alphabet.



## Numbers

Numbers are pronounced as individual digits. The number 60 is pronounced six zero, not sixty. The number 509 is pronounced five zero nine, not five hundred nine, and not five oh nine.

Again, some agencies may have their own way of doing things. If you are working specifically for an agency that uses a different method it is perfectly correct to do it their way, but the digit by digit method is the one safe, sure way to ensure any number is clearly understood.

## Formal Written Traffic

Any formal traffic should be written out and signed by the author, but this isn't always practical in an emergency. You may have to be the one to write down the message. If you do write the message, try to have the "author" sign it, or at the very least read and approve it (make a note of the circumstances if necessary).

These precautions are especially important when sending a message requesting any sort of supplies, equipment, support, personnel, etc. If you are originating such a message, be sure you have asked all questions necessary to have obtained the following:

1. Who is requesting and from whom?
  - What is the requestor's full name, title, agency, and location?
  - What is the recipient's full name, title, agency, and location?
2. What are they requesting and how many do they want/need?
  - Is it a list or single item?
    - If it's a list, do all items come from the same place?
      - If multiple sources, send as multiple messages.
  - Is the subject the transportation of an item, or the acquisition of that item, or both?
3. Where will it come from (not always the same as the location of the person receiving the request)?
4. Where will it go (not always the same as the location of the person requesting the items)?
5. When is it needed?
  - Time/date as applicable

## Communications is:

- A two way exchange of ideas or information
- The fewest words that completely define the thought
- One complete thought or task at a time
- Sometimes eloquent, but usually not, because it is precise
- Unemotional

## Public Service and Emergency Communications

### Getting the Message Through - Power Isn't Everything

In any communications systems, to improve communications, the goal is not to raise the signal power but to improve the difference between the signal and the noise levels to achieve reliable communications. Therefore, there are things that can be done to reduce noise. Similarly, there are techniques that can be used to reduce obstacles that are like noise in that they diminish or block successful communications.

### Basic Communications Model

Any communications system can be modeled using these conceptual components:

- The message to be sent.
- Encoding the message to a form that can be conveyed over a medium.
- Transmitting the message.
- The medium used for communications.
- Noise in the medium.
- Receiving the message.
- Decoding the message from the medium to a humanly understandable form.
- Recognition of the message by the receiving person.
- Feedback to the originator of the message.

We will use this model to examine ways for improving emergency communications.

### Using the Basic Communications Model to Troubleshoot a Breakdown in Emergency Communications

At times, communications between two points can break down, resulting in reduced or nonexistent communications. Whenever there is a breakdown in communications, examine which components are affected, and what can be done to mitigate the problem or workaround the limitation. Similarly, by reviewing each component, small changes can be made to enhance the contribution made by that component.

### The Message

A key element in the communications system is the message. A message is used to cause action by the receiver of the message. This leads to some thoughtful questions:

- What kind of action is needed at the receiving end?
- What information is needed for the action to take place?
- Since there is an emergency and this request/information will be competing for attention and response, what additional information is available to justify a higher priority?
- How can the sender tell if the correct action to the message has taken place?

### Composing Formal Traffic

In most situations, the radio operator is providing communications on behalf of a served agency. An authorized person on staff with the agency would be originating and receiving these messages. In the middle of an emergency, it is often possible that the staff person will overlook one or more key elements of a message. As communications specialists, we can assist by “coaching” the person through the composition of the message and reviewing the message to see if it has the key elements in a good formal message.

Good formal messages should include:

- Addressee (full name, full title, agency, location, optional telephone number)
  - Body of the message
    - = What is the situation?
    - = Who is the requestor?
    - = What is being requested? Is the request for a single item or a list of items? How many are needed or wanted?
    - = When is it needed?
    - = If known, indicate the sources where the items can be obtained. If it is for a list of items, does it come from a single source? If it comes from multiple sources, a message should be generated to each source.
    - = Where should the material or people be sent? Where is the transfer point? Be specific and identify it down to the side of a building, as one can waste a lot of time walking around looking for buildings and walking around a building.
    - = What are the available times for arrival?
    - = Is the access to the site expected to be clear?
    - = Who should the responder locate when he/she arrives?
    - = Is there a frequency, telephone number, or other means of contact in the local area? Or when the response is in progress?
    - = Who should be notified when the response is under way?
    - = Any other considerations?
  - Signature (full name of sender, full title, agency, location, optional telephone number)
- Note that a handwritten signature is not always essential, but the full name and title are essential parts of the "signature"

In certain situations, the staff person may not be available and in the interest of time, the communicator may need to draft the message on behalf of that person or agency and have it ready for their review and approval before sending the traffic. In these situations, be sure to review the message for these elements before presenting it for approval.

On a large operation there will be a lot of formal message traffic. Most agencies have some form for writing down messages - more and more agencies are adopting the standard ICS General Message Form (ICS form 213). Some agencies call their form a "213" but have modified the standard form. Use whatever form the served agency provides - if that form calls for additional information, fill in the information on the form.

Sometimes it may be important to send out information to the net about radio operations that are not of direct consequence or interest to the served agency, but are important to coordinate and sustain net operations. Examples are establishing new nets, new stations on the nets, and mobilizing fresh operators to relieve existing operators. These messages may appear as informal traffic. The informal traffic should also be reviewed before it is sent to see if it includes the information above. All traffic that involves resources (supplies, equipment, or personnel) should be treated as formal traffic and written down.

**Encoding/Decoding – Use Plain Language and ITU Phonetics, No Slang**

The first aspect is looking at the encoding/decoding of the message. Clearly, expressing a thought and composing it into a message is a human activity. The choice of available communications media influences the size of the message; however, it is still a human that determines how a message is phrased and what it contains. Therefore, you should observe the choice of words and operational prosigns that you use to carry out the communications.

**Use Plain Language**

During an emergency, the rule is that you’ll be working with people you have not met before. Therefore, to avoid any assumptions about having to know abbreviations, key phrases, jargon, and other information that may be specific to a given agency, use plain language to compose and pass a message. Avoid the use of slang, as the other party may not be from the same background as you and can even misinterpret the slang expression to be translated literally.

Different agencies may have different procedural codes:

- Police department communications procedures used to encourage use of 10 codes - now most departments officially call for plain language, but 10-codes, abbreviations, and jargon are still very common. This usually isn't a problem for communications *within* a single department, but can cause great confusion when personnel from more than one department are involved.
- Fire and ambulance services also used to use 10 codes, but many are moving to plain language now (Just as with Police Departments, you may see a mix of operating styles within an agency).
- The codes used by one department may not be the same as the codes used by another.
- Most public works departments use plain language, but may have codes for some things.
- Different municipalities have different standards.
- Hams sometimes use “Q” signals, sometimes don’t.
- Some *REACT* Teams used to use 10 codes, a few may still do, but plain language is *the* standard.

When each group communicates only among themselves, this is not an issue. However, in a mutual aid drill involving a simulated commuter train wreck with eighty casualties, nearly thirty different entities were involved from six municipalities. In the debrief, at

least one significant error was traced to failure to use plain language: a dispatch order wasn't understood and the needed rescue equipment rolled twenty minutes late.

Use standard phonetics, preferably the ITU phonetic alphabet. It is the set of phonetics used internationally in most two-way radio settings. Resist the temptation to use "cute" phonetics such as those often used by Amateur Radio operators for their call signs.

### **Receiving Techniques**

Wherever possible, transfer the message to hardcopy. Whether you copy the message text by hand, have a computer print an incoming packet message, or jot down notes from an informal message, putting the message down on paper helps others read the message – especially if you should walk away from the operating position, take a break, take a nap, or be replaced by a new operator.

Whenever possible, print using large block capital letters. It comes across neater than script, so more people can read it.

Practically speaking, the average person can block print around 15 words per minute.

When copying a radiogram message, get in the habit of copying five words to a line. It does not have to line up into five columns (which is nice, but not a requirement). It is more important to break it up into groups of five words to ease the counting of words.

Whenever possible, use headphones to cut down the impact of nearby noise and to increase privacy of the information.

### **Sending Techniques**

Practice sending at the appropriate rate at which the other operator can copy comfortably. That means you shouldn't ramble off the message text at high speed, but pace yourself to the same speed that the other party is copying (about 15 WPM). That translates to about one word every four seconds. As you speak, imagine that you're writing the word in your mind. After a while, you'll get the hang of talking 15 WPM. If you do this right, you will rarely get a request to repeat a section.

When asking for part or all of the message to be repeated, get into the habit of saying "Say Again" instead of "Repeat." Repeat is used in the military to fire another salvo of artillery. Also, if you're using a VOX or foot switch, there's a greater chance that the receiving party will hear "again" instead of hearing a fraction of the word "...peat".

If you are right-handed, get used to holding and keying the mike with your left hand, to keep your right hand free for writing down the message. Or use a foot switch to free your hands when you key the radio.

Use a boom mike to free your hands and cut down stray background noise.

### **Equipment Settings**

When working with another operator, make an effort to observe the operator, learning the controls that he/she activates to make contact. There may be a time when you have to relieve that operator and the more you know, the faster you'll be able to handle that assignment.

### **Communications Methods - Using Whatever Mode and Frequency Necessary**

The first contribution to the design of an effective emergency communications network is to reduce the number of elements in the communications path. This includes:

- Reducing the number of hops or stations that need to relay the message.
- Reducing the number of radio operators needed to handle the message.
- Reducing the number of people involved in handling the message.

Reducing the number of elements without a substantial drop in quality makes the total system more reliable.

If one particular communications method (equipment, mode, frequency) is not available or usable, we must be prepared to switch to another band or method that is usable.

At times, it may mean using the telephone or a radio system that isn't our own. For example, you might be called upon to be a relief operator for a local government agency radio system. You should make an effort to become familiar with their operating practices, including the sequence of calling/called stations and procedural codes that may be in use. Take some time to familiarize yourself with the phone (PBX) system, nearby fax machines, and e-mail systems that might be present. Even copy machines should be considered communications equipment, as the copies you make communicate with other people.

Remember that you can use government or commercial radios with the permission of the appropriate authority because such systems are covered by station licenses issued to the organization or agency and do not require individual operator licenses. However, unless you hold an Amateur Radio license, you cannot operate Amateur Radio equipment even if it is owned by the agency (such as Amateur Radio equipment installed in some state and local Emergency Operations Centers).

As emergency communicators, our mission and goal is to pass the message accurately, in a timely fashion, and in a usable form to the destination. That means that at times we may have to step aside from our radios and use other prudent methods to get the job done. At times it might be best to hand over the microphone to the person wishing to speak, so he can say the message to the recipient directly – thereby cutting out one delay in the relaying of the message. If we're holding the microphone, we become part of the communications path and can reduce the reliability of the message. This technique of having the person originating the message speak directly over the radio is equally valid with all radio services (including Amateur Radio) but in all cases the radio operator remains responsible for proper operation of the radio.

Even non-electronic signaling methods are forms of emergency communications. If you are directing rescue workers to an unfamiliar scene (such as via a military helicopter), you can instruct a party at the rescue scene to move a police car near a suitable landing site closest to the scene, and have them activate the rooftop flashing lights to guide the incoming helicopter to that location. If you can send messages to both parties to coordinate the hook-up using the visual flashing light, that will better ensure that minimal time is used to locate the rescue and evacuation scene.

In times of communications difficulties, cross-band operation may be necessary. This may include using different modes or even different radio services. Do not hesitate to talk on “your” frequency and listen out of band to the transmissions of another agency. If they have access to a scanner, they likewise can listen to your transmissions and thereby achieve reliable two-way contact even when you do not share a common frequency.

### **Noise in the Communications Media**

Noise in the communications media can take many forms. In radio communications, it can take the form of static, adjacent channel interference, intermodulation, and other similar interference.

In the audio portion, conversations by nearby bystanders can interfere with your ability to hear the radio.

Poor lighting or other distractions are another form of “noise.”

Codes used to facilitate and expedite handling by the operators in one radio system could be misinterpreted or ignored by another set of operators in another system. The “signal” in one system becomes “noise” in another. Use plain messages instead of codes to communicate requests such as “send an ambulance” or “send a work crew to...”

Relaying the messages through multiple stations can cause distortions and other mishandling of the message. Minimize the amount of message handling required.

Where possible, examine the environment and see what you can do to reduce the amount of noise present at your station, which increases your ability to receive the message clearly.

These are all smart ways of making a “better communications medium.”

### **NEVER SPECULATE**

Do not speculate on anything relating to an emergency! There may be hundreds of people listening to what you say (other radio operators, media, and even the public via scanners) and any incorrect information could cause a panic.

Always get any information from *the* official source. Generally this is the person in charge, not just anyone from the served agency who happens to be at the scene. Do not take the word of bystanders or even co-workers when responding to a request for information. Getting the information from the official source may sometimes cause a brief delay, but that delay is better than passing bad information. Sometimes a person from the served agency will be designated to work with the communicator; if so, this person should be the one handling any requests for information. More often you will have to obtain the information yourself. Always go to the person in charge unless they specifically direct otherwise. At a fire scene, you would get your information from the Chief commanding the units there, not simply from the nearest firefighter. At a shelter, you would get your information from the Shelter Manager, not just one of the workers.

As an emergency communicator, your role is to pass the information, not to create or interpret the information. Unfortunately in the real world sometimes the person with the official answer may not be immediately available and the person needing the information

may insist on an immediate answer. If your served agency absolutely insists on an estimate, and you cannot get a firm answer, you may have to provide that information. Try very hard to avoid this situation and be sure to make it very clear that it is an estimate. For example: "Estimated number of spare shovels at fire base three is twelve" could be acceptable, but the first choice is no speculation. If someone needs a count of something, try to get them the official count. Sometimes the official count may not be the same as what you see because the person responsible may have information that isn't obvious. If you are pressed into giving an estimate always make note of what was asked, by whom, and what answer you gave, then try to get confirmation or actual information from the official source.

### **Pass Messages Exactly as Written**

Your job as a communicator is to pass traffic as quickly and accurately as possible. Therefore you will *not* change any message as you handle it.

If you note an inaccurate word count in formal traffic, you will maintain the original count and note the corrected count received at your station.

### **Not All Tactical Messages Will Be in standard format.**

It is important that you understand that much of the tactical information being passed during an event may not be in standard format. It *will* have much of the same information, such as:

- Name, Agency, and Title of the originator
- Name, Agency, and Title of the recipient
- Date, Time, and Priority of the message
- Body of the message

but may not be in standard format.



## Message Handling

### Standard Formats:

The purpose of using a standard or a specified format in any endeavor is so that everyone knows what to expect. Agencies that regularly send and receive significant amounts of formal message traffic will have an established format. Some agencies and organizations don't handle that much formal message traffic and may not have an official standard format. If you regularly work specifically for an agency that has an official standard format, learn it and use it for traffic within that agency.

For traffic among agencies that do not have a format of their own, you will need to set up some sort of format. The most widely used format that is easily learned and readily recognized by almost any organization or agency is the ICS General Message Form (ICS form 213). The ICS form 213 is designed primarily for direct written communications and for originating and delivering messages. It does not include spaces for information specifically about sending and receiving the message.

Another common format is the Amateur Radio message form or "radiogram" format adopted by the ARRL as the standard for their National Traffic System. This form has special entries specifically for handling the message over the radio. Some amateurs use the radiogram format on a regular basis and many are at least somewhat familiar with it. Its use during emergency situations is very natural. While the published standard may not be perfect for all applications, it serves as a baseline that can be readily adapted for use with a specific served agency if necessary.



Some people think there is a problem choosing between the ICS 213 and the ARRL Radiogram format. There is *no reason* for this to be a problem. If the agency uses the ICS 213 and amateur radio operators want to use the Radiogram, the simple solution is to treat the entire ICS 213 *including its headings* as part of the text of the message for the Radiogram. In these instances, messages received in Radiogram format are simply written out on the ICS 213 (or other agency format) for delivery.

As an emergency communications volunteer, you will rarely be the one deciding what format to use for handling messages. You will simply use the format chosen by the agency you are serving. If the agency does not have an established format of its own, you can't go wrong using the ICS 213 format for local messages.

**ICS General Message Form (ICS 213)**

While some agencies have adopted slightly modified versions of the standard ICS 213, if you are familiar with the standard form, you should have no problem with any local differences. This is the standard ICS 213:

**GENERAL MESSAGE (ICS 213)**

1. Incident Name (Optional):		
2. To (Name and Position):		
3. From (Name and Position):		
4. Subject:	5. Date:	6. Time
7. Message:		
8. Approved by: Name: _____ Signature:  _____ Position/Title: _____		
9. Reply:		
10. Replied by: Name: _____ Position/Title: _____ Signature:  _____		
ICS 213	Date/Time: _____	

The blocks on the ICS 213 are generally self explanatory, but if there is any doubt, you can refer to the standard instructions for this form, as shown on the next page:

**ICS 213  
General Message**

**Purpose.** The General Message (ICS 213) is used by the incident dispatchers to record incoming messages that cannot be orally transmitted to the intended recipients. The ICS 213 is also used by the Incident Command Post and other incident personnel to transmit messages (e.g., resource order, incident name change, other ICS coordination issues, etc.) to the Incident Communications Center for transmission via radio or telephone to the addressee. This form is used to send any message or notification to incident personnel that requires hard-copy delivery.

**Preparation.** The ICS 213 may be initiated by incident dispatchers and any other personnel on an incident.

**Distribution.** Upon completion, the ICS 213 may be delivered to the addressee and/or delivered to the Incident Communication Center for transmission.

**Notes:**

- The ICS 213 is a three-part form, typically using carbon paper. The sender will complete Part 1 of the form and send Parts 2 and 3 to the recipient. The recipient will complete Part 2 and return Part 3 to the sender.
- A copy of the ICS 213 should be sent to and maintained within the Documentation Unit.
- Contact information for the sender and receiver can be added for communications purposes to confirm resource orders. Refer to 213RR example (Appendix B)

Block Number	Block Title	Instructions
1	Incident Name (Optional)	Enter the name assigned to the incident. This block is optional.
2	To (Name and Position)	Enter the name and position the General Message is intended for. For all individuals, use at least the first initial and last name. For Unified Command, include agency names.
3	From (Name and Position)	Enter the name and position of the individual sending the General Message. For all individuals, use at least the first initial and last name. For Unified Command, include agency names.
4	Subject	Enter the subject of the message.
5	Date	Enter the date (month/day/year) of the message.
6	Time	Enter the time (using the 24-hour clock) of the message.
7	Message	Enter the content of the message. Try to be as concise as possible.
8	Approved by • Name • Signature • Position/Title	Enter the name, signature, and ICS position/title of the person approving the message.
9	Reply	The intended recipient will enter a reply to the message and return it to the originator.
10	Replied by • Name • Position/Title • Signature • Date/Time	Enter the name, ICS position/title, and signature of the person replying to the message. Enter date (month/day/year) and time prepared (24-hour clock).



- The **address**. For messages leaving the local area this includes name, street address or P.O. box, city, state or province, and postal code of the individual to whom the message is intended to be delivered. The address should also include the area code and telephone number since the majority of messages leaving the local area are ultimately delivered via local phone call in the destination area. For message traffic within a local area, the name or title of the individual and the specific agency may be sufficient.
- The **text** of the message. The text should be brief and to the point; limited if possible to 25 words or less. Care should be taken to avoid contractions. This is especially important for messages that may be transmitted by Amateur Radio traffic nets because the apostrophe is generally not used in CW. Contractions are easier to misunderstand and may create errors in the word count. Also if “cannot” appears in a message to be originated at your station, it should be written, counted, and sent as two words: “can not.”
- The **signature**. This can be a single name, a name and call sign, Mom and Dad, a name and a title – whatever is needed to ensure the recipient can identify the sender. The amateur originating a message should have enough information so that a reply message can be returned to the originator.

### **The Signature -- Why It Is Important**

During an emergency the messages you handle can easily contain requests for very expensive supplies that have a very limited “shelf life” (such as blood for an aid station) or for services that will only respond to authorized requests (flight for life helicopters). As such it is imperative that you insure the signature/authority is included in every message.

### **ARRL Radiograms**

There are very specific instructions for every block in the ARRL Radiogram format as well as for how such messages are sent and processed. Those instructions are too detailed to cover here. If you are working for an agency that uses the ARRL Radiogram format refer to the ARRL traffic handling manuals available on their website at [arrl.org](http://arrl.org) for detailed information.

While the Radiogram and the ICS 213 look quite different, a closer examination of the formats shows that although very different in appearance they can be compatible.

**ARRL** — the national association for Amateur Radio™

# RADIOGRAM

NUMBER	PRECEDENCE	HX	STATION OF ORIGIN	CHECK	PLACE OF ORIGIN	TIME FILED	DATE
TO			THIS RADIO MESSAGE WAS RECEIVED AT				
PHONE NUMBER			AMATEUR STATION		PHONE		
E-MAIL			NAME		E-MAIL		
			STREET				
			CITY, STATE, ZIP				
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;">FROM</div> <div style="width: 20%;">DATE</div> <div style="width: 20%;">TIME</div> <div style="width: 20%;">TO</div> <div style="width: 20%;">DATE</div> <div style="width: 20%;">TIME</div> </div>							
REC'D			SENT				
<small>This message was handled at no charge by a licensed Amateur Radio operator whose address is shown in the box at right above. No compensation can be accepted by a "ham" operator. A return message may be filed with the "ham" delivering this message to you. Further information on Amateur Radio may be obtained from ARRL Headquarters, 225 Main Street, Newington, CT 06111 or <a href="http://www.arrl.org">www.arrl.org</a>.</small>				<small>The ARRL is the national association for Amateur Radio and the publisher of QST magazine. One of its functions is promotion of public service communication among Amateur Radio operators. To that end, the ARRL has organized the National Traffic System for daily nationwide message handling.</small>			

The areas highlighted here in yellow are completed by the amateur radio operator sending the message.

The areas highlighted in pink are completed by the amateur radio operator receiving the message. These areas are only used for sending and receiving the message over amateur radio. None of this information comes from or goes on the ICS 213

The area highlighted in green is identical to block 2 of the ICS 213.

ALL the remaining information from the ICS 213 goes in the text of the message (the area highlighted in blue).

Transcribing the ICS 213 into the text of a Radiogram might seem complicated when looking at the picture of an ICS 213 form, but it becomes much more obvious when you look at the "text" version of the ICS 213 which is the format used for sending an ICS 213 via email, teletype, packet radio or similar modes. This is the text version of a standard ICS 213:

- ```

GENERAL MESSAGE (ICS 213)
1. Incident Name (Optional):
2. To (Name and Position):
3. From (Name and Position):
4. Subject:
5. Date:
6. Time
7. Message:
8. Approved by: Name: Signature: Position/Title:
9. Reply:
10. Replied by: Name: Position/Title: Signature:
ICS 213
Date/Time:
    
```

## **Prowords**

When sending formal traffic, certain Procedure Words (prowords) are used to clarify portions of the message. The standard prowords are:

### **BREAK**

Separates address from text and text from signature.

### **CORRECTION**

I'm going to correct an error.

### **END**

End of message.

### **MORE**

More messages to follow.

### **NO MORE**

No more messages to follow.

### **FIGURES**

Used for a word group consisting of all numbers.

### **INITIAL**

Used only for a single initial.

### **I SAY AGAIN**

Used to indicate a 'repeat' of a word.

### **I SPELL**

To spell [ phonetically ] a word.

### **LETTER GROUP**

Examples: ARES, SCTN

### **MIXED GROUP**

Examples: 12BA6, NNNØSBK

When receiving formal traffic, certain prowords are used to ask for clarification or repeats of missing words. These prowords, which should be preceded by the proword SAY AGAIN, are:

**WORD AFTER**

**WORD BEFORE**

**BETWEEN**

**ALL AFTER**

**ALL BEFORE**

## ARRL Numbered Radiograms

The ARRL has adopted a standardized list of often used phrases in NTS messages. Each phrase on the list is assigned a number.

***During any emergency communications assignment, never originate a message using ARRL Numbered Radiograms because there is too much chance that they will be misunderstood. Always use Plain Language.***

There are two groups: group one for emergency relief consists of 26 phrases numbered consecutively from one to twenty-six. As an example, number six means: "Will contact you as soon as possible."

Group two, for routine messages, consists of 21 phrases numbered forty-six and then consecutively from fifty through sixty-nine. A complete list is included in Appendix B of this manual and is available in ARRL publication FSD-3.

When using numbered radiograms, the letters ARL (ALPHA ROMEO LIMA) are placed in the Check block of the preamble, just prior to the number indicating the word count. In the text of the message, the appropriate numbered radiogram is inserted by using the letters ARL (ALPHA ROMEO LIMA) as one word, followed by the number written out in text - not numerals. For example: "ARL FIFTY SIX." When using voice it is important to spell out the numbers. This allows the receiving station to correctly copy what is being sent and *not* inadvertently write the figures 5 6. "ARL F-i-f-t-y S-i-x" is counted as *three* words. Some common mistakes are for the receiving station to write ARL dash five six and count it as one word; or ARL space five six and count it as two words.

Other examples:

- ARL SIXTY TWO: Greetings and best wishes to you for a pleasant [————] holiday season.
- ARL SIXTY FOUR: Arrived safely at [————]

As these examples show, there are some numbered radiograms which require a "fill in the blank" word or two in order to make sense!

***One special consideration in the use of ARRL Numbered Radiograms is that the message must always be translated to plain text before delivery*** (unless the addressee is an Amateur Radio operator and you are absolutely certain he or she knows the text of the numbered radiograms).

***Translating numbered radiograms to plain text is also the proper practice any time the message is being passed outside Amateur Radio – including messages transferred from the NTS to MARS!***



## Personal Safety Considerations

### Yourself

Each of us has heard the saying, “Watch out for number one, because no one else will.” Whether in a training exercise or an actual emergency your safety is up to you. It is your primary concern and responsibility.

If at any time you are asked to perform an assignment that, for any reason, you are uncomfortable with, decline it. If your concern is with safety, please let your group leader know why you declined.

### Your Team

Your second priority is the safety of your team. This is not just your *REACT* Team, but the entire team working the emergency, especially anyone working with or for you.

There can easily be assignments where a person will be busy or engrossed with their specific task and may not notice unsafe conditions. You as the second person there will need to be very careful about the safety of your team.

### Your Mission

Your mission becomes important only after your safety and the safety of your team. During that mission, if the safety of anyone becomes an issue, speak up, and if necessary leave.

The standing rule in fires and other hazardous situations is to always have *two* exits and should one of them become unavailable, *immediately* use the one you still have. If necessary leave your equipment. Equipment can be replaced, people can't.

### Workers Compensation Insurance

During the briefing for the event you are about to go out on there should be mention about workers compensation insurance. If it is not mentioned, ask!

Not every served agency will be able provide you with workers compensation insurance. If yours does not, feel free to decline the assignment if the lack of insurance bothers you. If you are willing to participate without workers compensation insurance, that is fine, but you must know in advance of going out, so you can make an informed decision.

Often state law will regulate which agency or agencies handle such coverage. In many jurisdictions, volunteers have to be *registered* with the agency before they will be covered. Such registration may be possible at the time of an emergency, but it is certainly easier to do it in advance. *REACT* Team leaders should consider this a vital point to cover during their advance planning with any served agency.

## Modes of Communications

*REACT* is a “multi-mode – multi-service” communications organization. But, of course, each individual member will not be licensed or equipped for every possible mode and service. Each Team utilizes those modes and services for which they have licensed, trained operators and appropriate equipment.

### Voice (FM, AM, & SSB)

Voice or “Phone” communications is the primary method utilized by REACT Teams. It is also the primary mode of communications used by virtually every agency and organization involved in emergency communications.

- **FM** (Frequency Modulation) can produce a high signal-to-noise ratio with a signal of moderate strength, and is very useful for mobile communications. It requires wide bandwidth, and does not always propagate well. FM is typically used on VHF and UHF. It is also used in parts of the 10-meter amateur band.
- **AM** (Amplitude Modulation) is the most basic form of voice radio modulation. It is used in broadcast radio, CB, and general aviation radio.
- **SSB** (Single Side Band) is a suppressed carrier Amplitude Modulated (AM) signal with one side band removed. This mode is more efficient than AM as the same information is packed into less bandwidth and uses less power. It is affected by ionization of the atmosphere, producing signal propagation across long distances under the right conditions. It is a noisy mode, though, with plenty of static and often a low signal-to-noise ratio if the signal is weak. There are two parts, Lower Side Band (LSB), and Upper Side Band (USB). SSB has very limited use among government agencies and the military. It is commonly used on some CB channels and for most Amateur Radio HF voice (“phone”) operation. On Amateur Radio frequencies LSB is typically used below 9 MHz; USB is used above 9 MHz. This convention is widely practiced, and originates with the way SSB equipment was first built and used in the 1950’s. The exception to the “9 MHz rule” is HF Packet that uses LSB above 9 MHz. SSB is authorized on parts of all amateur bands, but is generally only found on HF, with some use on 2 meters for long distance (DX).

### CW (Continuous Wave) - Morse Code

CW is the most basic radio communications mode, operating as a single tone turned on and off in dots and dashes. A dash is three times as long as a dot. CW can be used under almost any condition and is known among Amateur Radio operators throughout the world. The equipment is simple. CW requires training and dedication for high speed traffic. Five words per minute is fairly simple to learn, but retention is poor without consistent use. Higher speeds require more training. CW has been just about abandoned by everyone outside Amateur Radio and since the requirement for Morse Code was eliminated by the FCC, most newly licensed Amateur Radio Operators in the US have no experience with CW.

**Digital Modes (Packet, RTTY, AMTOR, PACTOR, PSK31, etc.)**

Digital modes require connecting a computer (or specialized hardware) to a radio and sending data by various protocols. Digital modes are not authorized in all radio services, most use of digital modes for emergency communications would be in Amateur Radio.

Simple text is the common format for digital modes. This allows long text files to be sent and received without speaking. For example, supply requests or lists of shelter residents can be sent without tying up a voice channel. The text can be sent by typing directly to the computer, or uploading a file. This is obviously very useful for some types of emergency communications.

The connection to the radio can be direct from a computer or by using an interface (known as a terminal node controller, or TNC) depending on the hardware available. Some TNC models have a mailbox capability for some modes, which allows messages to be left without both operators being present. The computer software used for digital modes also often includes this function.

All digital protocols use binary code to send and receive data. Each protocol differs in the method used to send/receive data. This determines the number of characters available, data rate (baud), and the error recovery method. These are robust, but the data transfer rate can and will be reduced considerably under bad band conditions. Error correction means the stations confirm that the text was received properly by “Automated Repeat Query” (ARQ). If conditions are bad, the stations can become stuck, repeatedly re-sending parts of the traffic. ARQ is used between a sending station and a single receiving station at a time. Multiple stations can receive under some conditions, but this requires that ARQ not be used. A “broadcast” mode known as “Forward Error Correction” (FEC) reduces the error rate by sending everything twice.

Using digital methods has a modest equipment requirement, but is not as simple as a basic voice station. The training and expertise required is somewhat higher than a “talker,” but below that of CW. Typically, a digital station requires a power supply, a computer or terminal, a TNC, and a radio.

- Radio teletype or RTTY (sometimes called BAUDOT). This is the original digital protocol (although some would argue that CW is digital), developed before World War II. It is very common, quite simple, good at beating bad band conditions, and is a popular contesting protocol. RTTY has a limited range of text characters (mostly capitals and numbers), and has no error correcting methods, either ARQ or FEC. It is simple enough to slip through much band noise. RTTY is strictly for HF bands.
- Amateur Teletype Over Radio (AMTOR). This is an enhanced version of RTTY, with ARQ and FEC. It has a small character list (slightly larger than RTTY), and is quite robust. AMTOR is strictly for HF bands.
- Packet is based on the original Internet protocol, named X.25. The packet protocol is known as AX.25 (where the A stands for Amateur). All text characters found on a keyboard (excluding ALT and CTRL keys) can be sent by packet. It is designed for ARQ contacts, but can broadcast in “CQ” mode. Packet can be used on HF and VHF, but is more suitable at VHF (where a higher baud rate of 1200 or 9600 can be

achieved). Higher frequencies produce even higher rates (up to 56 kilobaud). Packet is designed for computer interface, and can be networked (see below).

- Packet Teletype Over Radio (PACTOR). This is a combination of packet and AMTOR. It is designed for HF use only, and has the best features of both. PACTOR is more robust than AMTOR or RTTY, but can be slowed by bad band conditions.
- Phase Shift Keying 31 baud (PSK31) is a new mode, and has a lot of promise. In terms of protocol and operation, PSK31 is similar to RTTY. All the above digital modes use “audio frequency shift keying” (AFSK), phase shift keying defeats much of the band noise and uses very little bandwidth. Low power signals have been sent long distances.
- There are a vast array of other digital modes and many variations among them. Other available digital modes include variations of MT63, Olivia, and many more. Digital modes can be very useful for emergency communications but such use requires advance planning because each station needs to be equipped and configured to use exactly the same mode.

An interesting thing about digital modes is the speed. Only on certain bands and with the right equipment will data speed ever exceed 1200 baud. On HF bands, the rate is typically 300 baud or less; often considerably less, especially on RTTY. Packet on VHF is normally 1200 baud. Compare that with Internet speeds of measured in Megabytes per second! The advantage is that the connection is simple, and does not rely on an elaborate fixed infrastructure (e.g., phone systems). Because most people cannot type as fast as the baud rate, this speed is not a problem for live communications.

Typically, any terminal software on a computer can be used to access a TNC and operate a digital mode. There are custom software packages for any given TNC, but they are often not necessary. Some digital modes (e.g., PSK31) use computer sound cards. Other modes can be emulated on a computer, without having a separate TNC.

### **Automatic Position Reporting System (APRS)**

APRS uses a Global Positioning System (GPS) connected to a radio to send a digital message containing the location (latitude and longitude). APRS uses a specific application of the Packet radio protocol to send the location, callsign, and short text message. This specialized mode is used when the location is the primary information to be communicated.

The APRS station can generally be set to transmit at regular intervals, or keyed to a voice transmission (i.e., sent immediately after the mike is unkeyed). The packet burst is received by stations operating on the same frequency or may be relayed from a voice repeater to the local APRS frequency.

Receiving stations translate the packet burst into a location on a map. Special programs display the location, call, and text message of the sender. A nationwide APRS net relays those signals by HF radio and Internet relay.

Until recently APRS has been primarily a mobile mode (e.g., in a car). New equipment recently coming on the market makes it possible to have a completely portable APRS transmitting station consisting of just a handheld radio with built-in GPS receiver.

Making effective use of APRS data still requires some hardware and software to plot and display the locations reported (usually a computer displaying the locations on a map). The principal value is following the location of a person or vehicle without the need for voice transmissions.

### **Packet E-mail Systems**

There are several methods for sending messages using Internet-like e-mail via radio. One highly effective method is called JNOS. JNOS is a Network Operating System (NOS) that can be used as a platform for exchanging messages using a wide range of methods such as the Internet and amateur radio.

Strengths of packet e-mail systems:

- Hardcopy messages provide accuracy when dealing with long or complicated information.
- Hardcopy messages are instantly available to be photocopied and handed out.
- For long messages, packet messages can be sent and received faster than voice messages.
- Messages can be received, forwarded, and printed automatically without the need for operators.
- It has very good signal detection at 1200 baud when compared to FM voice. A TNC2 will pull out a full copy digital signal when it is barely audible on voice.
  - When engineered correctly, a packet network has a high level of service.

Weaknesses:

- Requires computers and continuous power to operate.
- Requires computer literate people to install and configure the equipment.
- Requires packet literate people to install and configure the equipment.
- Requires all participating systems to use the same software and methods.
- The communications channel can get congested if other stations randomly enter the network, resulting in a poor quality of service.
- Messages that need to be rerouted to another network are not automatically detected and rerouted as would be done by operators in a voice network

### **Visual Fast-Scan TV and Slow-Scan TV**

**Fast-scan TV (FSTV)**, also referred to as amateur television (ATV), uses a transmission format fully compatible with video equipment designed for the home consumer market. The video is amplitude modulated and the audio is frequency modulated. Simply stated, the ATV picture display has full motion with simultaneous sound, can be in full color, and has excellent detail. Because the signals occupy several megahertz of bandwidth, the FCC does not permit ATV on bands below 420 MHz. with most activity being between 420 and 440 MHz.

**Slow-scan TV (SSTV)** uses a special format to send TV-like images one frame at a time. The effect is a still picture or a slide show rather than a moving picture. SSTV requires much less bandwidth than FSTV so the SSTV can be transmitted on bands where FSTV is not authorized. SSTV can generally be transmitted over any sort of connection (such as telephone) that can support voice traffic..

## **Security and Privacy Considerations**

### **Who Is To Receive the Message?**

The message is for the intended recipient and the communications should remain private. When handling the message, you should not reveal the existence or contents of the message, even after the operation. Let the receiving agency determine if they want to acknowledge the message, and let their Public Information Officer (PIO) inform the media of the content.

### **Who Is Listening?**

You do not know who is listening. It could be the general public. It could be the media. During a hectic operation, it is unlikely they could monitor and track the full range of messages in transit. Because they are willing to pick up on one message out of context and expand on it, rather than having the full benefit of all the information at the Emergency Operations Centers, distortions and misrepresentations could result by third parties.

