January 2001

Emergency Communication (EmCom)
Study Guide

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Prerequisite - a good attitude.

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Acronyms used in EmCom material.

Contributors - the people that made it possible.

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III. **Level III - Management Aspects**

A Level 3 certification indicates that the person certified has attained sufficient grasp of leadership and management knowledge that the person can develop and lead a team of volunteer emergency communicators.

As of January 2001 the full development cycle for this material has not been completed. Please see **http://home.earthlink.net/~w0ipl/emcom-rd.htm** for the work in progress.

Prerequsite

Emergency Communication (EmCom) Certification overview

EmCom certification is an opportunity to provide the public service community with trained Amateur Radio operators who will have a consistent level of expertise in Emergency Communication no matter where in the United States they live.

It is evident that there are areas in the U.S. that have few opportunities to train operators in disaster communication. While other areas have far more than any would wish. The certification program will provide consistency in technical training where ever the person lives. The added benefit comes in that it will be easier to insure the students understand the attitudes necessary to interface with the public service community in a manner which is beneficial to all.

There are many personality types in Amateur Radio, some of which lack the necessary knowledge to participate in a positive manner. These people simply need guidance and assistance to understand what the position of Amateur Radio is in public service.

The goal therefore is to provide consistently knowledgeable communication people who have a very positive, service oriented attitude.

Attitude

Before you begin the technical material involved in earning a certification in Emergency Communication (EmCom) it is imperative that you understand your knowledge in EmCom 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 Amateur Radio 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 **serving** - remember that word - are professionals that have seen far too many people that are more interested in impressing someone that 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 of served agency people, will cement relations with your served agency.

Please consider:

- Attitude: n. manner, disposition, feeling, position, etc. with regard to a person or thing; tendency or

orientation, esp. of the mind

- Service: n. an act of helpful activity; help; aid
- Positive: adj. 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

Hams are patriotic, independent people and they are volunteers. The attitude among a few hams 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 outside of A.R.E.S./R.A.C.E.S.*

Do not adjust, play with or fiddle with any piece of equipment in use for an event, during that event, unless it is malfunctioning. Remember, an incident scene is not about radios and being a Ham, it's about the incident and YOU will either be part of the problem or part of the solution.

Questions for this segment

The only passing score on attutude is 100%.

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True, False:

The most important "thing" you bring to Emergency Communication is
operating skill

During an emergency, you are there to provide direction to the served
agency(ies)

You should be as loud as possible during an emergency

You should try to impress everyone with your knowledge

It will only take you five minutes to handle any emergency, everyone
else will have to stay and do the work
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You need to be a team player

You will take direction

It's OK to interfere with served agency people

Select the most appropriate answer:

1) Your attitude
    A) Doesn't matter
    B) Shows how much you know
    C) Determines the effectiveness of the Amateur Radio participation
    D) Helps everyone laugh

2) With regard to a person or thing; your attitude
    A) Is a manner
    B) Is a disposition
    C) Is a feeling
    D) Is a position
    E) All of the above

3) To serve is to:
    A) Provide aid
    B) Provide help
    C) Provide direction
    D) None of the above
    E) All of the above
    F) A & B only

Introduction to EmCom

Introduction to the ARRL CE - EmCom

An Amateur Radio license and ARRL Emergency Communication certification is not meant to be a substitute for localized ARES/RACES training. However, neither can localized ARES/RACES training succeed without foundations such as the Amateur Radio license and the background that is essentially the ARRL's emergency communication program.

To be successful, one needs all these components: (a) Amateur Radio license (b) the ARRL certification program and (c) localized ARES/RACES training.

One could dispense with the ARRL certification program if the local ARES/RACES groups provided **all** of the same coverage in their training. However there are many districts without any training program and the ARRL certification provides a level of understanding, consistent across the nation. The ARRL certification was never designed to replace local ARES/RACES training. These two programs are complementary and neither will function as effectively by themselves as the two, working together.

Introduction to Emergency Communications

I. Overview and Generalized Training

   1. Introduction to Emergency and Public Service Communication

      . What is a Communications Emergency

      The easiest way to think about a communications emergency is to begin by using the definitions used in the Incident Command System -ICS- (see section I.9 for the Incident Command Overview). "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.

      1. 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

      2. The role Amateur Radio 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 rapid response team. If you arrive at the scene of an emergency just as the sirens are quieting, keep your mouth shut and get out of the way! We do not provide first aid, transport victims, provide traffic control or any other function normally provided by public service agencies. We DO provide communication when public service systems are overloaded. Even the SKYWARN group (information available on the world wide web) does not activate until the National Weather Service has requested our help.

         As a group we will, in many cases, 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 doing that work AND it does not hinder your ability to communicate.

         Most operators think of ARES/RACES as a simple extension of the "talk time" in the hobby. This is not true. ARES/RACES are organizations that continually

need more trained operators that 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 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.

3. Why Amateur Radio works when other methods don't

   . Amateur radio equipment does not rely on wires and communications facilities provided by common carriers and phone companies, thus it is not prone to disruptions with the telephone system.

   b. Public Service agencies can communicate with each other only if they are on the same frequency. Amateur radio operators have a wide range of frequencies to choose from and thus provide that common frequency.

   c. Amateur radio enthusiasts use a wide range of radio bands, each one with it's particular strength in overcoming the communication barriers. VHF (Very High Frequency-50, 144, 222 Mhz) and UHF (Ultra High Frequency-440 Mhz and above) radios handle short ranged communications. HF (High Frequency) provide coverage beyond VHF and UHF. All may cover 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.

   d. Amateur radio operators are distributed throughout the community, near schools, churches and park facilities which are often used for evacuation shelters. These operators are then near the scene of the event and can respond quickly. Please note that Amateur Radio operators are **NOT** first response people in their capacity as ARES/RACES. Should for any reason a section of a town or city be devastated, there is enough equipment and operators ready in other parts of the same community, to respond.

   e. Regardless of the specific brand and model of radio equipment, amateurs that use the same frequency band and mode can communicate with each other. This is the reverse of private companies and government, where communications is limited to each entity by their FCC license and equipment. In many cases, they are not able to communicate with each other.

   f. Amateur radio operators are already licensed and pre-authorized to communicate internationally into and out of places hard hit during natural disasters.

   g. Amateur radio operators are allowed to run higher power than other licensed and unlicensed personal radio services such as Citizen Band (CB), Family Radio Serivce (FRS), General Mobile Radio Serivce (GMRS) and have more flexibility with the equipment. Therfore, they can communicate over greater distances and with greater diversity.

h. Amateur radio operators are encouraged to use their equipment regularly which verifies that it's maintained and operational. Thus the amateur 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.

4. Why the phone companies may not operate during emergencies

Communications between agencies and the general public are handled by common carriers such as phone, paging and Internet companies. Phone companies invest large amounts of monies into equipment that provide reliable phone service, including durable and secure buildings, highly reliable phone switches, diesel generators, large banks of batteries. Cellular, paging and Internet companies in turn rely on communications services provided by the phone companies. These phone systems (a) are sized for business reasons for the peaks in regular daily usage, **not peaks in emergency usage**, (b) usually rely on copper or fiber optic cables which when exposed are prone to damage during high winds, storm and unusual flooding conditions, (c) are usually not portable and reliable enough to respond to the demands of the emergency.

These are the most common reasons why normal public communication needs are not met during emergencies. Since Amateur Radio communication does not rely on these same features, it is able to respond to the needs of the emergency.

5. How does Amateur Radio Emergency Communications compare with other amateur radio activities?

. **Uses basic skills and activites as a foundation**.
Amateur radio operators will find that much of emergency communications borrows from existing aspects of the hobby. For example:

- Each operator is federally licensed after a period of study and examination on varying levels of technical, operating and regulatory knowledge.
- Each operator routinely uses that privilege to practice and build upon the ability to communicate via radio.
- One uses general operating practices to converse on repeaters and HF.
- NTS practice offers skill sets for passing formal traffic efficiently and accurately.
- Contesting emphasizes speed, listening skills and endurance.
- Field Day offers the chance to practice operating out of tents handling radios powered by generators.
- Public Service events lets us practice flexible communications practices while walking around serving a public event.

In these ways regular amateur radio activities resemble skills used for

emergency communications.

b. 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.

- Emergency communicators are often activated with little or no previous warning, to organize and coordinate field operations.
- Emergency communicators must handle several key organizations simultaneously and may become the primary means of inter-agency communications.
- Emergency communicators are often dealing with several nets simultaneously to pass messages within a limited timeframe.
- Stations must be portable and must be setup and operational in a matter of minutes or at most a few of hours.
- Emergency communicators are looking for specific stations to contact NOW to pass traffic. **Teamwork, not competition between stations**, is imperative.
- Emergency operations are likely to continue for several days or weeks.
- Unlike general amateur radio activities, <u>emergency operations happen in real-time. Things can not be delayed.</u>
- Emergency communications involves both amateurs and non-amateurs alike.
- Emergency communicators must have the equipment, skill and knowledge to improvise additional communications capacity in very short order.
- **In all this, leadership, teamwork and initiative are key factors to success!**

Simply put, amateur radio emergency communications offers a very rich, challenging and rewarding environment to apply amateur radio knowledge and skills in unique situations where no one else has a viable solution. *Amateur radio operators that have honed that knowledge and skills have truly earned their certification.*

Questions for this segment

The role Amateur Radio Serves:

True or false:

*Amateur radio emergency communicators have the same role as emergency responders and search and rescue personnel.

*Our primary mission is to provide first aid to accident victims.

*Our role is just to communicate and not provide service to the served agency.

*A communications emergency is when the police chief can't find his secretary

*During a communications emergency all routine traffic flows normally

*You get into emergency communications so you can talk more

*Training is unimportant

*It's not important how fast you handle emergency communication

Identify which of the following reasons on why amateur radio succeeds during an emergency is *false*.

*Amateur radio operators should be trained and proficient in operating other personal radio services such as citizen band and family radio service.

*Amateur radio operators should be trained and proficient in operating radio services such as the local government radio system, given authorization and training provided by the local CD agency.

*All Amateur Radio communications for emergencies are handled on one frequency

*All Amateur radio communication is limited to line of sight

*If the telephone service is out Amateur Radio will not function

*You should never test your equipment for functionality

*Cell phones will handle all necessary communication during an emergency

*You will always know, in advance, when an emergency is about to happen (you will see it on TV).

*Teamwork is unimportant in emergency communication

*Emergencies only last ten or twenty minutes.

*Lack of teamwork, like a bad attitude, will hamper the Amateur Radio effort during an emergency

*Cell phone systems overload quickly during an emergency

Public Service Communication

The beautiful thing about learning is that nobody can take it away from you

B. Public Service Communications

1. Public Service Communications is communications services amateur radio operators provides to non-profit organizations sponsoring a public event that require self-equipped radio communicators.

   Key elements to public service communications are:

   - The served agency must be non-profit.   The Amateur Radio Service and amateur radio operations cannot support public service communications for a for-profit organization. For-profit organizations and events needing communications services should rent or purchase commercial radios (which operate in a commercial radio service), which amateur radio volunteers can operate and use for the for-profit event.
   - The event is a public community event, such as a parade, marathon, fun-run, block party, search-and-rescue operation, etc.
   - Usually requires amateur radio operators to provide their own personal radios to be used during the event.

2. The role Amateur Radio serves

   - Provides a community reserve of operators and technicians that 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 a larger cause.
   - Visible community service by amateur radio volunteers within the community. The amateur radio organization providing Public Service Communications often has it's name acknowledged in the credits of the event.

3. Similarities to Emergency Communications

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

4. Differences with 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.
- In contrast to emergency events and emergency management agencies, 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, amateur radio operations 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 during emergencies.
- May not require wearing a visible ID badge.

5. Types of events and their unique requirements

   . Parades

- Operations
  - Multiple fixed operating locations. Be prepared to deploy 50 watt mobile radios with deep cycle, gel-cel batteries and a mast-mounted antenna if the parade route is more than 1.5 miles. Sometimes may need repeaters to provide end-to-end coverage.
  - Some mobile stations on bicycles may be needed.
  - May need to shadow key parade officials.
  - Need to show up ahead of parade time to assist in the organization of the parade.
  - Stations may be dismissed once the end of the parade passes their location.
- Traffic
  - Most of the traffic is tactical/informal in nature.
  - 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. Need to coordinate T-shirt sizes.

  b. Marathons, Fun Runs

- Similar in nature to parades, although it may be over a larger course and last longer. May require more fixed stations with higher powered base/mobile radios.

- Operations
  - The last runner is tracked and progress relayed so that each station knows when it can be dismissed.
- 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 latrines may or may not be available.

c. Sporting events
  - Operations
    - Usually has 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.

d. Search-and-rescue support
  - Operations
    - Usually has 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 be tactical or formal in nature.
  - Logistics
    - May not have strong logistical support from the sponsoring organization. Since the search-and-rescue effort will be outdoors away from ready access to commercial areas, operators should be prepared to be self-sufficient.

QUESTIONS

- True or false? Public Service Communications is communications services amateur radio operators provides to non-profit organizations sponsoring a public event that require self-equipped radio communicators.
- True or false? Amateur radio operators can use their amateur radio equipment to provide public service communications for for-profit events.

Communication Organizations

C. Organizations to meet communication goals

1. Radio Clubs

    Radio clubs meet the need for people to turn to when we need to establish emergency communications systems. The local club is a source of expertise in many areas of amateur radio. By getting involved with your local radio club, you will meet and get to know the other amateur operators in your area and you will learn their operating habits. The local club also serves as a major point of contact with the public and many clubs are heavily involved in providing public service communications. Getting involved with your local group's public service activities allows you to make sure that your equipment is working properly and that you are practiced in operating in a formal net environment. These are two fundamentals to effective emergency communications work. If you are not familiar with any of the local clubs in your area, you can get on most any repeater or your section net and ask some of the locals for more information. Also, you can check the ARRL's Affiliated Club listing to see if there is a club in your area. The SSC (Special Service Club) designation of a club indicates a club with higher than usual activities in the realms of public service and emergency communications.

2. [A.R.E.S.](#)

3. [R.A.C.E.S.](#)

4. [Two organizations, how do they differ and why be a member of both.](#)

5. [N.T.S.](#)

6. [M.A.R.S.](#)

7. When/How do we use REACT

    REACT International, "Radio Emergency Associated Communication Teams"

    REACT is comprised of volunteers who are organized internationally and use CB radio, UHF, VHF, Amateur Radio, and the general mobile radio service to provide public service communications for travelers and their local communities. REACT teams also provide voluntary communications in response to emergencies and for community events ranging from single family house fires, brush fires, chemical spills, train derailments, and to assist the Red Cross, Salvation Army and other agencies during various emergencies (See http://www.reactintl.org).

    REACT is an auxiliary communications organization that has historically focused on communications with the public. REACT operators handle many sorts of unstructured situations that do not fit well into standard net procedures, such as: supporting logistics by collecting information from and providing instructions to truckers bringing relief supplies

into a disaster area; processing radio calls from the public in areas of telephone outages; and dealing with other spontaneous volunteer radio operators.

8. E-9-1-1 What do they need to know?

Many people understand that they are to dial 9-1-1 for emergency help. How many people know what information they will need to have available once they are connected to the 9-1-1 call taker? Unfortunately very few. Here is a list of information you will need.

Questions for this segment

A.R.E.S.

* True or False: non-amateurs may be a member of ARES.

* True or False: The primary form of information passed on nets is informal traffic.

* True or False: Amateur radio emergency communicators should be skilled and trained.

* True or False: Appropriate emergency communications procedures can be picked up and become proficient solely by reading or studying.

R.A.C.E.S.

* True or False: The RACES regulations are contained in FCC Part 97.

* True or False: Amateur radio operators can authorize RACES operations.

* True or False: In the event the president invokes the War Emergency Powers, amateurs may communicate on any frequency in the amateur radio band.

* True or False: ARES and RACES have redundant functions, therefore, only one of these two organizations should serve a given geographic area.

N.T.S.

* True or False: NTS is limited to the CW mode of transmission.

* True or False: There is only one NTS.

Information for 911 Calls

The following list is to help you to provide the information the 911 Call person will need to get the correct help on the way as soon as possible. It is important to have as much information as possible and having it in sequence will speed the help.