Do not speculate, and stick to passing messages originated and signed (authorized) by a responsible sender. Log all messages, including the date/time of origin in case there is a need to verify the origin and timing of the message.

As liability lawsuits have become quite common following disasters and emergencies, the detailed documentation of message traffic has become ever more important. The dreaded legal questions of "What did he know?" and "When did he know it?" may well be decided based on the message logs of an individual emergency communications volunteer radio operator.

### **What You Don't Say**

To the extent possible, do not pass along codes or account numbers over the air that are considered unlisted or private. Examples are unlisted phone numbers, credit card numbers, control codes for repeaters. If such codes or numbers are needed to fulfill an action, see if the message can be routed without the codes to a third person who has both the codes and regular (telephone) communications and who can act on behalf of the affected party to complete the action (i.e., send the message to a relative who also has the unlisted telephone numbers to complete the calls) .

If the situation becomes tense, especially due to priorities vying for limited availability, be careful of the language passed on the air. The safest method is to replace language with high emotional content with language consistent with what diplomats use. (“We are very disappointed that the requested engineer and doctor will be displaced on the first flight out by the persons from administration support. We request you reconsider in light of the new developments in the last half hour and reinstate the engineer and doctor.”) Remember, you can *suggest* more tactful language, but unless you are the originator you have to send the message as the originator actually wrote it.

Be sensitive during times when fatalities may occur. If the operation involves the possibility of finding the remains of dead people, do not refer to the need for additional resource people as “Need additional help. Send over more bodies.”

Use headphones when operating to avoid having others nearby casually listen in.

### **Enhancing Security and Privacy**

If you need to enhance security or privacy, consider these techniques.

- Use digital (non-voice) modes to enhance privacy/security. Modes such as CW, packet, AMTOR, PSK31, RTTY are possibilities.
- Use modes not frequently found in scanners or consumer radios, such as SSB and CW for HF and 6m, FM for 10m, SSB and CW for VHF/UHF/1.2G.
- Use satellite systems (with directional, non-terrestrial, low power signals) to work around casual terrestrial listeners.
- Use image modes such as ATV, SSTV and FAX to pass images.
- Use horizontal polarization to reduce vertically polarized signal strength.
- Use split-frequency, cross-band, or cross-mode operations to force the monitoring party to use two separate receivers.

Do not reveal the existence of the communications even after completion of the incident.

Do not speculate about the messages. Do not attempt to expand upon messages beyond the text of what has been exchanged.

Do not pass codes or numbers on the air that are considered unlisted or private.

Observe the use and content of the language used.

Use tactical callsigns not indicating sensitive locations (i.e., “Station Alpha” instead of “ICS Command”).

## Operating Stress

Emergency communications is a very challenging assignment. There is a lot of need being placed on people in a short amount of time. For this reason, stress can build upon the operators. As these demands wear down the individual's capacity for tolerance, flexibility, and creativity, the person shows signs of stress. People show it as varying levels of irritability and emotional outbursts, which affect the interpersonal relationship present.

The best time to deal with stress is to learn coping mechanisms *before* responding to an event. It includes:

- Focusing on teamwork, strategy, and results, and not on idle worry and concern – which does nothing to help the situation.
- Learning tolerance and patience during times of heightened demand and activity.
- Learning that we are human and there are limits to our performance, both individually and corporately.
- Learning the impact that diet, beverages, and exercise can have on relieving stress and increasing the capacity for coping.
- Learning to get rest and take breaks.

In the intensity of the situation, a person may be exposed to new life experiences. A healthy person is able to withstand the emotional experience enough until the impact of the onset passes, then begin processing the experience and begin to accept the situation. The members of the team should learn skills to improve the level of emotional maturity before engaging in stressful activity.

## Active Listening Skills

There are a number of simple, practical skills that can be learned and used in any interpersonal situation. One of the most valuable ones is “active listening.” With active listening, you will be able to increase your listening ability as you gain the receptiveness of the other person. By building bridges through effective listening skills, you can prevent situations from escalating unnecessarily.

One of the barriers to effective communications is leaving the other person with the feeling that you did not correctly understand his/her situation and message. There are a number of ways this can occur unintentionally:

- The person's rate of talking is quick, and you speak slowly, or vice versa.
- The person's tone of voice does not match yours.
- The person is trying to communicate a point, you have not acknowledged it, and you're trying to communicate another point.



Active listening skills can be used to break through a stalemate. It is composed of:

- Giving the other person your full, undivided attention.
- Listening carefully to what the person is saying.
- Repeating back and paraphrasing to the person what you heard him/her say, in effect acknowledging that you received the point.

You can acknowledge the person's feelings, or the content that the person is saying, by using phrases such as:

- "It must have been frustrating to have been there."
- "The heat must have been exhausting while trying to operate and maintain contact."
- "Let me see if I understand... You're saying..."
- "So you're saying that you believe ..."
- "If you're correct, then you think that..."

If the person perceives you understand his/her feelings and the message, he/she will feel more comfortable with the situation and establish a better rapport.

### **"Pace, Then Lead" Skills**

If you're successful in establishing good rapport and you wish to direct a conversation constructively, you can use the "pace, then lead" method to guide discussions to productive outcomes. The concept is to "come alongside" the other person, establish a rapport, then when the understanding is solid begin to lead the person in discussion toward productive outcomes.

First, establish a good bridge using the active listening method above. This enables you to "come alongside" the other person.

Next, establish a solid rapport by understanding the point (or points) the other person is relating. The other person may also be venting, so just keep listening and allow the person to vent away the frustration and emotion.

When the emotional content has been diffused, slowly introduce the topic you wish to discuss. Begin slowly, and have the other person become open to other observations or ideas. One of the better ways is by using the "Feel, Felt, Found" method. You can use it to overcome objections to a given situation. The conversational sequence is:

- I've heard others feel that ... (express to the other person that you understand how they feel and what's on their mind)
- Some others also felt that ... (express that other people felt that way too. This helps him/her to feel comfortable that others feel the same way.)
- They looked into it and found that ... (this gives you a chance to relate what others found, and how it changed their minds).

The “feel, felt, found” technique establishes a common starting point, rooted in an emotion-based belief about the topic. It then introduces the concept of a search and gives you an opportunity to relate the outcome of that search effort. The other person can still question the validity of the outcome, but at least you had a meaningful way to present the observation or idea. \*

Steps for leaders to consider before the incident – Steps are needed to anticipate oncoming stress and mitigate the results after the onset. Some steps for leaders include:

- Inform the emergency communicators that tensions can form, so don't take anything personally.
- Tell people up-front that we're all in this together, and remind the people present of the objective. (Since the objective changes from event to event, there is no one single answer. It could be riding out the event, getting out of danger's way, stabilizing and transporting victims to an area hospital, etc.)
- Establish teamwork and cooperation. Remind everyone that working together will achieve the most results. We have to make do with what we have.
- Inform everyone of who is in charge.
- Look ahead to secure the essentials for the comfort of those present, such as food, water, sanitation, chairs and mats. Find out what is available to meet the needs of parents with small children if they are present in the scene. Secure a broadcast radio so that those present can monitor progress as reported by the media.
- Inform the emergency communicators to check with the person designated to process them before releasing them from the assignment. This gives the opportunity for someone to assess the condition of each communicator prior to their returning home and see if they need follow-up attention.
- Activate and bring in stress management personnel.

If the operator is assigned to a location that is out of touch, the operator's family may be increasingly concerned as time passes. Make an effort to get a message to the family letting them know where the operator is located, that he/she is doing fine, the value that the person is contributing to the effort, and when the assignment may be completed. This consideration shown to the family will make it easier for the operator to participate during the next event.

### **When You Live in a Disaster Area**

Living in an area that experiences a disaster can be emotionally devastating. People see a lifetime of effort destroyed in a matter of hours or minutes. One needs to go through a period of grieving and a time of healing before becoming productive. Relief workers and communicators may need to help counsel those affected by the disaster. To help with the grieving process, allow the affected person to express emotion and memories while being an active listener.

\* Additional information on this topic can be found in the audiotape and videocassette series, *How To Deal with Difficult People*, by Rick Brinkman and Rick Kirschner (Boulder, Colo.: CareerTrack, Inc., 1997).

### **Dealing with Stress as an Emergency Responder**

A responder to an emergency may be expected to stabilize the situation while the main body of rescue and relief workers are mobilized. Often the first responders have to work with little in the way of people, equipment, and supplies.

There are times when the first people on a scene are exposed to experiences that can be overwhelming. At such times, leaders must be prepared to relieve the operator and allow him/her to meet with stress management and post-trauma personnel.

Most emergency management agencies and many emergency response organizations have programs called Critical Incident Stress Debriefing (CISD). Participation in such programs may be mandatory or voluntary. Many people resist participating in these programs the first time, but almost everyone who has ever participated in one acknowledges its value. If your agency has such a program, participate. If the agency doesn't have a program, encourage them to start one or to find a way to share in the program of another agency or organization.

### **When Not To Say Anything**

When a person is overcome with emotion, the best thing to do may be to let the person process the emotions and not say too much that would disrupt them. Depending on the person's needs, they may want company during the time of difficulty and assurance that they won't have to face the difficulty alone.

To help with the grieving and coping process, allow the affected person to express emotion and memories while being an active listener.

Sometimes it might be appropriate to contact a relative or friend to take over the task of maintaining emotional contact.

### **Debriefing**

Assign someone to check on the operators as they check out before they leave an assignment. This gives your team an opportunity to receive any field reports from the operator, to assess the operator's condition prior to releasing them to return home, and to thank them for turning out.

On major incidents there will almost always be a formal demobilization process. This process generally applies to every individual who was deployed at any time during the incident. Whenever you respond to an incident, be sure that you know and follow the complete demobilization process.

## The Four C's of Emergency Communications

The best advice for any emergency communicator can be summarized by the four C's: Calm, Courteous, Correct, and Concise.

### Calm

Try to keep emotion out of your voice. No matter what the emergency, a calm, professional attitude will help keep things cool and get the message through more quickly and accurately. Losing your cool, calm attitude may cost you an important message. The more reason for getting excited, the more important it is for you to remain calm. As a *REACT* member you should set a good, calm example for the other party to follow.

### Courteous

You must think of yourself as a public servant. Regardless of provocation, remain courteous at all times. Never display temper on the air. Remember the "Golden Rule" at all times and practice it. Never fight with other operators over handling calls. During a net, follow the instructions of the Net Control Station. Outside a net, the simple rule of common sense is that the station with the best communications handles the call. If some problem needs to be ironed out, do it by telephone, not over the radio.

### Correct

Work to keep errors out of your communications. Use the phonetic alphabet and repeat the message where appropriate to get names, locations, and other information accurately. Write everything down for reference. A small inexpensive voice recorder is a handy tool at your station, but the information on the recording will be no better than what you originally got over the air. Report emergencies to the correct authorities. If you live near any jurisdiction boundaries, become familiar with them. Keep a local street map with the boundaries marked. When giving road directions refer to your street maps and confirm addresses whenever needed. It is always better to admit you don't know rather than give out information that is wrong. Unless specifically required by a served agency, always use plain language not Q-signals, 10-codes, etc. Correct communications includes following the FCC regulations.

### Concise

Your job as an emergency communications operator is to get the message and provide assistance to the agency you are serving. Avoid tying up the frequency by keeping your transmissions as brief as possible. If prolonged communications appear to be necessary consider moving to another frequency. Always leave a few seconds between transmissions in case someone needs to break in with another emergency call. A strictly business attitude is your best technique for assuring time-saving communications.

## Served Agency Communications Systems

Most agencies we will work with have their own communications systems. Our role is generally to help meet a shortfall caused by surge requirements during an emergency. The most common such requirement involves communicating between different agencies, but in some cases there may also be a need for additional operators for the agency's own communications systems, especially for agencies that do not normally operate their system on a 24 hour basis.

### Overview of Served Agency Systems

Each served agency will have its own unique communications system. It is in the best interests of both served agencies and the *REACT* Team to discuss and understand what systems your local served agency uses. While you discuss the communications they use, ask what, if any, requirements they may have for additional radio operators to operate the served agency system and what unique knowledge these operators will need.

### Trunked Systems

Trunked systems use computer control to switch any given conversation from frequency to frequency (within a set limit). This has the advantage of seeming to be the only communications going on at that time (no doubles). This is accomplished by having a computer controller move the conversation from frequency to frequency in accordance with a pre-established algorithm. Amateur Radio does not generally use this type of system, but many government agencies (especially in larger metropolitan areas) have moved to trunked systems in the last few years.

### Digital Systems

Many government agencies have moved to various digital radio systems. Digital systems are easier to encrypt and are more difficult for the public to monitor with scanners even when not encrypted. When properly designed and installed, a digital system will often be more reliable than a conventional analog system within its intended coverage area. Digital radio systems provide a degree of error correction that helps to ensure clear voice communications. Unlike analog systems which tend to become noisy in weak or fringe areas, digital radio systems are generally all-or-nothing. There is generally no weak area where voice signals are noisy, instead any signal strong enough to be decoded will be completely clear, but any signal that is too weak to be decoded correctly will fail completely. Thus as a user moves out of range there is no warning that the signal is becoming weak - the radio just suddenly stops communicating. There are several different kinds of digital systems being used by various government agencies. While all these systems are very similar in features and operation, generally they are not compatible with other systems. The most common digital radio standard among government agencies in North America is usually called "P25" which is short for APCO Project 25. In Europe the TETRA system is nearly universal among government agencies. Many systems are known by the manufacturer's trademark name, such as "MotoTrbo" by Motorola rather than the generic name for the standard being used.

## Subaudible Tones

Subaudible tones are used to minimize interference caused by multiple users on a single channel. The technical term is Continuous Tone Coded Squelch System (CTCSS) but it is often called "PL" (for the Motorola trademark name "Private Line"). It requires the transmitting station to have a specific tone (in the range of 67 to 250.3 Hz) with a deviation (on FM) of approximately 750 Hz. The receiver hearing this tone opens the squelch to allow communications. This system does *not* eliminate or prevent interference nor does it create any real privacy. What the system does is to enable the receiver to *ignore* signals that do not have the matching tone. Thus several users can use the same channel without having to hear each other's messages, but if two users attempt to transmit at the same time it still creates the same sort of interference that would occur any time two stations try to transmit on the same frequency at the same time. CTCSS is also used to control access to some amateur and most commercial repeater systems. In this role it generally prevents unintended signals from keying the repeater.

**Tone Encode** and **Tone Decode** are terms describing two ways CTCSS systems operate.

- Tone Encode (also called Transmit Tone or TX Tone) is a transmitter function that sends the subaudible tone every time the radio is keyed. Tone Encode is necessary to access repeaters using tone and is necessary to communicate with other radios that are using Tone Decode. Tone Encode can be used by itself for these purposes. When a radio is set up to use *only* Tone Encode, that radio will receive any signals on the frequency regardless of whether or not those signals have the matching tone. Tone Encode is generally the preferable setting to use during emergency communications.
- Tone Decode (also called Receive Tone or RX Tone) is a receiver function that prevents the radio from receiving any signal that does not have the matching tone. Tone Decode would not be used without also using Tone Encode. Any radio equipped with Tone Decode should also be equipped with some easy method to temporarily disable the decoder so the operator can check the frequency before transmitting. A few radios omit this necessary control function. Even on radios properly equipped with the "monitor" function, often operators simply are not aware of it. Operators using Tone Decode on shared frequencies must be trained to *always* check the frequency before transmitting.

## Digital Coded Squelch (DCS)

DCS is also sometimes called "DPL" (the Motorola trademark "Digital Private Line"), "DCG" (the GE trademark "Digital Channel Guard"), or CDCSS (Continuous Digital-Coded Squelch System). For the operator, DCS operates the same as CTCSS tones but it uses digital encoding instead of subaudible tones.

## Telephone and Satellite Systems

Many agencies have specialized internal telephone systems. Some agencies also have satellite communications systems. All these systems in use by Public Service agencies vary greatly. Please contact your local agency to determine their unique requirements.

## **Nets: What They Are and How They Work**

### **Key Terms:**

Controlled Net: A means of ensuring orderly use of limited frequency resources to conduct communications for a scheduled event or during an emergency.

Net Control Station (NCS): The person charged with control of information flow on the frequency used by a controlled net.

Please take a moment to study the NCS definition. During an emergency the NCS does *not* control the *event!* NCS is there simply to control information flow. The Incident Command System (ICS) provides a coordinated system of command, communications, organization, and accountability in managing emergency events.

### **Net Types**

Nets are typically categorized by their structure or function:

#### **Structure**

Open (Informal) Nets - During an open net almost any type of traffic or communication is permitted. Conversations are often permitted provided they break whenever needed to allow incident related traffic to flow.

Directed Nets - A directed net is typically used when a large number of stations need to use the frequency or the volume of traffic cannot be dealt with on a first-come first-served basis. The NCS will determine who uses the frequency and what traffic will be passed first. A directed net may be conducted in which each station transmits only to the NCS or station to station contacts may be directed. In some situations the NCS may authorize direct station to station contacts on a net (especially an event net if the net is relatively small and consists of experienced net operators), but the NCS always has absolute control over the net.

#### **Function**

Tactical - Tactical nets are the primary coordination nets for the event. They will be a directed net, using tactical calls, restricted to traffic for the event *only*. Traffic is as directed by the NCS.

Resource - The resource net is intended to acquire volunteers for the event and make work assignments for the event. This net will be a directed net using FCC issued calls, normally restricted to traffic pertaining to the event. All traffic goes through the NCS.

Traffic - Traffic nets are for the passing of formal, normally written, traffic. They are generally directed nets, using FCC issued calls. Traffic may be passed on the net frequency or sent off to another frequency at the option of the NCS. Casual conversations may be allowed at NCS discretion during periods when there is no traffic ready to be handled.

**ICS Nets**

During an emergency a large percentage of our served agencies use the Incident Command System as a model for their operations. When this system is used by your served agency you will need to understand how the terms in ICS correspond to terms in common use.

|                                                 |                                          |
|-------------------------------------------------|------------------------------------------|
| <i>REACT</i> / ARES / RACES<br>Typical Net Name | Incident Command System<br>Function Name |
| TACTICAL                                        | OPERATIONS                               |
| RESOURCE                                        | LOGISTICS                                |

Please understand that the name you use for any given net is a local option. The same holds true for tactical identifiers. Use the name for your nets and locations that convey the most information to the necessary people at your event.

**Net Participant Guidelines**

**Legal**

Legal requirements within nets are those of identification and operation on frequencies within the appropriate radio services. For the Amateur Radio Service, the FCC regulations require that you *must* identify at ten minute intervals during a conversation and in your last transmission. There are similar rules with other requirements for other radio services. During periods of heavy activity in event nets it is easy to forget when you last identified.

The easiest way for amateur radio operators to ensure they comply with the FCC identification requirements during an event net is to identify with their FCC issued call as they complete an exchange. This serves two functions: (1) Tells the NCS they consider the exchange to be complete without having to use extra words (saves time), and (2) Fulfills all FCC identification requirements.

**Customary**

Customary protocols will normally be used in long standing, non-emergency nets. They may include such practices as identifying with the FCC call of both stations on each transmission, giving the FCC call of the next person to talk, or many other variations. Whenever joining an existing radio net, please listen to the net before joining. Customary protocols will easily stand out.



### **Tactical Calls: When and How To Use Them**

Tactical calls are used to identify a location (such as “North Avenue Shelter”) or function (such as “Truck Five”) during an event regardless of who is operating. This is an important concept. The tactical call allows you to contact a location without knowing the FCC call of the operator there. It also virtually eliminates confusion at shift changes and when a person takes a break from operating. Think about that. Do you answer a call from the sound of a person’s voice or from the identified location? Obviously from the identified location.

Once location or functional assignments have been made, tactical calls should be used for all emergency nets if there are more than three participants and most public service nets if there is more than minimal traffic. Net control will assign the tactical call as each location is opened. It will normally be some unique identifier that indicates which location or function this is. Some examples are:

NET CONTROL - for the Net Control Station

FIRE-BASE-1 - for the first fire base established or the fire base in a region

CHECKPOINT-1 - for the first checkpoint in a public service event

C P - for the event command post

AID-3 - for the third aid station on a route

NORTH AVENUE SHELTER - a shelter located on North Avenue

E O C - the Emergency Operations Center

Tactical call signs may be any unique identifier that is easily recognized.

### **Proper Use of Tactical Calls**

#### Initiating a call

- If you were at aid station three during a directed net and wanted to contact Net Control you would say “NET CONTROL THIS IS AID3” or, in crisper nets, simply “AID3.” If you had emergency traffic you would say “AID3, emergency traffic” or for priority traffic “AID3, priority traffic.”
- Notice how you have conveyed all information necessary without using any unnecessary words or taking any unnecessary time.
- If you had traffic for another location, such as checkpoint five, you would say “AID3, traffic for CHECKPOINT 5”. This tells NCS everything needed to handle the traffic. NCS will then call check point 5 with “CHECKPOINT 5, call AID3 for traffic,” if there is no other traffic holding.
- Notice that there have been no FCC issued calls used. At this point none are necessary.

#### Traffic during a call

- When the contact involves several short exchanges, it is normally not necessary to repeat the tactical calls with each short transmission unless there might be some confusion such as when a separate location is mentioned in the message.

### Completing a call

- To complete the call from AID3, after the message/traffic is complete you would say "AID3, (your call)". This fulfills your identification requirements and tells NCS that you believe the call to be complete.

The above is the same for all participants under virtually all traffic examples.

### Participating in a Net

Enjoy yourself - public service is fun!

Prepare yourself. Are your batteries charged? Are you on your best antenna for the frequency you will be on? Do you have pencil, paper, and other items you think you will need?

Listen. If you are there at the start of a net or join one in progress, listen for several minutes before you check in.

The NCS will announce or ask for what they want.

Follow NCS instructions. NCS will ask for specific people or categories of people as they are needed. Follow instructions.

Do not editorialize. "This is Phred in the North East portion of the county at 9300 feet where it is snowing, but it was sunny five minutes ago when I came in from feeding the birds, geese, and hamsters, but it's cold right now and it looks like it could rain in the next day or so. Just checking in," is unnecessary and almost always unwanted. This ties up the net and does nothing to add usable information. Check in with your callsign. Add name and other information as requested by NCS.

Plan your transmission. If you have more information than just your name and callsign, jot it down. You can, if necessary, just read your note. This promotes clear concise communications.

During any sort of event, especially any incident or emergency, check in *only* if you are going to be part of the net. Do not check in as "in and out" or "for the count." Either you are joining the net or you should just listen.

Checking in with, "This is," then a pause or unkey followed by the call works on most nets, but causes delays and potential problems on others. This is a local net option, so follow the protocol normally used by the net you are joining.

Unless your transmission is longer than ten minutes, you need only identify at the end of the transmission/exchange of information.

Let the NCS know when you leave or if you need to leave early. Do not go into details of why you need to leave unless asked or if the reason is directly related to the event or incident.

During an event or incident, if the authorities ask you to move, do so immediately and without comment, then notify the NCS of your change in status as soon as you can.

If an on-scene authority requests that you shut your radio off, or that you not transmit, do what they ask immediately and without question. This is one circumstance where you do not notify the NCS of a change in your status. This deserves a little explanation. This would normally occur only if there is a presence of explosives or explosive chemicals or vapors, and there is the possibility that a spark-producing electronic device is present which might be triggered by an RF signal.

Be patient with the NCS. An NCS operator is under high stress. His questions and requests should be clear and crisp; but as he/she begins to tire, there may be a tendency to become rather terse. Typically, there is a whole lot going on at an NCS that the field operators never know about.

REACTers are patriotic, independent people and they are volunteers. The attitude among a few people is that, "Volunteers don't have to take orders." That's absolutely correct. We don't *have to* take orders. But if you are not ready to follow instructions, you may want to do something else instead of emergency communications.

**Leaving a Net** - You will leave a net for one of three reasons:

1. The location is closing - If NCS has given you directions to close the location, simply identify with your FCC issued callsign, the location tactical call and the word "Closed." The NCS will tell you if anything else is needed. If you are closing the location on orders of the served agency, you will identify with your FCC issued callsign, location tactical call and the phrase "location closed per (name and/or title of person and agency)."
2. You need a break and there is no relief operator - Tell NCS, "I will be away from the radio for (number of minutes)" and end with your tactical ID and your callsign.
3. You have turned the location over to another operator - You will normally not need to tell NCS that you are leaving. However if there are specific instructions from NCS then follow those instructions.

### **Don't Over Identify**

There is normally nothing that will expend more time, needlessly, than over-identification. Someone who uses their FCC issued call in every transmission is usually a person who is unsure of themselves or, worse yet, someone who is more interested in having their call known to everyone at the event. In the latter situation, help them find work elsewhere.

The FCC regulations require that Amateur Radio operators only need identify at ten minute intervals during a conversation (*not* during a net, unless you talk for more than ten minutes) and during your last transmission. The requirements in other radio services are generally even less frequent. For example, GMRS stations must identify every 15 minutes compared to 10 for the Amateur Radio Service. If you end each exchange with your call, that fulfills all FCC requirements and tells everyone that you are of the opinion the exchange is complete.

## Write It Down

The easiest way to minimize what you say during a net is to write down everything before you key the microphone. Since very few of us like to write lengthy notes, this will promote brevity. An excellent place to keep this information is in your location log. This serves two purposes: (1) You have a complete log of everything that came from your location (2) It will become very brief.

## Roles in a Net

### NCS

The NCS is in charge of the net while the net is in session. He or she is responsible for controlling who uses the frequency and when they pass traffic. This needs to be balanced with the fact that you will be dealing with volunteers.

Net Control needs to have a commanding signal, i.e., a clear, crisp signal with good audio characteristics. An NCS who can barely be heard will not be able to effectively control the net.

NCS must keep track of which resources are on the net and who has cleared the channel. NCS is also responsible for knowing what traffic each person is capable of dealing with (sending traffic to be relayed on HF to a Technician class ham will not work well).

In medium and large operations you need to have a backup NCS *and* a person to maintain the log.

Keep a written record of the incident and all traffic passed. This does not mean that the NCS must copy of all formal traffic; the NCS log can be simply an overview of the messages including the stations sending and receiving the traffic. The NCS would copy all formal traffic that was sent TO the NCS.

Make *all* instructions clear and concise, using as few words as possible.

Use tactical call signs. If participants do not follow your lead, only recognize those using tactical calls (obviously an exception must be made if it is emergency traffic).

Different nets handle different traffic. If someone tries to pass traffic that should be on another net, refer them to the correct net unless it is actual emergency traffic.

### NCS Backup

There are two types of NCS backups. The first is located in the same room/area as the NCS and acts as relief for the NCS at regular intervals. The second type is a person who maintains a duplicate log of everything happening at the event and is available should there be a failure at the primary NCS location. Whenever there are enough people working an event, an offsite backup NCS should be maintained. This person must be operating with the knowledge and consent of the NCS station and should be known to the entire net.

**Loggers**

People to keep an operational log for the event are very important to the smooth operation of the event. These people free the NCS from having to split their time/effort down to a level that is neither efficient nor productive. Every net will be enhanced by a good logger.

**Site Communicators**

Site communicators are responsible for listening to everything that happens on the net and maintaining contact with the served agency people at their site. They need to produce formal traffic as applicable, maintain a log of activity at their location, and be responsive to the needs of their served agency people.

It will be far easier to handle all of the tasks at the location if there are at least two people there, especially in an emergency situation.

**General Communicators**

Report to the NCS promptly as they become available.

Ask clearance from NCS before using the frequency.

Answer promptly when called by NCS.

Use tactical call signs.

Follow established net protocol.

**Listeners**

*Just* listen

Listeners are not really part of a net, but we discuss them here because there are always people who show up at a scene or on a net frequency because they just want to help. If you are one of these people, be a good listener.

The most helpful listener, during an emergency, is one who listens and stays quiet! NCS does not care that you are there listening unless he asks for assistance from listeners. Normally there will be enough people working the net to handle anything NCS needs. If additional people are needed, the NCS will make an appropriate announcement.

**Liaison Stations**

Liaison stations provide the communications link between different nets. The nets may be simultaneous or at different times. Liaison Station generally will be limited to only two nets if those nets are simultaneous so they can maintain good communications on both nets. It is *very* difficult to listen to more than two nets at the same time even if the nets are not very busy. A Liaison Station might service several nets if the nets are at different times such as local and sectional NTS traffic nets.

Liaison stations serving simultaneous nets will need to have at least two radios, each with its own antenna. These antennas must be separated sufficiently to not interfere with each other when the operator transmits on either frequency.

Liaison stations will be appointed by NCS or the staffing officer, usually from trained operators.

*Never* listen to one net to bring information to another net unless you are an *assigned* liaison station or it is traffic specifically designated for relay to the other net. This is especially critical in emergency and Skywarn nets where such a second-hand report may be misinterpreted as an independent “confirmation” of something that was erroneously reported on the first net.

## Traffic Handling

Formal (written) message traffic can be handled over many different kinds of nets. Each kind of net has advantages and disadvantages. This section will briefly outline some of the considerations.

### CW Nets

Not all nets need to use voice to pass traffic. CW nets can be used to move traffic in an efficient manner over conditions that are not favorable for voice networks. During such times, CW can be an effective means of passing traffic. Examples are:

- Limited power at the transmitting location, requiring conservation of energy.
- Limited antenna capability, especially during a windstorm such as a hurricane or tornado, where it is not possible to deploy a full, directional antenna.
- Extreme interference due to foreign broadcast, commercial paging, or similar high-output conditions.
- Poor propagation and high static, especially on 40m and 80m, diminishing the use of voice for efficient two-way communications.

### Digital Nets

- HF digital is *not* plug & play
  - Receiver stability, bandwidth, dynamic range, and operator skill are essential.
  - Interfacing requires special care for both RF and audio lines.
  - Each mode requires operator understanding of software and hardware such as TNC commands, a sound card interface etc. Digital station operators must know how to monitor/operate the particular mode being used.
  - HF net frequency specifications are unique.
- Like CW, skill in HF digital operation comes with practice.
- Controlling a digital net is more daunting than a voice net.
  - Typing skills
  - Know essential commands
- Higher data throughput
- Less prone to scanner-listeners

## Voice Nets

**SSB Nets** - SSB nets are found mostly on the HF bands and are designed to meet the needs of particular groups of radio operators. Nets can be found for most everyone's operating habits, including emergency communications. Because of the nature of HF, these nets can be international, national, or regional in coverage. Band selection and propagation will usually dictate the net coverage, and many nets are placed to take advantage of particular band conditions. In addition to the HF SSB nets, there are some regional and local SSB nets on VHF throughout the country that can be put to emergency use if the need arises. A good reference to the many nets in current operation, including regular emergency nets, exists in the ARRL's Net Directory.

Standard Frequency: As part of your local emergency plan, there should be some reference to your local and section nets and their operating frequencies and times. A standard operating frequency is important, as this is where everyone will congregate when an emergency occurs. Alternates to this frequency are also important if the frequency should become unusable for some reason. Make sure you keep a current list of nets, their frequencies and times, and any emergency frequencies that may be called into service if the need arises.

NCS Rotation: Emergency nets need well trained net control stations. Most major emergency nets keep a rotation list of net control operators. It is the responsibility of these net control operators to make sure that the nets run smoothly and efficiently: They *control* the net. You should follow the net control's lead in understanding how a particular net is operated by listening first. It is important for a net control station to designate an alternate NCS during the operation of any nets, because of the potential loss of a NCS due to equipment failure or other problem.

Traffic: The goal of all nets is to transfer information (which we call traffic). Important things to remember here are that each net has its own priority for differing kinds of traffic. The normal order is Emergency, Priority, Routine, and Health and Welfare traffic. Some nets will not take Health and Welfare traffic, preferring to send operators with such traffic to other nets specifically set up for that traffic. *All* nets should take priority and emergency traffic if there is not a better net available to handle such traffic. If you have any traffic, when you check in, make sure you state this information to the NCS.

Participation: Regular participation in emergency nets is the best way of staying current and understanding the operations of a particular network. In addition, it makes sure your equipment is operating properly and helps you to understand your station's propagation coverage in a particular net.

Check-ins/Check-outs: All nets have particular procedures for checking into the net. Listen to the net preamble to learn about the proper way to check in to that net. If there are no specific instructions, listen to how the net participants operate. Generally you can announce your call during a pause in communications (not during traffic or if instructed to stand by) and, if acknowledged by NCS, check in.

Relays: SSB nets and FM simplex nets will require relays if there are weak stations trying to check in with traffic. Many nets have established policies in dealing with relays, sometimes alternating NCS to widen the net's reception due to propagation. (Note: Nets on FM repeaters will require relays if someone is trying to get into the repeater and cannot maintain a full quieting signal. A station closer to that unreadable station can sometimes relay the request by listening to the unreadable station's transmission directly on the repeater input frequency and relaying the request to the net on the repeater.)

**FM Simplex** - Regularly scheduled nets held on FM simplex frequencies are usually called into effect as backups when normal FM repeater communications are disrupted or to handle local traffic. These nets hold special challenges for all concerned, and are closer to SSB nets in function than they are to FM repeater nets. For that reason, experience in operating on HF SSB nets will hold the operator in good stead during a simplex net.

Location – location – location: The first fundamental of efficient simplex operation is location. If you are mobile, move your antenna until you can receive a good signal and use enough power to be able to communicate with the NCS. Some stations will relocate to a high point to conduct a simplex net to improve their coverage.

Net Control challenged: As part of the challenges facing simplex operations, the NCS must learn to use relay stations properly to pass traffic. Since not all stations can hear each other on most simplex nets, there is a need to establish those stations with the best reception coverage as relay points. If you try to check in to such a net and NCS does not acknowledge you, ask for a relay.

Practice regularly to develop skills: A regularly scheduled simplex net can get everyone up to speed on the problems facing simplex operations and can stimulate those involved to steadily improve their stations and operating skills to the point that simplex becomes a well established alternative to emergency communications should the local repeater system fail.

Have a plan: It is important to have a local emergency plan. All of the local radio operators should know what that plan is. Knowing what frequency to turn to in the event of an emergency is the best way to ensure that there are enough operators available to assist in an emergency situation. Having backups to these established frequencies is also an important need that should be in the plan. These backups should include both FM repeater and simplex frequencies. Reference to local section HF nets should also be mentioned for those with HF capabilities. Find out what the local plan has in it. If there's not one, help make one. Amateur Radio operators should get with the local EC. Local emergency communications plans prepared by *REACT* Teams and local ARES units are a good start, but to be fully effective any plan must be fully coordinated with the local emergency management agency and should include any other major local organizations that will be involved in emergencies, such as the American Red Cross and other voluntary agencies.



**“Simplex Repeaters”** - There is increasing use of “simplex repeaters” in emergencies. These are simply radios equipped to listen to a particular simplex frequency and record what is being received. When the carrier drops, they will repeat that same information on the same frequency. This is usually from a location with wide coverage and may be using higher power than the sending station. These provide a special challenge and require different operating skills for those who use such repeaters. While coverage is definitely increased for a simplex net using a simplex repeater located at a high point, the drawback is that there is a time delay while the messages are being repeated, literally doubling the communications time for any message. There is also a great deal of confusion (especially among operators not used to a simplex repeater) if the receiving station can hear the original sender. If time is of the essence and a communications path is available, it would be better to conduct emergency traffic directly. A move to a different frequency probably would be the best way to conduct such traffic if a simplex repeater is in place. Simplex repeaters definitely have value, especially in areas where there are coverage problems. It is important to recognize that "simplex repeaters" do not fall within the definition of a "repeater" in the FCC rules. A "simplex repeater" requires a control operator present to control the station even though the function is fully automatic.

**Repeaters** - VHF and UHF FM repeaters are, by far, the most common method for local nets, including regularly scheduled club social nets, local traffic nets, and local emergency nets.

### **Repeater Etiquette:**

Leave at least a 1-2 second break between transmissions. This allows other stations to break into a conversation should there be an emergency.

Some repeaters have courtesy beeps. These signify that the time out timer is reset.

Autopatch: Most are “closed,” which means the autopatch is for club members only. For all autopatches you need to think of the following:

- Keep calls short and to the point.
- Inform the person on the phone line that this call can be heard by others.
- Remind the person on the phone line that there is to be no profanity.
- Don't say anything to the person on the phone line that you would not say loudly at the local shopping mall.

Various repeaters may have purposes other than or in addition to rag chewing. Learn about the repeater you intend to use *before* you begin a long rag chew.

Linked repeaters: In general, linked systems are not a good place to hold long rag chews. You will not just tie up a single frequency pair. You may, in some systems, have repeater pairs in as many as ten cities tied up. Be careful.

“Q” signals are for CW, not phone, and especially not for repeaters.

Leave the “10-codes” on radio services where they are normal practice.

## Basic Training: an Individual Checklist

### Why Training Is Important!

- Small disasters
- Large disasters
- Communications failures (911 etc.)

Education and training are important because you need to have confidence that you can execute the required steps in the shortest amount of time, with the minimum amount of wasted motion. Hesitancy and indecisiveness will quickly tire you, as you are expending more mental energy than required, and that would soon dull your senses. So, educate yourself and train before the skills are needed.

**What You Need To Do.** As a *REACT* member you have already taken the first important step: you are part of a group organized for the purpose of providing emergency communications.

Undergo an educational/training program. There are training materials available from *REACT* International headquarters. Additional training materials may be available from your state or area *REACT* Council. Most Teams have local training programs available through their local emergency management agency and other organizations they serve. Teams and members also have access to training materials and training opportunities from other organizations through National Voluntary Organizations Active in Disaster (NVOAD), their state VOAD chapter, and individual organizations with which *REACT* International has formal Memorandums of Understanding, including the American Red Cross, the Salvation Army, and the National Weather Service. There are also often community programs available to the general public through the local emergency management agency. One of the best sources of training is FEMA's Emergency Management Institute which provides a large number of free online training courses. The FEMA Independent Study Courses are mentioned several places in this manual and are covered in more detail in Appendix C.

Unlearn what you thought you knew. There are false concepts on emergency communications that are due to people's impressions and are not based on what has been tested and evaluated in actual field experience. Some of the most important emergency communications operating principles differ from regular daily radio practices, simply because emergency communications will require a network of message relay stations to be set up from scratch and operating within minutes or hours of an activation. This is something that is not done routinely by hobby radio operators in the normal course of enjoying the pastime. It is important to seek out educational material that is based on sound practices refined with actual field experience. Be open to learning new material, and the reasons it works.

Work as a team. Unlike individual radio operators operating from a single station at home or in the mobile, emergency communications involves radio operators forming teams and relaying messages using both similar and dissimilar techniques. This has been the focus of *REACT* since it was founded in 1962. This is one reason why membership in *REACT* has always been through the formation of local Teams.

Be flexible. Knowledgeable emergency communicators know very well that it's not a case of choosing which method is the "single one-size-fits-all method" for getting the job done but rather that it's a mix of techniques, whichever is appropriate for that particular message. This is a strength of *REACT*'s all-mode/all-service approach, which encourages Teams to take fullest advantage of all available resources by using the capabilities of different licensed and unlicensed radio services.

Work with your local emergency management agency. The emergency communicator must operate as part of a system with many levels. Each level has its own special requirements and procedures. While the lower levels of the operations may resemble and borrow from our personal experience as radio operators and technicians, it requires personal growth to operate in a challenging environment such as the one that materializes during an emergency.

Learn about the Incident Command System.

Learn about emergency management agencies in your area.

Learn about how disaster declarations are escalated from the city or county official, to the state governor, to the nation's president – paving the way for outside relief and aid.

Learn about how requests for mutual aid are handled within your community during a disaster.

Find out about the notification/activation tree for emergency communicators and sign-up as a team member.

Take a first aid and CPR course. It is knowledge you can use anytime, anywhere.

Equip yourself:

- Get a NOAA Weather Radio with digital Specific Area Message Encoding (SAME) alert. Program it with the code or codes for your area.
- Put together a quick deployment bag with your spare radio equipment, antennas, coax, clipboard, pens, IDs, etc.
- Place your checklist of last minute items (fresh batteries, water, etc.) with the bag to help ensure you don't forget anything.
- Put together a pack consisting of personal items (clothing, medications, etc.) you would need to take care of yourself for 72 hours in an emergency. This is useful for both field deployment and emergency evacuation.

Learn about emergency communications procedures:

- Practice checking into and out of nets. Practice operating in a net.
- Practice becoming Net Control.
- Practice sending and receiving messages in the format adopted by your Team based on the agencies or organizations you expect to serve.
- Practice participating in a tactical network during events such as a parade or marathon.
- Learn about emergency communications equipment.
- Learn and practice each of the communications techniques you are licensed for.

Learn about the agencies you will serve and about the training opportunities available from other organizations in your area. Team leaders need to take an active role in coordinating with other organizations and agencies:

- Check with your local ARES and RACES officials.
- Check with your local amateur radio clubs.
- Check with your local emergency response agencies: Civil Defense, American Red Cross, National Weather Service, Salvation Army, etc.
- Check with your local church and denomination.

Participate in joint training and drills whenever possible.

## Experience and Training

One key to the success of emergency communications is the amount of education, training, and preparedness prior to the event. By learning, practicing, and evaluating prior to the emergency, the overall level of proficiency is raised. During the activation and operation, the time to develop one's skills and knowledge is limited or non-existent, yet this is the time when having that knowledge and experience makes the most difference and has the greatest impact. Because of this, practicing emergency communications is best approached as a team effort scheduled on evenings or weekends; not learning while the actual emergency is happening.

There are a number of ways to develop knowledge and practice. The best way is to learn from the experiences of other emergency communicators, taking the best practices and avoiding pitfalls that can occur in any setting.

**Realistic Expectations** - When you go out on a real emergency there are several things you need to understand. The four listed relate to expectations and attitude while the remainder of this chapter deals with specific actions that your group will need to handle.

- **Expect confusion.** When we respond to a field assignment, our served agencies are getting their response organized and are often being pulled in a number of directions. Expect that some people won't know why you're there, what it is that you are supposed to do, and for whom. It is important that Team leaders have coordinated in advance and that you only respond when and where requested. *Never* self-dispatch.
- **Be flexible.** Because of the confusion, we must always remain flexible and convey to those we are serving that we are here to help. Your Team officers will attempt to have location directions and contact names for each field assignment before the member goes mobile, but this isn't always possible. Sometimes our function is clearly defined and understood, other times it isn't. Remaining flexible reduces your stress level and proves to our served agencies that you are a team player.
- **Know your audience.** Avoid arriving to a field assignment looking like either Rambo or an attorney. Neither is good; don't overdress. Instead try to look the part that's required. Outfit yourself as appropriate for the situation. For example, don't arrive to assist the base camp of a wildfire in short pants and a tank top, you might be asked to leave because your clothing choices could put you in danger. Stop for a moment, consider your assignment and whom you will be assisting, and make appropriate clothing and appearance choices. Don't arrive like you just crawled out from beneath a rock. Always look clean and well groomed.
- **Be aware of your first impressions.** Some of us are shy, some are outgoing. Some are demure, others are outspoken. Know how others perceive you and adjust your character as needed for the situation. If you are a shy and quiet individual, know that you might have to be bold to find the official or area you have been assigned to assist. If you are typically loud and outspoken, look around you; you might need to tone it down a little. If you are assigned to a police or fire dispatch center, loud talking and bold action are not going to be appreciated by the dispatchers who are assisting citizens with emergency needs.

## Simulations and How They Help

Skill is needed for handling simultaneous and multiple activities that can arise during emergencies. The very nature of responding to an emergency affords very little in the way of on-the-spot education and training. It is vital that the education, training, and practice occur ahead of time. Coping with equipment problems, people requesting attention and a response, listening for a station with a weak and distorted signal, all while simultaneously trying to absorb the situation and direct a team effort on and off the air are real-life situations that can occur. Fortunately, there are ways to learn and practice in a broader setting.

Simulations, exercises, and practice nets are proven ways to bring together these elements in a non-threatening and fun environment, develop the composure and skills, provide analysis and feedback, and gain new confidence to rise above any situation.

Radio operators are always in search of new knowledge, equipment, and operating opportunities. The learning and training sessions leading up to the simulations and exercises are excellent ways for specialists to introduce the rest of the team to new modes or techniques. There are a number of things you can arrange to try out and practice before the exercise, then test the team's proficiency during the event. Try alternate frequency and communications modes, such as simplex (non-repeater) operations, SSB, Near-Vertical Incident Skywave (NVIS) for HF coverage, satellite for reliable long-haul coverage, packet and digital modes for passing message text.

Simulations offer a safe environment for being an NCS or liaison/relay station. Other operators are trying out their skill and just as in practicing for team sports, an occasional error or two offers an avenue for review, learning, and improvement. Practice removes the fear, uncertainty, and anxiety of doing something you have not done before. Just that calming effect you feel afterwards with that sense of accomplishment is worth the experience. You have attempted an operating skill that few operators venture. Many operators will shy away from being an NCS, some believing that it is stressful, others thinking it's hard work (both are *right*). Many would rather sit on the side and listen. Being NCS is not a difficult skill to learn and master. The few who have accomplished the skill of handling nets have acquired a skill that is very useful in running and expediting meetings using a roundtable fashion, turning business and project meetings into a productive and enjoyable setting.

The National Traffic System is an excellent vehicle for amateur radio operators to practice relaying large volumes of messages in a timely and coordinated fashion. NTS stations practice originating, relaying, and delivering messages (collectively called traffic) quickly and efficiently. The skills honed with NTS experience remove the hesitation and mishandling that can happen when faced with having to pass traffic with another station that is new to you.

### **Public Service Events**

Public service events are the centerpiece of the training for many *REACT* Teams. These events provide an excellent setting where emergency communicators can practice teamwork and refine their confidence. Many public service events involve operators supporting and coordinating outdoor events such as parades or community fun runs, communicating using handheld radios. These outdoor operators are typically supported by Net Control Stations and/or relay stations using portable or mobile stations.

Public service events are excellent settings for practicing and refining skills on passing informal traffic, juggling amongst multiple operating frequencies, outfitting oneself with radio and personal equipment to comfortably operate in the field for a sustained period, all while enjoying and participating in a community event.

Real emergencies are the ultimate learning experience for emergency communicators.

Debriefing sessions should be held after each major operation to exchange lessons learned to be used for future operations. Since each event typically features a new set of operators, the lessons learned are frequently the same material being conveyed to a new audience. It is a wise use of time to learn from the experience of others and work toward mitigating potential gaps and obstacles rather than repeat past mistakes. Most of the considerations discussed in this manual were gleaned from past emergencies, exercises, and operations.

### **Teamwork and Attitude**

The mission for emergency communicators is to use any available communication technique to forward the message to its final destination. Whether it's via regular telephone, fax, amateur radio, commercial and government radio, Citizens Band, Family Radio Service, or even bicycles; the method is immaterial. What counts is that the message got delivered in usable form to the correct recipient in a timely and accurate fashion so that the recipient could take action.

It is a team effort to relay messages from source to destination. Each person in the chain is needed. Each person in the chain is special.

At no time should anyone be put into a situation that endangers that person or the people nearby.

Move the message in a timely and accurate fashion.

Each emergency is unique. You have to use initiative to find the available and the best paths to route the message to its destination. Standard Procedures and protocols are important, but the message is more important. Do not get locked into blindly following *only* the Standard Operating Procedures if that procedure isn't working.

You need not operate the radio yourself. If necessary, you can turn the microphone or radio over to the person originating or receiving the message.

Whenever the telephone system is available, a phone patch is a desirable piece of equipment when authorized in the radio service being used. Phone patches are authorized in the Amateur Radio Service, but *not* in GMRS, for example.

You may have to dispatch a runner to hand-deliver key messages if the recipient is not nearby.

Emergencies may require creating an operating environment where none previously existed or where existing facilities have been destroyed. In a matter of minutes, you must create a new environment and chances are that it won't happen seamlessly on its own. Recognize and accept this reality; do not rely upon someone else when you can do your own preparations.

The time to prepare personally for emergency and disaster situations is *now*, while there is time to think it through, purchase what you need with no lines at the store, and assemble things into kits and checklists. Your single most important item in the field is fresh water (not beverages such as coffee or soda that will dehydrate you). Personal emergency preparedness is discussed in more detail later in this manual.

*Now* is the time to read about and learn practical skills such as CPR and first aid. This is a more practical use of time than watching TV.

Don't worry and be distracted about the condition of someone else's equipment and operational readiness.

When you are at your site (or heading to your assignment or evacuation shelter), focus on your own situation first, then deal with other situations as conditions permit. The better your preparations and the faster you arrive at your destination, the faster you will handle your immediate situation.

If you have safeguarded your personal records and key belongings in off site locations such as a safety deposit box, your equipment is already substantially packaged, you have a checklist made to include the last minute items, and a checklist for setting up operations, you've substantially increased your chances of success in an emergency.

Just remember that nothing is guaranteed to go right in a real emergency. Do not wait for someone else to do your preparations. *You* make it happen. *You* provide for your education and results. *You* make it go right.

### **Remember That You Are Emergency Communicators, *Not* Emergency Rescue Personnel**

Keep your ID on you at all times – this includes your *REACT* ID as well as any other ID materials issued by your local emergency management agency or the agency you are serving.

Do not impede the work of professional responders such as firefighters, police and emergency medical personnel.

Stay out of the "hot zone" unless instructed. You don't want to endanger yourself and add yourself to the casualty list. Follow the directions of your lead operator or the chain of command. You may be required to perform duties beyond just emergency communications. Remain flexible to respond to the needs of the situation.



**Test Your Techniques *Before* an Exercise or an Event.**

If you want to experiment with a new technique or method, test it before you have a major exercise or event. You don't need more frustration or embarrassment, so why compound that chance when the stakes are higher?

Keep essential spare parts together with the equipment.

**Operating Skills**

Once you've learned the basics, gain as much on-the-air experience as possible.

Practice before the event. Publicize and hold practice sessions. Plan for them.

One cannot anticipate all the possible problems that can come up in the field, or on-the-air during a spontaneous event. By engaging in on-the-air activities, you practice solving problems spontaneously while simultaneously advancing the mission to communicate.

Don't be *overly* concerned with the problem solving during an exercise. Exercises are not so much about solving problems as about *identifying* problems. Once a problem has been identified, everyone can work together to develop *and test* a solution. What's important is that you experience and learn to cope with multiple, unexpected situations which will help you in future activities. You do not want to deploy into the field with uncertainty or hesitation. You want to work out your "butterflies in your stomach" ahead of time in a safe environment, such as an afternoon or evening net or on simplex with a couple of your buddies. During an exercise or drill, work with the situation as it occurs. Detailed analysis of what might have been a better way to accomplish some task is often best left until the critique after the exercise.

Message handling also means knowing how to find the most efficient route available to send formal or tactical messages between different frequencies and nets. Invest some time to practice and acquire this skill.

Practice being efficient with your time and the use of other people's time (like cutting out excessive chatter and getting immediately to the point) because during an emergency, time is of the essence.

Make your transmissions sound crisp and professional like the police and fire radio dispatchers and the air traffic controllers. Do not use any more transmission time on the radio than absolutely necessary. Someone *is* waiting to use the channel. (That's why frequencies are busy and congested during an emergency.) You don't like it when someone is hogging the channel when you need it, so you should be considerate and keep your time on the air short.

**Your Training Isn't Complete Until You Are Confident That You Can Train Another Operator**

During an emergency, expect people to walk-on to the project who were not previously trained. You need to feel comfortable training others on-the-job.

Ultimately, you want your trained students to be able to train others. Not everyone is capable or inclined to do this, but for those who can, it's a worthy art.

## Operating Practices

Agree on a limited set of frequencies to monitor during the initial stages of any emergency. *REACT* Teams that utilize amateur radio should coordinate with other amateur radio organizations in the area, especially ARES, RACES, and SATERN. If possible, all groups should agree on a single shared frequency as the primary stand-by frequency when an emergency is expected or just beginning. Non-amateur members should consider monitoring the same frequency on a scanner. A repeater is one of the most efficient ways of keeping people informed and coordinated during the early stages of an alert. An HF NVIS frequency has similar coverage and characteristics.

Every Emergency Management Agency *should have* a completed ICS Form 217A COMMUNICATIONS RESOURCE AVAILABILITY WORKSHEET that lists radio frequencies designated for possible use. Obviously such a list will not include every possible frequency across all the ham bands or even all the CB and GMRS channels. But it should include every frequency that has been identified for possible use in an incident. In many communities, this list has not been compiled at all or is badly incomplete. In some communities the 217A lists only the local government radio frequencies, in other communities the 217A may have been prepared by the ARES EC and may list only the local amateur repeaters. If an ICS form 217A has been prepared, use it as a starting point. If the 217A has not been prepared, all stakeholders should work together to complete this important planning document.

If the situation is localized, chances are that at least some repeaters are unaffected, so they can be used to coordinate and pass messages. If the situation involves only a small area, you may want to establish one or more simplex frequencies on one radio band (VHF or UHF) for local operations, and a repeater frequency on another band (UHF or VHF) for calling and coordination. Those with dual band radios can take full advantage of this procedure.

If the designated repeater is down, have people monitor the frequency to inform and direct responders to the “new” repeater or frequency. Similarly, have someone monitor the national simplex frequency or a locally agreed frequency.

### Establish a Calling Channel

Net operations within a metropolitan area are significantly improved when all stations can hear a common calling channel and move immediately to another frequency to handle the traffic. An amateur radio or GMRS repeater is frequently the best choice as a calling channel, especially if additional repeaters are also available for handling the traffic after the initial contact on the calling channel. Stations should call and confirm a usable frequency, then change frequencies to exchange the traffic. Do not converse or pass bulletins on this calling channel. You want to complete as many requests for contacts as possible. If you have need to pass a long bulletin, announce the frequency (another repeater or HF channel) and time (e.g., in two minutes) where you will pass the bulletin.

If you have the luxury of both VHF and UHF repeaters, consider which to use for a calling channel. The bulk of your traffic will probably be passed using one band, so you'll need a calling frequency on the *other* band to avoid desensing your radio. For amateur operators, this increases the utility of dual-band handheld and mobile radios with simultaneous dual receivers. Monitor the UHF side for calls and the VHF side for traffic.

### **Establish a Frequency You Will Monitor**

Various agencies and nets need to cooperate and encourage sending stations to switch to the appropriate monitored frequencies and call to gain the attention of the receiving stations. If the use of the frequency or the net is directed, get an acknowledgment and permission by the Net Control Station before calling the receiving station.

### **Use a Scanner Rather Than a Transceiver To Monitor**

A scanner has several advantages over a second radio for monitoring activity in the VHF and UHF bands: it scans faster, has more available frequency bands and memory channels, requires less power to operate, frees up your radio so you can talk, and allows you to delegate monitoring to a non-amateur with confidence that they will not transmit when you're not supervising the area.

### **Minimize the Need for Relay Stations**

To the extent possible, communications should be made directly without the use of relay stations.

Each relay station doubles the amount of time needed to send a message. There are factors such as terrain and congested frequencies that greatly influence what can be done, but again, *to the extent possible* find a clear open channel and communicate directly.

### **Do Not Rely Solely on Radio Repeaters**

Repeaters may go down during windstorms, weather situations, earthquakes, etc.

Alternate techniques include VHF/UHF simplex, HF NVIS, and digital modes.

### **Expect To Operate on Multiple Frequencies, Bands, and Services**

There is substantial interference and desense from radios that are operated next to each other. For example, a ten watt VHF 2m FM radio will effectively wipe-out the receivers of all other VHF radios in the immediate vicinity; therefore, you will be limited to only one 2m conversation at a time. If your radio is susceptible to intermod interference from paging companies, you should also expect to be affected by nearby, in-band radio transmissions.

Consider the interaction of multiple radios and systems in the same or adjacent bands and look for ways to diversify your use of radio spectrum:

- UHF – ham 440 MHz/70cm, GMRS, FRS, various business frequencies, and many public service agencies (very common for police and fire departments in cities)
- Ham 222 MHz doesn't conflict with other systems in common use, but equipment is scarce in most parts of the country

- VHF – ham 144 MHz/2m, MURS, various business frequencies, and many public service agencies (very common for police and fire departments in smaller cities and suburbs)
- VHF Low Band – ham 50MHz/6m, a few business frequencies (mostly abandoned), some public service agencies and utilities (still common with some state police agencies, rural sheriffs departments, and rural utility companies), and the American Red Cross national frequency
- HF – Includes frequencies below 30MHz. Mobile ham 28MHz/10m (SSB, FM, and some AM) and CB 27MHz/11m (AM and SSB), low power mobile equipment is readily available at low cost. The lower frequency HF bands are generally only used by the Amateur Radio Service, although a few military units and federal government agencies still maintain some HF equipment. HF is excellent for long distance communications between amateur radio operators, but has limited local applications.

These are very solid reasons to consider licensing in multiple radio services and upgrading your amateur radio license class.

Consider VHF or UHF for local tactical use with another band/service for inter-EOC and inter-agency metropolitan communications. Consider CB and FRS for direct access with the public, which may be essential if phone service is knocked out across a significant area. Consider amateur HF for communications between metropolitan areas or beyond line-of-sight with the minimum use of relays.

### **Practice Handling Both Formal and Tactical Messages**

The national standard for passing formal messages on amateur radio for many years has been the ARRL National Traffic System (NTS) Radiogram format and NTS handling procedures. Messages originated locally can be sent outside the affected area, even nationally without having to be reworked. The NTS "Radiogram" format is discussed elsewhere in this manual. Formal messages within the Incident Command System will normally be written on ICS form 213 for origination and delivery.

More recently the ARRL has advocated WinLink as a partially automated system for passing email via amateur radio.

Tactical messages should be short messages with:

- A recipient.
- A sender.
- A one sentence status or situation, and/or a one sentence request or directive.

### **Handling Weak Stations**

If you have a weak station on the net, consider splitting the net so the weak station won't hold back the operations of the main net. You'll have too many stations on hold waiting while you try to communicate with the weak station. Perhaps another station can be NCS or a relay station, move to a second frequency, and work with the weak station to relay needed information.

### Use Tactical Callsigns

You don't have to use a full FCC callsign to ID every transmission. Amateur radio operators are only required to identify by callsign at the end of a transmission or series of transmissions, or once every ten minutes if a transmission or series of transmissions lasts over 10 minutes. The rules for GMRS operators are essentially the same except that the time limit is fifteen minutes instead of ten minutes. Use tactical IDs to name stations at other times.

Tactical Callsigns are most commonly assigned based on the station location and/or function, such as North Street Shelter or Fire House One. Another method, if you have fewer than 26 stations, is give each one a letter unit designation and call them by their ITU phonetics. For example, the first shelter could be designated "Unit Alpha." You can then say "Alpha, call Bravo" instead of wasting time giving out the full callsigns. Every trained operator is familiar with ITU phonetics, so this is nothing new. The drawback to this method is that there is nothing about the designation that helps anyone remember who any station is or where that station is located. In some situations this can actually be an advantage in that it makes information a little more secure from casual listeners (or the media) monitoring the net.

For a relatively stable group, such as a *REACT* Team or an organized ARES or RACES group, individual unit designations can be assigned in advance and the same designation used for every event. This increases familiarity with the designation and makes it less likely to be forgotten in the stress of an emergency or the boredom of a long event.

If you have operating locations, such as hospitals, police, and fire stations, you can use the hospital and substation names as tactical callsigns. These have the advantage of being easily recognized and not changing each time an operator is replaced. The disadvantage, of course, is that the individual operator needs to remember a new tactical call each time he moves.

Remember that you don't even have to give your callsign at the beginning of the transmission series – only at the end. Use this fact to speed up the call sequence. In a well disciplined net there should rarely be any need for both the sender's and receiver's call sign on a transmission.

### Use Rollcall IDs for Nets

If an amateur net has been running for a while in a tactical mode, you can take roll-call IDs. Let the NCS call out the tactical call and have the station reply with their callsign (W1XYZ). That's all you need to do. Announce callsigns using letters (W ONE X Y Z) (7 syllables) and refrain from using phonetics (WHISKEY ONE XRAY YANKEE ZULU) (9 syllables), which wastes time and holds up the net. You can also use the acknowledgment to verify that the stations are present and available on the net.

If the net is on a repeater where all stations can hear each other equally, let the stations ID individually in the order of their unit designation when NCS calls for the ID break. This technique works well in a disciplined net with experienced (and alert!) operators, but will tend to break down if more than one or two operators miss their spot.

### **For Packet Radio, the User Interface Is Most Important**

The software and interface for packet radio should resemble e-mail so that clerical, non-radio people can operate the equipment. JNOS, with its Internet-style e-mail interface is recommended.

Packet stations used to receive long lists should have a printer so the list can be used without tying up the station computer. A packet station at an EOC or other prepared location may be able to pass data to the served agency on floppy disks, provided that the format is agreed in advance.

### **Winlink**

Winlink, also known as the Winlink 2000 Network or simply Winlink 2K, is a worldwide radio messaging system that uses amateur-band radio frequencies to provide radio interconnection services that include email with attachments, position reporting, weather bulletins, emergency relief communications, and message relay. The system is built and administered by volunteers and administered by the Amateur Radio Safety Foundation Inc. Winlink networking started by providing interconnection services for amateur radio. It is well known for its central role in amateur radio Emcomm messaging. The system runs several central message servers around the world for redundancy. A subset of HF gateway stations operate since 2013 as the Winlink Hybrid Network, offering message forwarding and delivery through a mesh-like smart network whenever internet connections are damaged or inoperable. During the past decade it increasingly became what is now the standard network system for amateur radio email worldwide. Email via High frequency (HF) can be used nearly everywhere on the planet, and is made possible by connecting an HF single sideband (SSB) transceiver system to a computer, modem interface, and appropriate software. The HF modem technologies include PACTOR, Winmor, and Automatic Link Establishment (ALE). Note that all aspects of Winlink messages are still subject to the regular FCC Rules and Regulations for Amateur Radio.

### **Operating Locations**

Your planning should include consideration of the hazards and special operations needs of various locations such as hospitals, etc.

Be prepared to deploy into the field and an office building.

You may have to operate from an evacuation shelter, which is typically a school cafeteria or gymnasium. Such locations may provide little more than four walls, a concrete floor, a roof over your head, and rows of hard tables and bench seats. School gyms are even worse, having bleachers for seats, no tables, and a floor that must not be scratched and that they may not even want anyone to walk on.

In some areas, the school gym or other large building used for a shelter may be a pre-fab, which is structurally equivalent to a giant lawn shed. The walls will be metal which effectively blocks most radio communications (including cell phones) inside. You may need to locate your station (or at least the antenna) outside or near an open doorway.

If you are assigned to an office building, chances are it is not designed to readily operate a radio station, so you will encounter long coax cable runs and a less than ideal antenna mounting location. Modern office buildings are typically designed so it is impossible to open any windows.

You should also anticipate the possible need to operate outdoors in a field, so get some sturdy and comfortable boots or work shoes to protect your feet and pack some suitable rain gear (such as a decent poncho, not one of the fifty cent “emergency” ponchos). You won’t know ahead of time that the situation may or may not require quality protection for your feet. Athletic shoes can be used in situations that are not hazardous. Use sunscreen if outdoors. Bring along insect repellent and/or insect spray to deal with annoying insects. Store spare batteries, water and other personal items in a fanny pack.

You need to keep in mind that during emergencies, operations will take place at locations that normally do not accommodate groups of people. As a result, you’ll probably find that there may be no accommodations for food, water, restrooms, personal hygiene, and first aid. You will need to prepare and bring whatever you need. Realistically, plan on supplies for at least two more people because you’ll be working in a team environment and there will be other responders. Packaged foods such as MREs, bottled water, prepackaged baby wipes, and rolls of toilet paper are signs of a well-prepared emergency communicator. But also remember that you can’t expect to travel with a truckload of steamer trunks. You need to be able to carry EVERYTHING that you bring.

### **Equipment**

Although we have emphasized the equipment you need to bring (or at least have available), also keep in mind that you will have to carry everything you bring. Sometimes you will have to carry it for a considerable distance and often you will need to carry it all in one trip. Plan your equipment *and your packing* so you can carry everything you need with you. If the minimum equipment for a particular station really cannot be carried by one person, look for the best way to break it down. This may be one large container with good handles for two people, or it may be a couple of suitcases. Whatever your solution, plan how to pack, carry, and transport everything, and try to coordinate the transportation arrangements in advance.

On VHF/UHF, use mobile radios, not handhelds for portable station operations whenever possible. Contrary to popular thinking, handhelds are not good for sustained emergency communications operations, especially in portable operations. Very often, you’ll need to run at least 1 watt, over a sustained period of time. Most new handhelds are very compact and have very small heat sinks. If you operate your handheld at high power, say 5 watts, for more than a few minutes, the thermal shutdown circuit will activate to protect it from overheating. Handhelds are good for monitoring, and the occasional acknowledgement, not for prolonged message handling. The solution is to run a mobile radio on low or medium power. Use a good antenna and a deep cycle battery.

Instead of using more power, improve your antenna. Your signal will radiate better with a better antenna, allowing you to conserve battery power. This will allow you to get more operating time from whatever amount of battery you are carrying.

- Transmitting with lower power also allows more receivers to operate in the same area by minimizing receiver desense.
- Mounting a VHF or UHF base antenna even ten feet above the ground will substantially improve your capabilities. It will also improve your reception.
- A simple quarter-wave antenna provides adequate performance over a wider frequency range than a loaded antenna. A VHF quarter-wave (about 18" to 19") will also perform adequately as a 3/4-wave for UHF. This is especially useful with today's dual-band radios.
- A VHF discone is a nearly perfect emergency base antenna for VHF and UHF. You can find plans for one in most antenna manuals or buy one from several companies. The old Radio Shack #20-043 is typical and sometimes still available. An even simpler and cheaper dual-band antenna for field use is sold by many companies as a scanner antenna. The old Radio Shack #20-176 is typical. This antenna is chrome-plated brass and steel, uses a standard coax connector, is durable enough to last for years and still cheap enough to throw away. Whatever your antenna choice, be ready with something better than a rubber duck.

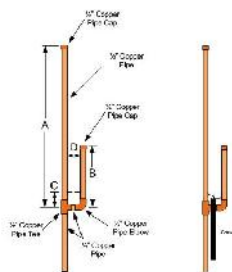


Radio Shack 20-043

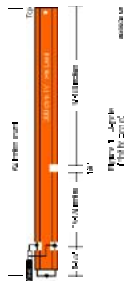


Radio Shack 20-176

- J-pole and "Slim Jim" antennas are easily made and are readily available at low cost. These antennas may be constructed of metal tubing (usually for permanent installation) or flexible wire antennas (excellent for temporary or portable installations). Both the J-pole and the similar Slim Jim are readily available as dual band antennas covering both VHF and UHF. One supplier of high quality Slim Jim antennas is N9TAX who makes dual band versions optimized for ham 2m/70cm or for VHF/MURS/GMRS. Even a ribbon J-pole antenna made from 300 ohm TV ladder feedline is far better than a rubber duck antenna. It is small, cheap, and light. There is no excuse for not using something better than a rubber duck antenna.



Copper J-pole



Twin-lead J-pole



Twin-lead Slim Jim



Be prepared to use 20 foot or longer coax runs to position your antenna in most temporary locations and even longer coax runs if you're in an office building.

For select applications such as point-to-point long haul communications, directional antennas such as beams, quads, and corner reflectors are excellent to increase your range and reduce the amount of local in-band interference. Position your antenna so that other antennas are placed to the side and rear, away from the main power lobes of your antenna.

### **Make Photocopies of Your Manuals and Store Them with Your Radio**

Don't leave the details of how to operate your equipment to your memory. Your mind gets fuzzy when it is fatigued. The manuals give you and others a chance to study your radio during spare moments you may have.

If your manual has a Quick Reference Sheet, make a copy *and laminate it*. If your manual doesn't have a one or two page quick reference section, make your own "cheat sheet" *and laminate it!*

Decide *in advance* whether or not you would ever be willing to let someone else operate your radio in an emergency. If someone else might be operating the radio make sure that all the needed directions are readily available (this may include information that *you* don't need).

### **Bring Extra Fuses**

Tape them on the outside so that they are readily visible to others, and that each radio has its matching fuse already preselected and ready to use. You can house the spare fuses in clear prescription containers or 35mm film canisters and tape them to the power cord, or you can tape the fuses directly to the power cord with vinyl electrical tape.

### **Bring Headphones**

There is substantial audio interference from operating in a confined space. Headphones cut down the noise and allow you to hear without interfering with the operator next to you.

Some dual-band radios have a stereo headphone jack. This works well for some operators, but not for others. If you use a dual-band radio (or expect to seriously monitor two radios) try using stereo headphones to see if this works for you.

Try different headphones to see what works well for you and your radio. Good communications headphones are not the same as music headphones. Music headphones provide a wide flat frequency response; communications headphones are optimized for voice frequencies. Some headphones deliver good sound and good isolation (they keep out the outside noise) but they may be too heavy to wear comfortably for very long. Lightweight headphones generally don't offer much isolation.

Some headphones are made specifically to *not* block outside sound, supposedly to make them safe to wear while jogging. Such headphones might help keep you from disturbing others, but won't keep them from disturbing you. Many of today's cheap headphones don't block the sound in either direction enough to be useful. They are really just two small speakers hanging on your head.

### **Consider Using a Foot Switch, a Boom Mike, or a Base Mike**

For many mobile and base radios, it's very easy to fashion a connector that enables you to control the radio with a foot switch. This will free your hands when you need them the most to do more things, especially writing down messages.

A good boom mike mounted to your communications headset will eliminate most background noise on your outgoing message. Such boom mikes do take some getting used to, so practice before using one in an emergency or public service event.

A desk mike is less work to use than a hand mike, but may have problems with background noise if your station is in a noisy environment.

### **Standardize on the Type of Batteries You Will Use**

If you are successful in standardization of batteries, you'll find that you probably need only two size cells for the majority of your radio and lighting equipment. Typically either AA or AAA and something larger like C or D.

The use of AA alkaline cells instead of rechargeable batteries is encouraged for short-term operations. Try to use newer battery technologies rather than old style NiCad batteries. A set of alkaline or lithium-ion batteries typically has about five times the life of an equivalent NiCad battery, thereby eliminating the weight and bulk of additional battery packs and a charger. You may not have reliable AC power to recharge your batteries. If you are responding to a long term situation with AC power, bring multiple batteries, chargers, and a power strip to simultaneously recharge the battery packs and conserve your alkaline batteries. Always try to have a dry-cell battery pack for any handheld radio.

You may also need a handful of batteries for equipment such as a multi-meter. Know what kind of batteries each piece of your equipment uses, and have them available.

Keep spare batteries on hand, and be sure to rotate your batteries to keep them fresh. When you need a new battery, put the "spare" into the equipment and buy a fresh spare.

You can make up a battery holder for nearly any DC powered equipment. A holder with five to eight size D batteries (depending on the voltage needed) will power a handheld radio nearly forever! And standard batteries are available just about everywhere.

## Resources

Resource planning is a major element of preparedness. This is the role of *everyone* involved in emergency response, from the Federal Emergency Management Agency down to each individual responder and the general public. Your role in this chain as an individual responder is to be prepared to provide those resources needed to support yourself and anyone you are responsible for (your family, anyone assigned to work for you, etc.) *and* to ensure that your emergency manager (generally a Team officer) knows what resources you have and any needed resources you don't have.

## People Considerations

### Shift rotation and overwork

- Radio operators are of value only when they show up at the operations site, and as a result, it's very easy to overwork those operators who respond if there is little response. Team leaders and operators as a whole must recognize this and anticipate bringing in fresh operators to relieve those on shift. Sometimes this means *not* using all available operators immediately when an emergency begins, but sending some of them home (or to a staging area) to rest up and report back as the next shift.
- While most of us are accustomed to working in an office or similar environment for eight hour days, radio operators should be allowed to take a break every hour. Ideally speaking, their shift should be no more than four hours in a 24 hour period, allowing them time to handle personal, work, or family matters.
- Often during emergencies, the demand for emergency communications far exceeds the available operators. A well staffed operation for a site requires a minimum of three operators at a time for adequate coverage and rest *during* a shift. Therefore, such a site would require about 18 operators per day to sustain operations. This level of staffing is very rarely available. Two or three operators dedicated to a single site is the best we can usually expect to see. During continuous operations a site with only two or three operators assigned will require support from non-operator "runners" and will still experience outages, communications failures, and operator burnout.

### Lack of replacement equipment (Yes, this is a *people* consideration.)

- Sometimes, as shift communicators leave, they will take back their personal equipment brought to the operation. This is understandable and should be anticipated.
- As people respond to an extended operation, managers must take a moment to find out how long they will remain and ask them if they're willing to let others use their equipment. If they indicate that they can only loan the equipment for a limited period of time, begin putting out a request for replacement equipment early.

### Everyone is "stressed out." Some sources of stress include:

- Emergency communications is a very challenging assignment. There's a lot of need being placed on people in a short amount of time.
- Operators need to meet with the appropriate person in charge to establish the working relationship, the boundaries of responsibilities, and the means of handing off working and communications. The person in charge is often too busy for any detailed discussion of these issues.

- Having a work table, lighting and similar considerations for your operating location is often a problem.
- The need to rapidly install equipment and antennas in a safe and durable fashion, dealing with equipment problems, and forgotten pieces of equipment, all are sources of stress.
- For those operating at an evacuation shelter, it is necessary to explain to members of the general public that we're communicators and not shelter managers.
- Dealing with problems and shortcomings on the radio nets, and within the operations center or assigned area.
- The level of fatigue after operating for a period of time.
- Dealing with people's differences in priorities, attention span, and ability to respond voluntarily.
- Demands for information from the EOC or agency headquarters which cannot be met by the on-site personnel.

As these demands wear down the individual's capacity for tolerance, flexibility, and creativity, the person shows signs of stress. People show it as varying levels of irritability and emotional outbursts, which affect the interpersonal relationship present.