. **Criteria for calling 911:**
   1. **Save a life.**
   2. **Report a fire.**
   3. **Report a crime in progress.**

B. Reporting a home incident:
   1. **What** (fire, person not breathing, person bleeding, etc.)
      - If a person - age, sex and approximate condition
   2. **Where** (address)
   3. **Weapons** (gun, knife, etc. or **NO weapons**)
   4. **Drugs/Alcohol or none**

C. Reporting an accident:
   1. **Where** (what city, what intersection on what road/street)
   2. **Injuries** (how many and what type (bleeding, walking around, unconcious, etc.)
   3. **How many vehicles**
   4. **Color of vehicles**
   5. **Exact location** (what side of the intersection/street and traffic lane)

D. Reporting a vehicle (reckless driver, possible drunk, etc.)
   1. **Color of vehicle**
   2. **Year**
   3. **Make**
   4. **Body style**
   5. **All Other** (body damage, added lights, roll bars, etc.)
   6. **License Number**
   7. **State**

E. Describe a Person
   1. **Race** (Black, White, Hispanic, Oriental, etc.)
   2. **Sex** (ONLY valid answers are Male/Female)
   3. **Age** (teens, 20s, 30s, 40s, etc.)

4. **Height** (in feet and inches - as accurately as you can)

5. **Weight** (in lbs. - as accurately as you can)

6. **Hair** (Color and - balding, long, short, pony tail etc.)

7. **Facial Hair** (beard, mustache etc.)

8. **Glasses**

9. **Hat** (type, color)

10. **Shirt** (color, style)

11. **Coat**

12. **Pants**

13. **Shoes**

14. **Weapons** (knife, revolver, semi-auto, shotgun, etc. and how/where carried)

15. **Transportation** (car, bicycle, truck, on foot, etc.)

16. **Direction of travel** (north, south, east, west, etc. from what address)

Who Runs the Event

[[Who Runs It](#) | [Talking /w media](#) | [Getting Involved](#) |]

D. 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 that Amateur Radio has is operators that go into an event and try to take over. Cowboy and "wanna-be" behavior WILL discourage the served agency from ever using Amateur Radio services again. In some cases it has resulted in the Amateur 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. You will help your served agency and your ARES/RACES group if you understand how the ICS works (see Section I.9 for an overview).

E. Who talks to the Media (press) - the primary served agency PIO

Dealing with the media/public: ** During an emergency do NOT make any statement(s) to the media/public about the emergency! The Public Information Officer (PIO) for the agency being served will make ALL statements. You can discuss nondetailed information about Amateur Radio if you have time and they ask. Do NOT include mode, frequency or traffic-volume information.

Should you encounter some very persistent media people, the following statement may help. Please check with your served agency before you use this statement.

"ARES is Amateur Radio Emergency Services. These are volunteer Amateur Radio communicators who are aiding local law enforcement, fire, EMS and other agencies with auxiliary or supplemental communications due to the current overload or difficulties due to high volume of traffic or other unusual conditions. We currently have (XX #) operators in places like the EOC, communications centers, red cross shelters and other places where additional communications are required."

Additional information from the ARRL about the Amateur Radio Emergency Service is at http://www.arrl.org/pio/emergen1.html. This is general information about ARES that the media may use as they wish.

F. ## How you can get involved

Contact your local ARES/RACES group and volunteer. You can be of help to these organizations by training in the disciplines needed for appropriate communication. Training in Emergency Communications BEFORE you are needed will help you develop the skills necessary to be an effective ARES/RACES 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 provide other support.

Questions for this segment

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* True or false:

- It is the amateur radio operator's role to take over the operations of an emergency that is in progress and give direction to Public Service officers.

- It is the amateur radio operator's role to talk with the news media.

- Amateur radio operators responding to an emergency should follow the Incident Command System methods and integrate into the ICS system that exists for the incident.

- You can become involved in Emergency Communication by volunteering with your local ARES/RACES group.

- Training in Emergency Communication BEFORE the event is important.

Communications

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2. Communication

. Basic Communication Guidelines

Let's face it, there are hundreds of people that can talk the ears off of a brass monkey and when they finally finish you ask yourself "what did they actually say?".

Within Emergency Communication you will have TWO different levels of communication. The first is in passing traffic on behalf of a served agency. This is known as formal traffic. 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 send.
If ANYONE else initiated the message, MAKE NO CHANGES!

The second type of communication is where YOU originate the message, it is not written and where 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. When ever 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 communication it is important to say as little as possible, yet convey all of the meaning. How can we do this?

1. Brevity and Clarity

The standing "rule of thumb" 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.

2. 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.

3. Listen

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

Communication is the - two way - exchange of thoughts, ideas or information. Two way. That requires listening. An olde timer once told me "A ham has two ears and one mouth. Therefore he should listen twice as much as he talks". Makes sense.

4. Standard ITU Phonetics

While it may take less affort to speak into a microphone and listen than to operate CW, it does take some care to quickly and accurately convey exact information. Speak distinctly at all times. If information is to be written, pace your speach accordingly.

For critical information, or under noisy conditions, spell words with standard ITU phonetics. ITU phonetics were chosen so that each word sounds completely different from all others. A list of ITU phonetics is available in the ARRL handbook and the ARRL logbooks. A compressed copy follows.

```
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)
```

5. Numbers

Numbers are pronounced as individuals. 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.

6. Formal written traffic

   Insure you have asked all questions necessary to have obtained the following:
   1. Who is requesting and from whom?
      . What is the requestors full name/title/agency & location?
      B. What is the recipients full name/title/agency & location?
   2. What are they requesting and how many do they want/need?
      . Is it a list or single item?
         1. If it's a list, do all items come from the same place?
            . If multiple sources then multiple messages.
      B. 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 to (not always the same as the location of the person requesting the item(s))?
   5. When is it needed?
      . Time/date as applicable

Communication IS:

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

Communication will be acknowledged

Communication is NOT:

- A bunch of unstructured words
- Fill noise such as Aaahhhhhh
- Vindictive or argumentative

Questions for this segment

---

* What are the two types of emergency communications messages? Formal and informal.

* True or false. Emergency Communicators should use contractions within messages.

* True or false. Emergency Communicators should editorialize and expand on messages sent/received at their stations.

* True or false. Emergency Communicators should listen before transmitting.

* True or false. Communication is the two way exchange of information or ideas.

Communication Techniques

Getting the message through - Power isn't everything

To improve communications you need to improve the difference between the signal and the noise levels (signal to noise ratio) to achieve reliable communications. For our purposes here, noise is defined as any impediment to transmission or reception of information (messages). What form can this "noise" take? Some of the more common ones are:

- Static and background noise on the air
- Equipment or voice sounds around you
- Inappropreate amount of light
- "Loose cannon" tempers
- Improper transmission speed
- Improperly formatted messages

What can you do to maximize message thruput? Here are some of the more common ways to handle impediments.

- Static and background noise on the air
  1. Insure you have the proper antenna for the job.
     An NVIS will work very well for 40 and 75 meter SSB when your communications rqange is up to about three hundred miles where a verticle will not. Conversly, a verticle will work quite well for VHF/UHF.
  2. Choose the best band for the job
     VHF/UHF are very good for short distances (less than 50 miles) but are useless for distances over one hundred miles. The antennas are quite small.
     HF propagation differs by band. What distance do you wish to cover? Antennas are quite large.
- Equipment or voice sounds around you
  1. Use a headset to minimize noise you will hear from the area you are in.
  2. Use a noise cancelling microphone to minimize transmitted noise.
  3. When ever possible, locate your station away from the source of noise.
  4. Make sure your equipment is grounded.
- Inappropreate amount of light
  Many people do not think of light as a potential problem. Think what happens when you have too much light when you try to read a computer screen or too little light when you try to read printed information.
  1. Stay out of direct sunlight if at all possible.

2. Try not to be in shade while having to look directly into the sunshine.

3. Insure there will be sufficient light for you to work at night.

- "Loose cannon" tempers
  These are very hard to deal with. You best bet is to ask assistance from your supervisor. A team working calmly toward a common goal will frequently defuse the situation.

- Improper transmission speed

  1. Practice sending at the appropriate rate where the other party can copy. 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'll never get a request to repeat a section.

  2. 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".

- Improperly formatted messages

  Please see the section on Message Handling for formatting information.

Message Handling

2. Message handling

. [Why standard formats](#)

b. [Examples](#)

c. [Abbreviations, Prowords, Prosigns](#)

d. Don't speculate

Do not speculate on anything relating to an emergency! There may be hundreds of people listening to what you say (Amateur Operators, Media AND Public - via scanners) and any incorrect information could cause a panic.

If your served agency INSISTS on an estimate, you may provide that information, so long at you make it - very - clear that it is an estimate. For example - "Estimated number of spare shovels at fire base three is twelve" - would be acceptable. First choice is NO speculation.

e. 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 NTS traffic, you will maintain the original count and note the corrected count received at your station.

f. Not all tactical messages will be in NTS format.

It is important that you understand that much of the tactical information being passed during an event may not be in NTS 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 NTS format.

Questions for this segment

* You can make a series of questions about a good piece of formal traffic from the outline above.

* What is the goal of emergency communications?
To exchange messages in a timely and accurate fashion.

* When we relay formal messages, which of these is true:
a) We do not change the content of the message.
b) We use the minimal number of relay stations.
c) We must include the signature (name and authority of the sender)
d) ALL OF THE ABOVE

* True or false: Amateurs are permitted to add other information to formal traffic.

* True or false: Wherever possible, use contractions such as "don't" instead of saying "do" "not".

* True or false: One should add comments and opinions to operations on the nets.

* True or false: A test of accurate listening is if the listener can repeat accurately the contents of a message without adding or deleting content.

ARRL Format Radiograms

3. ARRL Format radiograms

   . [Preamble](#)

  b. [Message Text](#)

  c. Signature and why it's 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.

  d. Modified message form for disasters

While NTS format messages can handle many different types of information flow, there will often be requirements for formats that are unique to an individual emergency. Use the most effective message format for the event you are working.

Work with your EC and served agency(ies) - before - the emergency to see what format will best fulfill their needs.

  e. [Other NTS Information](#)

Safety

4. Personal Safety Considerations

   . You

   I think each of us has heard the saying something to the effect - watch out for number one, or no one else will. Be it a training exercise or an actual emergency your safety is up to you. It is your primary concern.

   If at any time you are asked to handle 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.

   b. Your Team

   Your second priority is the safety of your team. There can easily be assignments such as ATV where the person with the camera will be very engrossed with insuring the picture is the best possible and may not notice unsafe conditions. You as the second person there will then need to be very careful about the safety of your team.

   c. 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 is to always have two exits and should one of them become unavailable, use the one you have - IMMEDIATELY. If necessary leave your equipment. Equipment can be replaced, people can't.

   d. Workmans Compensation Insurance

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

   Not every served agency will be able provide you with workmen's 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 workmen's compensation insurance that's fine but you must know in advance of going out, so you can make an informed decision.

Remember, an incident scene is not about radios and being a Ham, it's about the incident and YOU will either be part of the problem or part of the solution. Keep your eyes open and do your best to anticipate unsafe conditions before they happen.

Communication Modes

5. Modes of communication

   . Voice (FM & SSB)

   1. FM

      - Can produce a high signal to noise ratio with a signal of moderate strength, and is very useful for mobile communications.
      - Requires wide bandwidth, and does not always propagate well. Typically limited to 10 meters and VHF/UHF bands.

   2. SSB is a supressed carrier Amplitude Modulated (AM) signal with one side band removed.

      - This mode is efficient as more information is packed into less bandwidth, uses less power, and thus is more efficient. It is effected 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). 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 "9Mhz. rule" is HF Packet that uses LSB above 9Mhz.
      - Available on all bands, but is generally limited to HF, with some use on 2 meters for DX.

   b. CW

   Very basic communication mode, operating as a single tone turned on and off in dots and dashes. A "dash" is three times as long as a "dot". Robust and simple; can be used under almost any condition, and is known throughout the world. The equipment is simple. Requires training and dedication for high speed traffic; 5 words per minute fairly simple to learn, but retention is poor without consistant use. Higher speeds require more training.

   c. Digital (Packet, RTTY, AMTOR, PACTOR, CLOVER-II, PSK31)

   Digital modes require connecting a computer to a radio, and sending data by various protocols. The connection can be direct, or by using an interface (known as a terminal node controller, or TNC). 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 residents of a shelter can be sent without tying up a voice channel. The text can be sent by typing directly to the computer, or uploading a file. Some TNC models have a mail box capability for some modes, which allows messages to be left without both operators being present.

All 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 corrections means that the stations confirm the text was received properly by "automated repeat request" (ARQ). If conditions are bad, the stations can hang up, repeatedly re-sending parts of the traffic. Multiple stations can receive one station 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. Most digital protocols require 5 KHz of bandwidth.

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 most 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, and is also known as AX.25. 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 (higher baud rate, 1200 or 9600). Higher frequencies produce higher rates (up to 56 kilo-baud). 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, include FEC, ARQ, and handles a standard keyboard. PACTOR is quite robust (more so than AMTOR and RTTY), but can be slowed by bad band conditions.

CLOVER-II is a digital communications system designed specifically for the HF bands which delivers error free text and computer files between two linked stations in the ARQ (Automatic Repeat Query) mode. Binary files are automatically compressed before being transmitted. CLOVER-II utilizes an adaptive protocol which automatically selects a data rate, one of multiple phase/amplitude modulation techniques available, which is optimized for the quality of the RF path as well as error correction coding which permits correction of limited data errors without the necessity of repetition. The maximum data rate available is 69.6 bytes/sec. An FEC (Forward Error Correction) mode is also available for broadcasts to multiple stations although error control cannot include repeats of lost data in this mode. Employing only 500 Hz bandwidth, it has been approved by the FCC for unattended

operation on some limited sub bands.

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. However, all of the above digital modes use "audio frequency shift keying" (AFSK). Phase shift keying defeats much of the band noise, is very robust, and uses very little bandwidth. QRP signals have been sent long distances. However, the mode is very new, and is not common.

An interesting thing about digital modes is the speed. Only on certain bands with the right equipment will data speed will ever exceed 1200 baud. On HF bands, the rate is typically 300 baud or less; often less, especially on RTTY. Packet on 2 meter is normally 1200 baud. Compare that with INTERNET speeds of 56 kilo-baud or more! The advantage is that the connection is simple, and does not rely on an elaborate infrastructure (e.g., phone systems). Further, the average person cannot type at a speed where the computer/TNC is not waiting on the person, most of the time. Thus the baud rate is not an issue.

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 sound cards exclusively. Other modes can be emulated on a computer, without having a TNC.

d. Networks

　　1. APRS

A global positioning system connected to a radio. A packet burst is sent with a message containing the location (latitude and longitude), call sign, and a text message. The radio can be set to transmit at regular intervals, or keyed to a voice QSO (i.e., sent at after a 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 APRS frequency of 14#.###.

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.

APRS is a mobile mode (e.g., in a car). A typical set up is bulky, and is not portable. The principal value is following the location of a person (i.e., a tracer) without any voice transmissions.

e. Visual (ATV)

f. Family Radio Service

One other mode that can be invaluable is Family Radio Service. FRS radios can be loaned to anyone that needs short range (typically less than one half mile) communication. With the fourteen channels and a cost of less than $50 each they can be very usefull for workers that need short range temporary communication during an event.

ATV

12. ATV

Disclaimer

This document is designed to provide the ARES operator with enough information to be able to function adequately as an emergency communicator. It is not intended to provide a technical foundation for this portion of the Amateur Radio hobby.

What is 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 it 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 cable channels 58 or 60) then broadcasts the signal for reception.

Pitfalls ?

When our served agencies have seen full color live action pictures during forest fires they have been very excited at having command officers being able to see what is happening rather than relying on someones verbal description. Accurate command decisions are much easier to make with that type of information.

The 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 are for public safety, then evidence that may be gathered as a byproduct is acceptable.

Policy

The following is the list of suggested policies for ATV.

1. The role for ATV is to document an event and present it to the public safety officials at the incident command post.
2. 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.
3. 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.
4. ATV crews shall operate with two people. One person will do the photography and the second person is to watch for possible hazards, handle voice communication and provide for the safety of both operators.
5. The time and date shall be displayed continuously for the recording tape and the benefit of public service officials.

Techniques

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

1. Hold the camera steady.
   Use a tripod or brace yourself against something solid.
2. Use wide-angle shots when "panning".
   This allows those watching to identify objects rather than just seeing a blur.
3. Pan slowly.
   Momentarily cover the lense with your hand if you must pan quickly.
4. Use wide-angle when walking with the camera.
5. Use telephoto only with a tripod and then **only** if explicitly instructed to.
6. **Remember** you are operating with a live microphone and **everything** you say is being recorded!

Security

Security Considerations

. **Who is the message intended for**

The message is for the intended recipient and the communication should remain private. When handling the message, you should not reveal the existence or contents of the message, <u>even after the operation</u>. 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.

B. **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. Since they are willing to pick up on one message out of context and expand on it, rather than having the benefit of all the information at the Emergency Operating Centers, distortions and misrepresentations could result by third parties.

Therefore, 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.

C. **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) communication that 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.

D. Be sensitive during times when fatalities may occur. If the operation involves the possibility of finding the remains of dead people, and there is a likelihood of that relatives are listening at the receiving end or on scanners, do not refer to the need for additional resource people as "Need help. Send over more bodies." Use headphones when operating to avoid having others nearby casually listen in. You may wish to call for a "supervisor" to come over and communicate the information direct to him/her rather than over the air. **Questions**

❍ True or false: You should not reveal the existance or contents of a

message, even after the incident has been completed.

❍ True or false: You do not know who is listening to an amateur radio transmission.

❍ True or false: To the extent possible, you should not pass along private information, such as account information, unlisted phone numbers and repeater control codes on the air.

❍ True or false: You should be sensitive to your comments during times when fatalities or severe casualties may have occurred.

Operator Stress

Emergency communications is a very challenging assignment. There's 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 affects the ability to work well with others.

The best time to deal with stress is before it presents itself. Learn coping mechanisms **before** responding to an event.

Some of those mechanisms are:

1. Focus on teamwork, strategy and results, rather than on worry and concern.
2. Learn tolerance and patience during times of heightened demand and activity.
3. Understand that we are human and there are limits to our performance, both individually and corporately.
4. Learning the impact that diet, beverages and exercise can have on relieving stress and increase the capacity for dealing with it.
5. Learn to get rest and take breaks as necessary for **you**. What works for someone else may not work for you.

You may be exposed to experiences that are unique and unpleasant. A healthy person is able to withstand the emotional experience of high stress well enough until the impact of the immediate need passes, then begin processing the experience to accept the situation rather than reacting to it. Members of the team should learn to work with the stress rather than reacting to it.

Active Listening Skills

There are a number of simple, practical skills that can be used in any interpersonal situation. One of the most valuable is "Active Listening". With active listening, you will be able to increase your listening ability as you gain the confidence of the other person. By building effective listening skills you can prevent situations from escalating that might otherwise be a problem.

One of the barriers to effective communication 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 unintentionally happen:

- 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 explain a point, you have not acknowledged it, and you try to explain another point.

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

1. Giving the other person your full, undivided attention.

2. Listening carefully to what the person is saying.

3. Repeat back and paraphrase what you think you heard him/her say. This insures you understood.

4. You can acknowledge the person's feelings with phrases such as:
   - "It must have been frustrating to have been there."
   - "The heat must have been exhausting."
   - "Let me see if I understand what you said"
   - "So you're saying that you understand ......"

If the person believes you understand his/her feelings and the message, they will be more comfortable with the situation.

Pace then Lead

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 along side" the other person, establish a rapport and when the understanding is solid, begin to lead the person in discussion towards the more productive outcome.

First, establish a good bridge using the Active Listening method described above. This enables you to "come along side" the other person.

Next, establish a solid rapport by understanding the point (or points) that the other person is relating. The other person may also be venting, so just keep listening and allowing 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 relating using the "Feel, Felt, Found" method. You can use it to overcome objections to a given situation. The conversational sequence is:

- I know others feel that ...... (tell the other person you understand how they feel and what's on their mind)
- I'm sure others also feel that ..... (show that other people felt that way too. This helps the other person understand they are not alone.)
- They looked into it and found that ...... (it 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 non threatening way to present the observation or idea.

A suggested text for additional learning is "How To Deal With Difficult People" by authors Dr. Rick Brinkman and Dr. Rick Kirschner.

Before the Incident

Anticipate oncoming stress and mitigate the results. This process includes:

- Inform your communicators that tensions will build but don't take anything personally.
- Tell people up-front that we're all in this together, and to remind everyone of the objective. (Since the objective changes from event to event, there is no one single answer.)
- Establish teamwork, cooperation, and remind everyone that working together will achieve the best results. We have to make do with what we have.
- Insure they know who is leading the effort and who is leading their team.
- Anticipate food, water and sanitation needs.
- 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 Make an effort to get a message to your operstors 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 a neighborhood that is in a disaster area, can be emotionally devastating. One needs to go through a period of grieving, and a time of healing before becoming productive. As such, send in relief workers and communicators to unburden 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.

Dealing with stress as an emergency responder

There are times being first on the scene of an emergency that one is exposed to experiences that can be overwhelming. At such times, be prepared to relieve the operator and allow him/her to meet with stress management and post-trauma personnel as soon as those people are available.

Coping withinjuries near you

When ever possible, stay away from the emergency scene. Remember, you are there to communicate. Not to handle emergency response activities.

If you are forced to be in the immediate area with injuries, be sure to be in frequent contact with your team leader. This interaction with someone that you know and can express your feelings with will help you maintain perspective in the situation. If you still find that the situation is too intense, call NCS and ask for relief from your operating position.

If NCS is unable to relieve you of your operating responsibilities AND you feel the situation is too intense, check out of the net and go home. Your health and well being are as important as anyone elses.

When not to say anything

Please see "Who talks with the Media (press)" for information on what you can say to the media or public about the emergency.

When a person is overcome with emotion, the best thing to do may be to let the person process the emotions and not say anything to 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.

When possible, 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 their help.

Questions

- True or false: The operator's stress condition should be assessed before the operator is released.
- True or false: Active listening skills are an important tool to aid another in managing their stress
- True or false: "Pace, then lead" skills is a tool can be used to guide another person to discover a successful outcome.

Served Agency Communication Systems

C. Served-Agency Communication Systems

1. Overview of Served Agency Systems

   Each served agency will have its own - unique - communication system. It is in the best interests of both served agency(ies) and ARES/RACES group to discuss and understand what your local served agency uses. While you discuss the communications they use, ask what - if any - requirements they may have for Amateur Radio operators to operate the served agency system and what unique knowledge these operators will need.

2. 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 communication 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 currently use this type of system.

3. Subaudable Tones

   Subaudable tones (A.K.A. Private Line - PL) are used to minimize interference caused by intermodulation. 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 communication.

4. Telephone Systems

   Telephone systems in use by Public Service agencies vary greatly. Please contact your local agency to determine their unique requirements.

5. Satellite Systems

   Satellite systems in use by Public Service agencies vary greatly. Please contact your local agency to determine their unique requirements.

Nets

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3. Nets, what they are and how they work

   CONTROLLED NET:

   > A means of insuring orderly use of limited frequency resources to conduct communications for a scheduled event or during an emergency.

   NET CONTROL STATION:

   > 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

      1. Open (Informal) Nets

         During an open net most any type of traffic or communication is permitted. Conversations (rag-chews) are permitted provided they break every so often to allow incident related traffic to flow.

      2. Directed Nets

         A Directed Net is created when there are a large number of stations needing 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.

      3. 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.
         NCS has absolute control over this net.

      4. Resource

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

      5. Traffic

         Traffic nets are for the passing of formal, normally written, traffic. They are 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.