Steps are needed to anticipate oncoming stress and mitigate the results after the onset. Some steps leaders should take include:

- Informing the emergency communicators that tensions can form, so don't take anything personally.
- Telling people up-front that we're all in this together, and reminding everyone of the objective. (Since the objective changes from event to event, there is no one single answer. It could be riding out the event, getting out of danger's way, stabilizing and transporting victims to an area hospital, etc.)
- Establishing teamwork and cooperation, and that working together will achieve the most results. We have to make do with what we have.
- Informing each person of who is in charge.
- Looking ahead to secure the essentials for the comfort of those present, such as food, water, sanitation, chairs and mats. Finding out what's available to meet the needs of parents with small children if they are present in the scene.
- Securing a broadcast radio so that those present can monitor progress as reported by the media.
- Activating stress management personnel. While you probably don't have your own people with the necessary skills to lead a Critical Incident Stress Debriefing, there is a good chance that one of the served agencies does. Team leaders should make arrangements for their volunteers to be included in the served agency programs.

Everyone should strive to be cooperative and not bruise someone else's ego

## ARES and RACES

ARES and RACES are the two largest amateur radio organizations with emergency communications as their specific purpose. You will find one or both active in most communities. Both are strictly amateur radio organizations, although some state and municipal governments are moving from pure RACES to an Auxiliary Communications Service (ACS) model which incorporates other radio services in addition to RACES. (A more detailed discussion of ARES, RACES, ACS, and other amateur radio organizations involved in emergency communications was covered in the first section of this manual.)

### Dual Membership and Its Advantages

Just as the ARRL recommends dual membership between ARES and RACES, for many of the same reasons *REACT* also recommends that members holding an amateur radio license should register with ARES and RACES if these organizations are active in their community.

#### Dual membership

- Fosters understanding and cooperation.
- Eases the transitions when one organization is activated before another and when one organization stands down before another, as an emergency grows then subsides.
- Supports best utilization of both personnel and equipment resources.

Persons registering with multiple emergency organizations need to ensure they are not being “double counted” by these organizations in emergency planning. This applies not only to emergency communications groups, but also includes other organizations that would respond to similar situations, such as Red Cross and some other public service organizations.

### Working Together

No one organization can do it all. *We will* be working together in any real emergency.

The leaders of *REACT* and the ARRL both actively recognize and support the need to work together.

The decision to be made at the field level isn't whether we will work together – only how.

In addition to *REACT*, there are a number of other radio organizations involved in providing emergency communications for national organizations. Among them are: ARES (ARRL), RACES (civil defense and local governments), SATERN (Salvation Army), SKYWARN (National Weather Service), and MARS (Military Affiliate Radio Service, a Defense Department program managed separately by each of the military services). Each of these is discussed elsewhere in this manual. Also many disaster response organizations such as the Red Cross, Baptist Disaster Services, Adventist Community Services, etc., all generally have amateur radio operators among their volunteers and often have organized these operators to provide communications support.

Both national and local radio organizations are often involved in supporting various emergency response and disaster recovery organizations such as: CERT (Citizens Emergency Response Team), VOAD (Voluntary Organizations Active in Disasters), hospitals and health care agencies, utilities, public service agencies. Some of these operate under the ARES/RACES/ACS structure; the decision is a local arrangement.

Emergency communicators are encouraged to register with more than one organization, depending on their interests, availability, and radio licenses. Persons signing up with more than one organization should declare their primary served agency, the one to which they will respond in the event of a major emergency. During times of non-emergency, they would be able to assist a peer organization in the development of their program, education and training efforts, and special events. If the primary served agency is not activated during a particular emergency, the individual is free to report to any agency needing assistance. For example, if an operator is enrolled in SKYWARN but the emergency is a railroad accident, the operator may be dispatched to assist the local hospital. Enrolling in *REACT* and other organizations makes the process of reassignments more orderly and efficient by having a structure and Memoranda of Understanding (MOUs) in place ahead of time.

**Leadership** - The function of true leadership at all levels in each organization is to accomplish the organization mission. For all emergency communications organizations, that mission is to support the needs of the community. This requires that everyone work to eliminate any “us vs. them” thinking and minimize bruised egos when multiple communication groups interact.

Quality leaders recognize that the overall goal is to move the messages to the final destination in a timely and usable manner. This is accomplished via teamwork and at times requires give-and-take to accomplish multiple goals. The culture of quality and professional leadership is established not during the event, but before the event. The membership should participate in leadership development, and communicate these values to members and non-members alike.

Minimizing bruised egos when multiple communication groups interact is done via MOUs and understanding amongst the leadership *before* an emergency develops. Effective operating procedures call for each organization to maintain a roster, noting which persons are signed up on a primary basis to work with that group. The choice of the primary served agency is up to the individual operator, as he or she is in the best position to determine both interest and availability given his or her training, work, home, and family situation.

Each agency determines which frequency(ies) they will monitor for calls, and notifies other agencies and nets which frequencies are being monitored for this incident. Frequencies for net operations should be coordinated on an area basis among the leadership and worked out ahead of time. The leadership must keep in mind that no emergency is perfect and variations in the arrangements are expected as adjustments are made due to the situation, the condition of equipment, propagation, operators, and agencies involved.

Remember overall objectives, priorities, and decisions must be made by the ICS command team. The Incident Commander should be clearly identified and changes should be noted and communicated as the situation evolves. Each response organization conducts its operations in accordance with the overall priorities and procedures established by the Incident Commander.

The focus is to align communications to anticipate and keep pace with the changes in overall emergency operations as indicated by the command team. Quality leadership in the communications groups recognize this and will coordinate their efforts among the groups to assure coverage and continuity.

Different kinds of emergencies will create different needs and will often involve having a different organization serving as the lead agency. The scope of the situation will also impact on the selection of lead agency and the lead agency may change as a situation develops. An emergency might start out with the local fire department providing the Incident Commander (IC); as the incident develops, responsibility for the incident might transfer to the County Emergency Management Agency, then the State Emergency Management Agency; finally as the incident winds down, the government agencies might secure their operations, but the Red Cross, Salvation Army, or other voluntary relief organizations may still be running shelters or feeding operations for the incident.

| <b>Typical Lead Agency for Emergency Situations</b>     |                                                                                                                                |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>Situation</b>                                        | <b>Lead Agency</b>                                                                                                             |
| Fire, Rescue, Hazmat, Weapons of Mass Destruction (WMD) | Fire Department                                                                                                                |
| Criminal Incident                                       | Police, FBI, ATF                                                                                                               |
| Natural Disaster                                        | Local/County/State Government, as delegated by the mayor, managing director, Office of Emergency Services, Civil Defense, etc. |
| Recovery from Transportation Mishap                     | National Transportation Safety Board                                                                                           |
| Maritime Emergency                                      | Coast Guard                                                                                                                    |
| Community Relief                                        | American Red Cross                                                                                                             |

## **The ARRL National Traffic System (NTS)**

The National Traffic System plan is a means for systematizing amateur traffic handling facilities by making a structure available for an integrated traffic facility designed to achieve the utmost in two principal objectives: rapid movement of traffic from origin to destination, and training amateur operators to handle written traffic and participate in directed nets.

Due to the resiliency and redundancy of the long-haul communications infrastructure in the United States, the NTS is rarely involved in handling large volumes of emergency traffic, however in wide-spread disasters or if a disaster strikes a highly populated area, NTS is likely to experience a significant of Health & Welfare inquiry messages.

Although the full NTS structure is unlikely to be needed for emergency communications traffic, its pool of highly trained, experienced operators are a valuable resource that may form the backbone of any emergency communications system where large volumes of formal traffic are to be handled.

There is a brief discussion of the NTS as it relates to emergency communications elsewhere in this manual. For detailed information about NTS see the ARRL Public Service Communications Manual or visit the ARRL web site at <http://www.arrl.org/nts>



## Equipment

### Personal Equipment Checklists

Note that these lists are *not* meant to suggest that you need to bring all the listed items. You probably can't bring all this stuff unless you will have your own truck to transport you and your equipment. These lists are meant to be a reminder of the equipment you *might need*. Each individual needs to consider the conditions where they live and the kind of events to which they will respond, then plan a kit that includes the items appropriate to their needs.

You should prepare an emergency kit with those items you expect to need in an emergency. This kit should be ready to grab-and-go all the time. Take this kit along even for one-day public service events when you know you won't need it. You will probably want to adjust your kit at least twice a year to take care of seasonal changes, but be sure you have at least the basics in the kit at all times.

For each event, whether it is an emergency call-out or a planned public service event, you then add whatever other equipment you will need for that event.

#### Equipment:

- Identification cards (*REACT*, served agency, state or local Emergency Management Agency, other related organizations such as ARES, RACES, Red Cross, etc.)
- Copy of any radio licenses (including copy of license for any business radios licensed to the Team)
- Handheld radio (dual band if applicable)
- Spare battery packs (charged batteries and AA or AAA holder)
- Headset, speaker-mike.
- Quarter-wave (usually about 19") mag-mount or ground plane antenna (will function on VHF and UHF)
- Coax jumpers and connectors
- Connector adapters (BNC/PL259/SMA as appropriate)
- Duct tape
- Notebook, pen & clip board (preferably waterproof)
- Watch
- Maps of area (topographic *and* street if possible)
- Compass and/or GPS
- Copy of emergency plan
- Copies of message forms and log sheets
- Boundary-marking tape

#### Personal Survival Items:

- Minimum three day supply of personal medications (even if only going to be out for one day)
- Medical information, with blood type, any allergies, medications, or medical conditions, and name and contact information for your doctor or doctors
- Warm clothing & boots (bright colors for shirts and jackets)
- First aid kit
- Moist towelette packets

- Sun screen (winter and summer)
- Rain suit
- Space blanket
- Plastic ground cover tarp
- Hat
- Gloves
- Orange or Bright Green vest (color as used in your area)
- Spare glasses (or spare contact lenses and solution if you wear contacts)
- Spare shoe laces and some twine
- Wool blanket
- Fanny-pack and/or backpack
- Supply of water (such as sports/bicycle water bottle)
- High energy snacks
- Large trash bags
- Toilet paper or facial tissue
- Flashlight with extra batteries
- Whistle

**Tools:**

- Multi-purpose knife
- Screwdrivers (Phillips *and* flat)
- Pliers
- Side cutter
- Crimping tool (with wire stripper)
- Assortment of crimp connectors, nails, brads, tacks
- Crescent wrench
- Fence pliers (includes hammer)
- Electrical tape
- MultiMeter / VOM

**For Public Service Events:**

- Cooler with food & drink
- Lawn chair
- Umbrella (sun or rain)

**Optional Items:**

- 3 wire AC extension cord with 2-to-3-pin adapter
- AC to 12vDC power supply
- Soldering iron with solder
- Beam antenna with tripod, mast, and guy rope
- Nut driver set
- Folding set of Allen/Torx wrenches
- Zip cord
- Hard hat
- Safety glasses
- Cash
- Transistor radio
- Binoculars

**HF Unique:**

- HF rig (12v DC preferred) with:
- Microphone
- Key
- Headphones and/or external speaker
- Tuner for the oddball antenna
- 50 ft or more of RG58 or better
- NVIS antenna (not a mobile vertical!)
- 75m dipole with ladder line or 130 ft of wire
- Insulators
- 3 masts, 8 ft or more, preferably non-conductive
- Guy rope
- Tent pegs for guys
- Lead weight and 50 ft light line for tossing over branches
- “Loud” marking tape to warn passers-by of guy lines, coax, etc.
- Power source (one or more)
- 12v gel cell 75 a/h with charger
- Vehicle with 12v battery & gas

**Portable “Shack”:**

- Shelter tent
- Table and chair

**Marking your Equipment.** There are very few people who would plan to steal your equipment, but during an emergency there is a lot of confusion. If you have each piece of your equipment marked with your name and callsign it will be much easier to ensure that your equipment is returned to you at the completion of the event.

## Standardized Connectors

During public service events or emergencies you could easily need to connect your radio to someone else's power supply or someone else may need to connect their radio to your power supply. A standard power connector goes a long way to facilitate this inter-connectivity.

*There is no universally accepted "standard" power connector.*

Many years ago ARES had recommended a molded nylon 2-pin Molex type connector (Radio Shack part number 274-222) as a 12-volt power connector for "low-powered" radios. The ARRL no longer recommends this as a standard connector due to the large number of amateur radios with current requirements exceeding the rating of this connector.

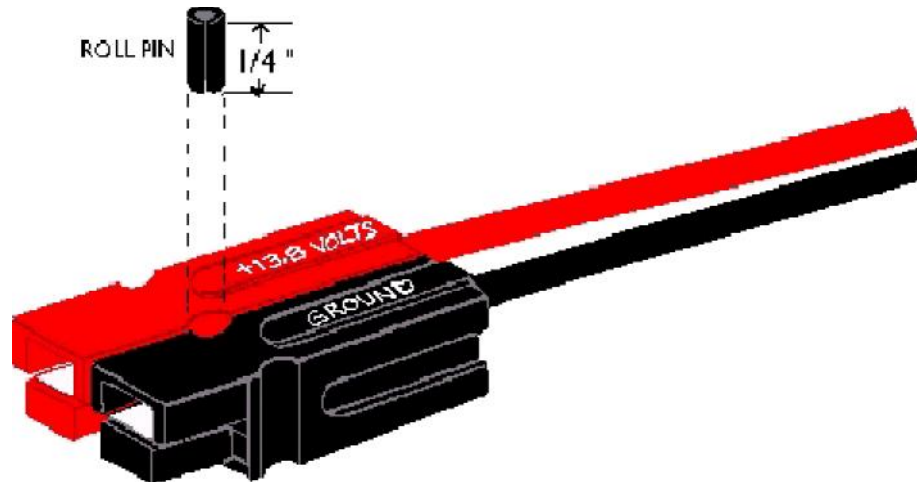
Many other groups, including the large and influential California RACES, recommend the Anderson Powerpole for its greater capacity and durability. This is the most commonly chosen "standard" 12v DC power connector today.

REACT does not specify any particular "standard" connector, but does urge Teams to conform to any existing local standard. If there is no local standard, the Anderson Powerpole is an excellent choice. There are valid arguments in favor of these connectors as well as arguments in favor of various other candidates. The instructions for the Anderson Powerpole "standard" connectors are included here for convenience. An additional consideration is also discussed at the end of this section.

### Anderson Powerpole

State of California Office of Emergency Services (OES) prescribes the Anderson Powerpole as the standard dc power connector for use by state ACS/RACES personnel, and recommends its use by county and city ACS/RACES personnel as well. Using this standard, highly reliable connector allows quick and easy installation and substitution of radios, power supplies, batteries, and other equipment.

Either the 15-ampere or 30-ampere sizes may be used, and both sizes mate with each other. The plastic parts are the same for both sizes. The barrel area (which holds the wire) of the 15-ampere silver-plated contact is smaller than that of the 30-ampere contact, but the contact area is the same. The connectors dovetail together into a compact unit.



Housings should be mated according to the diagram above, viewing from the contact side (opposite the wire side), tongue down, hood up, *red* on the left, *black* on the right. Use a 3/32-inch-diameter roll pin, 1/4 inch long, to keep the housings from sliding apart.

Highly conductive silver-plated copper contacts allow minimal contact resistance at high currents. Self-wiping action on make and break keeps the conducting surfaces clean. Contact dents keep connectors mated in high-vibration applications and provide quick-break, snap action upon disconnect.

Noncorrosive stainless-steel leaf springs maintain constant contact pressure, which is ideal for frequent connections/disconnections and intermittent overloading. The durable, high impact-resistant, polycarbonate housing with UL94V-2 flammability ratings comes in many colors for circuit traceability and coding.

Identical connector halves are genderless, making assembly quick and easy and reducing the number of parts stocked. *Because the connectors are genderless, it is possible to connect individual connectors of opposite polarity, causing a short circuit. This problem is minimized by proper assembly of connector pairs (as specified above) and standard color coding.*

Molded-in dovetails allow for a customized harness in a variety of configurations. When the connectors are disconnected, no metal parts are exposed.

The 15-ampere contacts are designed for 16-20 AWG wire and the 30-ampere contacts are designed for 12-16 AWG wire. The contacts can be soldered or crimped to wires. A crimping tool is available from Anderson. After a contact has been attached to a wire, it should be installed into the housing so that the housing spring mates with the underside of the contact.

To remove a contact from the housing, use Anderson insertion/extraction tool #111038G2. You may also substitute a very small blade (jeweler's screwdriver or Xacto knife) to depress the spring, allowing the contact to be removed.

Here are the Anderson part numbers:

| <b>15 A</b> | <b>Complete Connector</b> | <b>Housing Only</b> | <b>Contact Only</b> |
|-------------|---------------------------|---------------------|---------------------|
| Black       | #1395G1                   | #1327G6             | #1332               |
| Red         | #1395                     | #1327               | #1332               |
| <b>30 A</b> | <b>Complete Connector</b> | <b>Housing Only</b> | <b>Contact Only</b> |
| Black       | #1330G4                   | #1327G6             | #1331               |
| Red         | #1330                     | #1327               | #1331               |

The connectors can be panel mounted with clamp receptacles, consisting of two aluminum plates (Anderson part #1462G1), notched to hold the plastic housings when they are dovetailed together.

**Safety Note:** The HS-8 (8-pole) connector housing has an operational design deficiency, in that a red/black pair could be inserted into the *center* of the connector, with unfortunate results. Bill Frisbee W3EMH has developed a simple solution: take the right block of four and rotate them 180 degrees, so the blacks are all in the center, and incorrect insertion is not feasible due to the inverted connectors. Alternatively, and as shown in the PowerWerx Gallery from KM6YH, they can all be rotated 90 degrees, so all blacks are on the same side. Both solutions require only minor mechanical skills and are quite recommended. If your group uses the 8-pole connector housing in any applications, you are strongly encouraged to select *one* of these solutions and include it as part of your “standard.”

The plastic housings come in other colors also. Red and black are suggested for standard DC connectors (red as positive and black as negative).

Anderson Power Products Web Site is <http://www.andersonpower.com/>

The 15 and 30 amp rated connectors shown are at <https://www.andersonpower.com/us/en/products/powerpole/pp15-to-45.aspx>

These connectors are available from many sources at different prices, don't be afraid to shop around.

**One Final Alternative**

The one “connector” that *everyone* has available is plain wire. This is, after all, the one connector that originally came with every 12vDC powered radio. It remains the lowest common denominator, not just for organized groups, but also for spontaneous volunteers and any potentially donated equipment.

Plain wire isn't as elegant as either of the other connectors, but don't forget that it is there if you need it. In an emergency, a wire stripper and a roll of electrical tape are the ultimate “adapter” to resolve otherwise incompatible connections.

No matter what standard is (or isn't) adopted in your local area, always make sure that you have the basic connector for your equipment with enough wire on it so you can make a connection without totally relying on someone else having a matching connector.

## Local Standards

If there is a “standard” connector adopted in your area, equip your radios, power supplies, and batteries with these connectors. Additionally you should have adapter cords (patch cords) made with these connectors that have large auto battery clips and cigarette lighter plugs as the power source. (Cigarette lighter plugs should only be used as a short-term temporary connector for low powered equipment.)

A standard connector is most valuable *if* the power source is equipped with the appropriate connector. If there is already a standard in your area, work to ensure that the EOC and other locations have that connector on their power supplies. Donate the connectors if that’s the only way to get them in place. If they already have a connector, then either accept that as the standard or be sure you have the necessary adapter.

## Knowing Your Equipment

Nothing is more embarrassing during an event than to have to ask someone else to show you how to operate your own equipment. To avoid that situation you should perform all these steps *before* going out on an event:

- Try all configurations of power source, transceiver, antenna, fuses, and patch cords you have.
- Label pre-programmed memory channels by name and frequency, preferably on the radio or in a plastic pouch attached to the radio. The radio may be used by operators who have never seen it before.
- Make a card with tuning procedures and operating precautions *and laminate it!*
- Photocopy key pages from the operating manual and place in an envelope attached to each radio. Include enough information so another operator can use your radio without further instructions.
- Make sure *you* can set up the radio on *all* frequencies/modes the radio will operate.
- Ensure you know how to set, turn on, and turn off the subaudible tone encoder.
- For VHF/UHF radios - make sure you can operate “reverse pair” in case the repeater is down and someone else is unable to program their radio.
- Does your radio have the ability to lock on or lock out a frequency? Make sure you know how to activate or deactivate that function.

Team leaders should try to become familiar with the radios used by each of their Team members. Asking the member to show you how the rig works is also a great way to make sure that the individual knows how his own rig works. Consider having a "Training Night" where various members bring in their radio and show everyone how it works.

**Equipment Maintenance** - When you keep some equipment in standby or “on the shelf” waiting for a callout the equipment may not be used for months. It’s easy to overlook routine maintenance that you should perform regularly. You should keep in mind:

NiCad batteries self-discharge at approximately one percent of their capacity per day. Newer rechargeable batteries self-discharge a little slower, but *all* rechargeable batteries do self-discharge even when not connected to any device. If you leave them on the shelf for over three months they can go to zero charge or be in such a poor state that individual cells in the battery pack may reverse polarity, thereby ruining the entire pack. The best way to avoid problems is to use every battery pack you have every month. One complete discharge/charge cycle will keep the battery pack healthy well beyond “normal” life span.

“Button” cells used for memory backup in programmable radios typically go dead in three to five years. Replace them when it’s convenient for you, not when it’s too late.

Connectors, switches, and potentiometers can develop corrosion from disuse, especially if dissimilar metals are present. Operate, unplug/replug, and clean them regularly.

Pre-installed antennas at served agency locations and vehicles can be damaged and detuned. Check them regularly for changes and physical damage.

Printer ink cartridges dry out from disuse. Develop a stock rotation plan so spares don’t get too old.

Dry cell batteries, flares, first aid supplies, fuels, food, and water all have shelf lives. Develop a stock rotation plan for them.

## **Portable Antennas**

Of all possible portable antennas, the type that will be easiest to transport, store, and put up is the wire antenna. These antennas can be made in various configurations based on the frequency range to be covered. For VHF/UHF the “J-pole” antenna, made from 300 ohm TV type twin lead or the larger 450 ohm twin lead, will produce gain over a quarter wave yet store in a very small space. For HF the mono band or multi-band dipole will be very effective.

## **HF Considerations**

One of the most effective “local coverage” HF antennas is the NVIS or Near Vertical Incident SkyWave. This is a generally half wave dipole mounted less than 1/8 wave (at the operating frequency) above the ground. This antenna is most effective on the 40m and 75m amateur bands.

When you put up HF antennas, you must consider the potential impact of the antenna on people and equipment in the area. You must have sufficient poles, rope, anchor weights, boundary marking tape and such to put the antenna far enough up to not be a hazard to people or equipment in the area.



An effective NVIS antenna for 40m and 75m can be made from a 1:1 balun and two lengths of wire (62' each for 75m and 34' each for 40m) per side. Add to that a four inch separator at the ends of the 40m elements and an end insulator at the ends of the 75m elements, and you are complete.

There are extensive materials about NVIS antennas and operation available at many websites. Most of the early technical work on NVIS was accomplished by the military and military manuals that cover NVIS operation are readily available online. Keep in mind that the antenna length numbers in the military manuals (and some amateur descriptions based on those military manuals) are optimized for military radio frequencies and not for the amateur radio bands. The ideal antenna for NVIS operation is basically a half-wave dipole at a height between 1/8 to 1/4 wavelength above ground. NVIS antennas built to the military dimensions or shortened dipoles will still work for NVIS operation but will require an antenna tuner.

### **VHF/UHF Considerations**

Many times you will be in situations where the 1/4 wave antenna will not be as effective as necessary. During those times a three to five element Yagi antenna can be very helpful.

Keep the antenna at least one full wavelength (at the operating frequency) away from conducting surfaces if at all possible.

Keep coax runs as short as possible.

Use the lowest loss coax you can.

Discone antennas perform well over a wider range of frequencies than most other simple antenna designs.

VHF antennas based on a 1/4-wave design will generally function well as a 3/4-wave at UHF.

### **Generators**

Ensure you have the best possible ground line hooked up to the generator ground post *before* you start the generator.

Check the engine oil level before you start the generator and each time you need to refuel.

Refuel the generator when it is cool if at all possible. *Always* shut down the generator before refueling it. Fuel vapor from refueling creates a great fire hazard around a running generator. If several generators are serving one site, try to keep them separated so they may be refueled independently. If several generators are located together, plan to shut them down together for refueling all of them.

Ensure that there is adequate ventilation around any generator.

Store the extra fuel away from the generator.

Remember, even the smallest generator has enough voltage and current to kill you. Use extreme caution with this equipment.

Use only three wire extension cords to bring power to the operating area. An extension cord with a Ground Fault Interrupter (GFI) included is an excellent investment for greater safety.

Ensure that the extension cord has the required capacity for the projected load *and* cord length. Remember that a 100 foot extension cord is still 100 feet long even if you are only going 30 feet with it. The minimum wire gauge is determined by both the amount of current being used and the length of the cord:

| <b>Cord Length</b> | <b>Device Amperage Rating</b> | <b>Minimum Wire Gauge</b>                            |
|--------------------|-------------------------------|------------------------------------------------------|
| 25 Feet            | 1 – 13 Amps                   | 16 Gauge (Light Duty)                                |
| 25 Feet            | 14 – 15 Amps                  | 14 Gauge (Medium Duty)                               |
| 25 Feet            | 16 – 20 Amps                  | 12 Gauge (Heavy Duty) or 10 Gauge (Extra Heavy Duty) |
| 50 Feet            | 1 – 13 Amps                   | 16 Gauge (Light Duty)                                |
| 50 Feet            | 14 – 15 Amps                  | 14 Gauge (Medium Duty)                               |
| 50 Feet            | 16 – 20 Amps                  | 12 Gauge (Heavy Duty) or 10 Gauge (Extra Heavy Duty) |
| 100 Feet           | 1 – 10 Amps                   | 16 Gauge (Light Duty)                                |
| 100 Feet           | 11 – 13 Amps                  | 14 Gauge (Medium Duty)                               |
| 100 Feet           | 14 – 15 Amps                  | 12 Gauge (Heavy Duty)                                |
| 100 Feet           | 16 – 20 Amps                  | 10 Gauge (Extra Heavy Duty)                          |
| 150 Feet           | 1 – 7 Amps                    | 14 Gauge (Medium Duty)                               |
| 150 Feet           | 8 – 10 Amps                   | 12 Gauge (Heavy Duty)                                |
| 150 Feet           | 11 – 15 Amps                  | 10 Gauge (Extra Heavy Duty)                          |

Do not put multiple cords together to get the length you need. The wire gage used in virtually all extension cords is the minimum allowable for that length/load; thus if you connect two fifty foot cords to get 100 feet, they will not have the proper capacity to carry the full rated load unless you have chosen extra heavy duty extension cords. Also the connection between the two extension cords has a chance of coming loose, being unplugged (especially if anyone trips over or steps on the cord). The connection between two extension cords can also be a danger if it becomes wet.

### **Generators: Care And Operation – A Few Observations From Past Experience**

[By Anthony Whobrey KC4JTV]

#### **Personal safety**

Even a small generator can present hidden danger; be careful with even the smallest unit.

Never use a generator without a known good ground connection. Many of the newer units have safety features that will not function without a ground connection.

The only proper way to hook a generator to your house wiring is with a properly installed transfer switch. Unless you have frequent power outages, or a standby unit large enough to power your entire home, it will be difficult to justify the expense of a transfer switch.

Consider the purchase of a number of heavy-duty extension cords; keep them with your generator. A few companies offer “generator cords” designed to plug into the 240-volt outlet of your unit; they have four to six 120-volt receptacles for use inside your home.

Always place the generator outside your home before use. I have seen portable units running inside a garage or breezeway; this is trouble in the making. Placing the unit away from your home will reduce the noise and also prevent dangerous exhaust fumes from entering your quarters.

Never try to refuel a running generator. It needs to be shut down anyway to check oil (and coolant, for larger units) levels. Store oil and extra fuel in a location away from the operating unit.

#### **Other Considerations**

Voltage regulation — Many of the smaller generators and even some larger ones have poor voltage regulation. Your furnace blower or reading lamp probably won't care, but do you really want to run your \$ 2000 HF rig off a \$ 299 generator? The same goes for any expensive electronic gear. Consider powering your station from a battery, which can be recharged by the generator or your automobile.

Fuel — It is a good idea to have fuel reserved for your generator only. Use a couple of cans, one for your generator and the other for lawn equipment, kids' go-cart etc. Rotate the two every time you buy fuel. This will ensure a fresh supply for the generator.

Practical testing — Starting the unit every month or so is a good idea. Consider running the unit under load at least twice a year. Operation with about 2/3 of the rated load for 90 minutes or so will get the engine and stator windings up to a high enough temperature to drive moisture out of the unit. If you have a small air-cooled unit this is probably overkill, but with any unit over 10 kW or so, and any size water-cooled unit, it is a valid point. A generator that won't pick up the load is useless.

## Equipment Operations

### DTMF

Consider equipping your radio with a DTMF (Dual Tone Multiple Frequency) microphone. Some radios don't come with it. A DTMF microphone is useful if you need to bring up an emergency autopatch, or if you need to remotely control a repeater.

Consider employing simplex autopatches for field units to access phone lines during emergencies. Note that the use of any telephone interconnect is prohibited in some radio services, including GMRS.

Some radios, especially handhelds, come with a DTMF decoder that also turns the radio into a DTMF pager.

### CTCSS

Almost all modern VHF and UHF radios are equipped with CTCSS. If your radio is not equipped with CTCSS (Continuous Tone Coded Squelch System), consider getting an encoder. You can use CTCSS as a kind of off-hours monitor. When the radio receives a signal without the CTCSS subaudible tone, the receiver will not open and you will not hear audio. When the radio receives a signal with CTCSS tone, it will open the squelch and you can hear the transmission.

CTCSS is useful for:

- Monitoring a common calling channel for emergency alerts (activate the CTCSS before calling).
- Blocking out interference from distant stations on the same frequency.
- Activating remote links on some repeater systems to extend coverage beyond just a local repeater, and with the CTCSS tone send the audio onto links to remote repeaters.

CTCSS operates in two modes, Tone Encode and Tone Decode

- Tone Encode is a transmitter function that sends the subaudible tone every time the radio is keyed. Tone Encode is necessary to access most repeaters and is necessary to communicate with other radios that are using Tone Decode. Tone Encode can be used by itself for these purposes. When a radio is set up to use *only* Tone Encode, that radio will receive any signals on the frequency regardless of whether or not those signals have the matching tone. Tone Encode is generally the preferable setting to use during emergency communications.

- Tone Decode is a receiver function that prevents the radio from receiving any signal that does not have the matching tone. Tone Decode would not be used without also using Tone Encode. Any radio equipped with Tone Decode should also be equipped with some easy method to temporarily disable the decoder so the operator can check the frequency before transmitting. A few amateur radios omit this necessary control function. Operators using Tone Decode must be trained to *always* check the frequency before transmitting.
- Nearly all FRS and GMRS radios are equipped with CTCSS, which the advertising and the user manual will often describe as a "Privacy Code" -- be aware that using the tone or "Privacy Code" on one of these radios does NOT provide any privacy. Anyone else listening to the same channel can hear everything you say simply by turning OFF the privacy code on their radio!
- Most FRS/GMRS radios and many commercial (Part 90) radios do not offer any choice between Tone Encode and Tone Decode. The CTCSS Tone function is either ON or OFF. When the Tone is ON, the radio uses tone encode *and* tone decode. When the Tone is OFF, the radio does not use either.

## AQS

Some radios support the Amateur Quiescence System (AQS). It uses a sequence of tones to perform digital signaling at the beginning of each transmission representing a sequence of numerical digits. You can use it to selectively call another station and quiet the receiver in the meantime.

Some manufacturers use different names for this same feature. Not all radios implement all the same functions such as group calling. Review the manual to see if the methods are compatible.

## Passband and Notch Filters

Learn the passband and notch filters, and the IF shift features of your radio. You can use them to work around adjacent frequency interference on SSB and CW.

Passband and IF shift are useful if there is a wide signal interfering that is adjacent to your receive signal. A notch filter is useful for CW, if there is an adjacent CW signal.

## Hospital Safety Requirements

Hospitals have strict regulations on permitting electronic devices to operate within the building. Stray interference generated by electronic devices can affect the sophisticated and often computer-controlled medical equipment. Have your equipment checked by the safety officer or designated hospital staff person. This includes not only radios, but also other equipment you plan to use inside a hospital such as power supplies and computers.

Having equipment and operating sites approved *in advance* is especially important for teams supporting the National Disaster Medical System (NDMS).

## Incident Command System Overview

The following description of the Incident Command System (ICS) is a summary for use by radio operators working on emergency communications activities. This summary only provides a limited basic understanding of terminology and concepts associated with ICS.

This outline does not replace formal ICS training which is *strongly* recommended. If your primary served agency or the emergency management agency for your area conducts its own ICS training, all Team members should participate in this training. If no local classes are available, Team members should complete the Basic Incident Command System home study courses available from the FEMA Emergency Management Institute (See Appendix C).

Suggested Team training standards are:

| Recommendations                                         | All Team Members       | All Team Leaders                   |
|---------------------------------------------------------|------------------------|------------------------------------|
| Minimum Essential Training                              | ICS-100, ICS-700       | ICS-100, ICS-200, ICS-700, ICS-800 |
| Highly Recommended                                      | ICS-200, ICS-800       | IS-29, IS-288                      |
| Suggested                                               | IS-394                 | IS-240, 241, 242 & 244, IS-802     |
| If Available                                            |                        | ICS-300                            |
| Training to consider based on Team location and mission | IS-324, IS-325, IS-559 |                                    |

Incident Command System is a management tool designed to assist anyone who has the responsibility for the successful outcome of an incident. An "incident" is any planned or unplanned occurrence or event, regardless of the cause, which requires action by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

The Incident Command System has two facets. These are interrelated and both are critical to the successful outcome of the incident. They are management by objectives and a consistent organizational structure.

### Management by Objectives

Four essential steps used in every incident, regardless of the size or complexity, are:

- Understand policy, procedures, and statutes
- Establish incident objectives
- Select appropriate strategy
- Apply tactics most likely to accomplish objectives (assign correct resources and monitor results)

The complexity of the incident will determine how formally the management by objectives portion will be handled. In a small, simple incident, the process can be handled by verbal communication among appropriate people. As the incident becomes more complex many of the differences in individual objectives will be resolved by documentation of the incident objectives. The ICS 201 document describes the process that allows this to happen in a systematic way.

### Organizational Structure

The ICS structure begins with the Incident Commander (IC). The person designated IC is responsible for the management of the incident and starts the process by setting incident objectives. This person may do all functions without aid but will usually delegate responsibilities to others in the organization. The IC still has overall responsibility for the incident, regardless of duties delegated.

It is common to have an incident cross jurisdictional boundaries. Unified Command is the ICS process that allows the multiple jurisdictions to develop unified objectives and strategies for the incident. This is accomplished without any loss of authority, responsibility, or accountability.

Under Unified Command:

- The incident will be handled under a single coordinated Incident Action Plan (IAP).
- One Operations Section Chief will have responsibility for implementing the Incident Action Plan (IAP).
- One Incident Command Post (ICP) will be established.

As the IC fills positions in the organizational structure, the positions will fall into five areas of management function:

- Command - Responsible for all incident or event activity. The command staff assists the IC and reports directly to the IC. The incident size/complexity will determine which other management functions will be filled.
- Operations - Responsible for directing the tactical actions to meet incident objectives. There is only one Operations Chief (if activated by the IC) per operational period but that position may have deputies as needed. The Operations Section commonly uses Branches, Divisions, Groups, Task Forces, and Strike Teams to maintain unity, chain of command, and span of control.
- Planning - Responsible for collection, evaluation, and display of incident information. It also maintains status of resources, preparing the IAP and incident related documentation.
- Logistics - Responsible for providing adequate services and support to meet all incident or event needs. *Communications is part of Logistics.*
- Finance/Administration - Responsible for tracking incident related costs, personnel, and equipment records, and administering procurement contracts associated with the incident or event.

Each of these functional areas can expand as needed into additional organizational units with further delegation of authority. As positions are filled, the ICS position titles are used as the message addresses and radio designations.

The ICS organization at any time should reflect only what is required to meet planned tactical objectives. The size of the current organization and that of the next operational period is determined through the incident action planning process.

A number of organizational elements may be activated in the various sections without activating sectional chiefs. Each activated element must have a person in charge of it. A single supervisor may initially be in charge of more than one unit. Elements that have been activated and are no longer needed should be deactivated to decrease organizational size.

The greatest challenge for the IC is to maintain control of the resources and to keep open communication both up and down the organizational structure. The principles of unity of command, chain of command, and span of control allow this to take place. These three principles are also critical for maintaining the safety of incident personnel.

- Unity of Command means that every individual has one designated supervisor, knows who that person is, and knows how to contact them.
- Chain of Command means that there is an orderly line of authority within the ranks of the organization with lower levels subordinate to and connected to higher levels. In most incidents, chain of command will initially consist of:

Command  
Resource

As incidents expand, the chain of command expands through an organizational structure that can consist of several layers. For example:

Command  
Section  
Branch  
Division or Group  
Unit  
Resource

- Span of Control relates to the number of individuals one supervisor can manage effectively. In ICS the span of control for any supervisor should fall in the range of three to seven, with five being considered normal. Span of control is accomplished through timely use of delegations and good resource management.