6. 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 what term in ICS corresponds to what term in ARES/RACES.

```
ARES/RACES        ICS 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 largest number of people at your event.

Net Participant Guide

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1. Net Participant Guidelines
   1. Net protocols.
      . Legal

      Legal requirements within nets are those of identification and operation on frequencies within the Amateur Radio Bands. The FCC tell us that you MUST identify at ten minute intervals during a conversation and in your last transmission. During periods of heavy activity in event nets it is easy to forget when you last identified.

      The easiest way to insure you comply with FCC identification requirements during an event net is to identify with your FCC issued call as you complete an exchange. This serves two functions: 1) Tells NCS you consider the exchange to be complete without having to use extra words (saves time) 2) Fulfills all FCC identification requirements.

      b. 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.

      Please listen to the net before joining. Customary protocols will easily stand out.

      c. Tactical Calls - when and how to use them

      Tactical calls are used to identify a location 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 persons voice or from the identified location. Obviously from the identified location.

      Tactical calls should be used for all Emergency nets once 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 - for net control
- FIRE-BASE-1 - for the first fire base established or the fire base in a particular region
- CHECK-POINT-1 - for the first check point in a public service event
- CP - for the event command post
- AID-3 - for the third aid station on a route
- etc.

Proper use of tactical calls can best be explained by example.

- Initiating a call

  If you were at aid station three during a directed net and wanted to contact Net Control you would say "NET, 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 check point five, you would say "AID3, traffic for CHECK POINT 5". This tells NCS everything needed to handle the traffic. NCS will then call check point 5 with "CHECK POINT 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

  Tactical calls will normally not be used in the contact unless 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 "(your call), AID3". 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.

d. Participating in a net

- Enjoy yourself - Amateur Radio public service is fun!
- Prepare your self. Are your batteries charged? Are you on your best antenna for the frequency/repeater 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. NCS will announce/ask-for what they want.

- Follow NCS Instructions. NCS will ask for specific people/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 its cold right now and it looks like it could rain in the next day or so - just checking in" is unnecessary AND unwanted. This ties up the net and does nothing to add usable information. Check in with your CALL. Add name and other information as requested by NCS.

- Plan your transmission. If you have more information than just your Name/Call then jot it down. You can, if necessary, just read your note. **** This promotes clear concise communication.

- Check in ONLY if you are going to be part of the net. Do NOT check in as "in & out" or "for the count". **You are joining the net or you should only listen.**

- Checking in with "This is" then a pause or unkey followed by the call may work on a few nets, but causes delays and potential problems on most. (Local net option)

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

- Let NCS know when you leave or if you need to leave early. **Do not go into details of why you need to leave.**

- During an event, 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 explaination.* 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.

- Hams are patriotic, independent people and they are volunteers. The attitude among a few hams 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 outside of A.R.E.S./R.A.C.E.S.*

e. 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 call, 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 call, location tactical call and the phrase "location CLOSED per (name of person - served agency identification)".

2. You need a break and there is no relief operator

   Tell NCS that "I will be away from the radio for (number of minutes)" and end with "Tactical id, (your call)".

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.

f. **Don't over identify**

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

The FCC tells us that you need only 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.

If you end each exchange with your call, that tells everyone that you are of the opinion the exchange is complete and you fulfill all FCC requirements.

g. 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.

2. Roles in a net

   . NCS

   - The NCS is in charge of the net while the net is in session. He/She is responsible for controlling who uses the frequency and when they pass

traffic. This needs to be balanced with the fact you will be dealing with volunteers.

- Net Control shall have a commanding signal, i.e. clear, crisp signal with good audio characteristics.
- 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 HF traffic to a Tech. will not work).
- In medium and large operations you need to have a backup NCS and a person to log.
- Keep a written record of the incident and all traffic passed. This does not mean a copy of all formal traffic. Simply an overview of the message.
- 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 all bets are off if it is emergency traffic).
- Different nets handle different traffic. Should someone try to pass traffic that should be on another net, refer them to the correct net.

b. 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 that 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.

c. Loggers

People to handle the keeping of an operational log for the event are a 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.

d. Site communicators

Site communicators have the responsibility of listening to everything that happens on the net and maintaining contact with the served agency people at the 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 (this presumes an emergency situation).

   e. 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.

   f. Listeners - LISTEN

The most helpful listener, during an emergency, is one that 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.

   g. Liaison Stations

Liaison stations provide the communication link between two nets. They will generally be limited to two nets so they can maintain good communications between the nets.

Liaison stations will need to have at least two radios, each with their own antenna. These antennas must be separated sufficiently to NOT interfere with the other radio when the operator transmits on either frequency.

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

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. 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.
- Does not require computer equipment or conditioned power to pass traffic.
- Poor propagation and high static, especially on 40m and 80m, diminishing the use of voice for efficient two-way communications.

During such times, CW can be an effective means of passing traffic.

Speed isn't everything

On-the-air speed is not an appropreate measure of effectiveness. The timely and accurate passing of messages is. Since accuracy is very important, it may be prudent to slow down the sending speed to make up for adverse conditions. The key is to send at a speed that the receiving station can pick up comfortably, and with heavy interference and poor signals, 10 WPM may be appropriate.

Receiving/Trasnsmitting Techniques

1. If your radio supports a high stability crystal option, (otherwise known as an oven crystal, TCXO or temperature compensated crystal oscillator), use it. It will keep frequency drift to a minimum.
2. Tune the receiver/BFO correctly so that you can zero beat with the NCS station and transmit on the correct (same) frequency. If necessary, use your RIT (Receiver Incremental Tuning) to compensate for receiver drift or frequency offsets.
3. Use your passband and/or notch filters to work around adjacent interference.
4. If possible (assuming your right handed), learn to send CW with your left hand, use a foot switch to transmit, and write with your right hand.
5. Bring one or two fluorescent desk lamps to provide proper illumination at your operating desk.

Filters

It pays to use a narrow CW filter to cut out the interference. Depending on the situation, audio filtering may be sufficient. Under heavy RF interference, filtering in the IF section should be employed.

One can buy DSP audio filters that processes out the noise being sent to the speaker or headphone. Some modern radios use DSP audio processing which adequately removes background noise.

Older radios use a crystal element to narrow the IF skirt for receiving CW signals. Others use DSP processing in the IF stage, which further improves the rejection of nearby RF products.

Procedure Signals (Prosigns) for Morse Code

BK Invite receiving station to transmit (break)
CL Going off the air (clear)
CQ Calling any station

K Go, invite any station to transmit
RR All received OK
AA All after

AB All before
AR Over, end of message
AS Please stand by

BT Break Text; Separation (break) between address and text
KN 'X' Go only, invite a specific station 'X' to transmit
SK End of contact

WA Word after
WB Word before

Abbreviations

ADEE Addressee (name of person to whom message addressed)
ARL (Used with "check", indicates use of ARRL numbered message in text.)
SIG Signed; signature (last part of message)

Use abbreviations and prosigns properly to format a ARRL Radiogram message into its component pieces.

Use abbreviations and prosigns consistently. Don't send "R", then ask for "AA" or "AB".

Questions

- True or false: CW nets may be important on 40 and 80 meters if the noise levels become too high.

- True or false: A high stability crystal oscillator is desirable for CW nets.

- True or false: Filters can substantially improve operating abilities on a CW net.

Digital Nets

E. [Digital Nets](#)

    1. HF digital is NOT plug & play

        . Receiver stability, bandwidth, dynamic range and operator skill

        b. Interfacing requires special care - RF/audio lines.

        c. Each mode requires operator understanding of TNC commands and how to monitor/operate point to point or with a BBS and accepted conventions on how to turn over the link.

        d. HF net frequency specifications are unique

    2. Like CW, skill in HF digital operation comes with practice.

    3. Controlling a digital net is more daunting than a voice net.

        . Typing skills

        b. Know essential commands

        c. Use ARRL QN signals

    4. Higher data thruput

    5. Less prone to scanner-listeners

    6. Many new operators

Voice Nets

F. Voice Nets

1. SSB Nets

SSB Nets are found mostly on the HF bands and are designed to meet the needs of particular groups of amateur 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 many regional and local SSB nets on VHF that exist 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

b. Net Control Stations and rotation

Emergency nets need net control stations, usually abbreviated NCS. 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 of the loss of a NCS station due to equipment failure or other problem.

c. Traffic for the net

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 priority is Emergency, Priority, Routine and Health and Welfare traffic, in that order. Some nets will not take Health and Welfare traffic, preferring to send amateurs 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.

d. Regular 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.

e. Checkins/checkouts

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. Otherwise, you can announce your call during a pause in communications (not during traffic or if instructed to stand by) and, if acknowledged by NCS, go ahead and check in.

f. 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.)

2. FM Simplex

. Regularly scheduled nets

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.

b. 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.

c. 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.

d. 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.

e. Have a plan

It is important that there should be a local emergency plan and that all of the local amateurs know what that plan is. Knowing what frequency to turn to in the event of an emergency is the best way to insure 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, get with your local EC (or your local club if there is no EC in your area) and help make one.

f. Simplex repeaters

There has started to be increasing use of simplex repeaters for use in an emergencies. These are simply radios that listen to a particular simplex frequency and record what is being sent, and when the carrier drops, they will repeat that same information on the same frequency, but usually from a location with wide coverage and higher power than the sending station. These provide a special challenge and different operating skills for those who use such repeaters. While coverage is definitely increased for a simplex net using a simplex repeater stationed 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. If time is of the essence and a communications path is available, it would be better to conduct emergency traffic directly if possible. A move to a different frequency would probably be the best route to conduct such traffic if a simplex repeater is in place. Simplex repeaters definitely have their place, especially in areas where there are coverage problems.

3. Repeaters

. Repeater Etiquette

- Leave at least 1-2 second breaks 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 about to reset.
- Autopatch: Most are closed - that is the autopatch is for club members only. For all autopatches you need to think of the following
  1. Keep calls short and to the point.
  2. Inform the person on the phone line that this call can be heard by others.
  3. Remind the person on the phone line that there is to be no profanity.
  4. Don't say anything to the person on the phone line that you would not say loudly at the local shopping mall.
- Various repeaters have functions other-than or in-addition-to rag chewing. Learn about the repeater you are about 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
- Leave the 10 codes on "other" radio services.

Basic Training

Why basic training is important

Education and training is what supplies the knowledge to help you build confidence in your ability to execute the required steps in the shortest amount of time and 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. Thus you educate yourself and train before the skills are needed. Education and training helps you function as part of a team.

Emergency communicators are part of an adaptive team that can rely on and support one another. All members must function as a cohesive unit. Individuals may possess great operating skills but will perform inadequately if they cannot work as part of a team.

What you need to do

Find an organization active in developing emergency communicators. Find an ARES, RACES or similar program in your community. You may ask at your local amateur radio club meeting if you do not know of any organization in your area.

1. **Undergo an educational/training program.**

   You may have to UNlearn some things you thought you knew

   There are many false concepts on emergency communications due to impressions that are not based on actual field experience. Some of the most important emergency communications operating principles differ significantly from traditional daily amateur radio practices. These because emergency communications requires a network of message relay stations to be built from scratch and operating within minutes or very few hours of an activation.

   Building a communications network is not done routinely by amateur operators in the normal course of enjoying the pasttime. 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 rationale why it works.

   Unlike individual amateur 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 simultaneously.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. These radio operators must work well and integrate with their host emergency management agency. While the lower levels of the operations may resemble and borrow from our personal experience as amateur radio technicians and operators, it requires

personal growth to operate in a challenging an environment such as the one that materializes during an emergency.

2. **Emergency Management**

   ❍ Learn about the Incident Command System.

   ❍ Learn about emergency management agencies in your area.

   ❍ Learn about how disaster declarations are escalated from the county mayor or local official(s), to the state governer, 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.

   ❍ It's highly recommended to take a first aid course. It's knowledge you can use anytime, anywhere.

3. **Equip yourself**

   ❍ Get a NOAA Weather Radio with digital SAME alert. Program it with the FIPS code 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) into the bag as well.

   ❍ Put together a 72 hour pack, useful for both field deployment and emergency evacuation.

4. **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 ARRL Radiogram messages.

   ❍ Practice participating in a tactical network, such as a parade or marathon.

5. **Learn about Emergency Communications Equipment**

   ❍ Learn and practice HF.

   ❍ Learn and practice NVIS.

   ❍ Learn and practice VHF/UHF simplex practices.

   ❍ Learn and practice Packet Radio.

6. **Existing programs at the local level.**

   ❍ Check with your local ARES official (SEC, DEC, EC, AEC, etc).

   ❍ Check with your local amateur radio clubs.

   ❍ Check with your local agency - Civil Defense, American Red Cross, National Weather Service, Salvation Army, etc.

   ❍ Check with your local church, county or state-wide denomination.

QUESTIONS

- True or false. Emergency communicators should debate endlessly whether a particular technique is vastly superior to another.
- True or false. An important part of education and training is to reduce the mental energy wasted in moments of hestitation during the real event.
- True or false. It is not important to learn about the Incident Command System (ICS) and the ICS teams in your area.
- True or false. A NOAA Weather Radio with digital SAME alert is recommended.
- True or false. You should put together a quick deployment bag and include a "last minute" checklist.
- When looking for programs at the existing level, one should check with:
    . your local ARES official (SEC, DEC, EC, AEC, etc).
    b. Check with your local amateur radio clubs.
    c. Check with your local agency - Civil Defense, American Red Cross, National Weather Service, Salvation Army, etc.
    d. Check with your local church, county or state-wide denomination.
- True or False: Key operating principles for Emergency Communications often differ from daily amateur radio operations.
- True or False: One should learn and practice being an Net Control Station.
- True or False: One should practice sending and receiving ARRL Radiogram messages.
- True or false. One should learn about HF even if you have only a Technician Class license.
- True or False. You should learn about NVIS operations even if you have only a Technician Class license.
- Trueor False. You should learn about VHF/UHF simplex practices even if you use only repeaters during your normal amateur activities.

Practical Experience

Practical Experience

When you go out on a real emergency there are several things you need to understand. The first four listed relate to expectations and attitude while the remainder deal with specific actions that your group will need to handle.

1. 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 whom you're doing it for.

2. Be flexible. Because of the confusion, we must always remain flexible and convey to those we are serving that we are here to help. Our AECs attempt to have location directions and contact names for each field assignment before our ARES 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.

3. Know your audience. We contrast arriving to a field assignment as either Rambo or an attorney. Neither is good, don't over dress, try to look the part that's required. Outfit yourself as is 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 who 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 kept.

4. 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 quite 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/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

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 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. Practicing emergency communications is best approached as a team effort scheduled on evenings or weekends and not 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.

Skill is needed for handling simultaneous 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. Hence 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 the while 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 that are enjoyable. Simulations, exercises and practice nets are proven ways to bring together these elements in a non-threatening and fun environment, developing the composure and skills, provide analysis and feedback and gain new confidence to rise above any situation.

Amateur 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 where FM modes are prevalent, Near-Vertical Incident Skywave (NVIS) for local HF coverage, satellite for reliable long-haul coverage, packet and digital modes for passing message text. See the section on Communications Technology for more information.

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 procedural 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 amateurs venture.

The National Traffic System is an excellent vehicle for practicing 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 removes the hesitation and mishandling that can happen when faced with having to pass traffic.

Public Service Events

Public service events are another 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 between each other using handie talkies. These outdoor operators are typically supported by Net Control Stations

and/or relay stations using portable/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.

In summary, training activities and community service participation allow you to try new methods for all communication activities in a non threatening environment with the added advantage of having fun while you work at them.

Real Emergencies

Lessons Learned on Past Events

Debriefing sessions should be held after each 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 towards mitigating potential gaps and obstacles rather than repeat their past mistakes.

Teamwork and Attitude

As the first segment in this course said, the attitude you bring with you will do more to determine the success of your effort than anything else. You must, therefore, bring an attitude of helpful cooperation to every event you participate in. If that is a problem for you, then I suggest you try something outside of ARES/RACES.

Move the Message Forward

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