### **Incident Documentation**

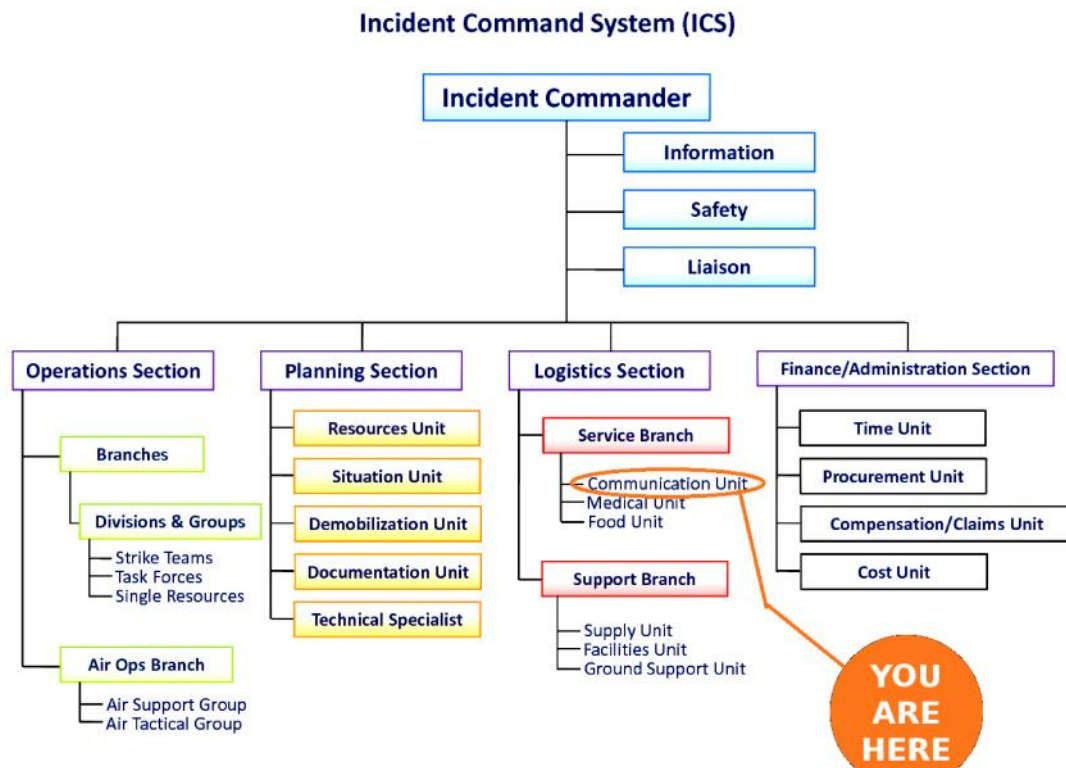
The Incident Action Plan provides all incident supervisory personnel with direction for future actions. It may be written or verbal but written plans are preferred. It is important to use written IAPs when:

- Two or more jurisdictions are involved
- The incident will overlap major changes in personnel or go into a new operational period
- There is extensive or full activation of the ICS organization





## ICS Command Structure



The above is not an absolute fixed structure. It shows the five functions and the way the structure typically expands within each of those functions. Depending on the type and size of the incident, there may be more or fewer units under each function, but the units will not move under a different function. It is possible in a small incident that one person may head more than one function, such as one person being both Planning and Finance Officer.

### Position Objectives

Each person within the ICS structure is charged with accomplishing specific tasks in support of the overall effort. These tasks, for incident managers are:

#### Incident Commander (IC)

- Assess the situation
- Establish incident objectives and overall plan
  - For the first hour
  - For hours two through eight
  - For extended operations
- Fill necessary ICS functions
- Brief staff
- Monitor staff and revise plans as necessary
- Handle requests for additional resources and release resources

### **Operations Chief**

- Obtain briefing from IC
- Establish operational objectives per incident plan
  - For the first hour
  - For hours two through eight
  - For extended operations
- Develop tactics to accomplish objectives
- Divide incident by geographic reference and/or function
- Appoint and brief Branch/Division/Group leaders
- Supervise operations
- Determine and acquire resources from Branch/Division/Group leader input

### **Branch/Division/Group Leaders**

- Assess the situation
- Establish incident objectives for Branch/Division/Group
  - For the first hour
  - For hours two through eight
  - For extended operations
- Develop tactical plan to accomplish objectives
- Determine time and resource requirements
- Determine logistical requirements
- Request needs from Operations Chief

### **Plans Chief**

- Obtain briefing from IC
- Establish necessary positions within function
- Supervise preparation of Incident Action Plan (IAP)
- Develop alternative strategies
- Provide periodic predictions on incident potential
- Supervise planning section units

#### **Situation Unit**

- Compile incident situation information
- Display incident status on maps, boards, etc.

#### **Resources Unit**

- Compile incident resource information
- Display resource utilization/availability
- Check in resources as they arrive

#### **Documentation Unit**

- Document complete incident

**Logistics Chief**

- Obtain briefing from IC
- Establish logistics section positions as necessary and do briefings as necessary
- Identify service and support needs for the duration of the incident
- Coordinate and process requests for resources
- Advise IC and staff of current service and support capability
- Prepare Service and Support portions of the IAP

**Finance/Administration Chief**

- Obtain briefing from IC
- Obtain briefing from agency administrator(s)
- Work with IC and Ops Chief to ensure work/rest guidelines are being met
- Identify cost sharing possibilities
- Assess potential for legal claims arising out of incident activities
- Ensure that proper tax documentation is completed
- Determine whether hosting agency will maintain time records, or whether the incident will document all time for the incident, and what forms will be used
- Track all expenditures

## Emergency Call Outs

### How Will I Know?

As a *REACT* Team member, you will normally be notified by a designated individual within your Team. Each Team sets up its own notification system based on the needs of the Team and the resources available. This system may include a “telephone tree” but should include methods that will work even if telephone service or electrical power are out due to the emergency. Part of this system should include a designated radio frequency for members to monitor in the event of any actual or expected emergency.

Your Team leaders should be registered with the local emergency management agency or the primary served agency. *You* should also be registered with your local emergency management agency and/or your primary served agency. This may be accomplished through the Team or individually depending on the system implemented by your local EM agency and local organizations.

If you are a licensed amateur radio operator, you should also register with the amateurs associated with RACES and ARES and make arrangements to be available for alert and activation.

Once the activation notice has been sent, operators are expected to activate and respond according to the established response plan. It is important to have an established response plan because this plan determines what each individual will do in the event of an emergency activation. Depending on local circumstances, this may involve establishing a radio net on a designated frequency, reporting to a central location, or reporting directly to prearranged job assignments.

### Setup and Initial Operation in an Emergency

When you arrive at any assigned location, report to the person in charge and introduce yourself as the emergency communications operator assigned to the location. For prearranged assignments at prepared locations this should be a very quick and simple process, but it is important to always make sure that the person in charge at the site knows you are there and what you are doing there.

If you are responding to a new location, as you get on site, ask for the person in charge and introduce yourself as the emergency communicator assigned to serve that location. The person in charge will be busy, so spend only a moment explaining that you would like to set up a communications station for that location, and to ask where he/she would like the station located. Be prepared to suggest an appropriate location: one that can serve as an operating table and message desk; has feedline access to the window, outdoors, or roof; has access to power and telephone, and is away from the command center to avoid commotion from disturbing either the command or communications center.

Move your equipment, battery, and power cords into position. You should arrive as a team of two or more, so that one person can start setting up while the other person is ferrying some of the equipment in. The priority would be to set up the primary station to establish essential contact with the net. If you have your radio, microphone, and power cord pre-wired and stored in a small duffel bag along with a magnetic mount antenna, lift it out, set it on the table, screw in the antenna and power (AC power supply or 12 volt battery), and begin operations. Test the equipment for proper SWR, then check into the net. Use the lowest power setting that produces reliable contact. Since you're operating in an unfamiliar environment, resist the temptation to run high power, which could possibly damage your radio due to high VSWR or cause local interference into nearby equipment.

If there are supposed to be more operators at your location, you may also use the radio to check on the progress of others responding to your location. Many Teams use a selected FRS channel for internal on-site communications.

Once the primary radio is operational, proceed to set up any additional equipment, such as a scanner, HF, packet, and other stations. As more of your communications setup becomes operational you can check into other nets and begin compiling a list of stations that are reachable directly or via a relay station.

**Paperwork Required at the Site** - These are some of the things you should have with you when you operate in the field:

- Outgoing message forms or sheets to compose messages. (ICS form 213 is recommended unless the agency you serve has its own form)
- Incoming message forms or sheets to copy and log messages. Often, you'll copy the message onto scratch paper, then transcribe it cleanly onto an incoming message form. (ICS form 213 is recommended unless the agency you serve has its own form)
- Log sheets to log incoming and outgoing messages. (*REACT* form 133 is preferred unless your agency asks you to use ICS form 214 or has adopted its own log form). Plain lined paper will do if forms are not available. Every station should maintain a complete log during any emergency assignment.
- Notepad for writing notes.
- 3M Post-its for annotating items.

### **Long-Term Operation**

If you expect to operate from the location for a period of time, establish a message filing system so that you can retrieve the messages as needed. Many office supply stores have a "portable office" consisting of a case that can hold several hanging folders and has a tray on top for pencils and other supplies. A mini-stapler, scissors and tape would also be very useful to organize and file the messages.

You should also look for and establish a break area, rest room facilities, and a sleeping area.

## Shutdown

**Notification of Shutdown** - The notification for shutting down operations may be given over the air by the NCS or bulletin station. The shutdown usually is preceded by notices giving a “heads-up” stating that shutdown of operations is coming. Notifications can be supplemented via telephone tree networks or other methods.

**Shutdown and Cleanup** - Upon receiving notice of a shutdown, the station should begin securing the messages, the message desk, equipment, and other materials.

## Debriefing

Notes should be jotted down during the event and at the debriefing, especially those noting at what time critical events occurred. It is useful in the analysis to determine timeframes for activation, setup, transit, etc.

- Note what happened.
- Note who was around. In case there are questions, you will know whom to contact for further information.
- Note the hours of operation.
- Note what was accomplished. Often, the list of accomplishments needs to be related to those who weren't there at the scene/operating location.
- Note what's pending. If there were unfinished items, note them so that someone else can follow-up.
- Note what was good. Jot down the things that went well. Often, in the heat of the moment, we forget that there were things that worked in our favor.
- Note what needed improvement. This is fairly easy to note, as we remember easily the items we struggled with the most.

Thank those who turned out and were involved. Even a simple verbal thank you goes a long way, compared to hearing not a single word. Make sure you make it a point to thank those around you and your family for letting you get the job done.

## Demobilization

For any major incident there will almost always be a formal demobilization process and usually a checklist to ensure that each individual who was mobilized for the incident completes the process. The formal demobilization process is *not* just for the professional responders and *not* just for responders brought in from outside the area. When a formal demobilization process is implemented, *everyone* must complete the process.

## Logging

Each station should maintain a log during any emergency operation.

If the agency you work for has adopted a form for logging, you should use that form. If the agency has not adopted a form of its own, then *REACT* form 133 is the suggested format for logging (See Appendix D). Many agencies use ICS form 214. If the agency uses ICS form 214, talk with the agency about whether it would be acceptable to draw columns to keep track of the "received from" and "delivered to" for each message. If you don't add those columns you still need to be sure to record that information for each message. It may be more convenient to keep *BOTH* an ICS form 214 *and* REACT form 133.

If nothing else is available, plain lined paper may be used. Whatever form you use, *keep a complete and accurate station log.*

The basic information recorded in the log includes the time of each entry, who the message was from, and who it was sent or delivered to.

It is not always necessary to log the full text of each individual message in the station log, but the full text of every message must be kept as part of your record. Anyone checking the record must be able to match up each message with its matching log entry.

When sending formal written message traffic, the text normally is not included in the log because the text is already included on the written message form. Record the message number in the log. You may also want to include a *brief* subject of the message to make it easier to find "that message about xxxx I told you to send a half hour ago."

For tactical traffic that is not prepared on a written message form, include at least the basic content of the message in the log.

Experienced operators will sometimes omit logging "insignificant" traffic. The ability to recognize which traffic is or isn't "significant" comes only with experience and even the most experienced operators can never be completely sure. The best advice is to log *all* the traffic passing through your station during any emergency operation. You never know what will turn out to be important days, weeks, or even years later when a legal battle is waged over liability for actions taken or not taken during an incident.

Computer fillable versions of the ICS-214 and most other standard ICS forms are readily available. If using a computer version of *any* ICS form, check in advance that it matches the version of the form as used by the agency you are working with. Although the actual content of the form will almost always be identical, many agencies have adopted versions of ICS forms that look slightly different from the "standard" version. Sometimes the difference is just adding the agency name or logo, in other cases the agency may have added blocks for additional information. Just because an agency says they use a particular ICS form number does not guarantee that every online copy of that form will look exactly like the one the agency uses. Always verify *exactly* what form your agency is using.







**Instructions for completing ICS form 214 Activity Log**

**Purpose.** The Activity Log (ICS 214) records details of notable activities at any ICS level, including single resources, equipment, Task Forces, etc. These logs provide basic incident activity documentation, and a reference for any after-action report.

**Preparation.** An ICS 214 can be initiated and maintained by personnel in various ICS positions as it is needed or appropriate. Personnel should document how relevant incident activities are occurring and progressing, or any notable events or communications.

**Distribution.** Completed ICS 214s are submitted to supervisors, who forward them to the Documentation Unit. All completed original forms must be given to the Documentation Unit, which maintains a file of all ICS 214s. It is recommended that individuals retain a copy for their own records.

**Notes:**

- The ICS 214 can be printed as a two-sided form.
- Use additional copies as continuation sheets as needed, and indicate pagination as used.

| Block Number | Block Title                                                                                                                                     | Instructions                                                                                                                                                                      |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | <b>Incident Name</b>                                                                                                                            | Enter the name assigned to the incident.                                                                                                                                          |
| 2            | <b>Operational Period</b> <ul style="list-style-type: none"> <li>• Date and Time From</li> <li>• Date and Time To</li> </ul>                    | Enter the start date (month/day/year) and time (using the 24-hour clock) and end date and time for the operational period to which the form applies.                              |
| 3            | <b>Name</b>                                                                                                                                     | Enter the title of the organizational unit or resource designator (e.g., Facilities Unit, Safety Officer, Strike Team).                                                           |
| 4            | <b>ICS Position</b>                                                                                                                             | Enter the name and ICS position of the individual in charge of the Unit.                                                                                                          |
| 5            | <b>Home Agency (and Unit)</b>                                                                                                                   | Enter the home agency of the individual completing the ICS 214. Enter a unit designator if utilized by the jurisdiction or discipline.                                            |
| 6            | <b>Resources Assigned</b>                                                                                                                       | Enter the following information for resources assigned:                                                                                                                           |
|              | • Name                                                                                                                                          | Use this section to enter the resource's name. For all individuals, use at least the first initial and last name. Cell phone number for the individual can be added as an option. |
|              | • ICS Position                                                                                                                                  | Use this section to enter the resource's ICS position (e.g., Finance Section Chief).                                                                                              |
| 6            | • Home Agency (and Unit)                                                                                                                        | Use this section to enter the resource's home agency and/or unit (e.g., Des Moines Public Works Department, Water Management Unit).                                               |
|              | 7                                                                                                                                               | <b>Activity Log</b> <ul style="list-style-type: none"> <li>• Date/Time</li> <li>• Notable Activities</li> </ul>                                                                   |
| 8            | <b>Prepared by</b> <ul style="list-style-type: none"> <li>• Name</li> <li>• Position/Title</li> <li>• Signature</li> <li>• Date/Time</li> </ul> | Enter the name, ICS position/title, and signature of the person preparing the form. Enter date (month/day/year) and time prepared (24-hour clock).                                |

NOTES: When using ICS form 214 as a station log for an emergency communications station, Block 3 is the name of the station, such as "5th St Shelter Communications." Block 4 would be the lead operator in charge of the station and block 6 would list any additional operators, loggers, runners, etc., assigned to the station. Block 5 would be the organization each individual comes from, such as the name of the REACT Team, ARES or RACES unit, etc. In each block that calls for the ICS position of the individual, use the title as assigned by the served agency. This might be Radio Operator (RADO) but many agencies reserve the RADO position title for their dispatchers and use a different title for emergency communications volunteers. Typical titles include Technical Specialist (THSP) or AUXCOMM

## **Specialized Modes**

There are some specialized modes of communication that may be useful in emergencies if the necessary equipment and trained operators are available. These modes are primarily used in the Amateur Radio Service, and may not be authorized in certain other radio services. Always be familiar with the FCC rules for each radio service used, especially before using any unusual modes of communications.

### **Packet Radio**

Packet radio provides a somewhat secure method of transmitting/receiving data. “Somewhat” in that not just anyone with a scanner can listen to the information, but not really “secure” in that anyone with a receiver, TNC, and computer can read the information being passed.

Packet increases the accuracy of the information by having it written rather than transmitted by voice. While the transmission time is a bit long, the accuracy and increased confidentiality make it a good choice for certain emergency activities. HF packet is generally 300 baud; although 9600 baud is possible at VHF and UHF with some equipment, 1200 baud is still very common. These speeds require long transmission times and heavy equipment duty cycles.

### **How Does Packet Work?**

A packet radio station consists of a computer, Terminal Node Controller (TNC), a radio, and some cables connecting all of the parts. Some of the TNCs use standard computer serial cables while others may have special requirements (see the TNC manufacturer’s instructions). The connection between TNC and radio will have ground, transmit audio, receive audio, and push-to-talk (PTT) lines. Specialized cables are typically required for different brands of radios (although some brands use compatible cables). Generally a packet station will be established by one operator providing at least the TNC, radio, and matching cables.

The computer will be loaded with one of many programs that will control the TNC. Some programs simply make the computer function as a dumb terminal. With these, if you try to make the computer do anything else it may lock up and do nothing at all. Ask a person with full packet training before you try to get the computer to multi-task.

Some terms you will need to know and understand are:

- Packet - the name of the piece of data sent from your computer to another. It has a header with the call of your station and the call of the station you are talking with (plus a little other information) followed by what you typed in.
- TNC - Terminal Node Controller. The device that acts as an interface between the computer and the radio. It normally includes a modem and will have a micro-processor included.
- Digi-Peater - a relay station between stations that cannot hear each other
- Packet Bulletin Board Systems (BBS) - a local collection point for messages between users. Usually linked to other BBSs to exchange messages.

- Cluster - Similar to a BBS but normally without the links to other BBSs/Clusters.
- Keyboard-to-Keyboard - Connection used to talk to other amateurs directly. Normally you will be talking with a single station or to a cluster.

### **Other Useful Information About the TNC:**

TNC state - Status of the TNC at that instant. Some of the status names are:

- Disconnected - Idle state where the TNC will monitor activity on the frequency and display that information on your computer.
- Connected - The state where the TNC has established contact with another station and is ready to exchange information. When you are connected, the channel activity no longer will be displayed on your computer (there are ways around this but don't worry about them).
- Converse Mode - once the TNC connects to another TNC it will normally enter converse mode so that anything you type in at your computer is transmitted to the other computer each time you press the Enter key.

Commands - Instructions to the TNC telling it what you wish it to do. These common commands can be abbreviated by using just the first one or two letters (indicated by the capital letters in the commands shown below). The most common commands are:

- MYcall - Definition of the call to be used by the TNC.
- Connect - Request to connect to another computer.
- Disconnect - Request to sever connection with another computer
- Send - Request to send a message to another user. This will be used when you have connected to a BBS (bulletin board) or cluster (interconnection among multiple users).
- Read - Read a received message from the cluster/BBS.
- CHeck - Normally set to zero for emergency communications work (keeps the TNC from automatically disconnecting if the activity is low).

Status Lights: Status lights may vary by manufacturer. The most common are:

- PWR - Power on indicator
- CON - Connect indicator
- STA - Data from the computer is ready to send but has not been sent yet.
- PTT - On when PTT line is active (transmitting).
- DCD - Incoming data indicator. The information available after this light goes out will only be displayed if the information was for your station.

### **What Will I Do?**

The packet station should be set up by an experienced packet operator (usually the person who owns the equipment), but if you are part of the setup team, you may be asked to help set up the station. Some prepared locations (such as a state or major city EOC) may have a dedicated packet station already on-site which may need to be set up for operation. Such stations should have setup instructions. Most cables will be labeled with information telling you where each is to be connected.

To set up a packet station, you will set up the equipment per the instructions and:

- Power up the computer
- Load the communications program
- Power up the TNC. The software used will determine whether the TNC will need to be powered up before the communications program is loaded (read the setup instructions).
- Power up the radio
- Follow any prepared directions about operating the packet station.

You are now ready to operate; i.e., send and receive messages as required by your location.

Do not adjust, play with, or fiddle with any piece of equipment in use for an event, during that event, unless it is malfunctioning and you know what to do about it.

### **Automatic Position Reporting System (APRS)**

Automatic Position Reporting System is a specialized form of packet radio in which location data is sent over the radio using the packet communications protocol.

Location data may be entered manually, but most commonly it is taken directly from a GPS unit. Location data for many stations may be collected by one or more stations where it can be displayed graphically on a map or used for other data processing by a computer. This system is generally used to keep track of the location of mobile or portable stations.

An APRS station may be configured to transmit its location only manually or automatically at specified time intervals. More elaborate systems provide a capability to control the transmitting of location information by distance moved or by various combinations of distance and time so the station would report its location more often when moving than when stationary.

APRS usually is conducted on packet frequencies, but properly configured it can be used over a normal voice communications frequency without creating undue interference. To use APRS on a voice frequency, the mobile system normally is configured to only transmit the location data at the end of a manual transmission and only if a reasonable time and/or distance have elapsed from the last transmission. When configured this way, the APRS data burst is very similar to the “courtesy beep” used on many amateur repeaters. If the APRS signal must be relayed by a digipeater, a local digipeater should be configured to receive the APRS signal on the voice frequency and relay it on a packet frequency.

In addition to the location data, the APRS version of the packet protocol allows for a short status message to be included.

## **Amateur Television (ATV)**

Fast-scan TV (FSTV), also referred to as amateur television (ATV), uses a transmission format fully compatible with video equipment designed for the home consumer market. The video is amplitude modulated and the audio is frequency modulated. Simply stated, the ATV picture display has full motion with simultaneous sound, can be in full color, and has excellent detail.

Because the signals occupy several megahertz of bandwidth, the FCC does not permit ATV on bands below 420 MHz. with most activity being between 420 and 440 MHz.

### **How Does ATV Work?**

ATV will normally use a high quality video camera that is capable of recording the image and passing the image to a transmitter at the same time. The transmitter (usually operating on amateur frequencies equivalent to cable channels 58 or 60) then broadcasts the signal for reception.

**ATV Pitfalls?** ATV is not yet commonly used in most areas, but it has been used by the California RACES during many events and emergencies. They have identified several potential problem areas and found effective techniques to avoid those problems. The material here is largely based on the experience of California RACES units using ATV.

When our served agencies have seen full color live action pictures during forest fires they have been very enthusiastic that command officers are able to see what is happening rather than relying on someone's verbal description. Accurate command decisions are much easier to make with that type of information. This enthusiasm sometimes extends to requests that are inappropriate for amateur radio.

One problem comes when a served agency asks us to use ATV for surveillance or for evidence gathering. Both of these activities are outside the realm of amateur radio. However, if the primary use of our pictures is for public safety, then the fact that evidence may be gathered as a byproduct is acceptable.

Amateur radio transmissions (including ATV) must not be conducted *for the purpose of* newsgathering or public broadcast. News media may quote from or rebroadcast material (including audio and video) that was transmitted by amateur radio for legitimate purposes (such as public safety) but we cannot conduct amateur communications specifically for them.

### **Suggested ATV Policies**

The role for ATV is to document an event and present it to the public safety officials at the incident command post.

ATV crews are expected to take a low key, passive, observer role. ATV crews are expressly forbidden from staging pictures or inciting a crowd to act up for the camera.

ATV crews must keep safety foremost in their minds. ATV lends itself to exposing its crews to dangerous situations such as fires, floods, and riots. Therefore added attention to safety is essential.

ATV crews should operate with two people. One person will do the photography and the second person will watch for possible hazards, handle voice communications, and provide for the safety of both operators.

The time and date should be displayed continuously for the recording tape and the benefit of public service officials.

**ATV Techniques** - The following will help you to provide good quality ATV pictures for your served agencies.

Hold the camera steady. Whenever possible, use a tripod or brace yourself against something solid.

Use wide-angle shots when “panning.” This allows those watching to identify objects rather than just seeing a blur.

Pan slowly. Momentarily cover the lens with your hand if you must pan quickly.

Use wide-angle when walking with the camera.

Use telephoto only with a tripod and then only if explicitly instructed to.

Remember you are operating with a live microphone and everything you say is being recorded (and may also be being rebroadcast live)!

### **Slow Scan Television (SSTV)**

SSTV uses a special format to send TV-like images one frame at a time. FSTV sends many frames per second, SSTV takes several seconds per frame.

SSTV may be used to send a single still picture or a series of still pictures. The effect is like a slide show rather than a moving picture.

SSTV requires much less bandwidth so the SSTV can be transmitted on bands where FSTV is not authorized. SSTV generally can be transmitted over any sort of connection (such as telephone) that can support voice traffic.



## **Citizens Band Radio Service**

The Citizens Band Radio Service, more commonly known as Citizens Band or CB, is a low power personal communications service using AM and SSB modulation on 40 specified frequencies (channels) in the 11m band from 26.965MHz to 27.405MHz.

Several of the available CB channels are unofficially designated for different uses. In most cases, these practices simply reflect local usage in much the same way that amateur radio band plans reflect the commonly accepted behavior of the radio community. Complying with such usage limitations is good manners, but generally not required by regulation. The one exception is that CB channel 9 (27.065MHz) is formally designated by FCC regulation exclusively for emergency and traveler assistance communications.

### **Using CB Radio for Emergency Communications**

CB has been the radio service most widely available to the public, although FRS is rapidly catching up. This is its greatest strength and its greatest weakness in emergency communications.

The equipment is inexpensive and readily available. Often vehicles from volunteer agencies that don't have a "communications system" will still be equipped with a CB radio.

Any adult can be shown how to operate a CB radio in just a few minutes. Of course this does not make the person a trained emergency communicator, but it may well be sufficient for tasks where the use of the radio is secondary to the main mission, such as keeping track of a van being used to deliver supplies to several shelters.

Although today fewer people have CB radios set up in their homes than in the past, there are still a tremendous number of cars with CB radios.

CB radio is recognized as *the* one way to establish communications with over-the-road truckers. Most major truck lines have text-only satellite communications systems in all their OTR trucks, but access to these systems is generally not available except through the specific company dispatcher. CB radio is the most practical method for providing information to truckers within or entering a community or an area. This can be a critical function in the response phase of a major disaster when large quantities of supplies are being brought into the area (often including unsolicited donations that do not have any specific location for delivery in the area).

CB also reaches a large portion of the travelling public on most major highways. This can be useful for encouraging travelers to bypass an area experiencing an emergency and to direct evacuees to emergency shelter locations.

CB radio may provide at least a partial substitute when telephone service is knocked out in a community. Many people have CB radios or would be able to access a CB radio at a neighbor. While this certainly is not a perfect solution, it does provide a way for the public to call for emergency services (fire/police/EMS) if telephone service is unavailable. These are among the same sort of calls *REACT* was originally founded to handle. Generally CB channel 9 is most appropriate for these purposes.

CB radio is likely to experience interference. The wide availability of CB radio does increase the likelihood of pranksters and malicious interference compared to other radio services. CB rules compliance is noticeably less than is typical in most licensed radio services. Propagation characteristics of the 11m radio signals sometimes will result in receiving signals from distant stations.

Because of the wide access by the public, CB is generally not appropriate for traffic of a sensitive or confidential nature.

### **Monitoring and Using CB Channel 9:**

Monitoring CB channel 9 was the original goal of *REACT* when it was founded in 1962 and to this day it remains one of the goals of *REACT* International. Throughout the United States and Canada, CB channel 9 is reserved for requesting and providing traveler assistance and reporting emergencies. Although individual licenses are no longer required to operate a CB radio, the FCC regulations still apply. Basically, CB channel 9 may be used to request road service, directions, or any information needed by a traveler to reach their destination or to report any emergency, unsafe, or hazardous situation where assistance is needed.

Monitoring was *REACT*'s original goal and it remains one of the community service programs most widely associated with *REACT*. Some Teams focus primarily on monitoring, while other Teams have their primary focus on other areas of emergency communications. All Teams and *REACT* members are encouraged to participate in various community service communications activities, such as reporting roadside emergencies and hazards when travelling, and assisting with communications support for various community service projects.

*REACT* members are not required to monitor CB channel 9, but are encouraged to do so. Monitoring does not need to be a burdensome activity. You will find it easy to turn on the CB radio, set it on channel 9, and go about your regular activities. Obviously this is not as effective as actually listening to the radio, but you will still be able to hear and respond to nearby calls for assistance. Depending on your situation you may need to turn up the squelch on the radio when leaving the radio set on CB channel 9; this will block most of the noise, but it will also block any weak calls. The best monitoring is performed by actually listening to the radio with the squelch set all the way off or at the level where it just barely blocks the background noise, but this is not always reasonable or even possible.

### **How to Call for Assistance on CB Channel 9:**

Call the local *REACT* Team (if known), identify yourself, and indicate what sort of assistance you need. Typical calls might be, “*Any REACT station, this is Bill Smith; I need road directions,*” or, “*This is John Doe calling any REACT station; I have an emergency.*” *REACT* members should identify themselves by their Team name and unit number, such as “*Any REACT base, this is [team] REACT Unit 299....*”

Keep calm. Don't babble or try to give the monitor all the information in one breath; rather try to give the monitor all available information in a logical manner. Be sure to give the exact location and an accurate description of the problem.

If you do not get an answer when you call on CB channel 9, stay calm. Try two or three more times. Each time state the problem and the complete location as accurately as possible. Remember, a monitor may be hearing you and just not be able to reach you with an answer.

In an emergency, if you do not get any answer, transmit the information blind at least twice. Be sure you give the location well enough that someone outside the local area could notify the proper authorities. There are many documented cases where no local monitor heard a call, but a monitor hundreds of miles away copied the information and notified the proper authorities. When transmitting blind, be sure to include the city and state.

If you don't get any answer on channel 9, try another channel. It is always best to try CB channel 9 first. You may not get an answer, but you can be reasonably sure that if you do get an answer it will be a trained monitor who will get the necessary information and report it to the proper authorities promptly.

One final point to remember: the more reason there is for you to be excited, the more important it is for you to remain calm.

### **How to Answer a Call for Assistance on CB Channel 9:**

Keep calm! Answer the call by saying something like “*Go ahead, [caller's name or handle]; this is [team] REACT Unit 299.*” Again, the more reason there is to be excited, the more important it is for you to be calm. If the caller is excited, your calm professional voice and attitude may help to calm them down enough for you to get the needed information. Identifying yourself as a *REACT* monitor may also help calm the caller.

Get all the information that is available, and *write it down* as you get it. Don't worry about spelling, but be sure the information is accurate and that you can read it. Then pass the information to the proper authorities.

Find out if the caller is still at the scene of the problem. Ask the caller to stay on channel 9 in case more information is needed. Be particularly careful to get an accurate location.

If you have any doubt about the validity of a call, report it to the authorities anyway but also report your reasons for doubting it. Leave any response decision up to the appropriate authorities.

Remember when passing calls to the police, fire department, or EMS, you must direct your call to the correct agency. In many communities it is better to call the response agency directly rather than use 911 because the 911 system will automatically show the address you are calling from and you may be switched to the agency covering where you live rather than the agency where the emergency is located. In all cases, clearly identify yourself as a *REACT* member relaying information from a CB call.

Keep a list of emergency telephone numbers at your station.

**DOs and DON'Ts on CB Channel 9**

- DO answer all calls for emergencies and travelers assistance.
- DO switch non-emergencies to another channel.
- DO ignore non-emergency users on Channel 9 as much as possible.
- DON'T use Channel 9 for non-emergency communications.
- DON'T argue with others on the channel.
- DON'T use the radio when the telephone is readily available.
- NEVER go to the scene of an emergency to “help” unless you are specifically requested to do so by the authorities.

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

The Family Radio Service is a low-power, unlicensed, personal communications, voice radio service using FM on fourteen specified UHF simplex frequencies. FRS channels 1 through 7 are the same frequencies as the seven GMRS interstitial channels at 462MHz. These channels are available to both unlicensed FRS users and licensed GMRS users. FRS and GMRS users may freely communicate with each other on these seven channels. FRS channels 8 through 14 are the corresponding 467MHz channels, spaced between the standard GMRS repeater input frequencies. These channels are not authorized for GMRS use.

FRS is used much like Citizens Band, but has technical characteristics more like GMRS and amateur UHF.

Fully featured FRS radios are readily available at low cost. A “fully featured” FRS radio offers all 14 channels and all 38 standard CTCSS tones.

Some manufacturers offer FRS radios with fewer channels, fewer tones, or even no CTCSS. These radios are not as flexible in use as the fully featured radios and generally cost very nearly the same price. While the fully featured radios are generally appropriate for experienced radio operators, the simplicity of a radio with the channel and tone set by internal controls and only a volume knob and push-to-talk switch on the outside may be better for some purposes.

Some manufacturers also offer FRS radios with additional features such as DCS or a range sensing transponder system that sounds an alert when the unit moves out of range of a matching unit. Some of these features may be very useful for specific purposes, but keep in mind that these features are generally proprietary and only work with other radios of the same model or the same manufacturer.

All FRS radios have a maximum 500mW (½ watt) output and a permanently attached antenna. Most are small handheld radios.

As of this writing, no FRS channels are officially designated for any specific purposes or usage, but FRS Channel 1 with no tone squelch is widely accepted as a “calling channel.” The FCC was briefly considering making this official, but decided not to designate any official emergency or calling channel on FRS.

The concept of a calling channel is that users would normally keep the radio on this channel while not communicating with anyone in particular.

The calling channel is where you would most likely initiate a call if you did not know (or did not care) who would answer. It is used for both general calling and for emergencies when you don’t have a particular station to call.

The calling channel is *not* appropriate as the published or designated channel for a specific station in a specific location. For example, the calling channel would *not* be a good choice of channel for a Park Ranger station to advertise as the channel to use to call them for assistance within the park. But it would be the logical channel for an injured hiker to use to call for help if there was no specific channel publicized for emergencies in that park.

FRS channels 1 through 7 are shared with the GMRS radio service.

- FRS users are limited to the 500mW legal output of an FRS radio. Licensed GMRS stations are authorized to use a maximum of 5W ERP on these interstitial channels. GMRS users on these channels may communicate with unlicensed FRS users, but the GMRS users must identify with their callsign and comply with all GMRS regulations.
- These channels are at narrow spacing between the GMRS channels used for simplex and repeater outputs. They are subject to adjacent channel interference from higher powered GMRS stations, especially if located close to a repeater with its output on the adjacent channel.

FRS channels 8 through 14 are *not* available to GMRS or any other non-FRS stations. These channels are located at narrow spacing between the standard GMRS repeater *input* frequencies.

- Use of these channels may cause interference to adjacent channel GMRS repeaters. Such interference, from a legal FRS radio, is almost always the fault of poor equipment at the GMRS repeater.
- Interference to a GMRS repeater by a legal FRS radio generally will only occur when transmitting on the adjacent channel while using the same CTCSS tone used by that specific repeater and when transmitting from a location near the repeater.
- It is common courtesy and good operating practice to avoid the use of channel and tone combinations in locations where it is know that the combination causes interference. Although interference to GMRS repeaters by legal FRS radios is almost always the fault of the GMRS equipment, the legal responsibility for preventing such interference between any unlicensed station and any licensed station always rests with the unlicensed station. Thus it is the FRS user who must avoid interfering with a licensed GMRS repeater.

| <b>FRS Channels and Frequencies</b> |           |                                  |
|-------------------------------------|-----------|----------------------------------|
| CH                                  | Frequency | Usage Notes                      |
| 1                                   | 462.5625  | FRS & GMRS (FRS Calling Channel) |
| 2                                   | 462.5875  | FRS & GMRS                       |
| 3                                   | 462.6125  | FRS & GMRS                       |
| 4                                   | 462.6375  | FRS & GMRS                       |
| 5                                   | 462.6625  | FRS & GMRS                       |
| 6                                   | 462.6875  | FRS & GMRS                       |
| 7                                   | 462.7125  | FRS & GMRS                       |
| 8                                   | 467.5625  | FRS Only                         |
| 9                                   | 467.5875  | FRS Only                         |
| 10                                  | 467.6125  | FRS Only                         |
| 11                                  | 467.6375  | FRS Only                         |
| 12                                  | 467.6625  | FRS Only                         |
| 13                                  | 467.6875  | FRS Only                         |
| 14                                  | 467.7125  | FRS Only                         |

## General Mobile Radio Service (GMRS)

The General Mobile Radio Service, more commonly known simply as GMRS, is a licensed personal communications service using FM modulation on 23 specified frequencies in the UHF band at 462 MHz and 467 MHz. (The 467 MHz frequencies are available only as repeater input frequencies.)

The FCC regulations for GMRS are contained in Part 95 which also covers CB, FRS, and MURS.

Originally GMRS licenses were available to individuals and non-individuals such as businesses and organizations. Many *REACT* Teams held GMRS licenses. In 1987 the FCC changed the regulations so that GMRS licenses are only available to individuals (real live persons; not groups, businesses, corporations, etc.) Non-individuals who held a valid GMRS license prior to July 31, 1987 were “grandfathered” and allowed to continue to renew their GMRS license provided they did not make any modifications to that license. This provision was not well understood at first (even at the FCC) and many non-individual GMRS licensees subsequently lost the right to renew their licenses under this limitation. *REACT* Teams and other “non-individual” licensees must be careful to operate within the limitations of their grandfathered GMRS license.

In 1998 and 1999 the FCC again made changes in the regulations for GMRS. These changes “simplified” the rules and opened all the available GMRS frequencies to all individual licensees. Some of the changes resulted in sections of the rules that appeared to conflict with other sections and with the FCC’s new licensing procedures. These conflicts will undoubtedly be resolved, but until the confusion is resolved all GMRS licensees will have to be especially careful.

One very significant aspect of the latest rule changes was opening all the available frequencies to all individual licensees. Originally each licensee could operate only on the one or two frequencies or frequency-pairs specified on the license. Later the FCC added seven low power simplex frequencies spaced in between the eight original 462 MHz channels, and authorized GMRS stations to use the 462.675/467.675 MHz frequency pair for emergency and traveler assistance communications *when operating outside their normal area specified on their license*. The most recent change opens all the authorized frequencies to all individual licensees, *but these changes do not apply to grandfathered non-individual licensees*. Thus we have a situation where there are effectively two different sets of rules for GMRS licensees.

- A GMRS license issued to an individual covers the “immediate family members” as defined in section 95.179(a). Grandfathered non-individual licenses cover the owners and employees of a business or the members and employees of an association as listed in section 95.179(b).
- GMRS stations operating under an individual license may use any of the frequencies specified in section 95.29 (subject to the limitations in the rules). GMRS stations operating under a grandfathered non-individual license may use only the frequencies specified on their license.

**Station identification requirements** for GMRS are similar but not identical to those for the Amateur Radio Service as mentioned elsewhere in this program.

Section 95.119, Station Identification, says:

- (a) Except as provided in paragraph (e), every GMRS station must transmit a station identification:
  - (1) Following the transmission of communications or a series of communications; and
  - (2) Every 15 minutes during a long transmission.
- (b) The station identification is the call sign assigned to the GMRS station or system.
- (c) A unit number may be included after the call sign in the identification.
- (d) The station identification must be transmitted in:
  - (1) Voice in the English language; or
  - (2) International Morse code telegraphy.
- (e) A station need not identify its transmissions if it automatically retransmits communications from another station which are properly identified.

In general, this sets a station ID requirement that is basically the same as for amateur radio except that the interval for identifications within a long transmission or series of communications is 15 minutes for GMRS compared to 10 minutes for amateur radio. The procedures recommended elsewhere in this program for call sign identification by amateur radio operators would also meet all requirements for GMRS operators.

**GMRS Frequencies** - There are a total of 23 authorized frequencies in the General Mobile Radio Service listed in section 95.29:

The eight frequencies available for simplex operation and as repeater outputs are listed in section 95.29(a): For a base station, fixed station, mobile station, or repeater station (a GMRS station that simultaneously retransmits the transmission of another GMRS station on a different channel or channels), the licensee of the GMRS system must select the transmitting channels or channel pairs for the stations in the GMRS system from the following 462 MHz channels: 462.550, 462.575, 462.600, 462.625, 462.650, 462.675, 462.700, and 462.725.

The eight frequencies available only for repeater control and input are listed in section 95.29(b): For a mobile station, control station, or fixed station operated in the duplex mode, the following 467 MHz channels may be used only to transmit communications through a repeater station and for remotely controlling a repeater station. The licensee of the GMRS system must select the transmitting channels or channel pairs for the stations operated in the duplex mode, from the following 467 MHz channels: 467.550, 467.575, 467.600, 467.625, 467.650, 467.675, 467.700, and 467.725.



The seven interstitial channels are available only for low-power (5 watt) simplex operation by “mobile” stations licensed to an individual. (Note: The definition of “mobile” includes handheld radios or other stations capable of operating while moving. It does not include a station operating from a fixed location such as any radio connected to a base antenna even if the same radio would be mobile if mounted in a vehicle.)

- The interstitial channels are listed in section 95.29(f): Except for a GMRS system licensed to a non-individual, a mobile station or a small base station operating in the simplex mode may transmit on the following 462MHz interstitial channels: 462.5625, 462.5875, 462.6125, 462.6375, 462.6625, 462.6875, and 462.7125.
- These channels may be used only under the following conditions:
  - (1) Only voice type emissions may be transmitted;
  - (2) The station does not transmit one-way pages; and
  - (3) The station transmits with no more than 5 watts ERP.
- The interstitial GMRS frequencies are the same as FRS channels 1 through 7.

| <b>GMRS Frequencies</b> |                                    |
|-------------------------|------------------------------------|
| Frequency               | Usage Notes                        |
| 462.5500                | GMRS simplex and repeater output   |
| 462.5625                | FRS & GMRS simplex                 |
| 462.5750                | GMRS simplex and repeater output   |
| 462.5875                | FRS & GMRS simplex                 |
| 462.6000                | GMRS simplex and repeater output   |
| 462.6125                | FRS & GMRS simplex                 |
| 462.6250                | GMRS simplex and repeater output   |
| 462.6375                | FRS & GMRS simplex                 |
| 462.6500                | GMRS simplex and repeater output   |
| 462.6625                | FRS & GMRS simplex                 |
| 462.6750                | GMRS simplex and repeater output * |
| 462.6875                | FRS & GMRS simplex                 |
| 462.7000                | GMRS simplex and repeater output   |
| 462.7125                | FRS & GMRS simplex                 |
| 462.7250                | GMRS simplex and repeater output   |
| 467.5500                | GMRS repeater input only           |
| 467.5750                | GMRS repeater input only           |
| 467.6000                | GMRS repeater input only           |
| 467.6250                | GMRS repeater input only           |
| 467.6500                | GMRS repeater input only           |
| 467.6750                | GMRS repeater input only *         |
| 467.7000                | GMRS repeater input only           |
| 467.7250                | GMRS repeater input only           |

\* The “675” frequency pair is generally recognized for emergency and travelers assistance *in addition to* regular communications.

## **Multi-Use Radio Service (MURS)**

MURS is a new radio service created by the FCC decision to eliminate license requirements for operation on five specific VHF “color dot” frequencies. These frequencies were previously licensed to itinerant business users and regulated under Part 90 of the FCC Regulations. In delicensing operation on these frequencies, the FCC designated them as a new personal radio service and placed the new regulations for this service in Part 95 along with GMRS, FRS, and CB. The final version of the rules for MURS was published in the Federal Register and the new service has been available for unlicensed use since November 13, 2000. The information about MURS published here is based on the final version of the rules published by the FCC. Although these rules are “final” there are several petitions for reconsideration and for rules changes that may result in further changes. This information will be updated if the rules are changed in ways that impact the information here.

The Multi-Use Radio Service (MURS) is a private, two-way, short-distance voice, data, or image communications service for personal or business activities of the general public. The rules for this service are contained in the new subpart J of Part 95.

Each MURS transmitter must be certified in accordance with Section 90.203.

The MURS channel frequencies are 151.820 MHz, 151.880 MHz, 151.940 MHz, 154.570 MHz, and 154.600 MHz.

According to the rules, “No MURS unit, under any condition of modulation, shall exceed 2 W effective radiated power (ERP).” Comments have been filed with the FCC recommending that this limitation be changed to specifying the transmitter output power rather than the effective radiated power. Transmitter output power is a function of the radio itself, whereas the effective radiated power changes with whatever feedline and antenna are connected to the radio.

MURS is available for both individual and business use by any person or entity *except* a foreign government or representative of a foreign government.

MURS operation is authorized anywhere CB station operation is permitted under 95.405; and aboard any vessel of the United States, with the permission of the captain, while the vessel is travelling either domestically or in international waters.

MURS operation is not authorized aboard aircraft in flight.

Anyone intending to operate a MURS unit on the islands of Puerto Rico, Desecheo, Mona, Vieques, and Culebra in a manner that could pose an interference threat to the Arecibo Observatory shall notify the Interference Office, Arecibo Observatory. The procedures for this notification are in section 95.1303 of the regulations. The operator will be required to make reasonable efforts in order to resolve or mitigate any potential interference problem with the Arecibo Observatory.

MURS should be a very flexible service. The rules authorize voice, data, and image transmission, including remote control and telemetry, using AM and FM modulation; but it is likely that only FM voice radios will be available initially.

The channels authorized for MURS systems are available on a shared basis only and will not be assigned for the exclusive use of any entity. Those using MURS must cooperate in the selection and use of channels in order to reduce interference and make the most effective use of authorized facilities. Channels must be selected in an effort to avoid interference to other MURS transmissions. This may be a difficult and contentious task:

- Existing business licensees on these channels are not likely to welcome the sudden surge of unlicensed (but perfectly legal) personal users. Likewise, the new personal users are not likely to appreciate having the channels occupied by continuous transmissions of some existing business operations. Some of the channels allocated to MURS are currently in use by fast food drive-thru windows.
- While many existing business licensees use these channels for purposes that might be considered trivial, others are using these same channels for functions that can impact public safety. Occasional unintentional interference to the local hamburger drive-thru may not be much problem, but interference to a construction company worker directing a crane swinging a steel I-beam into position a few hundred feet in the air could be quite serious.
- CTCSS may well make these problems worse rather than better. The use of tone squelch keeps users of one tone from hearing users of a different tone on the same channel, but does nothing to eliminate the interference when both users attempt to transmit at the same time. This could be a severe problem if radio manufacturers and stores make the same kind of false claims about CTCSS on MURS as are common in their advertising for FRS radios now.

The first MURS radios on the market are existing commercial radios already certified under Part 90 for these same frequencies. These existing radios generally have only one or two channels available or to have a mix of MURS and *non*-MURS channels available through internal dip switches or other programming.

- Some distributors and dealers may try to sell off existing radios that were certified under Part 90, but do not actually meet the specifications for MURS.
- These early MURS radios lack the flexibility likely to be found in later radios actually designed for MURS operation. Later radios are likely to have the five MURS frequencies directly available at a channel knob. This will be important to enable individual users to select a channel that avoids existing business users who in many cases will not be able to change frequencies.
- Some existing radios for these frequencies lack tone squelch. CTCSS or DCS will certainly be needed for any practical use of MURS in most areas.

Teams and individuals considering using MURS may want to program the MURS frequencies into a scanner to check existing activity on these channels throughout their local area. The “look-before-you-leap” approach is always a good idea before planning to use any new radio frequency.

## Skywarn

Skywarn is the National Weather Service (NWS) program of trained volunteer severe weather spotters. Skywarn volunteers support their local community and government by providing the NWS with timely and accurate severe weather reports. These reports, when integrated with modern NWS technology, are used to inform communities of the proper actions to take as severe weather threatens. Skywarn, formed in the mid 1970s, has historically provided critical severe weather information to the NWS in time to get the appropriate warnings issued. Thus the key focus of the Skywarn program is to save lives and property through the use of the observations and reports of trained volunteers.

Anyone is welcome to participate. Public safety workers (police, fire, EMS) and radio operators (both amateurs and *REACT* members) are actively recruited to participate in the Skywarn program both due to their demonstrated interest in public service and their ability to report observations by radio rather than having to rely on the telephone system which often fails in exactly the circumstances when Skywarn is needed.

*REACT* operators' participation in the Skywarn program is formally acknowledged and encouraged in a Memorandum of Understanding (MOU) between *REACT* International and the NWS (see Appendix E). This agreement indicates that *REACT* will encourage its local Teams to provide the NWS with spotters and communicators as requested by the NWS during times of severe weather. A similar MOU between the NWS and the ARRL covers amateur radio participation in the Skywarn program.

### Why Skywarn?

The NWS's mission is to protect lives and property. When weather conditions are favorable for severe thunderstorms or tornadoes to develop, a severe thunderstorm or tornado *watch* is issued. A severe thunderstorm or tornado *warning* is issued when severe weather has been reported by a Skywarn spotter or indicated by Doppler radar. Skywarn volunteers become the NWS and local Emergency Management eyes and ears, helping to provide better weather warning services.

The Skywarn program originated before the latest Doppler radar systems. Earlier radar systems had a very limited capability to identify severe weather and no real ability to tell the difference between a severe thunderstorm and a tornado. Modern Doppler radar has greatly improved the capability to identify potentially dangerous weather, but even the best radar cannot distinguish between a potential threat and an immediate danger as well as a *trained* human spotter. Despite the elaborate radar and forecasting equipment at the National Weather Service, they are only able to determine the potential for severe weather. They rely on reports from emergency services personnel and the public to specifically identify actual severe weather.

Accurate and reliable information from the general public is difficult to obtain. Severe weather is complicated and confusing. The NWS has found that only regular training of weather spotters improves the quality of information. The NWS collaborates with *REACT*, amateur radio organizations, and others to put together training programs. The NWS brings its weather knowledge, *REACT* and the Amateur Radio Service bring their expertise in emergency communications, and together they work with local government.

Trained Skywarn observers provide the Weather Service with accurate and timely reports from radio equipped cars and homes. The NWS is most interested in severe weather reports. Severe weather includes flash flooding, hail, damaging winds, a wall cloud (which is the area of a thunderstorm where a tornado could form), and a tornado funnel. If the NWS confirms severe weather with radar and other available information, it then notifies local authorities who then can activate sirens or other community warning systems. The news media will also receive notification so they can make reports on local broadcast stations.

Skywarn volunteers donate thousands of hours and the use of their own personal radio equipment and vehicles to give their communities advance warning of life-threatening weather. Since the NWS instituted the Skywarn program, there has been a significant decrease in the death rate due to tornadoes and other severe weather.

### **Who Will Activate Skywarn?**

The NWS and/or the local emergency management authorities may activate the Skywarn net whenever there is a threat of severe weather or the NWS issues a severe thunderstorm or tornado watch. In this case information may be relayed through amateur radio repeaters. Localized events may be phoned directly to the NWS and/or local emergency management.

The actual details of implementing the Skywarn program are handled locally in each community. In areas with a local NWS office, usually the NWS acts as the lead agency activating the Skywarn program and taking reports directly from trained spotters. In areas without a local NWS office, this role is usually handled by the local emergency management agency. Since each NWS office and each City or County EMA operates their own program independently, those programs will vary greatly from one community to another. In some communities, the local emergency management agency routinely activates Skywarn for all weather watches; in other communities Skywarn is activated only when a specific weather threat is observed or expected. In some areas trained spotters are issued a "Spotter Number" or other designation by the agency that conducted the training. In other communities the program is much less formal.

### **Where Will Skywarn Observations Be Taken?**

Reports will be submitted wherever a spotter observes reportable conditions.

Skywarn reports are relayed from on the road, while at work, or at your home.

In some communities, the Skywarn program includes assigned locations for some observers. Other communities rely entirely on wherever the spotters happen to be. In such communities, some spotters may choose to find a better vantage point to observe approaching weather. In any case, it is important not to jeopardize your own safety while participating in Skywarn.

## **How Do I Join Skywarn?**

The key to joining Skywarn is to participate in the training. Classes for spotters are normally presented several times each year, usually just before the beginning of the local “severe weather season.” In some communities only a basic level spotter class is offered; in other communities more advanced training is available for those who have already completed the basic level training.

Nearly all *REACT* Teams actively participate in the Skywarn program either directly with a local NWS office or through their local emergency management agency. Check with your Team officers for more information about Skywarn Storm Spotter training and other Skywarn activities in your area.

For additional information on Skywarn, contact the National Weather Service Forecast Office serving your area. Trained spotters who want to review their training should refer to the Skywarn Spotter Guide and other materials available from your nearest NWS office or local emergency management agency.

A Basic Spotter's Field Guide can be downloaded from the NWS website at <http://www.crh.noaa.gov/images/pah/pdf/basicspotterguide.pdf>

A Spotter's Field Guide may also be downloaded from the NWS web site at <http://www.srh.weather.gov/jetstream/downloads/spottersguide.pdf>

And an Advanced Spotter's Field Guide can be downloaded from the NWS website at [http://www.crh.noaa.gov/images/lmk/spotter\\_reference/advanced\\_spotters\\_field\\_guide.pdf](http://www.crh.noaa.gov/images/lmk/spotter_reference/advanced_spotters_field_guide.pdf)

Online training and information about local classroom training are both available at <https://www.skywarn.org/training/>

Additional online courses are available via the University Corporation for Atmospheric Research (UCAR) COMET Program at <https://www.comet.ucar.edu/>

These courses can be completed at your own pace, and serve as an excellent supplement to training offered by the NWS:

Skywarn Spotter Training

[https://www.meted.ucar.edu/training\\_course.php?id=23](https://www.meted.ucar.edu/training_course.php?id=23)

Role of the Skywarn Spotter

[https://www.meted.ucar.edu/training\\_module.php?id=817](https://www.meted.ucar.edu/training_module.php?id=817)

Skywarn Spotter Convective Basics

[https://www.meted.ucar.edu/training\\_module.php?id=816](https://www.meted.ucar.edu/training_module.php?id=816)

## Responding to Skywarn Activations

Skywarn radio net participation is serious business. We must perform certain tasks to ensure that the operation runs smoothly and only necessary information is brought to the net.

### Checking into the Net

When checking into a Skywarn net, the NCS only needs the following information: Your callsign, location, and whether you have severe weather at your location. If you do not have severe weather at your location, simply state “Nothing to report.” Here is an example: “This is K4XXX, Richard Avenue and Old Circle Road, nothing to report.” This gives the NCS all the information he or she needs.

Note that there are times when you should not even check into the Skywarn net *at all* if you have nothing to report. If the net is actively taking reports of current severe weather and damage, do not check in with a “nothing to report.” Just stand-by and listen to the net. Once the immediate reports are taken and traffic slows a little, the NCS will probably call for additional check-ins. It is also possible (although unlikely) that the NCS may call looking for a report from the area where you are located. If the NCS asks, “Do we have any report from the Mission Hills area?” and you are in Mission Hills, *then* you would respond; otherwise don’t interrupt a busy Skywarn net *just* to check in.

### What To Report and What *Not* To Report

The mission of Skywarn is to take reports of severe weather to the NWS so they can warn the public. If the weather phenomena is not severe, the NWS does not need or want the information, and will not act upon it if they receive it. The same applies to the NCS of the Skywarn net. With such a clearly defined mission, reporting any other information is not necessary, and ties up the frequency. The primary rule in any formal Skywarn net is to pass *only* severe weather information or emergency traffic. During a formal Skywarn net it is important to only transmit what is necessary, and in the briefest manner possible. There may be many other operators needing to report emergency traffic.

Transmit only if you have a report of any of the following:

- Tornado
- Funnel cloud
- Wall cloud with or without rotation (usually only reports of rotation will be taken to the NWS, however the Skywarn NCS needs to know about any wall cloud.)
- Winds above 55 miles per hour. Refer to a wind chart such as the one in the Field Spotter Quick Reference Guide.
- Hail, dime size (3/4 inch) or above
- Flash or urban flooding. This does not include large amounts of water running in ditches nor slight to moderate ponding of water on the roadways unless it poses a serious traffic accident hazard. If the water is collecting a little in a low spot in a field, that is also ponding.
- Severe damage not previous reported.

You would, however, report any true emergency situations such as an injury accident, fire, serious personal injury, or any situation involving serious threat of injury or death, or serious felony crime.

Gray Areas: There are many other important incidents that may or may not need to be brought to the net. If the net is very busy and you have doubt, wait until the emergency traffic slows down before transmitting. (Example: There is a non-injury accident while someone is reporting a tornado. Clearly, the information regarding the tornado is much more important.) However, if the net is slow and little information is being passed, ask the NCS if they can take a non-emergency report. Use discretion on incidents like this.

### **What *Not* To Report:**

- Lightning - It is a normal part of thunderstorms (but do report damage caused by a lightning strike)
- Rain - It is a normal part of thunderstorms. Only report flooding
- Winds less than 55 mph. (Refer to a wind chart)
- News reports, information heard on the scanner, warnings, or watches. This information has already been reported to the appropriate agencies and does not need to be reported again. If watches or warnings need to be transmitted, it will be left to net control, or a station appointed by net control.
- Anything that does not pertain to the net or radio's role in it

### **How To Prevent Those Types of Reports**

Frequently, there are operators who are not familiar with the Skywarn program, or have not participated in many emergency nets, that check into a Skywarn Net. These operators have the best of intentions and try very hard to help. However, if they have very little knowledge of the operating procedures, they often report too much and often the wrong information. This can cause disruption to the net by tying up the frequency and preventing important traffic from being passed.

There are three ways to prevent this from taking place. First, it is the responsibility of the NCS to clear the air during the net if unimportant traffic is taking place. This is a very delicate thing to do at times. The NCS has to get a person to stop transmitting without making that person feel they are not helpful. It is very hard to teach in the heat of the moment, so patience is very important.

Second, get these operators involved in the program and enrolled in training classes. This is the best option, but sometimes a difficult task. They don't want to get very involved, but they want to help. If you hear an operator reporting the wrong type of information and you know them, take a moment and call them on the phone (*not on the radio*) and explain the situation to them as a friend.

Lastly and most effectively, teach by example. New radio operators look to more seasoned operators to see how they should conduct themselves on the air. If you are an experienced operator, avoid making unneeded reports. The fewer unneeded reports heard on the air, the less habitual it will become to others.



**Using the Internet:**

The Internet is a valuable resource for gathering information. It needs to be used with caution and only for reference. Much of the information on the Web is timestamped. Make sure that what you are looking at is current. Since the advent of the WorldWide Web, many weather watchers have spent a little too much time looking at the Internet and reporting it. This distracts everyone from paying attention to the sky. If your group is going to use the Internet to gather information, appoint one person to that duty, and let them decide what is truly important to report to the NCS.

**Asking for Information**

Do not check into a formal Skywarn net to ask what the weather is. Take a few moments and listen to net activity. Asking for the weather takes airtime and distracts the net. If you need more information, consult your favorite radio station. Net control will alert the net if there is a severe weather warning for the local area. This is a hard habit for many people to break.

**Safety Information:**

Safety must always be the primary concern. Storm spotting, as we all know, can be and is a hazardous activity. There are a number of threats to storm spotters. Some are obvious, some not. These hazards can be divided into four main categories: Travel, Storm, Situational, and Aftermath.

**Travel Hazards**

Travel hazards often present more of a danger to spotters than any storm phenomena. This is not to discount the power of a bolt of lightning or a tornado, but the act of driving during a severe weather event is probably one of the most overlooked hazards when spotting. Please make sure you and your vehicle are in good condition to go. Most importantly, obey all traffic laws. Let's face it, there is a lot of adrenaline flowing through your system as you cruise into an area where there is an approaching severe thunderstorm. You are excited, and your mind will tend to race about everything that you have learned in Skywarn classes, or things you have seen in the movies, or on The Weather Channel.

The first order of business is *slow down!* Maybe you have forgotten, but would you like to see a few of the hazards you are presented with, or could be presented with while driving during a storm spotting activation?

- Wet roadways
- Limited visibility
- High wind
- High noise levels
- Debris on the road
- Large hail
- Flying debris
- Flash flooding
- Tornadoes

These, along with everyday hazards we have become accustomed to like traffic, other drivers driving poorly, potholes, and even pedestrian traffic all add up to one large list of hazards for the storm spotter. Hazards don't care that you are helping the National Weather Service provide warning for the public. They do not care that you are assisting other disaster preparedness and/or relief agencies. Your chances in the field are all a matter of statistics. If you proceed with caution and observe common sense and safety rules, you will be on the winning side of the statistics. This is not intended to scare you, but if you are not prepared for what you are getting yourself into fear may not necessarily be a bad thing.

### **Storm Hazards**

Storm hazards are the most obvious hazards we think of. Heavy rain, high winds, lightning, and tornadoes are what we are expected to see. Combine these hazards with the normal everyday hazards of being out of our home and rule number one for weather spotters should be: *Never go alone!*

Because we are *not* "storm chasers" we can do a lot more planning about spotting locations. How should you pick a good location? Just pay attention while you are driving about your normal daily business. Pay attention to the view when you get out of the maze of downtown. After a while, you will have seen many places around the county with a good view in a particular direction. Mark them on a map if you like.

After finding sites with a view, evaluate them for safety. Does the site have a lot of utility lines running overhead? Does it have more than one escape route? Is it prone to standing water or flooding? Is sitting in your car at that site going to endanger you because of traffic? Most importantly, is there nearby shelter? Never leave yourself in a location where you cannot find shelter within a few seconds to a minute.

### **Situational Hazards**

Situational hazards are really a combination of other hazards. However, they are important to mention. One of the most common situational hazards often encountered is, "Who the heck are you, and what are you doing here?" Weather spotters have encountered this response from citizens and law enforcement officers.

Avoiding situational hazards is mostly a matter of common sense and respect. Just because you are a volunteer for any one of a number of agencies, you do not have a license to behave in a socially unacceptable manner. A police officer is not going to care that you are trying to get a better view of a storm if you are going 80 miles per hour. Think before pulling off the side of the road. Are you clear of the lane of travel? Are you blocking the view of an intersection? Never make yourself a traffic hazard. Another good rule of thumb is to make sure everyone can see you.

Never trespass on private property. Respect the rights of property owners while going about your activities. If in rural areas, do not block their driveway, drive on their grass, or do anything that will damage someone's property. You are not authorized to do that, and if you do, you bear sole responsibility.

From time to time, you will encounter a spotter from another agency. Volunteer firefighters, rescue squad members, emergency management agency personnel, or any number of spotters may be out in the field for any of a number of reasons. Each reports to their agency, giving their control points requested information. “Share the road” as it were with these personnel. We are all on the same team, even though we may be talking to different agencies. Be professional and be a team player. Always carry your *REACT* and Skywarn identification with you. This will help to prevent many common misunderstandings. If confronted by a law enforcement officer, having agency and organizational identification will save you a lot of trouble explaining why you are sitting outside during a severe storm.

The final situational hazard a spotter can face is forgetting who they are and their role in spotting. While you are out in the field, you are a representative of *REACT*. Your conduct reflects on not only *REACT*, but also any other agency for whom *REACT* is providing communications. Please remember this. It has taken a lot of time and effort on the part of many people to establish and maintain a good relationship with the community, the various agencies, and local governments. Be professional, and realize that those relationships are very important to all of us. Think before you jump.

### **Aftermath Hazards**

If you are a storm spotter for a few years, you occasionally will get caught in the aftermath of a severe storm or tornado. If you have not been instructed to be there by an official agency and do not personally have business being there, get out of the area immediately. Disaster scenes are no place for onlookers. If you are in such an area after a storm, immediately leave the area. If you do not exit the area promptly, you may very well find yourself in trouble. While leaving, request instructions from the organization or agency you are representing.

If you are asked to go to a disaster area to assist in relief communications for a served agency, remember that you are there for disaster relief, not emergency service. You are *not* authorized to use sirens or signal lights. You do not need to be the first person on the scene and, in the real world, you don't want to be. Most of the relief agencies will need time to get their operations organized and won't be ready for you for a reasonable amount of time, anyway.

After a disaster, residents of an affected area are especially suspicious of outsiders, and are often very sensitive to conversations. Respect their time of trouble by not discussing aspects of the disaster with them unless you have reason. Many weather spotters have found that residents do not respect the fact that you are a storm spotter after their house has been leveled by a tornado. If you are in the area for disaster relief efforts, that is all anyone needs to know.

There are inherent hazards to disaster scenes you must be aware of. You may encounter debris, hazardous materials, broken water and sewer lines, leaking gas lines, downed electric wires, and other unexpected hazards. Practice extreme care in everything you do. Stay in contact with the agency you are assisting and never leave the area where you are expected to be without notifying your organization's control officer.

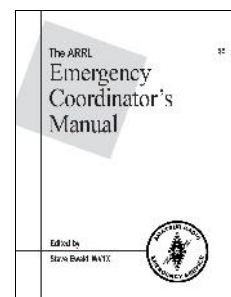
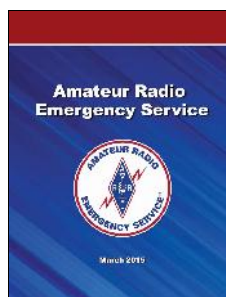
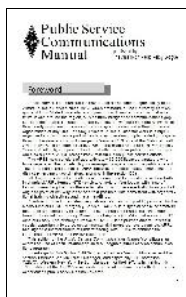
## ARRL Manuals

The American Radio Relay League (ARRL) previously published an excellent manual on public service communications called, naturally enough, the *ARRL Public Service Communications Manual*. This manual is no longer available from the ARRL but a copy can be downloaded at <http://www.wi-aresraces.org/Documents/pscm.pdf>

The Public Service Communications Manual has been replaced by the larger and more comprehensive *Amateur Radio Public Service Handbook* which is available via the ARRL website in paperback for \$24.95 or as a Kindle download for \$19.95

The ARRL also publishes several other publications that can be valuable resources in preparing for public service and emergency communications. Among these are:

- *ARES Manual* -- This manual provides a thorough explanation of what ARES is, how it is organized, how the various ARES positions function, and how ARES operates. The manual can be downloaded from the ARRL website at <http://www.arrl.org/files/file/Public%20Service/ARES/ARESmanual2015.pdf>
- *ARES Field Resources Manual* -- This manual is intended to serve as a quick trainer and reference for amateurs deployed in the field for emergency services work, primarily through the Amateur Radio Emergency Service (ARES). It can be ordered in paperback for \$11 (Kindle \$7.99) or downloaded from the ARRL website at <http://www.arrl.org/files/file/ARESFieldResourcesManual.pdf>
- *The ARRL Emergency Coordinator's Manual* -- Covers some of the finer points of Emergency Coordinator duties, as well as recruiting and obtaining the necessary resources to properly plan and implement effective emergency and disaster communications. It can be downloaded from the ARRL website at <http://www.arrl.org/files/file/Public%20Service/ECMANUAL.PDF>



Prices shown are current as of the time this is being printed and do not include shipping. Most publication downloads at the ARRL website are only available to ARRL members.

## Do's and Don't's for Public Service Communications

The ARRL has an excellent list of Do's and Don't's for public service event communications. Some of this advice is specific to the amateur radio service, but most of it applies to any public service communications. Some of the advice is really directed towards the person arranging the communications for the event, rather than the individual operators. If you are setting up the communications, keep these points in mind. If you are just one of the operators, you won't have as much control over how things are set up, but you can still bring up these issues in the planning stage.

The following is adapted from the ARRL's list of "Do's and Don't's For Public Event Communications" with a few added comments to highlight issues where there are differences between the Amateur Radio Service and other radio services we may use.

### DO:

- Enjoy yourself! Public service is fun!
- Get a crystal clear understanding of the needs of the group you are serving.
- Prepare the night before. Make sure your radio's batteries are charged and you take spares if needed. Have a clipboard with paper and pencils, gas in the car, miscellaneous spare parts you might need, maps if available. Know where you are going and when you must be there.
- Arrive on time on the day of the event. If you are not familiar with the occasion allow extra time to get there. Checking the map the night before to plan your route will not guarantee that you turn correctly. If it's a large event, you may also find that some roads are closed. Even if you asked about road closings in advance, what you find on the way to the event may not be exactly what you were told, especially if the road is supposed to be closed later on in the day.
- Inform the event communications coordinator if you cannot make the event after agreeing to be there. The sooner this is relayed to the person in charge of communications at the event, the better.
- Introduce yourself to the person or people you will be working with at your station. Let them know who you are and why you are there. Stay at your post unless you are excused. Make sure both the NCS and the officials you are with know when you leave.
- Help the NCS keep track of who is where so he knows whom to call when asked to contact a person or checkpoint.

### DON'T:

- Leave the frequency unless the NCS knows. If you must leave early, the more advance notice you give, the better.

**DO:**

- Maintain a courteous, professional image. You may be working with several agencies including police, fire, first aid squads, National Guard, etc. Extend every possible courtesy to members of these groups. Make sure they know who you are and what your communications capabilities are.
- Arrange for someone knowledgeable about the area to handle talk-in, or at least someone with a good map if no one else is available.
- Tell your operators exactly what their assignments are and remind them of the general guidelines for public service events. Assignments and changes in them should be made known to the entire group before the event begins or during its progress if the change occurs then.
- Have operators working in teams of at least two persons, if possible. Make sure that at least one member of each team is monitoring the radio at all times!
- Arrange for relief operators. Everybody needs lunch or coffee breaks.
- Use simplex if at all possible, with a repeater as back-up and for talk-in. Clear the function with the repeater group in writing, and well in advance.
- Obey instructions of the Net Control Station. The NCS is there to respond to general queries from the net or from other amateurs on the frequency. Even with only a few operators involved, he is necessary to smooth functioning. Address requests to transmit to him and obey his instructions just as traffic nets.
- Use tactical call signs. Checkpoint or unit numbers, or other special identifiers, are legal provided the station identification requirements are also fulfilled. Use standard operating procedure in all communications.

**DON'T:**

- Over identify! Amateur radio operators only need to identify with their callsign at ten-minute intervals during a series of transmissions. However, don't jump into the net every ten minutes just to identify. For example, if you only engage in a short exchange of transmissions every half-hour or so, you will fulfill the identification requirement if you ID at the end of each exchange. The 10-minute time applies to the amateur radio service, other services have different identification requirements. The interval for GMRS is 15 minutes. The same practices used in the amateur radio service will also meet the requirements in all the other services we are likely to use.

**DO:**

- Transmit as little as possible. Silence is golden! Avoid excessive use of callsigns (once every 10 minutes is all that is required). "Net Control, This is Checkpoint 1" conveys much more useful information.
- Memorize the main operations frequency and alternate frequencies.

**DON'T:**

- Apply first aid unless you are trained and certified to do so! Call for medical assistance; an ambulance or medical personnel will be dispatched to your location.
- Transport an ill or injured person in a private vehicle. This is the job of the medics and the police. An emergency vehicle is properly equipped and can get through traffic safely much faster than a private car.
- Offer more than you can deliver. You are not there to provide direct emergency assistance! You are there to communicate the need for such assistance to proper authorities.

**DO:**

- Resist the temptation to generate traffic just to be busy. Silence is golden when you cannot add to the real information being passed.
- Arrange for someone to be in charge as Net Control. Even small events can have messy communications without this. The group needs a leader.
- Arrange for your people well in advance, but check on them the week before to ensure that they are still available. If you can have extra people or stand-bys available, do so. Excuse people as soon as you can as long as their jobs are finished and all other positions still needed are covered.
- Thank your operators and share any feedback you get with them. Courtesy and thoughtfulness pay off.
- Keep your ARRL EC or DEC informed of what you are doing and who participates. He can help you arrange publicity. Public relations releases before and after the event can help us all get our message across that we are here with the ability to serve. He can also help get the operators. The same applies to informing your state REACT Council, your Regional Director, and the RI Publicity Committee. Don't forget to get some good pictures and write up a short article to appear in The REACTer.
- Identify vehicles as Communications Vehicles. Operators should be identified, too. A patch or team name tag is sufficient. Use baseball caps with a patch or logo. We all know this advice applies to REACT Teams and operators just as it does to amateur radio, but we still forget to do it. In addition to making sure that everyone has appropriate REACT identification clearly visible, also keep in mind your total appearance: vehicle, clothes, equipment, personal appearance. If you want to be treated like professionals, you have to look and act professional.
- Use the standard message form when necessary for official requests and messages.
- Make sure that the frequency is clear before making a call. The channel can get very busy during "tactical operations." This is especially critical if you are using CTCSS ("tone") squelch.

- When you complete an exchange with another station, use the prowords “clear” or “out” so other stations will know the frequency is now available to them. One method is to end with just your call. This fulfills all the FCC identification requirements and takes less time. Whatever procedure your Team uses, make sure everyone knows and uses the same procedure.
- Keep transmissions as short as possible. Resist the tendency to ragchew or ramble.
- Be professional. If you want to be treated as a peer and as a professional communicator, dress in a professional manner. Don't come to a meeting wearing a T-shirt and callsign cap, and carrying four radios on your belt. At the same time, don't try to look like a police officer (unless you happen to be one). Dress appropriately for the occasion.

### **DON'T:**

- Handle routine business or commercial communications over Amateur Radio. This includes communications regarding dollar amounts of walkathon pledges, etc. The press and broadcast stations may quote or rebroadcast amateur signals, provided the signals rebroadcast do not contain references to the broadcast. This is primarily an Amateur Radio Service concern. And even on the Amateur Radio Service it isn't just “dollar amounts” that make the difference between allowable and prohibited communications. Be familiar with the rules for each service you use. This is especially important if you are using several services to cover the same event because some operators will be working more than one radio.