When you are handling traffic, be sure you do not become myopic with your effort. The classic example is during a practice session in Packet, NCS should have one station pass a simulated emergency message to one of the other packet stations (something like the time on your watch at that instant). You will be amazed at how many people will spend the time to format the message in packet to send it rather than using the microphone to send a voice message that would be followed up with a packet message.

Creating an Operating Environment

You will learn to create a new environment where none previously existed -- and chances are that it won't happen seamlessly on its own. Recognize and accept this reality. Do not rely upon someone else to do your own preparation and the time prepare personally for emergency and

disaster situations is **<u>now</u>** 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 <u>fresh water (not beverages such as coffee or soda that will dehydrate you)</u>. There is much written about the topic of personal emergency preparedness, so further discussion will be deferred.

Don't worry and be distracted by the condition of someone else's equipment and operational readiness. Since you're already at your site (or heading to your assignment or evacuation shelter), focus on your situation first, then deal with other situations as conditions permit. The better you prepare and the faster you arrive at your destination (without speeding), the faster you'll handle your immediate situation.

While we would like to see everything go smoothly in an emergency, Murphy tell us that nothing will. Do not wait for someone else to do <u>your</u> preparation. <u>YOU</u> make it happen. <u>YOU</u> provide for your education and results. <u>YOU</u> make it go right.

Here are a few hints to help you during an emergency:

❍ Remember you are emergency communicators, not emergency rescue personnel

❍ Keep your Civil Defense RACES ID on you at all times.

❍ Do not impede the work of professional responders such as fire fighters, 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 <u>before</u> 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?

Operating Skills

Once you've learned the basics, gain as much on-the-air experience 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 such a spontaneous event. By engaging in on-the-air activities, you practice solving problems spontaneously while continuing to communicate.

Don't be overly concerned with the problem solving during the exercise. What's important is that you experience and learn to cope with fielding multiple, unexpected situations which will help you in future activities. Problem solving will be developed simply by attempting to handle the message traffic and situations.

There is a very good reason for training in advance. You do not want to deploy into the field with

any form of uncertainty or hesitation. You want to work out your "butterflies in your stomach" ahead of time in a comfortable and safe environment, such as an afternoon or evening net or on simplex with a couple of your buddies.

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 on the radio channel 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 reciprocate similarly and keep your time on

Staging of Resources

Please see the section on Incident Command for a full overview of ICS.

A staging area is exactly what it sounds like. It is a location where resources are staged and managed prior to being sent into the field. Separate staging areas might be needed for many reasons:

❍ Lack of space at the base camp (because it is set up at the trail head parking lot, and is short on space for heliports, parking, etc.).

❍ The mission might be geographically spread out over such a great distance that it makes more sense to marshal some people at a separate staging area.

❍ The mission might use unique transportation systems that require their own specialized staging area (marine support from a dock or harbor, air support from a landing strip, snow-mobile support from an access trail not close to the base camp, etc.).

Characteristics of Staging Areas include:

❍ Staging areas are managed by the Logistics Section.

❍ Assets that are mobilized into the field from the Staging Area are controlled by the Operations Section.

❍ The staging area can be colocated with the ICS staff at Base Camp.

❍ If a staging area is not co-located with the ICD staff at Base Camp, a separate communication system (cell phone, runner, two-way radio) must be set up between the ICS staff and the staging area.

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 the operators that respond if there are less than needed. Team leaders and amateur operators as a whole must recognize this and anticipate bringing in fresh operators to relieve those on 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. Practically speaking, their shift should be no more than ten 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 that of available operators. A typical, well staff operations for a given site requires a minimum of three operators for adequate coverage and rest during a given shift. Therefore, a given site requires on the order of a minimum of 18 operators per day to sustain operations.

Lack of available food/water and "facilities"

One needs 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 are no accommodations for food, water, restroom, personal hygiene and first aid. You will need to prepare and bring for your needs, and realistically, for at least two more people (since you're working in a team environment and there'll 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.

Lack of replacement Equipment

Sometimes, as shift communicators leave, they will take back their personal equipment brought to the operations. This is understandable, and should be anticipated. As people respond to an extended operation, take a moment, 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.

Every one is "Stressed Out"

Emergency communications is a very challenging assignment. There's a lot of need being placed on people in a short amount of time. The following are some tasks that will help things go more smoothly:

❍ Meet with the appropriate person in charge to establish the working relationship, the boundaries of responsibilities and the relative means of handing off working and communications.

❍ Set up an operating location with work table, lighting and similar considerations in a safe and - if possible - comfortable environment.

❍ Insure you install equipment, antennas in a **safe** and durable fashion.

❍ For those responding at an evacuation shelter, informing the general public that we're primarily communicators and not shelter managers and to refer shelter management issues to the appropriate designated person. Do not attempt to handle Red Cross issues for them.

❍ Remember that may people have many different priorities. Try to work within these differences.

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 affects the interpersonal relationship present.

Steps are needed to anticipate oncoming stress and mitigate the results after the onset. These include:

❍ Remind 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 to remind the people present of the objective. (Since the objective changes from event to event, there is no one single answer.

❍ Try to establish teamwork and cooperation, and remind everyone that working together will achieve the best results. We have to make do with what we have.

❍ Insure everyone knows the command structure.

Being cooperative and not bruising someone else's ego

The best time to emphasize this is up-front, before the event. Build this in as part of the culture of the emergency communications team. Remind the team when they're activated and before they begin their operations. Remind the team that they will be shining examples of what amateur radio is about to the rest of the community, whether they are professionals, the general public or other amateurs. Therefore, their conduct should be that of "professionals" -- to be courteous, considerate, effective and to rise above the situation. The only thing that's amateur is in our name and that's because we do it out of love, not compensation.

Remind them that even if things are not going well at the moment, that it's not a failure. It's delayed success. The key is to focus at the task at hand and pull it off.

ARES/RACES

Dual Membership and it's advantages

It's not a question of ARES or RACES, it is to enroll and partici pate in both. Each organization has a distinct origin, yet both provide the coverage of amateur radio emergency communications services for the community.

RACES originated as a Federal Government program designed to use amateur radio operators and equipment scattered throughout the community as a ready resource in the event of a Cold War incident. RACES is comprised of two parts:

. specially designated FCC-licensed RACES stations and
b. amateur radio operators registered with civil defense organizations as a pool of community volunteers authorized to operate in the RACES service upon a declaration of an emergency by civil defense.

Amateur radio operators are encouraged to register with their civil defense organization to be available to operate under FCC Part 97.407 in the event the President invoked an emergency under the War Emergency Powers of 1934, however, RACES operators can respond to emergencies declared by civil defense authorities.

During RACES operations in wartime, only RACES stations may communicate with other RACES stations.

RACES stations or amateur radio operators enrolled in civil defense organizations cannot begin RACES operations until specifically authorized by the civil defense organization for the area served. As such, RACES amateur radio operators cannot begin conducting advisory and prepatory nets before an activation, nor can they continue relief operations after official civil defense authorization/operations has concluded.

During these times, amateur radio operators organized under ARES can operate and serve as trained individuals to effect emergency communications. ARES operators can initiate nets and operations ahead of formal RACES activations and can continue to operate providing relief, health and welfare communications after the formal RACES operations concludes. As an operating arm of ARRL, ARES operations can request and incorporate ARES operators from neighboring counties and other states into the communications response for the affected area.

ARES can respond to situations that may not draw the attention of civil defense organizations. For example, if a local hospital's PBX phone system fails, ARES can respond and provide essential radio communications within the hospital complex. Even using employees with cellular and wireless telephones, wireless phone service would be overwhelmed with the volume of required calls. Amateurs stationed at key locations within the hospital could assist staff in dispatching and routing of personnel. A hospital's phone system problem would not warrant intervention by civil defense authorities nor the activation of RACES as it does not directly involve government services or affect overall community welfare.

In summary, RACES may not be activated to respond to every emergency situation. Similarly, ARES operators will not be allowed to operate as RACES operators in the event of a war unless authorized by the local Office of Emergency Management. In many instances, identification issued by civil defense authorities may be needed to access areas affected by the emergency. It is therefore prudent to enroll and serve with both programs to retain flexibility to respond to the situation as needed.

Working Together

There are a number of peer amateur radio organizations involved with 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 Other emergency management organizations may also be served by amateur radio groups: CERT (Citizens Emergency Response Team), VOAD (Volunteers Organizations Active in Disasters), MARS (Military Affiliate Radio Service), hospitals and health care agencies, utilities, public service agencies. Some of these operate under the ARES/RACES umbrella as a local agreement.

Amateurs are encouraged to register with more than one organization. For example, a person can sign up in ARES, RACES and SKYWARN without much difficulty or overlap. A person should declare his/her primary served agency -- the one which he/she will develop and respond to in the event of an emergency. However, 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 during a given emergency, the primary served agency is not activated, the individual is free to report to any agency needing assistance.

Leadership - Who is in charge (not an issue if they work together)

Minimizing brused egos when multiple groups interact

This must done via MOUs and understanding amongst the leadership BEFORE an emergency develops. SOP calls 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/she is in the best position to determine his/her availability given his/her work, home and family situation.

SOP calls for each agency to determine which frequency(ies) they will monitor for calls, and notify other agencies and nets which frequencies are being monitored for this incident. Frequencies for net operations should be coordinated on an area basis amongst 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 an emergency is about providing SERVICE, not about which organization is in charge or who will get credit!.

SOP also calls for overall objectives, priorities and decisions to be made by the ICS command team. The lead commander should be clearly identified and changes in lead commanders should be noted and communicated as the situation evolves.

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

Minimizing "us vs them" thinking

Quality leadership recognizes that the overall goal is to move the messages to the final destination in a timely and usable manner. Quality leadership recognize that this is done via teamwork and at times require 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 non-members and non-amateurs alike.

ARES Section Leadership

At the local level, there are operators registered with the ARES program. Non-ARRL members can sign up as ARES operators. The Emergency Coordinator (EC) position, however, requires ARRL membership. ECs are appointed by either their Section Emergency Coordinator (SEC) or their Section Manager (SM). Assistant Emergency Coordinators (AECs) are selected and appointed by the EC. Each EC may have as many AECs as required to effectively manage the ARES Unit. (Refer to Chapter 3 of the ARRL Emergency Coordinator's Manual for a complete outline of EC and AEC duties.)

At the section level, the Section Manager for a given ARRL section appoints the SEC. The SEC in turn appoints District Emergency Coordinators (DECs) to cover districts within the section. The size of a district is local decision and may encompass several counties, for example. The DECs work with ECs within their district to come up with a comprehensive emergency response plan comprised of SOPs coordinated amongst the ECs.

ARES - Mutual Aid

During severe emergencies, ARES personnel can be called in from other parts of the state and country. The situation is elevated from EC to the DEC, SEC and ARRL HQ. Often, the emergency will be carried on national news, and other available amateurs in the region and across the country would ready themselves for deployment and identify themselves to ARRL HQ. In the exchange of information, the request and acknowledgment for more emergency communicators is also exchanged and confirmed. The emergency communicators are dispatched, and informed who to contact when they arrive in the affected area.

Questions

- True or False: Enrolling in either ARES <u>or</u> RACES gives an amateur radio emergency communicator the same access to opportunities to operate during times of emergency and disaster.
- True or False: Only amateur radio stations may be RACES stations.
- True or False: During RACES operations in time of war, only RACES stations may talk with other RACES stations.

- True or False: RACES operators can begin RACES operations before a civil defense activation has been authorized.
- True or False: ARES operators can begin emergency communications operations ahead of a RACES activation.
- True or False: ARES operators are permitted to operate as RACES operators in times of war.
- True or False: Both ARES and RACES operators should adhere to Incident Command System (ICS) procedures during times of emergency activation.
- True or False: ARES personnel can be called in from other parts of the state or country.

Equipment

8. Equipment

  . Personal Equipment Checklist

  Each ARES member is expected to be prepared to respond as effectively as possible to a callout. No one is expected to ignore personal responsibilities to family or employer, nor unnecessarily risk their welfare. However, personal inconvenience or lack of preparation is insufficient reason for not supporting a callout.

  How do I prepare? Put together a "go-bag" of the items suggested in the equipment list shown below.

  Please understand that you are not expected to stuff your entire ham shack, closet and pantry into a time capsule in preparation for and alternative life style in support of ARES. Rather that you think about the items you do not have and acquire them while there is time and no urgency.

  The list includes virtually everything you will need to be helpful in an ARES event. We suggest you maintain one "go-bag" with the items that you would need only during a deployment and possibly a second (or it could be just a list) of the items that, when added to the first, will provide you with the personal supplies and radio equipment to make you much more effective and comfortable during an event.

  To summarize, don't wait until you are called to assemble your "go-bag". Do it in advance at your leisure.

  The items shown in UPPER CASE are the ones most likely to be needed.

  ### Equipment:

  - ARES/RACES/SERVED-AGENCY IDENTIFICATION CARD
  - COPY OF AMATEUR RADIO LICENSE
  - HANDHELD RADIO (dual band if possible)
  - SPARE BATTERY PACKs (CHARGED nicad and AA)
  - HEADSET, SPEAKER-MIC.
  - 19IN. MAG. MOUNT/GROUND PLANE ANTENNA (will function on 70cm)
  - COAX JUMPERS AND CONNECTORS
  - CONNECTOR ADAPTERS (bnc/pl259, bnc/so239, some radios require SMA)
  - DUCT TAPE
  - SHORTHAND NOTEBOOK, PEN & CLIP BOARD

- WATCH
- MAPS OF THE AREA (Topo and street)!!!
- COPIES OF MESSAGE FORMS
- Compass and/or GPS
- Copy of District Operations Manual
- Boundry-Marking Tape
- Insect Repellent (summer)
- List of served agency phone numbers in your area (not just district)

Survival Items:

- 3 DAY SUPPLY OF PERSONAL MEDICATION!
- WARM CLOTHING & BOOTS (bright colors for shirts and jackets)
- HAT - (this is IMPORTANT for everyone)
- GLOVES
- SPARE GLASSES (spare contact solutions if you wear them)
- FIRST AID KIT
- SUPPLY OF WATER (the warmer your region, the more you need but EVERYONE needs water with them)
- TOILET PAPER/KLEENEX
- Moist Towelette Packets
- SUN SCREEN (winter or summer)
- RAIN SUIT
- ORANGE VEST (for use if your clothing is drab colored)
- Space Blanket
- Plastic ground cover tarp
- Spare shoe laces and some twine
- Wool blanket
- Fanny-pack/Back-Pack
- Sports/Bicycle water bottle
- High energy snacks
- Large trash bags
- Flashlight W/extra batteries
- Whistle

Tools:

- SWISS ARMY - type - KNIFE
- SCREW DRIVER (phillips and flat)

- PLIERS
- SIDE CUTTER
- CRESENT WRENCH
- ELECTRICAL TAPE
- VOM
- Fence Pliers (includes hammer)
- Crimp Tool (includes wire stripper)
- Assortment of crimp connectors, nails, brads, tacks

For public service events:

- COOLER with FOOD & DRINK
- Lawn chair
- Umbrella (sun or rain)

Optional items:

- 3 Wire AC Extension Cord w/2-3 pin adaptor
- AC to 12V power supply
- Soldering Iron w/solder
- 2M Beam Antenna w/Tripod, mast & guy rope
- Nut Driver set
- Folding set of Allen/Torx wrenches
- Zip Cord
- Cash (for pay phones & if power is out)
- Transistor radio
- Binoculars

HF Unique:

- HF rig (12V dc preferred) with:
    - Mic
    - Key
    - Head phones, ext speaker
    - Tuner - for the oddball antenna
    - 50 ft + RG58 or better
- NVIS antenna: (NOT a mobile vertical!)
    - 75m dipole w/ ladder line or 130 ft of wire
    - Insulators

- - 3 Masts, 8ft or more, preferably non-conductive
  - Guy rope
  - Tent pegs for guys
  - Lead weight & 50 ft light line for tossing over branches
  - "Loud" marking tape to warn passers-by of guys, lines.
- Power source (one or more):
  - 12V gel cell 75 A/H w/ charger
  - Vehicle w/ 12V battery & gas
- Portable shack:
  - Shelter tent
  - Table & chair

Marking your Equipment

There are very few people that would knowingly releave you of 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 call it will be much easier to insure your equipment is returned to you at the completion of the event.

Latest Update: 8/22/00

Connectors to Equipment Operation

[Standard Connectors | Know your Equipment | Equipment Maintenance | Antennas and Generators | Equipment Operation |]

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. To facilitate this inter connectivity a standard for power connectors is necessary.

Anderson Powerpole

The recomended connector is the Anderson Powerpole 30A. This connector is gender non specific but when assembled per recommendation cannot have the positive and negative polarity reversed. The recommended configuration is shown at http://home.earthlink.net/~w0ipl/hc-conn.htm. This connector is rated at 30 amps and is recommended for higher power applications but will work very nicely for lower power situations as well.

In a size comparison between the previous recommended RS/Molex and Anderson PP-30A there is about .020" difference between the two connectors with the PP-30A being the smaller. Or more simply, they are virtually the same size but due to the difference in appearance, the Anderson PP-30A looks smaller than .020" would indicate.

The Anderson Powerpole 30A connector is not as readily available as the Molex connector. Thus your group may want to consider purchasing bulk quantities for its members. This will also reduce the cost per connector. One supplier charges $1.00 per connector, plus shipping, in quantities of ten but also charges seventy five cents per connector, delivered in quantities of 200.

The manufacturer (with a list of - distributors -) is at http://www.andersonpower.com/distributors/US/

Adaptors

It is recommended that you equip your radios, power supplies and batteries with these connectors. Since not everyone will use these connectors it would be very helpful for you make adaptor cords (patch cords) made with these connectors and other types. Connections you may want to have available are:

- large auto-type battery clips
- cigarette lighter plugs
- any other connectors that your group has in abundance.

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:

1. Make sure YOU can set up the radio on any frequency/mode the radio will operate on.
2. Insure you know how to set, turn on and turn off the sub audible tone encoder for VHF/UHF.
3. For VHF/UHF radios - make sure you can operate "reverse pair" if the radio is not "rock bound", in case the repeater IS down and someone else is "rock bound" or doesn't know how to fully operate their radio.
4. Does your radio have the ability to lock on or out a frequency? Insure you know how to activate or deactivate that function.
5. Try all configurations of power source, transceiver, antenna, fuses, and patch cords you have.
6. Make a card with tune-up procedures and operating precautions.
7. Photocopy key pages from the operating manual and place in an envelope attached to each radio. Include enough information so another ham can use your radios without further instructions.