### **DO**

- Always stop a second to be sure which mike you just grabbed. Don't give your ham call on GMRS or vice versa.



## NTS Message Handling Instructions

The ARRL National Traffic System has a long history of originating, relaying, and delivering messages via amateur radio. This system includes many features that do not conform to the guidance of the Incident Command System, particularly the requirement to use "Plain Language" for all communications. Operators originating any message within the ICS system should always use plain language. However it is possible that you will receive messages that include ARRL NTS Handling Instructions or Numbered Radiograms.

### **Avoid using these handling instructions when originating a message.**

If a message is received that already includes one or more of these Handling Instructions, those instructions are part of the message and must be included. If the message is being relayed outside the ARRL National Traffic System it will generally be necessary to translate the HX-code into plain language. There is no space for handling instructions on the ICS General Message Form (ICS form 213) but the plain language version of the instruction can be included with the message text when necessary.

According to the NTS manual: When Handling Instructions are used, one or more of the instruction codes are inserted in the message preamble between the precedence and the station of origin. Its use is optional with the originating stations, but once inserted is mandatory with all relaying stations. The following definitions apply:

- HXA** (Followed by number) Collect landline delivery authorized by addressee within...miles. (If no number, authorization is unlimited.)
- HXB** (Followed by number) Cancel message if not delivered within...hours of filing time; service originating station.
- HXC** Report date and time of delivery (TOD) to originating station.
- HXD** Report to originating station the identity of station from which received, plus date and time. Report identity of station to which relayed, plus date and time, or if delivered report date, time, and method of delivery.
- HXE** Delivering station get reply from addressee, originate message back.
- HXF** (Followed by number) Hold delivery until (date).
- HXG** Delivery by mail or landline toll call not required. If toll or other expense involved, cancel message and service originating station.

Example: NR 207 R HXA50 W4XXX 12...(etc.).

If more than one HX prosign is used, they can be combined if no numbers are to be inserted; otherwise the HX should be repeated thus: NR 207 R HXAC W4XXX...(etc.). On phone, use phonetics for the letter or letters following the HX, to ensure accuracy.

## ARRL Numbered Radiograms

The ARRL National Traffic System has a long history of originating, relaying, and delivering messages via amateur radio. This system includes many features that do not conform to the guidance of the Incident Command System, particularly the requirement to use "Plain Language" for all communications. Operators originating any message within the ICS system should always use plain language. However it is possible that you will receive messages that include ARRL NTS Numbered Radiograms.

When a message containing Numbered Radiograms is to be relayed within the ARRL National Traffic System, the message will be relayed exactly as received.

When a message containing Numbered Radiograms is to be relayed outside the ARRL National Traffic System or is to be delivered, convert any Numbered Radiograms to plain language.

According to the NTS manual: The letters ARL are inserted in the preamble in the check and in the text before spelled out numbers, which represent texts from this list. Note that some ARL texts require insertion of numerals or other information.

Example: NR 1 R W1AW ARL 5 NEWINGTON CONN DEC 25 DONALD R SMITH  
164 EAST SIXTH AVE NORTH RIVER CITY MO PHONE 995 732 3968 ARL  
FIFTY ARL SIXTY ONE DIANA

For additional information about traffic handling, consult *The ARRL Operating Manual*, published by ARRL.

### Group One—For Possible “Relief Emergency” Use

ONE - Everyone safe here. Please don't worry.

TWO - Coming home as soon as possible.

THREE - Am in \_\_\_\_ hospital. Receiving excellent care and recovering fine.

FOUR - Only slight property damage here. Do not be concerned about disaster reports.

FIVE - Am moving to new location. Send no further mail or communication. Will inform you of new address when relocated.

SIX - Will contact you as soon as possible.

SEVEN - Please reply by Amateur Radio through the amateur delivering this message. This is a free public service.

EIGHT - Need additional \_\_\_\_ mobile or portable equipment for immediate emergency use.

NINE - Additional \_\_\_\_ radio operators needed to assist with emergency at this location.

TEN - Please contact \_\_\_\_\_. Advise to standby and provide further emergency information, instructions or assistance.

ELEVEN - Establish Amateur Radio emergency communications with \_\_\_\_\_ on \_\_\_\_\_ MHz.

TWELVE - Anxious to hear from you. No word in some time. Please contact me as soon as possible.

THIRTEEN - Medical emergency situation exists here.

FOURTEEN - Situation here becoming critical. Losses and damage from \_\_\_\_\_ increasing.

FIFTEEN - Please advise your condition and what help is needed.

SIXTEEN - Property damage very severe in this area.

SEVENTEEN - *REACT* communications services also available. Establish *REACT* communication with \_\_\_\_\_ on channel \_\_\_\_\_.

EIGHTEEN - Please contact me as soon as possible at \_\_\_\_\_.

NINETEEN - Request health and welfare report on \_\_\_\_\_. (State name, address, and telephone number.)

TWENTY - Temporarily stranded. Will need some assistance. Please contact me at \_\_\_\_\_.

TWENTY ONE - Search and Rescue assistance is needed by local authorities here. Advise availability.

TWENTY TWO - Need accurate information on the extent and type of conditions now existing at your location. Please furnish this information and reply without delay.

TWENTY THREE - Report at once the accessibility and best way to reach your location.

TWENTY FOUR - Evacuation of residents from this area urgently needed. Advise plans for help.

TWENTY FIVE - Furnish as soon as possible the weather conditions at your location.

TWENTY SIX - Help and care for evacuation of sick and injured from this location needed at once.

*Note: Emergency and priority messages originating from official sources must carry the signature of the originating official.*

**Group Two - Routine messages**

FORTY SIX - Greetings on your birthday and best wishes for many more to come.

FIFTY - Greetings by Amateur Radio.

FIFTY ONE - Greetings by Amateur Radio. This message is sent as a free public service by ham radio operators at \_\_\_\_\_. Am having a wonderful time.

FIFTY TWO - Really enjoyed being with you. Looking forward to getting together again.

FIFTY THREE - Received your \_\_\_\_\_. It's appreciated; many thanks.

FIFTY FOUR - Many thanks for your good wishes.

FIFTY FIVE - Good news is always welcome. Very delighted to hear about yours.

FIFTY SIX - Congratulations on your \_\_\_\_\_, a most worthy and deserved achievement.

FIFTY SEVEN - Wish we could be together.

FIFTY EIGHT - Have a wonderful time. Let us know when you return.

FIFTY NINE - Congratulations on the new arrival. Hope mother and child are well.

SIXTY - Wishing you the best of everything on \_\_\_\_\_.

SIXTY ONE - Wishing you a very Merry Christmas and a Happy New Year.

SIXTY TWO - Greetings and best wishes to you for a pleasant \_\_\_\_\_ holiday season.

SIXTY THREE - Victory or defeat, our best wishes are with you. Hope you win.

SIXTY FOUR - Arrived safely at \_\_\_\_\_.

SIXTY FIVE - Arriving \_\_\_\_\_ on \_\_\_\_\_. Please arrange to meet me there.

SIXTY SIX - DX QSLs are on hand for you at the \_\_\_\_\_ QSL Bureau. Send \_\_\_\_\_ self addressed envelopes.

SIXTY SEVEN - Your message number \_\_\_\_\_ undeliverable because of \_\_\_\_\_.  
Please advise.

SIXTY EIGHT - Sorry to hear you are ill. Best wishes for a speedy recovery.

SIXTY NINE - Welcome to the \_\_\_\_\_. We are glad to have you with us and hope you  
will enjoy the fun and fellowship of the organization.

Note: Texts sixty and sixty-two can be used for all holidays. Sixty can be used for any occasion and *always requires* information to fill in the blank. If sixty-two is used without information to fill in the blank, the text will be delivered as “Greetings and best wishes to you for a pleasant holiday season.”

## FEMA’s Independent Study Program

The EMI Independent Study program consists of self-paced courses designed for both the general public and people who have emergency management responsibilities.

Each Independent Study Course includes lessons with practice exercises and a final examination. Those who score 75 percent or better are issued a certificate of completion by EMI. The average course completion time is 10-12 hours although experienced individuals may complete some courses much more quickly.

You may obtain the course materials from the EMI Web site at [https://training.fema.gov/is/crslist.aspx /](https://training.fema.gov/is/crslist.aspx/)

All materials on the EMI Internet Web site are available to anyone who can access them, but official enrollment in the courses and scoring of final exams is generally limited to United States citizens. *REACT* members outside the United States interested in taking online FEMA courses should contact the Region 9 Director for additional information.

The courses available (as of August 2017) are:

| Course Code | Course Title                                                                                                      |
|-------------|-------------------------------------------------------------------------------------------------------------------|
| IS-3        | Radiological Emergency Management - (10/31/2013)                                                                  |
| IS-5.a      | An Introduction to Hazardous Materials - (10/31/2013)                                                             |
| IS-8.a      | Building for the Earthquakes of Tomorrow: Complying with Executive Order 12699 - (10/31/2013)                     |
| IS-10.a     | Animals in Disasters: Awareness and Preparedness - (10/2/2015)                                                    |
| IS-11.a     | Animals in Disasters: Community Planning - (10/2/2015)                                                            |
| IS-15.b     | Special Events Contingency Planning for Public Safety Agencies - (10/31/2013)                                     |
| IS-18.17    | FEMA EEO Employee Course 2017 - (1/25/2017)                                                                       |
| IS-19.17    | FEMA EEO Supervisor Course 2017 - (1/25/2017)                                                                     |
| IS-20.17    | Diversity Awareness Course 2017 - (1/25/2017)                                                                     |
| IS-21.17    | Civil Rights and FEMA Disaster Assistance - (1/25/2017)                                                           |
| IS-26       | Guide to Points of Distribution - (8/11/2010)                                                                     |
| IS-27       | Orientation to FEMA Logistics - (10/31/2013)                                                                      |
| IS-29       | Public Information Officer Awareness - (10/31/2013)                                                               |
| IS-30.a     | Mitigation eGrants for the Subgrant Applicant - (10/31/2013)                                                      |
| IS-31.a     | Mitigation eGrants for the Grant Applicant - (10/31/2013)                                                         |
| IS-32       | Mitigation eGrants Internal System - (10/31/2013)                                                                 |
| IS-33.17    | FEMA Initial Ethics Orientation 2017 - (1/25/2017)                                                                |
| IS-35.17    | FEMA Safety Orientation 2017 - (1/25/2017)                                                                        |
| IS-36       | Multihazard Planning for Childcare - (10/31/2013)                                                                 |
| IS-37.17    | Managerial Safety and Health - (1/25/2017)                                                                        |
| IS-42       | Social Media in Emergency Management - (10/31/2013)                                                               |
| IS-60.b     | The Homeland Security Geospatial Concept-of-Operations (GeoCONOPS) for Planners and Decision Makers - (9/20/2016) |

|                 |                                                                                                                    |
|-----------------|--------------------------------------------------------------------------------------------------------------------|
| IS-61.b         | The Homeland Security Geospatial Concept-of-Operations (GeoCONOPS) In Depth - (9/20/2016)                          |
| IS-62.b         | The Homeland Security Geospatial Concept-of-Operations (GeoCONOPS) In Use - (9/20/2016)                            |
| IS-63.b         | Geospatial Information Infrastructure (GII) - (9/20/2016)                                                          |
| IS-64.a         | DHS Common Operating Picture Application - (9/20/2016)                                                             |
| IS-75           | Military Resources in Emergency Management - (2/25/2011)                                                           |
| <b>IS-100.b</b> | <b>Introduction to Incident Command System, ICS-100 - (10/31/2013)</b>                                             |
| IS-100.FDA      | Introduction to Incident Command System (ICS 100) for Food and Drug Administration - (10/31/2013)                  |
| IS-100.FWa      | Intro to Incident Command System (ICS 100) for Federal Workers - (10/31/2013)                                      |
| IS-100.HCb      | Introduction to the Incident Command System (ICS 100) for Healthcare/Hospitals - (10/31/2013)                      |
| IS-100.HE       | Introduction to the Incident Command System for Higher Education - (10/31/2013)                                    |
| IS-100.LEb      | Introduction to the Incident Command System (ICS 100) for Law Enforcement - (10/31/2013)                           |
| IS-100.PWb      | Introduction to the Incident Command System (ICS 100) for Public Works - (10/31/2013)                              |
| IS-100.SCa      | Introduction to the Incident Command System for Schools - (10/31/2013)                                             |
| IS-101.c        | Preparing for Federal Disaster Operations: FEMA - (10/31/2013)                                                     |
| IS-102.c        | Preparing for Federal Disaster Operations: FEMA Response Partners - (10/31/2013)                                   |
| IS-103          | Geospatial Information Systems Specialist - (10/31/2013)                                                           |
| IS-106.17       | Workplace Violence Awareness Training 2017 - (1/25/2017)                                                           |
| IS-107.17       | FEMA Travel Rules and Regulations 2017 - (1/25/2017)                                                               |
| IS-111.a        | Livestock in Disasters - (10/31/2013)                                                                              |
| IS-120.a        | An Introduction to Exercises - (1/23/2008)                                                                         |
| IS-130          | Exercise Evaluation and Improvement Planning - (1/23/2008)                                                         |
| IS-144          | Telecommunicators Emergency Response Taskforce (TERT) Basic Course - (10/31/2013)                                  |
| IS-156          | Building Design for Homeland Security for Continuity of Operations - (6/12/2014)                                   |
| IS-158          | Hazard Mitigation Flood Insurance in Disaster Operations - (11/16/2016)                                            |
| IS-162          | Hazard Mitigation Floodplain Management in Disaster Operations - (11/16/2016)                                      |
| <b>IS-200.b</b> | <b>ICS for Single Resources and Initial Action Incidents - (10/31/2013)</b>                                        |
| IS-200.HCa      | Applying ICS to Healthcare Organizations - (10/31/2013)                                                            |
| IS-201          | Forms Used for the Development of the Incident Action Plan - (10/31/2013)                                          |
| IS-207          | Overview of the FEMA Qualification System (FQS) and Qualification Review Boards (QRBs) - (10/31/2013)              |
| IS-212.b        | Introduction to Unified Hazard Mitigation Assistance (HMA) - (12/7/2015)                                           |
| IS-215          | Unified Federal Review Advisor Training: An Overview of the UFR Process - (8/22/2016)                              |
| IS-216          | An Overview of the Unified Federal Review Process: Training for Federal Disaster Recovery Leadership - (8/22/2016) |
| IS-230.d        | Fundamentals of Emergency Management - (12/16/2013)                                                                |
| IS-235.c        | Emergency Planning - (12/15/2015)                                                                                  |
| IS-240.b        | Leadership and Influence - (6/16/2014)                                                                             |
| IS-241.b        | Decision Making and Problem Solving - (3/31/2014)                                                                  |
| IS-242.b        | Effective Communication - (3/31/2014)                                                                              |

- IS-244.b Developing and Managing Volunteers - (3/29/2013)
- IS-245.a Introduction to the Defense Priorities and Allocations System (DPAS) - (10/31/2013)
- IS-246.17 Implementing the Defense Priorities and Allocations System (DPAS) - (1/25/2017)
- IS-247.a Integrated Public Alert and Warning System (IPAWS) - (10/31/2013)
- IS-248 Integrated Public Alert and Warning System (IPAWS) for the American Public - (8/27/2013)
- IS-250.a Emergency Support Function 15 (ESF15) External Affairs: A New Approach to Emergency Communication and Information Distribution - (5/7/2012)
- IS-251 Integrated Public Alert and Warning System (IPAWS) for Alerting Authorities - (6/12/2014)
- IS-253.a Overview of FEMA's Environmental and Historic Preservation Review - (10/31/2013)
- IS-271.a Anticipating Hazardous Weather & Community Risk, 2nd Edition - (10/31/2013)
- IS-276.a Benefit-Cost Analysis Fundamentals - (5/3/2017)
- IS-277.a Benefit-Cost Analysis (BCA): Entry- Level - (5/23/2017)
- IS-279.a Introduction to Retrofitting Flood-Prone Residential Buildings - (10/13/2015)
- IS-280 Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures, FEMA Publication 259, 3rd Edition - (10/18/2013)
- IS-284 Using the Substantial Damage Estimator 2.0 Tool - (1/2/2014)
- IS-288.a The Role of Voluntary Organizations in Emergency Management - (2/12/2015)
- IS-293 Mission Assignment Overview - (6/2/2009)
- IS-301 Radiological Emergency Response - (10/31/2013)
- IS-302 Modular Emergency Radiological Response Transportation Training
- IS-303 Radiological Accident Assessment Concepts - (1/13/2014)
- IS-315 CERT Supplemental Training: The Incident Command System - (8/13/2013)
- IS-317 Introduction to Community Emergency Response Teams - (6/26/2014)
- IS-318 Mitigation Planning for Local and Tribal Communities - (10/31/2013)
- IS-319 Tornado Mitigation Basics for Mitigation Staff - (10/31/2013)
- IS-320 Wildfire Mitigation Basics for Mitigation Staff - (10/31/2013)
- IS-321 Hurricane Mitigation Basics for Mitigation Staff - (10/31/2013)
- IS-322 Flood Mitigation Basics for Mitigation Staff - (10/31/2013)
- IS-323 Earthquake Mitigation Basics for Mitigation Staff - (10/31/2013)
- IS-324.a Community Hurricane Preparedness - (10/31/2013)
- IS-325 Earthquake Basics: Science, Risk, and Mitigation - (10/31/2013)
- IS-326 Community Tsunami Preparedness - (10/31/2013)
- IS-328 Plan Review for Local Mitigation Plans - (10/31/2013)
- IS-331 Introduction to Radiological Emergency Preparedness (REP) Exercise Evaluation - (10/31/2013)
- IS-346 An Orientation to Hazardous Materials for Medical Personnel - (10/31/2013)
- IS-360 Preparing for Mass Casualty Incidents: A Guide for Schools, Higher Education, and Houses of Worship - (6/24/2013)
- IS-362.a Multi-Hazard Emergency Planning for Schools - (10/31/2013)
- IS-366.a Planning for the Needs of Children in Disasters - (12/9/2015)
- IS-368 Including People With Disabilities & Others With Access & Functional Needs in Disaster Operations - (2/20/2014)
- IS-386 Introduction to Residential Coastal Construction - (10/31/2013)
- IS-393.b Introduction to Hazard Mitigation - (6/15/2017)
- IS-394.a Protecting Your Home or Small Business From Disaster - (10/31/2013)



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| IS-395          | FEMA Risk Assessment Database - (10/31/2013)                                                                      |
| IS-403          | Introduction to Individual Assistance (IA) (DF-103) - (5/12/2010)                                                 |
| IS-405          | Overview of Mass Care/Emergency Assistance - (12/10/2013)                                                         |
| IS-420          | Implementing the Emergency Food and Shelter National Board Program - (10/6/2010)                                  |
| IS-421          | Overview of the Emergency Food and Shelter National Board Program - (10/23/2013)                                  |
| IS-450          | Emergency Preparedness for Federal Employees - (10/31/2013)                                                       |
| IS-450.NC       | Emergency Preparedness for Federal Employees in the National Capital Region - (10/31/2013)                        |
| IS-453          | Introduction to Homeland Security Planning - (10/31/2013)                                                         |
| IS-454          | Fundamentals of Risk Management - (10/31/2013)                                                                    |
| IS-505          | Religious and Cultural Literacy and Competency in Disaster - (3/4/2016)                                           |
| IS-520          | Introduction to Continuity of Operations Planning for Pandemic Influenzas - (10/31/2013)                          |
| IS-522          | Exercising Continuity Plans for Pandemics - (8/27/2010)                                                           |
| IS-523          | Resilient Accord – Exercising Continuity Plans for Cyber Incidents - (4/16/2013)                                  |
| IS-525          | Guardian Accord (GA) Workshop - (2/28/2014)                                                                       |
| IS-545          | Reconstitution Planning Course - (8/11/2014)                                                                      |
| IS-546.a        | Continuity of Operations Awareness Course - (10/31/2013)                                                          |
| IS-547.a        | Introduction to Continuity of Operations - (10/31/2013)                                                           |
| IS-551          | Devolution Planning - (10/22/2010)                                                                                |
| IS-552          | The Public Works Role in Emergency Management - (10/2/2015)                                                       |
| IS-554          | Emergency Planning for Public Works - (10/31/2013)                                                                |
| IS-556          | Damage Assessment for Public Works - (10/31/2013)                                                                 |
| IS-558          | Public Works and Disaster Recovery - (10/31/2013)                                                                 |
| IS-559          | Local Damage Assessment - (10/31/2013)                                                                            |
| IS-632.a        | Introduction to Debris Operations - (10/31/2013)                                                                  |
| IS-633          | Debris Management Plan Development - (4/6/2017)                                                                   |
| IS-634          | Introduction to FEMA’s Public Assistance Program - (10/2/2015)                                                    |
| IS-650.a        | Building Partnerships with Tribal Governments - (6/11/2010)                                                       |
| IS-660          | Introduction to Public-Private Partnerships - (12/20/2011)                                                        |
| IS-662          | Improving Preparedness and Resilience through Public-Private Partnerships - (10/31/2013)                          |
| <b>IS-700.a</b> | <b>National Incident Management System (NIMS) An Introduction - (10/31/2013)</b>                                  |
| IS-702.a        | National Incident Management System (NIMS) Public Information Systems - (10/31/2013)                              |
| IS-703.a        | NIMS Resource Management - (1/15/2010)                                                                            |
| IS-706          | NIMS Intrastate Mutual Aid - An Introduction - (10/31/2013)                                                       |
| IS-720          | An Introduction to NET Guard - (10/31/2013)                                                                       |
| IS-772          | IA PDA Orientation - (12/3/2013)                                                                                  |
| IS-775          | EOC Management and Operations - (8/6/2008)                                                                        |
| IS-794          | External Affairs Program Liaison - (11/13/2013)                                                                   |
| <b>IS-800.b</b> | <b>National Response Framework, An Introduction - (1/20/2017)</b>                                                 |
| IS-801          | Emergency Support Functions (ESF) #1 - Transportation - (10/31/2013)                                              |
| IS-802          | Emergency Support Functions (ESF) #2 - Communications - (10/31/2013)                                              |
| IS-803          | Emergency Support Function (ESF) #3 – Public Works and Engineering - (10/31/2013)                                 |
| IS-804          | Emergency Support Function (ESF) #4 – Firefighting - (10/31/2013)                                                 |
| IS-806          | Emergency Support Function (ESF) #6 – Mass Care, Emergency Assistance, Housing, and Human Services - (10/31/2013) |

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| IS-807    | Emergency Support Function (ESF) #7 – Logistics Management and Resource Support Annex - (10/31/2013)                   |
| IS-808    | Emergency Support Function (ESF) #8 – Public Health and Medical Services - (10/31/2013)                                |
| IS-809    | Emergency Support Function (ESF) #9 – Search and Rescue - (10/31/2013)                                                 |
| IS-810    | Emergency Support Functions (ESF) #10 - Oil and Hazardous Materials Response Annex - (10/31/2013)                      |
| IS-811    | Emergency Support Functions (ESF) #11 - Agriculture and Natural Resources Annex - (10/31/2013)                         |
| IS-812    | Emergency Support Function (ESF) # 12 - Energy - (10/31/2013)                                                          |
| IS-813    | Emergency Support Functions (ESF) #13 - Public Safety and Security Annex - (10/31/2013)                                |
| IS-815    | ABCs of Temporary Emergency Power - (12/27/2016)                                                                       |
| IS-820    | Introduction to NRF Support Annexes - (6/16/2009)                                                                      |
| IS-822    | Fundamentals of Management and Support Coordination of Federal Disaster Operations - (11/27/2013)                      |
| IS-830    | Introduction to NRF Incident Annexes - (5/26/2011)                                                                     |
| IS-836    | Nuclear/Radiological Incident Annex - (3/26/2009)                                                                      |
| IS-842.a  | NEMIS HMGP System: Enter the HMGP Application - (7/13/2015)                                                            |
| IS-860.c  | The National Infrastructure Protection Plan, An Introduction - (7/21/2015)                                             |
| IS-870.a  | Dams Sector: Crisis Management - (7/2/2014)                                                                            |
| IS-871.a  | Dams Sector: Security Awareness - (10/30/2013)                                                                         |
| IS-872.a  | Dams Sector: Protective Measures - (10/30/2013)                                                                        |
| IS-890.a  | Introduction to the Interagency Security Committee (ISC) - (10/31/2013)                                                |
| IS-891    | Facility Security Level Determinations for Federal Facilities - (10/31/2013)                                           |
| IS-892    | Physical Security Criteria for Federal Facilities - (10/31/2013)                                                       |
| IS-893    | Facility Security Committees - (10/31/2013)                                                                            |
| IS-906    | Workplace Security Awareness - (10/31/2013)                                                                            |
| IS-907    | Active Shooter: What You Can Do - (12/28/2015)                                                                         |
| IS-908    | Emergency Management for Senior Officials - (10/31/2013)                                                               |
| IS-909    | Community Preparedness: Implementing Simple Activities for Everyone - (10/31/2013)                                     |
| IS-912    | Retail Security Awareness: Understanding the Hidden Hazards - (10/31/2013)                                             |
| IS-913.a  | Critical Infrastructure Security and Resilience: Achieving Results through Partnership and Collaboration - (11/1/2013) |
| IS-914    | Surveillance Awareness: What You Can Do - (10/31/2013)                                                                 |
| IS-915    | Protecting Critical Infrastructure Against Insider Threats - (7/10/2013)                                               |
| IS-916    | Critical Infrastructure Security: Theft and Diversion – What You Can Do - (10/31/2013)                                 |
| IS-920    | FEMA Performance Management Program - (10/31/2013)                                                                     |
| IS-921.a  | Implementing Critical Infrastructure Security and Resilience - (11/1/2013)                                             |
| IS-922    | Applications of GIS for Emergency Management - (10/31/2013)                                                            |
| IS-923    | Performance Management – Goal Writing - (10/31/2013)                                                                   |
| IS-930    | Emergency Responder Health Monitoring and Surveillance (ERHMS) System: Leadership Training - (9/11/2013)               |
| IS-951    | DHS Radio Interoperability - (9/22/2016)                                                                               |
| IS-1100.a | Increased Cost of Compliance - (3/15/2016)                                                                             |
| IS-1101.a | Basic Agent Tutorial - (11/17/2016)                                                                                    |
| IS-1102   | Theory of Elevation Rating - (8/17/2015)                                                                               |

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| IS-1103.a | Elevation Certificate for Surveyors - (6/8/2017)                                                              |
| IS-1104   | NFIP Claims Review for Adjusters - (10/20/2015)                                                               |
| IS-1105   | EC Made Easy: Elevation Certificate Overview - (9/2/2015)                                                     |
| IS-1106.a | FEMA Mapping Changes - (12/28/2016)                                                                           |
| IS-1107   | Adjuster Customer Service - (9/2/2015)                                                                        |
| IS-1108   | Insuring Condominiums - (9/2/2015)                                                                            |
| IS-1109   | Understanding Basement Coverage - (8/21/2015)                                                                 |
| IS-1110.a | Writing Commercial Exposures - (5/11/2016)                                                                    |
| IS-1111   | Introduction to Commercial Claims - (9/2/2015)                                                                |
| IS-1112   | Introduction to Flood Claims - (9/2/2015)                                                                     |
| IS-1113   | Coastal Barrier Resources Act - (8/17/2015)                                                                   |
| IS-1150   | DHS Human Trafficking Awareness for FEMA Employees - (9/14/2016)                                              |
| IS-1170   | Introduction to the Interagency Security Committee (ISC) - (8/21/2017)                                        |
| IS-1171   | Overview of Interagency Security Committee (ISC) Publications - (8/21/2017)                                   |
| IS-1172   | Risk Management Process for Federal Facilities: Section 4 Federal Security Levels Determination - (8/21/2017) |
| IS-1173   | Levels of Protection (LOP) and Application of the Design-Basis Threat (DBT) Report - (8/18/2017)              |
| IS-1174   | Facility Security Committees - (8/21/2017)                                                                    |
| IS-1200   | TERT Team Leader Course - (12/2/2016)                                                                         |
| IS-2001   | Threat and Hazard Identification and Risk Assessment (THIRA) - (1/2/2014)                                     |
| IS-2900   | National Disaster Recovery Framework (NDRF) Overview - (11/1/2013)                                            |

IS-100 and IS-700 should be considered the minimum essential training for all *REACT* Team members.

IS-200 and IS-800 should be considered essential for all *REACT* Team and Council leaders and are highly recommended for all *REACT* members.

Each Team should also consider the programs and the emergency hazards in their community to determine which other training would be valuable. For example IS-111 would be valuable in a farming community but probably not needed in a large city. While IS-324 would be important along the Gulf and Atlantic coasts but probably of less value in Oklahoma or Illinois.

Some courses are valuable to the general public – *including all REACTers*. Some examples would be IS-5 and IS-394. Everyone should be encouraged to complete these courses.

There are several other online courses highly recommended for *REACT* Team and Council leaders. Some suggestions (in addition to those already mentioned) include: IS-15, IS-42, IS-120, IS-240 through -244, IS-288, and IS-802. Some of these courses will help you do your function better, others will help you understand just how you and your Team fit in the overall emergency management and disaster response programs.

With the introduction of the National Incident Management System (NIMS) and national standards for emergency response agencies, it is generally necessary for *REACT* Teams to be “NIMS Compliant” if they are going to work with their local Emergency Management Agency or any other emergency response agencies – the starting point for NIMS compliance is training.

To meet federal standards, all emergency responders will need to have completed *at least* IS-100 and IS-700 or an approved equivalent. Most agencies are now requiring IS-100, 200, 700, and 800 for all responders. State Emergency Management Agencies may offer approved training that meets the requirement for ICS training. Talk with your local Emergency Manager or whichever emergency response agency your Team works with to see what training is available in your area.

Advanced training is usually presented as instructor-led classroom training using state or federal instructors. Advanced training, such as ICS-300, ICS-400, and the Department of Homeland Security's Auxiliary Communications (AUXCOMM) courses are generally not essential for individual *REACT* members but may be worthwhile for Team and Council leaders.



STATEMENT OF UNDERSTANDING  
between  
*REACT* INTERNATIONAL, INC.  
and the  
NATIONAL WEATHER SERVICE

AGREEMENT FOR THE COORDINATION OF SEVERE WEATHER SPOTTER  
AND COMMUNICATIONS ACTIVITIES  
BETWEEN THE NATIONAL WEATHER SERVICE  
AND *REACT* INTERNATIONAL, INC.

This Memorandum of Understanding (MOU) is entered into between the United States of America, Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, herein after referred to as the NWS, and *REACT* International, Inc., herein after referred to as *REACT*.

The purpose of this MOU is to state the terms of a mutual agreement between the NWS and *REACT*. This MOU is to serve as a framework within which local *REACT* teams may coordinate their services, use of facilities, and equipment with the NWS in support of nationwide, state, and local early warning and emergency communications functions. Through joint coordination and exercise of the resources of *REACT*, the NWS and Federal, state, and local governments intend to enhance the nationwide posture of early weather warning and readiness for any conceivable weather related emergency.

I. RECOGNITION

The NWS recognizes that *REACT* is the principal organization representing the interests of more than 9,000 volunteers using such public access radio communications as Citizens Band Radio Service, General Mobile Radio Service, and Marine Radio Service. Because of its field organization of trained and experienced communications experts, *REACT* can be of valuable assistance in the spotting and reporting of severe weather.

*REACT* recognizes the NWS' statutory responsibility to provide civil meteorological services for the people of the United States. These services consist of:

1. Providing accurate and timely forecasts and warnings of weather and flood conditions affecting the nation; and,
2. Observing and reporting the weather of the U.S. and its possessions.

The NWS operates a vast network of offices of many types within the U.S. to fulfill its function and many related, specialized weather services. The NWS cooperates in the exchange of data in real time with other nations, including obtaining weather reports from ships at sea.

## II. ORGANIZATION OF THE NATIONAL WEATHER SERVICE

The NWS consists of a National Headquarters in Silver Spring, MD, and six regional offices in the United States: Eastern, Southern, Central, Western, Pacific, and Alaska.

Fifty-two Weather Service Forecast Offices and 209 Weather Service Offices provide warnings and forecasts to the Nation.

Skywarn is the spotter training program developed and sponsored by the NWS. Radio operators have volunteered to assist as communicators and Skywarn spotters since the program's inception. In areas where tornadoes and other severe weather are a frequent concern, the NWS recruits volunteers, trains them in storm identification and spotting procedures, and subsequently accepts the spotter's reports during episodes of severe weather. By utilizing the Skywarn volunteers, the NWS has "eyes and ears" throughout the affected area in conjunction with NWS sophisticated remote sensing equipment.

## III. ORGANIZATION OF *REACT* INTERNATIONAL, INC.

*REACT* International, Inc. was established in 1962 as a nonprofit IRS 501 (c)(3) organization, chartered to promote emergency communications and motorist assistance. *REACT* is headquartered in Wichita, KS. *REACT* members use Citizens Band Radio, Marine Radio, General Mobile Radio, Amateur Radio, and Business Radio among other radio services to provide emergency and disaster communications to the public and to government emergency management agencies. *REACT* teams accept the responsibility of maintaining a monitoring system for emergency communications.

There are 26 State Councils that act to improve communication and coordination between local *REACT* teams within their state. Each *REACT* team is a wholly independent entity with its own form of administrative control, developed to suit local needs and conditions. Because many of the monitored frequencies are designed for local communications, there is no limit to the number of *REACT* teams in any geographical area. *REACT*, on behalf of local teams throughout the nation, works effectively with other national emergency groups to advise on the proper use of local radio communications.

## IV. PRINCIPLES OF COOPERATION

*REACT* agrees to encourage its State Councils to arrange for the provision of specialized communications and observational support on an as-needed basis for NWS offices in weather emergencies including severe local storms, hurricanes, hazardous winter weather, heavy rain and flash flooding, and other hazardous weather conditions.

*REACT* further agrees to encourage its membership to contact and cooperate with NWS Forecast Offices for the purpose of establishing organized Skywarn networks with radio communicators and spotters.

The NWS agrees to work with *REACT* State Councils and Teams to establish Skywarn networks and/or other specialized weather emergency alert and relief operations. The principal point of contact between *REACT* and local NWS offices is the Meteorological Services Division (MSD) of the appropriate NWS Regional Office. Addresses for NWS Regional Offices are provided below. The national contact points for *REACT* are Government Relations Committee, c/o Norman L. Kaplan, 2605 Loma Street, Silver Spring, MD 20902-4841 and/or *REACT* International, Inc., Post Office Box 998, Wichita, KS 67201. A listing of *REACT* International, Inc. State Councils shall be provided to the NWS on an annual basis.

NWS Eastern Region, NOAA  
Airport Corporate Center  
630 Johnson Avenue  
Bohemia, NY 11716

NWS Southern Region, NOAA  
819 Taylor Street, Rm. 1 0A-26  
Fort Worth, TX 76102

NWS Central Region, NOAA  
601 E. 12th Street, Rm. 1836  
Kansas City, MO 64106-2897

NWS Western Region, NOAA  
Box 11188, Federal Bldg.  
125 S. State St., Rm. 1215  
Salt Lake City, UT 84147

NWS Pacific Region, NOAA  
Prince Kuhio Fed. Bldg., Rm. 4110  
300 Ala Moana Blvd.  
Honolulu, HI 96850-4993

NWS Alaska Region, NOAA  
222 West 7th Ave., No. 23 Rm. 517  
Anchorage, AK 99513-7575

## V. AMENDMENT PROCEDURES

This Memorandum of Understanding may be amended at any time in the following manner:

Amendments requested by the President and Chairman of the Board of *REACT* shall be forwarded to the NWS Regional Director for review. Upon approval by the NWS Regional Director, the amendment shall be forwarded to NWS Headquarters for approval by the Assistant Administrator for Weather Services.



An amendment by the NWS shall be coordinated through the NWS Regional Director and approved by the Assistant Administrator for Weather Services, then forwarded to the President and Chairman of the Board, *REACT*.

Once all parties have reached agreement on the proposed amendment, the MOU shall be changed and pages of the MOU on which amendments appear shall be completely replaced, and the amended provision marked with an asterisk in the left margin and REVIEW followed by the date at the bottom of the page. This identification need only remain until the page is again amended.

The amendment shall become effective on the last date shown on the amendment when signed by both parties to the original MOU.

If both parties cannot agree to the amendment, an effort shall be made to reach an acceptable compromise. If a compromise cannot be reached the amendment will not be made. The NWS reserves the right to accept or reject changes to this MOU as deemed appropriate. If an amendment is rejected, by either party, the original MOU provisions remain in effect unless terminated by the provisions of Article VI.

#### VI. EFFECTIVE DATE

This MOU shall become effective on the last date shown below when executed by both parties hereto. This MOU is valid and binding until termination by either party upon 60 days written notice.