8. Label pre-programmed memory channels by name and frequency. Preferably on the radio or in a plastic pouch attached to the radio.

Equipment Maintenance

When you maintain 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 you should perform regularly. You should keep in mind:

1. NiCd batteries self discharge at approximately one percent (1%) of their capacity per day. 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 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.
2. "Button" cells used for memory backup in programmable radios can go dead in three to five years. Replace them when it's convenient for you, not when it's too late.
3. Connectors, switches, and potentiometers can develop corrosion from disuse, especially if dissimilar metals are present. Operate, unplug/replug, and clean them regularly.
4. Pre-installed antennas at served agency locations and vehicles can be damaged and detuned. Check them monthly for changes and physical damage.
5. Printer ribbons and ink cartridges dry out from disuse. Develop a stock rotation plan so spares don't get too old.
6. Dry cell batteries, flares, first aid supplies, fuels, food and water all have shelf lives. Develop a stock rotation plan for the ones you have.

Portable Antennas and Generators

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, 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.

H.F. Considerations:

- One of the most effective "local coverage" H.F. Antennas is the NVIS or Near Vertical Incident SkyWave. This is a half wave dipole mounted less than 1/8 wave (at the highest operating frequency) above the ground. This antenna is most effective on 40 and 75 Meters.

- When you put up H.F. antennas, you must consider the potential impact of the antenna on people and equipment in the area. Or more simply you must have sufficient poles, rope, anchor weights, boundary marking tape and such to put the antenna far enough up to not be a hazzard to people or equipment in the area.

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

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 will be very helpful.

- Keep the antenna at least one full wave (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.

Generators:

There are several safety considerations to keep in mind when using portable generators. Some of the primary are:

- Insure 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.

- Store the extra fuel away from the generator.

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

- Use only three wire extension cords to bring power to the operating area.

- Insure the extension cord has the required capacity for the projected load. 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).

Equipment Operation

High Current Connector

- Anderson PowerPole -
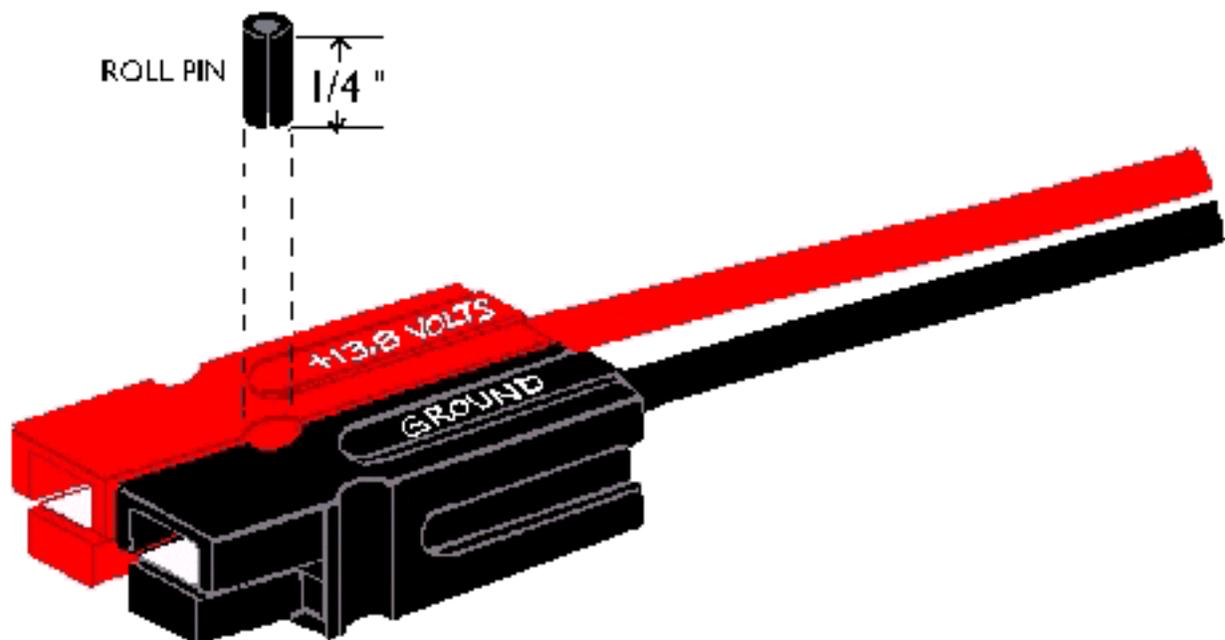
Assembly.

This is the 30 Amp connector.

The recommended configuration is shown above. If you take the time to pre-assemble the connector bodies per the pictorial above, as you receive your shipment, you will find it much easier to assemble the connectors for use and there will be no ambiguity in plus minus connections.

When you finish crimping the spade lug to the wire, insure you re-form the crimped portion to round. This will allow easy insertion into the plastic connector body.

We also recommend soldering the connections.

To assemble the wire/spade-lug and the plastic body, insure you - firmly - press the wire/spade-lug into the plastic body. There will be a distinctive click as the wire/spade-lug locks in to the plastic body.
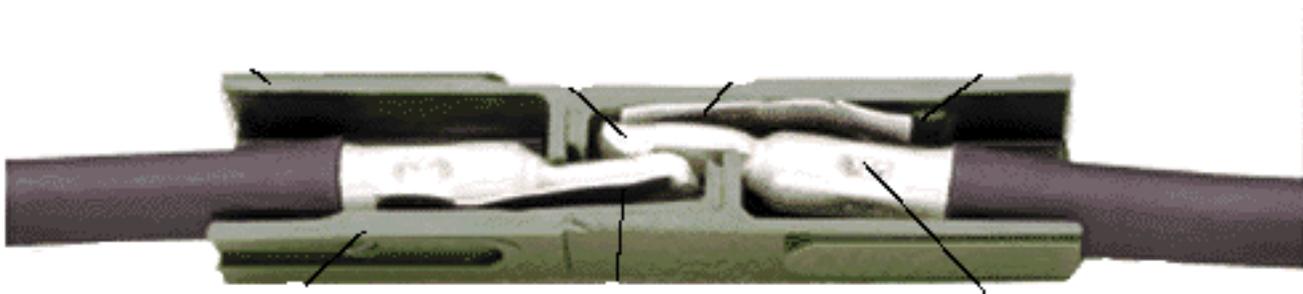
Diagram used with permission of Anderson Interconnect Inc., manufacturer of the Anderson Powerpole connectors.

Incident Command System

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9. Incident Command System

A. ICS Overview

The following description of the Incident Command System (ICS) is a summary for use by Amateur Radio operators working on ARES activities. This summary is **-only-** to provide Hams with basic a understanding of terminology and concepts associated with ICS and NOT to replace formal ICS training within your district.

Understand that the structure defined in this document is for large events. In smaller events, a subset of the full structure will likely be used.

Incident Command System is a management tool designed to assist anyone who has the responsibility for the successful outcome of an incident. We will define an incident as 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 halves. These halves are interrelated and both are critical to the successful outcome of the incident.

. Management by Objectives

Four essential steps used in every incident, regardless of the size or complexity are:
1. Understand policy, procedures and statutes
2. Establish incident objectives
3. Select appropriate strategy
4. 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 between 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.

B. 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:

1. The incident will be handled under a single coordinated Incident Action Plan(IAP)
2. One operations Section Chief will have responsibility for implementing the Incident Action Plan(IAP)
3. 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:

1. Command - The IC is responsible for all incident or event activity. The incident size/complexity will determine which other management functions will be filled. The command staff assists the IC and reports directly to the IC.
2. Operations - Operations is 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.
3. Planning - Responsible for collection, evaluation and display of incident information. It also maintains status of resources, preparing the IAP and incident related documentation.
4. Logistics - Is responsible for providing adequate services and support to meet all incident or event needs.
5. 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 filed, the radio designations are replaced with ICS position titles.

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.

1. UNITY OF COMMAND means that every individual has one designated supervisor, knows who that person is and how to contact them.

2. 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 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
   - Sections
   - Branches
   - Division/Group
   - Units
   - Resource

3. SPAN OF CONTROL relates to the number of individuals one supervisor can effectively manage. In ICS the span of control for any supervisor falls 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

INCIDENT ACTION PLAN is to provide 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:

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

COMMUNICATIONS PLAN can be very simple and given verbally or may be quite complex and form a portion of the written Incident Action Plan.

B. ICS Command Structure

INCIDENT COMMANDER

Reporting are:
1. Command Staff
    . Safety Officer
    B. Liaison Officer
    C. Public Information Officer
2. Logistics Officer
    . Service Branch
        1. Communications
        *** This is where Amateur Radio fits in ICS when there is need for the full ICS structure.***
        Understand then that each incident will be structured as needs dictate.
        As an ARES member, your job is to suppliment Served Agency communications. Therefore we will be assigned where the Incident Commander (IC) needs us.
        2. Medical Unit
        3. Food Unit
    B. Support Branch
        1. Supply Unit
        2. Facilities Unit
3. Operations Officer
    . Staging Area Manager
        1. Fire
        2. Law Enforcement
        3. Emergency Medical Service
        4. Public Works
    B. Emergency Medical Service Branch
        1. Triage Group
        2. Treatment Group
        3. Transportation Group
    C. Fire Service Branch
        1. Suppression Group
        2. Rescue Group
        3. Rehabilitation Group
    D. Law Enforcement Branch
        1. Investigations Group

       . Interviews

      b. Crime Scene

   2. Perimeter Group

       . North

      b. East

      c. West

      d. South

   3. Search Division

       . Team 1

      b. Team 2

      c. Team 3

      d. Tactical Response

  E. Public Works Branch

   1. Diking

   2. Debris Clearance / Street repairs

   3. Utilities, Electrical

   4. Utilities, Gas

   5. Utilities, Water

   6. Telephone

4. Planning Officer

   . Resources Unit

  B. Situation Unit

  C. Documentation Unit

  D. Demobilization Unit

  E. Technical Specialists

5. Finance Officer

   . Time Unit

  B. Procurement Unit

  C. Compensation Unit

  D. Cost Unit

C. 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)

1. Assess the situation
2. Establish incident objectives and overall plan
   . For the first hour
   b. For hours two - eight
   c. For extended operations
3. Fill necessary ICS functions
4. Brief staff
5. Monitor staff and revise plans as necessary
6. Handle requests for additional resources and release resources

I. OPERATIONS CHIEF

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

   . BRANCH/DIVISION/GROUP LEADERS

   1. Assess the situation
   2. Establish incident objectives for Branch/Division/Group
      . For the first hour
      b. For hours two - eight
      c. For extended operations
   3. Develop tactical plan to accomplish objectives
   4. Determine time and resource requirements
   5. Determine logistical requirements
   6. Requests needs from Operations Chief

II. PLANS CHIEF

1. Obtain briefing from IC
2. Establish necessary positions within function
3. Supervise preparation of Incident Action Plan (IAP)
4. Develop alternative strategies
5. Provide periodic predictions on incident potential
6. Supervise planing section units

. SITUATION INFORMATION CENTER

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

B. RESOURCE STATUS UNIT

1. Compile incident resource information
2. Display resource utilization/availability
3. Check in resources as they arrive

C. DOCUMENTATION UNIT

1. Document complete incident

III. LOGISTICS CHIEF

1. Obtain briefing from IC
2. Establish logistics section positions as necessary and do briefings as necessary
3. Identify service and support needs for the duration of the incident
4. Coordinate and process requests for resources
5. Advise IC and staff of current service and support capability
6. Prepare "Service and Support" portions of the IAP

. STAGING AREA MANAGER

1. Determine location of staging area
2. Establish staging area layout
3. Determine support/service needs for staging area
4. Report status of equipment and personnel in staging area to Plans Chief
5. Dispatch personnel and equipment from staging area to the incident as necessary

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D. Incident Command System and Amateur Radio

The Incident Command System (ICS) was developed as a result of wildland fires in California in the 70's.

Many agencies at the local, state and federal level were tasked with responding and providing some level of assistance to this type of incident, and it became painfully evident that differences in terminology and the lack of a unified command structure created confusion, and prevented a coordinated approach to managing the incident.

A Federal/State/Local task force was created to develop a system for the management of these wildfires, and it expanded to include any incident.

A few years later, ICS was formalized. Over the past two decades, it has been implemented

throughout the US and Canada and today is the standard emergency response framework for managing incidents of any size.

The primary components of ICS are:
- ❍ Common Terminology
- ❍ Multi-Jurisdictional **Unified Command**
- ❍ Modular Organization
- ❍ Integrated Communications
- ❍ Manageable Span of Control

As Amateur Radio groups continue to work more closely with the different Public Service Agencies, they may be asked to function within the ICS structure. It is incumbent upon Amateur Radio leadership, and, to a lesser degree, all Amateur Radio operators to understand how Amateur Radio fits into ICS.

ICS does not seek to alter the way any unit (including Amateur Radio) performs its internal function. ICS does not dictate how the police does its policing, how firefighters fight fires, nor how Amateur Radio units accomplish their tasks. Existing Amateur Radio methods and procedures remain unchanged. *ICS does provide an organization and reporting structure, with a clearly defined chain of command and span of control.*

The elements of ICS are discussed in the detailed ICS description in the first portion of this web page.

While the ICS structure might look a bit daunting at first, it should be noted that this structure allows for the management of any incident, regardless of size. *All tasks may <u>not</u> be needed at every incident.* **ICS allows for the expansion of the organization as needs dictate, to maintain a span of control between 3 and 7 (optimal of 5) subordinates per supervisor.**

Where we fit in the organization.

The primary area of interest to Amateur Radio participants is the Logistics Section, Services Branch, Communication Unit. Typically, the primary contact at the served agency will notify the primary Amateur Radio leadership individual and advise the nature of the incident, and where to report. This may be a staging area, or to the Command Post area, usually to either the Logistics Section officer, the Services Branch officer, or the Communications Officer. One individual may be serving in all three capacities, so Amateur Radio operators serving at a command post need to understand the specific nature of the incident. The command post may be identified by a green light or a green flag. An Amateur Radio operator may be assigned to the Communications officer or they may be assigned as a Technical Specialist in another area. Also, Amateur Radio operators may be requested to perform non-ham radio activities and could conceivably be assigned anywhere. If an operator is assigned to a non-ham unit, operators need to comply with the directions of the unit supervisor, understand the mission and report actions back to that unit supervisor.

Amateur radio groups deployed as units should be structured into groups of 3 to 5 hams under one Amateur Radio unit supervisor. For example: If a unit has 20 members, the leadership needs to

break the unit down into 4 or 5 units. This could be based upon geography (where the units will be deployed), time of day (shifts), specific function (HQ unit, field unit 1, field unit 2, etc), or any other reasonable, manageable division of labor. Then, instead of one Amateur Radio leader needing to get status or provide direction to 20 members, the 1 leader interacts with 4, and those four with 3 to 5 each. This allows for a much quicker and more manageable method of communications and control. Smaller units are also able to be re-assigned and moved more quickly than large units, so the smaller units also allow Incident Command more flexibility in the utilization of overall resources.

Everyone **MUST** insure that all assignments, delegation and hand overs are done with **explicit** statement of intent and **explicit** statement of acceptance. The most likely problems will occur when duties are assigned/accepted implicitly. For example; If two people read the same information, it would be easy for one of them to conclude "north" while the other concluded "east" or "west" or "south", i.e. different interpretation of the same material. If **ALL** assignment, delegation, handovers, acceptance etc. are explicit, the potential mis-understandings are minimized or eliminated.
A good technique to insure understanding is to repeat back the exact order or instruction. This will expose errors before they can become a problem.

Amateur Radio leadership with the likelihood of serving in supervisory roles for an incident should familiarize themselves with the ICS structure, forms, methods and procedures. The 'higher up' the pyramid an individual Amateur Radio operator serves, the more important ICS training becomes. It would be mandatory for an Amateur Radio operator assigned to a served agency command post as the Amateur Radio liaison to be fully trained in the Incident Command System. Each Amateur Radio Emergency Services group within Colorado should have a cadre of individuals "fully trained" in ICS.

ICS training is provided by served agencies throughout the United States; check with your local OEM, Sheriff's Office, or Fire agency for local information.

In addition, ICS courses are available from the Federal Emergency Management Agency (FEMA) on the web at:

http://www.fema.gov/emi/is195lst.htm

As previously mentioned, the methods and procedures used by Amateur Radio operators: use of nets, methods such as packet or ATV, and other training such as Damage Assessment, Fire (Red Card) or Fire Weather training-- are items that remain in place, in use, and unaffected by ICS-- except for the nature of how information is reported up the chain and how commands are given down the chain. Amateur Radio operators should continue to receive training in these areas-- and add ICS to the already valuable skills used to serve the public via Amateur Radio.

Emergency Call Out

Emergency Warning Point Networks

Each community and metropolitan area has it's own means of connecting the critical emergency operating centers into an activation network. Emergency communicators should be aware of the network connecting various warning points that monitor for alerts and activate the appropriate level of response. Some of the networks and network techniques used can be found in most locations nation-wide. Knowledge of these networks yields insights on how activations and notifications would propagate, and how to monitor for the latest bulletins.

Public Warning Networks

A number of warning networks exist to inform the public on a timely basis. These networks will not carry the same alerts as those used by emergency management agencies, however, it will keep you informed in the most practical manner. Each network carries information from different sources, so the timeliness will vary depending on the nature of the emergency.

- **NOAA** Weather Alert & NWR (National Weather Radio)

  For most emergencies dealing with nature, the National Weather Radio, sponsored by the National Oceanic and Atmospheric Administration (NOAA) is a good source of alerts. NWR is fed from the National Weather Service, with its network of forecasting offices, and yields timely and quality alerts dealing with weather and other natural events. Many of the NWS alerts go out through NWR within a few minutes of being received by the forecast office.

  NWR uses seven frequencies in the 162 Megahertz radio band to carry audio broadcasts to the general public. The receivers can be purchased at radio stores throughout the country. You can put the radio in alert mode, where the radio remains silent until it hears an alert generated by the local NWS forecast office.

- Emergency Alert System (Broadcast Radio & TV)

  One can also get alerts and information via the Emergency Alert System (EAS). The FCC has mandated that radio and TV stations connect to local authorities and carry alert information concerning the community. You see this as text "crawlers" that appear on the bottom of TV screens, or hear it as spot announcements on radio.

- Civil Defense Sirens

  One way to flag attention for the Emergency Alert System is the use of civil defense sirens. These are often activated by the civil defense authorities, with another activation panel located at the local county warning point. Upon receiving an immediate alert, the warning point or civil defense

agency can activate the sirens in conjunction with public broadcasts distributed through the EAS.

There are two different alert tones. One is a constant pitch, indicating the need to pay attention and tune to a broadcast radio or TV. The second is a fluctuating, warbling tone indicating the need to take immediate action. It is used primarily to signal an imminent enemy attack, but could be used to notify of an equally pressing situation such as a hazardous materials release.

Emergency Management Warning Networks

In addition to the alert & warning networks for the general public, there are warning networks for emergency management agencies. These are the common ones.

- NAWAS (National Warning System)

  The Federal Government maintains a national wireline phone network connecting the warning points in each state called NAWAS. It's chief operations is at the National Warning Center at the Cheyenne Mountain Complex in Colorado. It's purpose is to inform and coordinate alert information amongst states in a given region. Typically, it's primary purpose is to serve as notification in case of enemy attack, however, during peace time, it carries alerts on tsunamis and other wide ranging emergencies. Roll call check-ins are taken periodically during the day to ensure that the phone circuits are fully operational.

- State-wide Warning Systems

  Many states maintain a State-wide alert and warning network. It is known by different names in each state. For example, in Hawaii, it's HAWAS. In California, it's CALWAS.

  These warning systems keep key entities informed on a real-time basis of bulletins cruicial to these agencies.

- Tsunami Warning System

  Many states along the Pacific maintain a Tsunami Warning System to provide timely exchange of tsunami warning information. In the United States, it's known as the Tsunami Warning System (TWS). There are regional operating centers in Honolulu, Hawaii and Palmer, Alaska that handle assessment and warnings for US interests in the Pacific regions.

- Earthquakes

  The U.S. Geological Survey operates the National Earthquake Information Center located in Golden, Colorado. The NEIC issues rapid reports for those earthquakes which register at least 4.5 on the Richter Scale in the United States, or 6.5 on the Richter Scale (or are known to have caused damage) anywhere else in the world.

Emergency Call outs

How will I know?

As an amateur radio emergency communicator, you should register with the amateurs associated with RACES, Civil Defense (or Office of Emergency Management) and ARES and make arrangements to be available for alert and activation. Typically, two or more amateurs serving as liaisons with CD RACES are on pager notification by the CD agency. The pagers and/or telephone voice message are typically activated by a computerized group-call paging/notification system activated by the CD communications officer using a touch tone telephone control code. Other similar automated or manual notfication system may be in use in your county.

Once these amateurs are notified, a number of alert mechanisms can be used. A common one is to disseminate the alert/notification via a pager and/or telephone tree. The pager code may indicate the six digit frequency of a local repeater, followed by a three digit action code (ie, 911 for an emergency, 000 for test). Some groups use a two tone paging signal on a local repeater with wide coverage, activating commercial voice pagers that have been modified to monitor the amateur radio repeater.

Once the activation notice has been sent to check into the local command repeater, an NCS establishes a check-in net while the ICS communications command team establishes themselves. The operation teams are expected to activate and respond according to their normal response plan. The command team will issue bulletin statements for the net as needed, directing and fine tuning the activation. They will cancel the alert as needed should the situation warrant it.

If the situation is weather or tsunami-related, amateurs can also monitor NOAA NWR for information direct from the National Weather Service.

You can find out more by contacting the Civil Defense office in your state:
http://www.fema.gov/fema/statedr.htm

Initial Operation

If you are responding to another 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 located. Be prepared to suggest an appropriate location -- one that can serve an an operating table and message desk; has feedline access to the window, outdoor or roof; 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. Hopefully, you've arrived as a team of two or more, so that a person can start setting up while the other person is moving some of the equipment in. The first priority would be to set up a 2M mobile station to establish essential contact with 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 cause local interference in nearby equipment.

Proceed to set up the scanner, then 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

Some of the things you should have with you when you operate in the field:

- Message forms or sheets to compose messages.
  Often, you'll copy the message onto scratch paper, then transcribe it cleanly onto the incoming message form.
- Log sheets to log incoming and outgoing messages.
- 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. Some of the "portable office" type that can hold several hanging folders and has a tray on top for pencils, a mini-stapler, scissors and scotch tape would 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.

Notification of shutdown

The notification for shutting down operations may be given over the air by the NCS or bulletin station. The shutdown is usually preceded by notices given a heads up stating that shutdown of operations is coming. Notifications can be supplemented via alpha pager and telephone tree networks.

Be sure you confirm the shutdown order.

Shutdown and cleanup

Upon receiving notice of a shutdown, the station should begin securing the messages, the message desk, equipment and other materials. Make sure you leave the area you operated at in as good or better condition than you found it. Your served agencies appreciate that.

Debriefing

As part of the preparation for after action debriefing, the following information should be noted:

- your log should contain what time critical events occured. It is useful in the port-mortem analysis to determine timeframes for activation, setup, transit, etc.
- Complete information on what happened.
- Note who was around. In case there are questions, you will know who to contact for further information.
- Note the hours of operation.
- Note what was accomplished. Often, the list of accomplishments need 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.

Packet

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11. Packet

. **Disclaimer**

This document is designed to provide the ARES operator with enough information to be able to function adequately as an emergency communicator. It is not intended to provide a technical foundation for this portion of the Amateur Radio hobby.

B. **Why 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 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 and while the transmission time is a bit long (1200 baud is very common at VHF/UHF) the accuracy and increased confidentiality make it a good choice for ARES activities.

C. **How does it work ?**

Packet radio consists of a computer, Terminal Node Controller (TNC), a radio and some cables connecting all of the parts. Some of the TNCs are happy with the full 25 pin cables and some are only happy with nine pin cables (see the TNC manufacturers instructions). The connection between TNC and radio will have ground, transmit audio, receive audio and puch-to-talk (PTT) lines.

The computer will be loaded with one of many flavors or software that (depending on flavor) will operate as a subtask of the computer, to some that make the computer function as a dumb terminal. With the latter, if you try to make the computer do anything else it will lock up and do nothing. Ask a person with full packet training before you try to get the computer to multi-task.

The terms you will need to know **and** understand are:

1. 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.
2. TNC - Terminal Node Controller. The device that acts as an interface between the

computer and the radio. It normally includes a MODEM (MOdulator DEModulator) and will have a micro-processor included. Other things about the TNC are:

- . TNC state - Status of the TNC at that instant. Some of the status names are:
    1. Disconnected - Idle state where the TNC will monitor activity on the frequency and display that information on your computer.
    2. 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 will no longer be displayed on your computer (there are ways around this but don't worry about them).
    3. 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.
- B. Commands - Instructions to the TNC telling it what you wish it to do. A small subset of these commands are:
    1. MYcall - Definition of the call to be used by the TNC.
    2. Connect - Request to connect to another computer.
    3. Disconnect - Request to sever connection with another computer
    4. 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 between multiple users).
    5. Read - Read a received message from the cluster/BBS.
    6. CHeck - Normally set to zero for ARES work (keeps the TNC from automaticly disconnecting if the activity is low).
- C. Status Lights:
  Status lights may vary by manufacturer. The most common are:
    1. PWR - Power on indicator
    2. CON - Connect indicator
    3. STA - Data from the computer is ready to send but has **not** been sent yet.
    4. PTT - On when PTT line is "down" (transmitting).
    5. DCD - Incoming data indicator. The information available after this light goes out will only be displayed if the information was for your station.
3. Digi-Peater - a relay station between stations that cannot hear each other
4. Packet Bulletin Board Systems (BBS) - a local collection point for messages between users. Usually linked to other BBSs to exchange messages for additional users.
5. Cluster - Similar to a BBS but normally without the links to other BBSs/Clusters.
6. Keyboard-to-Keyboard - Connection used to talk to other amateurs directly. Normally you will be talking with a single station or to a cluster.

D. **What will I do ?**

If you are part of the setup team, you will be asked to set up the station. Each of the districts with district-owned equipment will have a set of instructions for you to use. Most cables will be labeled with information telling you where each is to be connected.

You will setup the equipment per district instructions and:

1. Power up the computer
2. Load the communications program
3. Power up the TNC
   Note: The software used will determine if the TNC will need to be powered up before the communications program is loaded (read the setup instructions).
4. Power up the radio
5. Connect to the Cluster

This leaves only for you to operate, i.e. send and receive messages as required by your location. **Note:** Most districts will have a set format for their messages. Contact your team leader to get a copy of the format used by your district.

Do not adjust, play with or fiddle with any piece of equipment in use for an event, during that event, unless it is malfunctioning.

Material from KC7FUY - volunteer date 5/29)

E. Point to point

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- .
- .

F. Using the Cluster

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- .
- .

G. APRS networks

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- .
- .

Acronyms

Acronyms used in the EmCom Certification material

- **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 to another computer for use.
- **AQS - Amateur Quiessence 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.
- **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**
- **CB - Citizens Band** - An unlicenced radio service for personal communications using low powered (5 and 12 watt) 27 Megahertz transceivers.
- **CERT - Citizens 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.
- **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.
- **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.
- **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.
- **EmCom - Emergency Communication** The ARRLs Continuing Education program in Emergency Communication.
- **EOC - Emergency Operating Center** - A facility designed to serve a focal point of operations during emergencies.
- **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.
- **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 unlicenced radio service for personal communications using low powered (1/2 watt) UHF (460 MHz) transceivers.
- **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.
- **HF - High Frequency** - the radio spectrum from 3 to 30 Megahertz.
- **ICS - Incident Command System** - A concept of command and control for emergency situations that is scalable to handle events of any size.
- **ID - Identification**
- **IF - Intermediate Frequency**
- **ITU - International Telecommunications Union**
- **JNOS** - A NOS (Network Operating System) that can be 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**
- **MOU - Memorandum of Understanding**
- **MRE - Meals Ready to Eat**
- **NAWAS - National Warning System.** The federal notification system used to inform and coordinate regional and national emergency management.
- **NET - Network** On the air meeting of Amateurs to handle messages and/or pass information relating to a scheduled or unscheduled event. May be conducted by an NCS.
- **NCS - Net Control Station** The person charged with maintaining orderly flow of information during a net.
- **NTS - National Traffic System** - The ARRL organization of daily local, regional and national

radio nets that passess messages nation-wide.

- **NOAA - National Oceanic and Atmospheric Administration.** The administration under the federal Department of Commerce responsible for oceanic and atmospheric study.

- **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 then 1/8 length wave 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. World wide communication is possible with as little as one watt of output power.

- **RACES - Radio Amateur Civil Emergency Service** - The FEMA program for organizing amateur radio operators registered with civil defense organizations into a reserve of emergency communicators.

- **RF - Radio Frequency**.

- **RIT** - Receiver Incremental Tuning

- **RTTY - Radio teletype** - A digital mode of radio communications.

- **SAME - Specific Area Message Encoding.** A 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.

- **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.

- **SM - Section Manager**. A position of leadership within the ARRL Field Services organization just below national level.

- **SOP - Standard Operating Procedure**

- **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**
- **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**

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Net Control Station (NCS) - I

[Charicteristics | Learning to be NCS | NCS Questions | NCS Hints **|]**

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1. Net Control Station (NCS)

    . **Characteristics of a good NCS operator**

    - Good communications skills and fluent command of language
    - Good voice quality
    - Good hearing capabilities
    - Good listening capabilities
    - Good ear-to-hand copying skills
    - Understands what SERVICE means
    - Has knowledge of the Incident Command System
    - Willing to take and carry out direct orders
    - Is a strong team player
    - Is Self-assured but not overbearing
    - Decisive, with the maturity to make good judgement calls
    - Physically able to tolerate high stress for extended periods
    - Constant concern for the safety of participants
    - Organizer
    - Sense of humor
    - Ability to absorb new terminologies quickly
    - Decent (readable) penmanship
    - Generally neat of appearance
    - Consistently demonstrates above average operating techniques
    - Knowledge of band characteristics

    B. **Learning to be an NCS**

    Many of the skills used in contesting are applicable to NCS. Both activities involve coordinating several stations on the same frequency at the same time. The contester running a pile-up will try to contact as many stations as possible in the least amount of time. A busy

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NCS will attempt to move as much traffic as possible in the least amount of time.

NCS techniques include:

    . When asking for reports or soliciting traffic, **listen!**

  b. Take down as many calls as you can identify before you acknowledge anyone!

  c. Acknowledge all stations that you heard, then yield the frequency to a single station. When that station is finished, hand the frequency to the next station on the priority list, without soliciting more traffic. Follow this pattern until you've completed your list, then repeat.
**** The exception to this is in handling routine traffic during an emergency net. With routine traffic, break between messages to solicit any emergency/priority traffic and handle that first.

  d. Most participants will catch on quickly to the pattern. If they do not, take the time to explain. Things get done much faster if everyone uses the same techniques.

  e. **Be as concise as possible.** Use the fewest words that will completely say what you mean. This will minimize the need for the repeating of instructions.

  f. Take frequent breaks. While you may not recognize the stress that being an NCS produces, it will become evident in your voice. If you are asking yourself when your last break was, you know it is time for one. Turn over the net to your backup at least every two hours and REST. Do not listen to the net. **Rest.** Then, when rested, listen to the net for a few minutes before resuming your station.

  g. Control the tone of your voice. Be as calm as possible. Tension tends to make our voices raise in pitch and this change **will** be picked up by the net. Use a calm tone and members of the net will tend to remain calm.

  h. Speak in first person. It is "recognizing kd0zzz, ..."
not "NCS would like to recognize ......"

The ability to remain cool, calm and collected will buy you more than anything else. There is no doubt that being an NCS is a high pressure assignment and it is easy to become frustrated or angry. If you have a frustrating problem, ask for help from other members of the net. Knowing when to delegate is the mark of a good leader.

Net Discipline:

In many ways your job as NCS can be equated to that of a traffic cop for the frequency. This analogy carries over to the duties of enforcing net discipline.

You can reasonably expect net members to:

    . Report to the NCS promptly as they become available.

  b. Ask clearance from NCS before using the frequency.

  c. Answer PROMPTLY when called by NCS.

  d. Use tactical call signs.

  e. Follow established net protocol.

All of the above expectations are great. However you must remember you are dealing with

volunteers with a vast range of knowledge and experience. This means you cannot order their compliance. You can only ask their cooperation.

Probably the best way to enlist the cooperation of the net is to explain what you are doing in a calm and straight-forward manner. This may involve supplying a small amount of real-time training. The one thing you **never** do is dress down someone over the air. It is better to lead by example and produces much better results.

One way of classifying a net is the level of net discipline used, or the "style" of the net. The two acknowledged styles are:

1. **Open (Informal) Nets**

   During an open net most any type of traffic or communication is permitted. Conversations (rag-chews) are permitted provided they break every so often to allow incident related traffic to flow.

2. **Directed Nets**

   A Directed Net is created when there are a large number of stations needing 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.

   Casual conversation is discouraged and tactical call signs will be used as applicable.

Like anything else, being a good NCS requires practice. Contact your local ARES EC for opportunities in your area!

C. Questions an NCS should ask themselves.

Click HERE for the list of questions an NCS needs to ask themselves before beginning a net.

D. NCS Hints and Kinks

- If it is a scheduled net, start on time!
- Use a script when/where possible. If you have time, make notes to yourself to help with the information in the script - before you start the net.
- Be friendly yet in control - speak slowly and clearly with an even tone, not a monotone. Sound confident, even if you are not. Above all, don't worry. Just give it an honest try.
- Ask SPECIFIC questions, give SPECIFIC instructions! You can make it much harder on yourself with nebulous questions and instructions.
- Have pencil/paper ready and write down ALL calls. It helps to practice with writing down calls when you are not the NCS.
- Read your owner's manual and understand how to use your microphone. The worst sounding NCS is one that cannot be heard or sounds like a train huffing and puffing

into the microphone as they speak. From the ARRL Field Resources Manual: Articulate, don't slur. Speak close to your mike, **but talk across it, NOT into it.**

- When there is a double, try to get something unique from one or more of the stations. Then call for clarification from those stations ONLY.

- During check-ins, recognize participants by name whenever possible.

- Acknowledge checkins and ALL messages.

- Be sure to frequently identify the purpose of the net (let people know what they are checking in to!) and advise all listeners of the subaudible frequency required if applicable.

- Ask for assistance if/when you need it. If this is not a weekly net, delegate responsibilities. You cannot do it all.

- If this is an emergency net, remind listeners to listen and tell them where the staffing net is. Someone checking in to say they are listening only slows the net.

- Don't be afraid to say "OOPS" if you get flustered and mumble a bit. Pause, take a deep breath, and go back at it. If you make a mistake, remember this is not Brain Surgery. Do your best to CALMLY recover. Nothing more will ever be asked of anyone.

- DON'T THINK ON THE AIR! If you need a moment to consider what is needed next, say something like "Stand by" and unkey your mic.

- Keep transmissions as short as possible. Resist the tendency to ragchew or ramble.

- Transmit only facts! If there is need to make an educated guess or speculate, make sure it is VERY clear that it is speculation. **First choice is to not speculate at all.**

- Avoid becoming the source for general information about the event. If it is an emergency, refer event status questions to the served agency Public Information Officer (PIO).

- When necessary, use standard ITU phonetics. There is no such thing as "common spelling". Send all numbers as individual numbers, e.g., 334 is three three four not three hundred thirty four.

- Speak in first person. It is "recognizing kd0zzz, ..."
  not "NCS would like to recognize ......"

- For voice nets, use plain English. "Q" signals are for CW.

- If the net has been quiet for more than ten minutes, check on operator status. This keeps the net running more smoothly and insures you know about equipment failures as soon as possible.

NCS Questions

[[Emergency Nets](#) **|** [Scheduled Nets](#) **|]**

Opportunities are often things you haven't noticed the first time around

The following is a list of questions an NCS operator should ask of themselves BEFORE starting a net. If you cannot answer at least two thirds of the questions in the affirmative, you should seriously consider having some one else run the net.

Emergency Nets

1. Is the NCS location away from the Command Post?

   The noise and commotion at CP degrades your ability to run a good net and the noise you generate only adds to the confusion there.

2. Do you have the best performing antenna for the conditions?

   A "rubber duck" is not adequate unless you can see the repeater antenna. That does not mean see the mountain the repeater is on, it means see the antenna. For HF, polarization of your antenns WILL affect your signal to others.

3. If you are running from battery: Do you have at least an hours of charge on the battery?

   Most desired is to have a battery with at least 90+% charge but if you are the only choice for NCS then make sure you can run the net long enough to have some one else get ready.

4. Are you using a headset with noise canceling microphone?

   Even from home the background noise will affect how well you can hear and be heard.

5. Do you have pencil/pen and paper sufficient to run the net for a full shift?

   You will NOT be able to remember enough about the traffic to be effective unless you **write it down**.

6. For VHF/UHF; **Do you know the characteristics of the repeater system you are on?**

   For example; The Colorado Connection system must have the repeater at the Denver end down for three seconds for the time out timer in Grand Junction (200 miles away) to reset.

   Your effectiveness as NCS will be adversely affected if you do not.

7. Do you have a runner, liaison or logging person to support you?

   For large scale events all three are required. You **cannot** handle the net and run messages.

8. Do you have a designated relief operator?

Everyone gets tired and NCS must be the most alert operator on the net.

Scheduled Nets

1. Is the NCS location away from the event operations?

   Noise and commotion degrades your ability to run a good net and the noise you generate only adds to the confusion there.

2. Do you have the best performing antenna for the conditions?

   A "rubber duck" is not adequate unless you can see that repeater antenna. That does not mean see the mountain the repeater is on, it means see the antenna. Even a quarter wave ground plane antenna (for VHF/UHF) will significantly improve your signal. For HF, polarization of your antenns WILL affect your signal to others.

3. If you are running from battery: Do you have sufficient charge to run the net or (if it is a multi hour event) a large percentage of it?

   Most desired is to have a bettery with at least 90+% charge. You will only make the net more confusing if you try to squeeze out the last little bit of use from you battery pack.

4. Are you using a headset with noise canceling microphone?

   Even from home the background noise will affect how well you can hear and be heard.

5. Do you have pencil/pen and paper sufficient to run the net for the full net?

   You will NOT be able to remember enough about the traffic to be effective unless you **write it down**.

6. For VHF/UHF; **Do you know the characteristics of the repeater system you are on?**

   For example; The Colorado Connection system must have the repeater at the Denver end down for three seconds for the time out timer in Grand Junction (200 miles away) to reset.

   Your effectiveness as NCS will be adversely affected if you do not.

7. Do you have a runner, liaison or logging person to support you?

   Only weekly and daily nets are exempt.

8. Do you have a designated relief operator?

   Only weekly and daily nets are exempt.

Net Control Station (NCS) - II

[[Contingency Plan](#) | [Handovers](#) | [Coverage Breaks](#) | [Irate Particip.](#) | [Malicious Interfer.](#) | [Shortcuts](#) |]

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1. Net Control Station (NCS)

E. **Contingency plans**