#### SIGNED

Elbert W. Friday, Jr. 07/13/93  
Assistant Administrator for  
Weather Services, NOAA  
Silver Spring, MD

Ronald McCracken 07/22/93  
*REACT* International, Inc.  
President and Chairman of the Board  
Wichita, KS

STATEMENT OF UNDERSTANDING  
between  
REACT INTERNATIONAL, INC.  
and the  
AMERICAN NATIONAL RED CROSS

INTRODUCTION

REACT International, Inc. was begun in 1962 after the advent of Citizens Band Radio Service in 1959. REACT teams provide supplementary, short-range communication on various radio frequencies on an organized, voluntary basis in emergencies or disasters. Local REACT teams working cooperatively with the American Red Cross and amateur radio operators have demonstrated their effectiveness and dedication repeatedly during the past decades.

Recognizing the mutual advantages of cooperative understanding, the American Red Cross and REACT International, Inc., present this expression of their mutual desire for cooperation at all levels in the public interest.

PURPOSE

The purpose of this document is to state the terms for an understanding between REACT International, Inc. and the American National Red Cross. This document will serve as a broad framework for the understanding. Volunteer personnel of the local REACT teams may coordinate their facilities and equipment with the American Red Cross chapters. Agreements for communications support for emergency and disaster relief, inclusive of any disaster except that caused by enemy action, will be made at the local level.

DEFINITION OF DISASTER

A disaster is an occurrence, such as hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, earthquake, drought, blizzard, pestilence, famine, fire, explosion, building collapse, transportation wreck, or other situation that causes human suffering or creates human needs that the victims cannot alleviate without assistance.

AUTHORITY OF THE AMERICAN RED CROSS

By congressional charter dated January 5, 1905, the American National Red Cross was designated the nationwide agency through which the American people voluntarily extend assistance to individuals and families in need as a result of disaster. In part, the charter provides that the Red Cross shall-

- continue and carry on a system of national and international relief in time of peace and apply the same in mitigating the suffering caused by pestilence, famine, fire, floods, and other great national calamities.
- and devise and carry on measures for preventing the same.

## RECOGNITION

The American Red Cross recognizes that REACT International, Inc., because of the excellent geographical coverage provided by its affiliated REACT teams, can render valuable aid in maintaining the continuity of local communications during disasters and emergencies when normal communication facilities are disrupted or overloaded.

REACT International, Inc. recognizes the American Red Cross as the agency chartered by Congress through which the American people voluntarily extend assistance to individuals and families in need as a result of disasters.

## ORGANIZATION OF THE AMERICAN RED CROSS

The national headquarters of the American Red Cross is located in Washington, D.C. National headquarters is responsible for implementing policies and regulations that govern Red Cross activities, for giving administrative and technical supervision and guidance to chapters and other national sector units within geographical jurisdictions, and for maintaining financial control of the organization.

The chapter is the local unit of the American Red Cross and is responsible for all local Red Cross activities within its jurisdiction, subject to the policies and regulations of the corporation. There are approximately 2,600 chapters across the United States.

Each chapter is responsible for developing a special disaster preparedness and relief organization composed of the best-qualified paid and volunteer staff available. The chapter disaster committee studies the disaster hazards of the locality and surveys local resources for personnel, equipment, supplies, transportation, emergency communications and facilities available for disaster relief. The chapter disaster committee also formulates cooperative plans and procedures with local government agencies and private organizations for carrying on relief operations should a disaster occur. Through its nationwide organization, the Red Cross coordinates its total resources for use in large disasters.

## ORGANIZATION OF REACT

Established in 1962, REACT International, Inc. is an international association of local teams whose members volunteer their assistance and provide citizens with two-way radio communications in local emergencies. Each REACT team accepts the responsibility for maintaining a station or system monitoring the Federal Communications Commission designated emergency channel frequencies, 24 hours a day, 7 days a week. At a minimum, the REACT teams monitor Citizens Band Radio Channel 9. This makes each team a working, active unit ready to respond to community needs for emergency communications.

Each REACT team is a wholly independent entity. Each team has its own form of administration and control designed for local needs and conditions by its membership. Because Citizens Band radio communication systems are designed for local communications, there is no limit on the number of REACT teams chartered within any given geographical area. In metropolitan areas, in particular, several teams may be needed to give adequate coverage.

Although REACT is oriented towards local emergency communications needs, the international organization provides the necessary liaison between local teams and other national and international organization. REACT International, Inc. accumulates information on new emergency techniques from hundreds of communities and develops materials and programs to help local teams.

REACT International, Inc., on behalf of local teams throughout the nation, works effectively with other national emergency organizations, including the American National Red Cross, the American Radio Relay League, the Federal Communications Commission, and FEMA, to coordinate proper use of local two-way radio communications.

#### METHODS OF COOPERATION

In order that the communication facilities of local two-way radio service may be coordinated and used to the fullest advantage during disasters and emergencies, the American Red Cross and REACT International, Inc., have agreed to the following:

- ❖ Through either its international office in Wichita, Kansas or its Government Relations Committee in Washington, D.C., REACT International, Inc. will maintain liaison with Disaster Services at American Red Cross national headquarters.
- ❖ REACT International and Red Cross Disaster Services will work together to form the closest possible cooperation in emergency communications planning and the coordination of local radio service communication facilities for disaster relief operations.
- ❖ The Red Cross welcomes the cooperation and assistance of REACT International, Inc., and its affiliated REACT teams to extend emergency communications planning into the jurisdictions of the chapters. The chapters may request one or more members of the local REACT team to volunteer for pre-disaster planning and during disaster emergencies.
- ❖ The placement of REACT equipment on Red Cross chapter property may be done where mutually acceptable terms to both organizations are reached regarding space, security access, and liability. The requisite transmitters, aerials or other equipment or easements requiring public approval licensure, or permission will be addressed in local negotiations between the REACT team and the Red Cross chapter prior to placement.
  - All equipment placed on Red Cross property remains the property of the REACT team. The REACT equipment shall only be used under the direction and authorization of the REACT team.
  - If clarification is required on any point, the respective national organization will resolve the issues.
- ❖ Whenever there is a disaster or an emergency requiring the use of local radio communication facilities, the American Red Cross may request the assistance of the REACT teams nearest the scene. This assistance may include:
  - The alerting and mobilization of volunteer emergency communications personnel by a prearranged plan.
  - The establishment and maintenance of fixed, mobile, and portable emergency communication facilities for local radio communications coverage and point-to-point contact between Red Cross officials and locations as required.
  - Provision for adequate local communications for the duration of the emergency or until substantial regular communications are restored.
  - The Red Cross chapters and REACT teams will be encouraged to work together in pre-disaster planning, exercises and drills.
- ❖ The American Red Cross will furnish copies of this understanding to its chapters, REACT International, Inc. will furnish copies to local REACT teams.

AMENDMENT PROCEDURES

This Statement of Understanding may be amended at any time in the following manner:

- Amendments requested by the President or Chairman of the Board of Directors, REACT International, Inc. shall be forwarded to the Vice President, Disaster Services, American Red Cross for review. Upon approval, the amendment shall be forwarded to the American Red Cross Headquarters for approval and signature.
- An amendment by the American Red Cross shall be coordinated through the Voluntary Agencies, Disaster Services and then forwarded to the REACT International, Inc. Headquarters, Wichita, Kansas for review. Upon approval, the amendment shall be forwarded to the Chairman of the Board for approval and signature.
- Once all parties have reached an agreement on the proposed amendment, the Statement of Understanding shall be changed and pages of the Statement of Understanding on which the amendment appear shall be replaced.
- The amendment shall become effective on the last date shown on the amendment when signed by both parties.
- If both parties cannot agree to the amendment, an effort shall be made to reach an acceptable compromise. If a compromise cannot be reached, the amendment will not be made. If an amendment is rejected, by either party, the original Statement of Understanding provisions remain in effect.

EFFECTIVE DATE

This Statement of Understanding shall become effective on the last date shown below when executed by both parties. This Statement of Understanding is valid and binding until termination by either party upon 60 days written notice.

SIGNATURES

Greg Seemuth 11/30/93  
Chairman of the Board  
REACT International, Inc.

Elizabeth Dole 11/17/93  
President  
The American National Red Cross

**STATEMENT OF UNDERSTANDING  
between REACT INTERNATIONAL, INC.  
and the SALVATION ARMY  
relating to DISASTER SERVICES**

**PURPOSE**

The purpose of this statement is to state the terms for an understanding between REACT International, Inc. and The Salvation Army that will serve as a broad framework within which volunteer personnel of the local teams affiliated with REACT may coordinate their facilities and equipment with The Salvation Army for communications in disaster relief to victims of natural or manmade disaster.

**RESPONSIBILITIES**

Since 1962, REACT International, Inc. has provided a program for organizing local Citizens Band (CB) Radio Emergency groups which when affiliated are known as REACT Teams. Besides supplying local CB and other communications in time of disaster, REACT Teams conduct a routine daily monitoring schedule to receive calls on the official emergency CB Radio Channel 9. It is the goal of every REACT Team to maintain a full 24 hour watch on the emergency channel. In addition, they are encouraged to cooperate with all local emergency agencies and to become part of the disaster communications plan for their community.

The Salvation Army since its first charter on May 12, 1899 (amended April 26, 1957) has provided emergency services to individuals and groups in time of disaster. This service has received public recognition. The Congress of the United States of America enacted the Disaster Relief Act of 1970, which was amended by the Disaster Relief Act of 1974, Public Law 93-288 officially recognized the capabilities of The Salvation Army. Since that time, The Salvation Army has entered into specific agreements with other agencies concerned with public and private emergency and disaster relief services.

**RECOGNITION**

The Salvation Army recognizes that REACT International, Inc. because of the excellent geographic coverage of the local affiliated REACT Teams, can render valuable aid in maintaining continuity of local communications during disasters and emergencies when normal communications facilities are disrupted or overloaded.

REACT International, Inc. recognizes The Salvation Army as an agency whose corporate charter merits sanction by the Federal Government, through which the American people voluntarily extend assistance to individuals and families in need as a result of disaster.

**ORGANIZATION OF THE SALVATION ARMY**

The National Commander of The Salvation Army in the United States is located at the National Headquarters, 615 Slaters Lane, Alexandria, Va. The United States is administratively divided into four territorial areas. There are 39 Divisional Commanders. The Divisional Headquarters are responsible for organizing, directing and coordinating welfare and emergency functions in their assigned areas. Reporting to divisional centers are the local volunteer committees operating in smaller communities.

**ORGANIZATION OF REACT INTERNATIONAL, INC.**

Established in 1962, REACT is an international association of Citizens Band (CB) and other communications Teams who volunteer their assistance and provide CB radio communications in local emergencies. REACT International, Inc. is an independent nonprofit public service organization. REACT Teams accept responsibility to maintain a monitoring station or system guarding the official CB radio emergency channel 9.

There are 26 State Councils that act to improve communication and coordination between local REACT Teams within their state. Each REACT Team is a wholly independent entity with its own form of administrative control, worked out to suit local needs and conditions. Because CB radio is designed for local communications, there is no limit to the number of REACT Teams chartered within any given geographical area. REACT International, Inc. accumulates information on new emergency techniques from hundreds of communities and develops materials and programs to assist local teams. REACT International, Inc. on behalf of local teams throughout the nation, works effectively with other national emergency groups such as the American National Red Cross, American Radio Relay League, Federal Communications Commission, FEMA, and other groups to advise on the proper use of local radio communications.

**PRINCIPLES OF COOPERATION**

In order that the communication facilities of local radio frequencies may be coordinated and utilized to the fullest advantage during disasters and emergencies, The Salvation Army and REACT International, Inc. have agreed to the following:

- Through its Wichita office and/or Government Relations Committee, REACT will maintain liaison with the designated Salvation Army headquarters, so that there may be the closest possible cooperation in emergency communications planning and the coordination of local radio communication facilities for disaster relief operations.
- The Salvation Army welcomes the cooperation and assistance of REACT International and the many affiliated local REACT Teams to extend emergency communications planning into the jurisdictions of the area office, divisional centers and Service Units.
- Whenever there is a disaster or an emergency requiring the use of local radio communication facilities, The Salvation Army or its units may request the assistance of the REACT Teams nearest the scene of disaster or emergency. The assistance may include:
  - The alerting and mobilization of volunteer and emergency personnel in accordance to prearranged plan.
  - The establishment and maintenance of fixed, mobile and portable station emergency communication facilities for local radio coverage and point-to-point contact between The Salvation Army officials and the locations as required.
  - Adequate local area radio communication facilities for the duration of the emergency period or until substantial normal communications are restored.
- Detailed operating plans for the full utilization of local radio communication facilities should be developed at the area office, divisional centers, and Service Units in cooperation with local REACT Teams.
- The Salvation Army will furnish, through its area office, copies of this understanding to its administrative officers and field units and REACT International, Inc. will similarly furnish copies to all local REACT Teams.
- This statement of understanding will not apply in countries or jurisdictions where local laws conflict.

- REACT International, Inc. and The Salvation Army will make an effort to coordinate REACT communications with The Salvation Army's S.A.T.E.R.N. radio system.

AMENDMENT PROCEDURES

- Amendments requested by the President and Chairman of the Board of Directors of REACT International, Inc. shall be forwarded to the Director of National Public Affairs, The Salvation Army, National Headquarters for review. Upon approval by the Director, the amendment shall be forwarded to The Salvation Army Headquarters for approval by The Salvation Army National Commander.
- An amendment by The Salvation Army shall be sent to the REACT International, Inc. Headquarters in Wichita, KS, for review. Upon approval, the amendment shall be sent to the REACT Chairman of the Board of Directors and President for approval.
- Once all parties have reached agreement on the proposed amendment, the Statement of Understanding shall be changed and pages of the Statement on which the amendment appears shall be completely replaced.
- The amendment shall become effective on the last date shown on the amendment when signed by both parties to the Statement of Understanding.
- If both parties cannot agree to the amendment, an effort shall be made to reach an acceptable compromise. If a compromise cannot be reached, the amendment shall not be made. If an amendment is rejected, by either party, the original Statement of Understanding provisions remain in effect.

EFFECTIVE DATE

This Statement of Understanding shall become effective on the last date shown below when executed by both parties. This Statement of Understanding is valid and binding until termination by either party upon 60 days written notice.

SIGNATURE

Commissioner Kenneth L Hodder  
National Commander  
The Salvation Army  
Alexandria, VA

Gregory Seemuth  
Chairman of the Board  
REACT International, Inc.  
Wichita, KS

Signed: November, 1993



MEMORANDUM OF UNDERSTANDING  
between the  
American Radio Relay League, Inc.  
and  
REACT International, Inc.

PURPOSE

1. This purpose of this document is to state the terms of a mutual agreement (Memorandum of Understanding) between the American Radio Relay League, Incorporated (ARRL), and REACT International, Inc., (Radio Emergency Associated Communications Teams), that will serve as a framework within which both organizations may coordinate the development of protocols and procedures for communication in emergency and disaster situations. Each organization comprises volunteers and professional staff in support of their respective educational and technical programs and efforts. It is intended that this agreement will promote joint coordination and exercise of the resources of both ARRL and REACT to recognize the potential and capability of individual members of both organizations to facilitate the flow of information to and from the public during disaster and emergency situations.

RECOGNITION

2. ARRL recognizes REACT as a public service organization of private radio operators, which provides radio communications to local communities during emergencies. REACT coordinates efforts with other emergency organizations including the police, FEMA, NOAA, RACES, ARES, NVOAD, the Salvation Army, and the American Red Cross. REACT's other activities including participation in safety radio assistance for community events, hosting "Safety Wake Breaks" on holiday weekends along highways and developing the use of radio services as additional sources of communications in emergencies. REACT accomplishes these goals through REACT Teams located through the United States and the world. Members of these Teams also have oversight authority over different Committees. The committees are responsible for establishing and maintaining the orderly flow of business within their specialties. REACT's primary mission is to improve their communities through the provision of voluntary, two-way communications that serve the interests of public safety.

3. REACT recognizes ARRL as a noncommercial membership association of radio amateurs, organized for the promotion of interest in amateur radio communication and experimentation. It is the principal representative of the Amateur Service and Amateur Satellite Services in the United States, and is the Secretariat for the International Amateur Radio Union, the worldwide association of national amateur radio societies. ARRL was organized for the establishment of networks to provide communications in the event of disasters or other emergencies, for the advancement of the radio art and of the public welfare, the fostering of education in the field of electronic communications; the promotion and conduct of research and development to further the development of electronic communication; the dissemination of technical, education, and scientific information relating to electronic communication; the printing and publishing of documents, books, electronic media, and publications necessary or incidental to any of the above purposes; for the representation of the radio amateur in regulatory matters; and to promote fraternalism and high standards of conduct among radio amateurs. It serves its members by protecting and enhancing spectrum access and providing a national resource to the public.

PRINCIPLES OF COOPERATION

4. In order that the parties may cooperate and utilize their resources from time to time to optimum mutual benefit to both parties, the following principles and methods are agreed upon:

4.1 The parties will correspond with each other and exchange certain materials and engage in certain activities in order to encourage and broaden interest, understanding, and appreciation of radio telecommunications technology and its value to the public in emergency situations.

4.2 The parties will work to establish protocols and procedures that foster safe and efficient radio services communication to help the public during emergencies and disaster relief. The parties, through these protocols and procedures, will try to eliminate duplicative or technically inferior service to the community in emergencies.

4.3 The parties will work with each other in times of emergency or disaster to meet the communications needs of the public.

4.4 The parties will generally encourage ongoing liaison with each other and urge members of both organizations to develop increasingly effective communications and cooperation.

5. This memorandum shall take effect upon its signing by authorized representatives of each organization. It may be amended by mutual agreement of the parties and will remain in effect until terminated by either party, upon ninety (90) days advance written notice to the other. REACT and ARRL will periodically review this agreement and coordinate such revisions as may be necessary. Nothing herein will create any joint venture, partnership, or other business association, nor shall either party enter into any obligation or commitment on behalf of the other.

Jim D. Haynie, President  
The American Radio Relay League, Incorporated  
225 Main Street  
Newington, Connecticut 06111-1494

Charles A. Thompson, President  
REACT International, Inc.  
5210 Auth Road  
Suitland, Maryland 20746-4330

## Acronyms, Abbreviations, and Terms

**AFSK - Audio Frequency Shift Keying** - A digital mode of radio communications where the RF carrier stays on the air throughout the transmission and a modulating audio tone is shifted in frequency.

**AEC - Assistant Emergency Coordinator** A position of leadership within the ARES organization reporting to the EC.

**AM - Amplitude Modulation** A modulation system that maintains a continuous carrier and applies the audio to vary the level of amplitude equally on both sides of the base carrier frequency.

**AMTOR** - Amateur Teleprinting Over Radio. Uses time diversity to minimize the effects of fading. Sent in either ARQ or FEC mode.

**APRS - Automatic Position Reporting System** A packet based communication system where information from a Global Positioning System (GPS) is fed over the radio to another computer for use.

**AQS - Amateur Quiescence System.** A form of digital signaling.

**ARES - Amateur Radio Emergency Service** - The ARRL Field Services program for organizing amateur radio operators into a reserve of emergency communicators. The name "ARES" is a trademark of the ARRL and may only be used by Emergency Communications groups affiliated with the ARRL.

**ARQ - Automatic Repeat Request** - AMTOR communication mode where a repeat is sent only when requested by the receiving station.

**ARRL - American Radio Relay League** - The national organization of amateur radio operators headquartered in Newington, CT.

**ATV - Amateur Television.** Television signals sent over amateur radio. Usually refers to FSTV.

**CB - Citizens Band** - An unlicensed radio service for personal communications using low powered (5 AM and 12 watt SSB) 27 Megahertz transceivers. CB is regulated under Part 95 of the FCC Rules & Regulations.

**CERT - Community Emergency Response Team** A program enabling citizens to organize into neighborhood response teams.

**CONTROLLED NET** A net, run by an NCS where all traffic is authorized by the NCS. Casual discussions are discouraged.

**CP - Command Post** - See ICP, Incident Command Post

**CTCSS - Continuous Tone Coded Squelch System** A form of sub-audible tone squelch that is used to minimize interference caused by intermodulation.

**CW - Continuous Wave.** A synonym for morse code.

**DEC - District Emergency Coordinator.** A position of leadership within the ARES organization reporting to the SEC. Generally responsible for several contiguous counties.

**DIRECTED NET** - A Directed Net is on the air radio net STRICTLY controlled by the Net Control Station (NSC) following established procedures to accurately and rapidly move information for a served agency or a specific purpose. Stations are NOT permitted to communicate directly without express permission from Net Control.

**DSP - Digital Signal Processor** - A high-speed numeric processor IC chip that improves audio signals.

**DTMF - Dual Tone Multi Frequency.** A signaling and control method using two simultaneous tones. The same method as used in telephones. Most modern VHF and UHF amateur radios are capable to transmitting DTMF tones.

**EAS - Emergency Alert System.** A system used by broadcasters to enable emergency management authorities to alert and inform the community via TV and radio.

**EC - Emergency Coordinator.** A position of leadership within the ARES organization reporting to the DEC. This position is usually at the county level.

**EComm - Emergency Communications** The *REACT* program in Emergency Communication.

**EmCom - Emergency Communications** The ARRL's Continuing Education program in Emergency Communication.

**EOC - Emergency Operating Center or Emergency Operations Center** - A facility at which the coordination of information and resources to support incident management activities takes place. An EOC may be a temporary facility but is most often a permanently established facility. This is generally NOT the location for Incident Command (on scene management of emergency response).

**Faith Based Organizations** - A category of nongovernmental organizations that are operated, controlled, or sponsored by a religious organization. The term is usually applied to those parts of a religious organization performing functions that are not specifically religious in nature. Examples include disaster relief programs sponsored by various religious denominations.

**FCC - Federal Communications Commission** - The federal agency with oversight of communications activities, including radio communications.

**FEC - Forward Error Correction** - One of the two modes of AMTOR communications. In this mode each character is sent twice.

**FEMA - Federal Emergency Management Agency.**

**FIPS - Federal Information Processing Standards codes.** A system of five digit codes assigned by the federal government to designate each county in the country.

**FM - Frequency Modulation** - The frequency of the carrier is varied in accordance with the variations in modulating signal.

**FRS - Family Radio Service** - an unlicensed personal radio service using low powered (1/2 watt) UHF (462 and 467 MHz) transceivers. Some FRS frequencies are shared with GMRS. FRS is regulated under Part 95 of the FCC Rules & Regulations.

**FSK - Frequency Shift Keying** - The transmitter shifts between two predetermined frequencies (mark - 1 or space - 0). The standard shift is now 170Hz.

**FSTV - Fast Scan TV** - An Amateur Radio image communication mode that closely resembles the picture quality available in commercial broadcast.

**GMRS – General Mobile Radio Service** – A licensed personal radio service using 23 frequencies at 462 and 467 MHz. GMRS is regulated under Part 95 of the FCC Rules & Regulations.

**HF - High Frequency** - the radio spectrum from 3 to 30 Megahertz.

**ICP - Incident Command Post** - The field location where primary command functions are performed. The ICP may be co-located with other incident facilities.

**ICS - Incident Command System** - A concept of command and control for emergency situations that is scalable to handle events of any size. The Incident Command System is *the* standard for handling emergency incidents at all levels in the United States.

**ID - Identification**

**IF - Intermediate Frequency**

**ITU - International Telecommunications Union**

**JNOS** - A Network Operating System (NOS) used as a platform for exchanging messages using a wide range of methods such as Internet, amateur radio, TCP/IP.

**LSB - Lower Sideband**

**MARS - Military Affiliate Radio Service.**

**MOA - Memorandum of Agreement.**

**MOU - Memorandum of Understanding.** The terms MOA and MOU are often misused interchangeably. An MOA is a more specific formal document and a binding agreement while an MOU is more general in nature.

**MRE - Meals Ready to Eat.** The current form of prepared packaged individual meals used by the US military. Occasionally used for emergency feeding in disasters.

**MURS – Multi-Use Radio Service.** An unlicensed personal radio service created by the FCC in November 2000 utilizing low-power (2W ERP) radios on five VHF frequencies. MURS is regulated under Part 95 of the FCC Rules & Regulations.

**NAWAS - National Warning System.** The federal telephonic notification system used to inform and coordinate regional and national emergency management.

**NCS - Net Control Station** The person charged with maintaining orderly flow of information during a net.

**NET** - On the air meeting of radio operators to handle messages and/or pass information relating to a scheduled or unscheduled event. May be conducted by an NCS.

**NGO - Nongovernmental Organization.** Organizations, particularly emergency response or relief organizations, that are not part of the government. For example, the Red Cross.

**NIMS – National Incident Management System** A systematic proactive approach guiding government agencies at all levels, the private sector, and nongovernmental organizations to work seamlessly to prepare for, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life or property and harm to the environment.

**NOAA - National Oceanic and Atmospheric Administration.** The administration under the federal Department of Commerce responsible for oceanic and atmospheric study. NOAA is the parent agency of the National Weather Service.

**NTS - National Traffic System** - The ARRL organization of daily local, regional and national radio nets that passes messages nationwide.

**NVIS - Near Vertical Incident Skywave.** The mode of HF propagation that uses the ionosphere overhead as a reflector for a vertical radio signal and provide HF coverage for a service radius of approximately 250 miles. Usually from a half-wave dipole mounted no more than 1/8 wavelength above the ground.

**NWR - National Weather Radio service.** The 162 MHz community radio service offered by the National Weather Service to provide timely weather information and alerts.

**NWS - National Weather Service.** The weather forecasting arm of the National Oceanic and Atmospheric Administration.

**OPEN NET** A net that may be run by an NCS but only to designate who is to speak next. Casual conversation is accepted and traffic is handled on a first-come-first-served basis.

**OSCAR - Orbiting Satellite Carrying Amateur Radio**

**Packet Radio** - A digital mode of radio communications where the information is sent as a "packet" containing the call of the source and destination stations, error correction information and the data.

**PACTOR** - A digital mode of radio communications.

**PBX** - Private Branch Exchange

**PSK** - Phase Shift Keying - The phase angle of the transmitted signal is shifted in response to the modulating signal.

**PSK31** - Phase Shift Keying 31 Baud - A point to point communication mode that works very well in low signal strength situations. Worldwide communication is possible with as little as one watt of output power.

**RACES - Radio Amateur Civil Emergency Service** - A program for organizing amateur radio operators registered with civil defense organizations into a reserve of emergency communicators. RACES is specifically controlled by state or local government emergency management agencies. There is no federal level RACES. RACES is legally authorized as a radio service which could remain on the air if the Amateur Radio Service were to be shut down by Executive Order under the presidential War Powers Act.

**REACT – Radio Emergency Associated Communications Teams.** A public service organization comprised of private radio operators serving travelers and their communities alike with radio communications. Member volunteers are dedicating to improving their communities by providing voluntary, two-way communications.

**RF - Radio Frequency.**

**RIT - Receiver Incremental Tuning.** A method (usually a control) for making fine adjustments in the receive frequency of a radio without changing the transmit frequency.

**RTTY - Radio teletype** - A digital mode of radio communications.

**SAME - Specific Area Message Encoding.** An alert messaging scheme used by the National Weather Radio (NWR) service to alert specific counties of emergency conditions. SAME uses FIPS codes to address the counties.

**SATERN - Salvation Army Team Emergency Radio Network.** An organization of amateur radio operators supporting the Salvation Army in disaster and emergency services.

**SEC - Section Emergency Coordinator.** A position of leadership within the ARES organization charged with leading a Section who reports to the Section Manager.

**SKYWARN** - A network of community weather spotters serving the National Weather Service. This program is managed at the local NWS office level and varies widely from one area to another.

**SM - Section Manager.** A position of leadership within the ARRL Field Services organization just below national level.

**SOP - Standard Operating Procedure**

**Single Resource** - Individual personnel, supplies, and equipment items, and the operators associated with them. A 5-ton dump truck with driver is a Single Resource. You and your radio are a Single Resource.

**SSB - Single Side Band**

**TNC2 - Terminal Node Controller, Version 2** - A piece of equipment for packet radio communications.

**Transceiver** - A radio that combines a transmitter and receiver into one unit.

**TCXO** - Temperature compensated crystal oscillator

**UHF - Ultra High Frequency** - The radio spectrum from 300 to 3,000 Megahertz

**USB - Upper Sideband** - A mode of radio communications.

**VHF - Very High Frequency** - The radio spectrum from 30 to 300 Megahertz.

**VOAD - Volunteer Organizations Active in Disasters**

**VOM - Volt-Ohm Meter or Volt Ohm Milliammeter.** A meter capable of measuring voltage, resistance, and current. Also sometimes called a Multimeter.

**VOX - Voice Operated Transmit** - a circuit that will cause a transmitter to automatically transmit when the microphone picks up voice or loud sounds.

**XIT - Transmit Incremental Tuning.** A method (usually a control) for making fine adjustments in the transmit frequency of a radio without changing the receive frequency.



## ICS Forms

A selection of most standard ICS forms, in fillable PDF format, can be downloaded from the FEMA website. Occasionally FEMA makes changes to their website, the address provided here is correct as of September 2017. If this address does not work, you can go to the FEMA home page and enter ICS Forms into the search box to find the new page. Currently the forms are at <https://training.fema.gov/icsresource/icsforms.aspx>

In addition to the individual forms in fillable format, the FEMA website also has a NIMS ICS Forms booklet with a set of ICS forms and instructions.  
<https://training.fema.gov/emiweb/is/icsresource/assets/nims%20ics%20forms%20booklet.pdf>

As Emergency Communications Volunteers you will probably not be directly responsible for filling out many of the ICS forms, but you need to have an understanding of what most of the forms are used for and you need to know which forms have the information that you need to know to do your job.

You should download the NIMS ICS Forms Booklet and review the forms to become familiar with the ones you will need to fill out and the ones that contain information you would need.

Unfortunately neither the individual forms on the FEMA website nor the booklet contain *all* the standard ICS forms. The forms on the site are those forms commonly used for incident management, however they omit some specialized forms. Among the forms omitted are the ICS Form 216 Radio Requirements Worksheet, the ICS Form 217 Radio Frequency Assignment Worksheet, and the ICS Form 217A Communications Resource Availability Worksheet.

The ICS form 217A is not used as part of an Incident Action Plan. The 217A has not been formally adopted as part of NIMS, but it is the standard form adopted by the Department of Homeland Security, Office of Emergency Communications. The ICS 217A is taught as part of OEC training for Communications Leaders and AUXCOMM radio operators. It is essentially an inventory of all the radio frequencies/channels that are available for use in an area. The ICS 217A is the starting point for developing the ICS 205 Radio Communications Plan. Every city and county should have an ICS form 217A, but many either do not have one or have one that includes only the local government radio system. The local government ICS form 217A is sometimes considered restricted information due to security concerns. It generally falls to the RACES Radio Officer or the ARES Emergency Coordinator to develop an ICS 217A covering the Amateur Radio frequencies. Team leaders should determine who maintains the ICS 217A in their area, then work together with them to include any additional resources the Team has or can make available, such as any GMRS repeater that would be available for use, specific CB, GMRS, or MURS channels that the Team regularly uses, etc. The 217A is usually prepared as an Excel spreadsheet rather than as a Word Document or fillable PDF file because this format is easier to use.

The individual forms currently available on the FEMA website and contained in the NIMS ICS Forms Booklet are:

| ICS Form #:                                         | Form Title:                                                                 | Typically Prepared by:                             |
|-----------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------|
| ICS 201                                             | Incident Briefing                                                           | Initial Incident Commander                         |
| ICS 202                                             | Incident Objectives                                                         | Planning Section Chief                             |
| ICS 203                                             | Organization Assignment List                                                | Resources Unit Leader                              |
| ICS 204                                             | Assignment List                                                             | Resources Unit Leader and Operations Section Chief |
| ICS 205                                             | Incident Radio Communications Plan                                          | Communications Unit Leader                         |
| ICS 205A                                            | Communications List                                                         | Communications Unit Leader                         |
| ICS 206                                             | Medical Plan                                                                | Medical Unit Leader (reviewed by Safety Officer)   |
| ICS 207                                             | Incident Organization Chart ( <i>wall-mount size, optional 8½ x 14</i> )    | Resources Unit Leader                              |
| ICS 208                                             | Safety Message/Plan                                                         | Safety Officer                                     |
| ICS 209                                             | Incident Status Summary                                                     | Situation Unit Leader                              |
| ICS 210                                             | Resource Status Change                                                      | Communications Unit Leader                         |
| ICS 211                                             | Incident Check-In List ( <i>optional 8½ x 14 and 11 x 17</i> )              | Resources Unit/Check-In Recorder                   |
| ICS 213                                             | General Message ( <i>3-part form</i> )                                      | Any Message Originator                             |
| ICS 214                                             | Activity Log ( <i>optional 2-sided form</i> )                               | All Sections and Units                             |
| ICS 215                                             | Operational Planning Worksheet ( <i>optional 8½ x 14 and 11 x 17</i> )      | Operations Section Chief                           |
| ICS 215A                                            | Incident Action Plan Safety Analysis                                        | Safety Officer                                     |
| ICS 218                                             | Support Vehicle/Equipment Inventory ( <i>optional 8½ x 14 and 11 x 17</i> ) | Ground Support Unit                                |
| ICS 219-1 to ICS 219-8, ICS 219-10 ( <i>Cards</i> ) | Resource Status Card (T-Card) ( <i>may be printed on cardstock</i> )        | Resources Unit                                     |
| ICS 220                                             | Air Operations Summary Worksheet                                            | Operations Section Chief or Air Branch Director    |
| ICS 221                                             | Demobilization Check-Out                                                    | Demobilization Unit Leader                         |
| ICS 225                                             | Incident Personnel Performance Rating                                       | Supervisor at the incident                         |

The individual forms also include an ICS 213RR which is an ICS 213 Message Form modified to provide specific information for a Resource Request. Not all agencies use the modified ICS 213RR. It is important to know which forms are used by the agency you are supporting.



| COMMUNICATIONS RESOURCE AVAILABILITY WORKSHEET |                                             |                |            |        |              |            |        |              |      | Frequency Band      | Description |
|------------------------------------------------|---------------------------------------------|----------------|------------|--------|--------------|------------|--------|--------------|------|---------------------|-------------|
|                                                |                                             |                |            |        |              |            |        |              |      | Page 1 Amateur VHF  | This County |
| Channel Configuration                          | Channel Name/Trunked Radio System Talkgroup | Eligible Users | RX Freq    | N or W | RX Tone/NAAC | TX Freq    | N or W | TX Tone/NAAC | Mode | Remarks             |             |
| Repeater                                       | TAC 1                                       | Amateur        | 147.1950 W |        | 107.2        | 147.7950 W |        | 107.2        | A    | Primary AuxComm     |             |
| Repeater                                       | TAC 2                                       | Amateur        | 146.6700 W |        | 88.5         | 146.0700 W |        | 88.5         | A    | Echolink            |             |
| Repeater                                       | TAC 3                                       | Amateur        | 145.2900 W |        | 186.2        | 144.6900 W |        | 186.2        | A    |                     |             |
| Repeater                                       | TAC 4                                       | Amateur        | 147.3000 W |        | 88.5         | 147.9000 W |        | 88.5         | A    | Low power/local use |             |
| Repeater                                       | Portable                                    | Amateur        | 146.9250 W |        | CSQ          | 146.6250 W |        | CSQ          | A    | Req via EMA         |             |
| Simplex                                        | D6565                                       | Amateur        | 146.5650 W |        | CSQ          | 146.5650 W |        | CSQ          | M    | D-Star Simplex      |             |
| Simplex                                        | V643                                        | Amateur        | 146.4300 W |        | CSQ          | 146.4300 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V646                                        | Amateur        | 146.4600 W |        | CSQ          | 146.4600 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V649                                        | Amateur        | 146.4900 W |        | CSQ          | 146.4900 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V652                                        | Amateur        | 146.5200 W |        | CSQ          | 146.5200 W |        | CSQ          | A    | Nat'l Call Freq.    |             |
| Simplex                                        | V655                                        | Amateur        | 146.5500 W |        | CSQ          | 146.5500 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V658                                        | Amateur        | 146.5800 W |        | CSQ          | 146.5800 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V742                                        | Amateur        | 147.4200 W |        | CSQ          | 147.4200 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V745                                        | Amateur        | 147.4500 W |        | CSQ          | 147.4500 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V748                                        | Amateur        | 147.4800 W |        | CSQ          | 147.4800 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V751                                        | Amateur        | 147.5100 W |        | CSQ          | 147.5100 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V754                                        | Amateur        | 147.5400 W |        | CSQ          | 147.5400 W |        | CSQ          | A    |                     |             |
| Simplex                                        | V757                                        | Amateur        | 147.5700 W |        | CSQ          | 147.5700 W |        | CSQ          | A    |                     |             |
| Simplex                                        | SSB                                         | Amateur        | 144.2000 W |        | CSQ          | 144.2000 W |        | CSQ          | A    | USB. Call Freq.     |             |
| Simplex                                        | PSK31                                       | Amateur        | 144.1440 W |        | CSQ          | 144.1440 W |        | CSQ          | D    | SSB PSK 31          |             |

The convention calls for frequency lists to show four digits after the decimal place, followed by either an "N" or a "W", depending on whether the frequency is narrow or wide band. Mode refers to either "A" or "D" indicating analog or digital (e.g. Project 25) or "M" indicating mixed mode. All channels are shown as if programmed in a control station, mobile or portable radio. Repeater and base stations must be programmed with the Rx and Tx reversed.