> Contingency Plan: n. a plan for possible, unforeseen or accidental occurence

A somewhat thread bare saying that is very true, tells us a lot about Contingency planning. "Those who fail to plan, plan to fail". Or as Murphey put it - "Anything that can go wrong, will. Anything that can't go wrong, still will".

How does this relate to Emergency Communication? Simple. As you begin your planning for emergency operation, be sure you have redundancy of equipment and back up people available when ever possible.

As NCS it is up to you to plan for your backup, have backup equipment available for your use and try to obtain more volunteers than you have positions to fill.

But wait. More volunteers than you have need for? Yes. On average, for every ten volunteers you get, there will be at least one that will develop equipment problems, or have transportation problems, or have personal emergencies that develop. If you have only "just enough" volunteers, you actually are short ten percent for the event.

Having one or two "floaters" who can act as relief for almost any of your operators WILL help the event run more smoothly. In addition, having an extra person to act as - runner - handling message transportation to/from your served agency will help your group function more efficiently.

The side benefit is that should one of the volunteers prove to not have sufficient training, they can become the backup on that job and have a successful training experience during the event.

F. **Handovers**

During the course of every event that lasts over two hours (and most of the others) you will have need to turn over operation of one or more of the locations in the net to a relief operator. As NCS it is in the best interest of the net and your sanity to do likewise with the net to another NCS operator at least every two hours.

To facilitate this change of operators the new operator will need:

- List or note of outstanding messages to/from the location
- Log of traffic to/from the location

  These two items may be one log, properly annotated
- Status of open queries
- Local and remote contacts for the location (served agency and others as necessary)
- Any other information the outgoing operator feels necessary

When ever possible, both operators should handle the location for at least ten minutes to allow smooth transition.

G. Coverage breaks

Coverage breaks are, as the name implies, failures of a station to handle traffic as required during a net. These will usually take the form of equipment failures, power supply failures or overly tired operators who fail to pay attention.

In ALL cases, prior agreement of how the coverage breaks are to be handled, should be announced in the pre event briefing.

NCS Coverage Breaks

The best way to handle NCS coverage breaks is with a known NCS backup. This person is known to the net and has a duplicate copy of the operational log for the event and thus is able to pick up operation of the net in just a few moments.

When there is not sufficient resource to have a backup NCS then the person with the best NCS skills and most complete staff at their location should take over the net. This person will start with a call for emergency traffic, handle that, then go to roll call to establish continuity. After which regular net traffic will resume.

NOTE: As this person takes over the net they will no longer be available to handle the previous assignment. A relief operator will need to be dispatched to handle the new NCS's previous assignment!

Non NCS Coverage Breaks

When a station fails repeatedly to respond to calls from NCS an assessment must be made of the criticality of the traffic. If there is critical traffic holding for that station then a relief operator will need to be dispatched immediately. If the traffic can be held for several minutes then a re-evaluation should be made at that time.

If the coverage break was from equipment failure and that can be corrected, then the relief operator may be recalled. If the coverage break was from inattentiveness, the relief operator should take over.

H. **Handling an irate participant**

This is one of the toughest problems you will face. If handled incorrectly, it can cause net participants to 'take sides' and erode the morale and effectiveness of your net. People can get their feelings hurt over very little, especially when they are tired and in unusually stressful circumstances. Your first reactions need to be:

. Slow up. Don't respond instantly. Take a deep breath.

b. Do a quick review of what you know about this person.

c. DO THE NEXT THREE STEPS ALL IN ONE STATEMENT.

1. Acknowledge the problem. Give in to the 'Problem' Whether they are right or wrong! This acknowledges that there is a problem and that you are recognizing that fact. Once you agree that there is a problem, the 'fight' is gone.

2. Empathize with them! Whether you understand or not, tell them that you can understand how they can feel that way and that, were the situation reversed, you would probably feel the same way.

3. Ask them to suggest a simple yet reasonable solution. Listen intently! This is where they will reveal the real problem. Everything they have said up to now may have been a loud smokescreen. Somewhere in their suggestion, they will tell you what they really want from you.

d. If their suggestion/solution is reasonable, tell them that you will try to put it into play. If it is not, make a counter-suggestion that will satisfy the real problem that they have revealed to you.

e. If the problem cannot be resolved quickly and reasonably, quietly send someone to replace this individual and relieve him from his post. If there are no posts involved in the operation, give up ... let him win . . . politely explain that the net must continue, thank the person for his services and tell him he doesn't have to stick around. You tried to solve the problem reasonably and he refused. He wins the fight and you win the battle. The rest of the net will respect what you did and morale will remain intact.

I. **Handling malicious interference**

Most people that interfere with net operations or with casual conversations are poor, weak individuals that think the only way to get recognition is to behave improperly. The best way to handle them is to ignore them. When they can evoke no response, at all, they tend to leave. Let them leave without comment. If you comment in any way, these people will persist.

Unfortunately, there are people who prove there is need for more chlorine at their end of the gene pool. To overcome the interference from these individuals you will have to plan for it. Plan by having alternate frequencies announced at the pre event briefing. Should the interference become intolerable, move to the alternate frequency.

When you move to another frequency, do so under pre announced set of conditions (at the briefing) and **without** saying anything on the primary frequency.

Another very successful method involves the use of your local "fox hunters" to track down the offending station. This will need to be a well coordinated effort that is not announced on the net frequency.

J. Shortcut to being a good NCS - Practice, Practice Practice

- Be willing to learn.
- Accept constructive criticism politely.
- Contact your district Emergency Coordinator and volunteer.
- Contact the person in charge of your local traffic net and volunteer.
- Contact your local Amateur Radio club to see if they have a net. If so volunteer.
- Look for the group that handles public service events in your area. Many times this will not be the ARES group, so volunteer.
- Work with the best NCS you can find. This person will be able to show you (if you care to watch) a lot of subtle techniques.
- Work as NCS as often as you can.

Working with Volunteers

[Why Recruit? | Define the Jobs | Assess your needs | Recruitment | Keeping Volunteers | Improve Feedback | Add new challenges]

Why Recruit?

"Eighty percent of those people not volunteering say the primary reason they didn't volunteer was because they weren't asked."

There has yet to be a volunteer that appeared by magic, at just the right time, knew all phases of emergency communication, could pick up any ARES job, complete it successfully, work without thanks, disappear when not needed and reappear when needed next.

With the above in mind we then need to plan a way to obtain the next best thing.
A person, that we:

- Recruit
- Train
- Thank - even if all they do is show up
- Organize
- Lavish with an appropriate amount of praise when they complete their assignments.

Working with volunteers is the most critical aspect of your job and will call for the most time and effort on your part.

Where do we start?
Let's try:

Define the Job

What specific jobs will your organization have?

Many organizations fail to be effective in their recruitment because they have failed to define their needs to the potential member. You should have a list of:

- all of the jobs available
- what each job does
- skills needed for that job
- training available to meet the skills required
- time requirements by job
- approximate activity level by job

Assess the needs of your organization

- How many different jobs will you need filled for any given event?
- How many people for each job position?
  - How many active volunteers do you need during low activity levels with your served agency?
  - How many will you need for average activity levels?
  - How many will you need for high activity levels?
  - How often have you experienced high activity levels?
- From the above - What is a reasonable level for your group?
- Who will recruit new members?

Recruitment

People volunteer for many reasons. Many will volunteer just to help someone else, while others volunteer for some type of personal gain. If you are uncomfortable with the idea that a person could benefit from doing volunteer work then think about what those benefits may be.

- FUN!
- help someone
- keep busy
- make new friends
- be challenged
- learn new skills
- share a skill
- keep skills alive
- gain leadership skills
- test yourself under adverse conditions
- be part of a team
- validate the reason for your license
- derive satisfaction from accomplishment
- get to know the public service community
- have an excuse to play radio

Each person will volunteer for his/her own reason. If your reason is one of those above you can do fine. If it is several of the above, you will make a GREAT volunteer in Amateur Radio Emergency Service (ARES)!

Where can I find new people? A few of the places that work quite well are:

- Ham Radio classes
- Local radio clubs

- Swap fests
- The local 'candy shop' usually has a board available
- On the air in general discussions
- After each weeks ARES net
- Other club/organizations that allow outside traffic
- Workplace - if yours encourages volunteering

Make sure that potential ARES members understand what they will be asked to do, how much time will be asked of them and how often training will be available.

Many of the questions the new volunteer will have should be answered as part of your 'pitch' for membership. Some of the items you should cover are:

- An ARES volunteer must have an Amateur Radio License to be able to handle radio communication. But the skills that are of most use are: good people skills, be a good listener, non-judgmental, friendly and supportive.
- It's OK to identify certain things you want to avoid as a volunteer. The happier you are about what you will be doing, the better you will be as a volunteer. So don't feel that you have to say -yes- to any assignment offered. Feel free to refuse any assignment for any reason.
- How much time are you willing to commit? Some can only provide a few hours per month. While others can provide several hours per week. What commitment can you make?
- Are you willing to undergo additional training? Most assignments in ARES require diverse skills. If you do not have all of the skills required, are you willing to do some training?
- Some served agencies will require a background check before you can work on their behalf. Don't be offended. This protects you, the people you work for and the people you work with.
- Many assignments within ARES will handle, or have close by, confidential information. Be sure that you do **not** violate that confidentiality.

Keeping Volunteers

Have or create a crisp, new-membership process. Nothing turns off new members faster than volunteering to help only to find that it will take months - or longer - to become a member or to get initial training.

Put them to work as soon as possible. They can only feel that they are contributing once they are working.

One thing most people don't realize is that on average a person will volunteer for one reason and stay for quite another. Some of the primary reasons to stay are:

- **Your time is well spent**
- You like the people you get to work with
- Your talents are appreciated
- You are able to teach others
- Your effort produces tangible results

Be sure that volunteers sign up for jobs that are within their capability - no one is served by over commitment. However, you should encourage volunteers to "step up" and take on new assignments. Often, they only need "permission" to try something that they've never done before.

Take care with volunteers that "know everything". They can drive good volunteers away.

Don't try and talk a volunteer into doing a job that you sense they really don't want to do; it won't turn out well. In fact, be sure that volunteers have a chance to decline or back out of an agreement. Guilt is a very poor motivator.

Getting volunteers work in teams or groups will help the work be more fun and won't wear people out. However, make sure that you have ONE person that is accountable for each task (this doesn't mean they do all the work, only that they are responsible for seeing that the work gets done).

Share your vision. Let others contribute their own ideas.
Try to find ways to incorporate others ideas into the overall effort.

Don't micro manage your people, but conversely don't just "dump" assignments on them.

Lead by example. Your attitude toward your people and your served agencies WILL be emulated by your people.

Help people feel welcome! Not everyone can spend as much time as a volunteer as you do. Help them understand their time IS an asset to your organization.

Be accountable, and make your volunteers accountable. (There is a line of thought that says, volunteers can't be held accountable because they're not being paid. This is a recipe for disaster. The volunteers that you really want **will** respond well to responsibility.) Be sure everyone is clear on what is expected of them.

Insure they understand they will be treated as a professional communicator therefore they are expected to act as professional communicator.

Keep the politics of your organization away from the field. If you need to take political action - insure it is NOT visible during training, activities or emergencies. Political infighting will hurt your organization when displayed to the workers.

If you must reprimand a volunteer, make sure you pull them aside. It would have to be a *severe* **and** <u>repeated</u> offence for you to even think of reprimanding someone in public. Be sure you do - not - criticize the member personally, direct your criticism at the persons actions.

Be sure you are a - service - organization. Your workers are not impressed when you attempt to over-ride a served agency.

Be sure you let your volunteers know what "accommodations" are available at the proposed assignment. Such as:

- is food/water provided or do they need to bring their own
- sanitation facilities at the site
- commercial power available or battery only

- protection from the elements

The most important element to maintaining an active volunteer base is acknowledgment. Acknowledge their contribution and their time. <u>Be sure to praise good work!</u>

Conversely, make sure that any awards or praise given is for solid performance, not just to give an award or praise. Many volunteers will be very unhappy if an award or praise is given to the unworthy.

Where ever possible, give praise to individuals. It has more meaning that way.

Of course there is the obvious. **Don't call your people unless you <u>need</u> them.** You will quite possibly loose people if they are called out only to be told "we don't need you now" because you missed on your situation assessment!

Remember, no volunteer is worthless. One day you may need all the volunteers you can get. While you may have some claim on a volunteer who carries a membership card for your group, you have - no - claim on one who does not.

Lastly, when you find that a member is causing more harm than good to your unit, it is important that you are diplomatic in your actions while keeping the effectiveness of your unit as your primary consideration.

Improve feedback

If you want to design meaningful rewards for your volunteers, a good starting point is to look at the reasons they volunteered in the first place. What did they hope to get? How can you help meet those needs and expectations?

Hold regular meetings. These meeting will:
- give volunteers a sense of connection to a group
- offer opportunities for ARES officers to deal firsthand with questions and concerns.

Provide the means for feedback during and after an event. It could be a great source for new and timely solutions.

Speed turnaround time between data collection and feedback. Your people **are** concerned about your organization. Help them feel at ease.

Add new challenges

Encourage established members to assume new responsibilities.

Encourage established members to help recruit new members.

Use established members to train new members.

Identify upcoming projects

- Weekly and monthly needs
- Special event needs
- Commitments from volunteers one month ahead
- Allow for emergencies, no-shows and substitutions
- Know the Tasks & Responsibilities
- Be specific
- **Look out for over commitment**
- Break down larger needs into tasks
- Know how many volunteers are needed for each task
- Don't hinder your operation by having too few people

Liaison and Training Others

[[Liaison](#) | [Training Others](#) | **]**

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3. **Liaison - Connecting the parts**

> Liaison: n. a connecting of the parts of a whole, as of military units, in order to bring about proper coordination of activities.

Your group

You are now at the point where you are accepting management duties. With these duties come the responsibility of becoming one of the people who MUST be concerned with how well each of the people in your group interact with others.

The easiest way to start this process is to make VERY brief mental notes to yourself on what person-x did wrong, or better yet what person-x did that was a great help. People respond very well to positive feedback and when you are consistent and - accurate - with positive feedback you will find your job much easier.

Please understand that if you become known as the local "snitch" people will cease to cooperate/interact with you. Thus it is important that you make comment ONLY when there is significant negative impact by person-x and that you are very accurate in your assessment. You, and the group, will be well served if you can just take person-x aside and provide them with friendly help to resolve the situation.

Served Agencies

The second portion of liaison is with your served agencies. This can be either quite easy (if the people before you were competent) or very difficult should you have to "re-educate" your served agency on the value of ARES/RACES.

When the re-education (or occasionally initial education) of a served agency is required, it is imperative that you are viewed as a team player that is there to help when and where they need help. This is easiest if you keep a few things in mind:

- ❍ Every public service agency has daily contact with people that are very negative.
- ❍ Police, Sheriff's departments and State agencies have had negative encounters with people that want to be a Police person or fire person but do not have "what it takes".
- ❍ Police, Sheriff's officers and State agencies are most comfortable when THEY are in charge.

❍ They may be embarrassed at having to ask for help.

It is up to you how the served agency will perceive you and your group. When you are friendly, without being pushy, cooperative and LISTEN to what they say, your group will make progress. If you go out of your way to be available (but NOT in their face) when they have training, you can slowly prove the value of your group to your served agency.

The key word in dealing with a served agency is SLOWLY. If you attempt to push, go too quickly (except in response to their requests) or attempt to tell them how to run their business, your efforts will fail.

There is a fine line between being available and being pushy. You will need to be very careful as you approach this line to insure you do not cross it. With that said, there are many agencies that appreciate regular contact and it does prove very helpful.

4. Training others - stay on the subject

As you begin to train others on a regular basis you will need to consider many things that are difficult to quantify. The reason they are hard to quantify is that each person learns at a different rate and in one of several different ways. Some of the more common learning/teaching techniques are:

❍ Stick to the subject.

Examples, used to make a point, are good. So long as you spend more time with the main material than on examples (commonly called "war stories").

❍ Vary your speed of presentation.

Highly technical information should have a slower presentation rate while simpler material can be covered more quickly. Take extreme care to realize what is simple to some may be quite complex to others.

❍ Organize your material.

The standard "timing" for course preparation is two hours of preparation time for each hour of presentation time. This will vary with how many times you have taught the material. The first time you do a segment you may need three to four hours of prep. time for each hour of class.

❍ Have a specific learning goal in mind for each segment.

The most effective presentations are short, concise and handle one subject.

❍ Use charts and diagrams as applicable.

Many people find it easier to learn material when they have "pictures" to help with explanations. The old true-ism states "a picture is worth a thousand words".

❍ Make copies of the material for your students.

Handouts give the student a good place to make notes and insures they will have a place to find those notes later.

❍ Make notes to yourself - on your copy - about which examples work best for this segment.

As you teach, you will find specific examples that work very well in emphasizing a given point. The notes will help you remember which one(s) work the best and where.

❍ Above all else, try to have fun while you teach.

Students pick up, very quickly, how relaxed you are. If you are having fun teaching, your students will probably have fun learning.

It has often been said that you learn more about a subject when you teach it. That is true and it can be fun.

[Click here for the EmCom change summary.](#)

Latest Update: 8/18/00

Emergency Communication (EmCom) Certification

I. Level I - Overview and Generalized Training

[Prerequisite](#) - a good attitude.

[Introduction](#)

1. Introduction to Emergency and Public Service Communication
   - [What is a Communications Emergency](#)
   - B. [Public Service Communication](#)
   - C. [Organizations to meet communcation goals](#)
   - D. [Who runs the event - PRIMARY SERVED AGENCY](#)
   - E. [Who talks to the Media (press) - the primary served agency PIO](#)
   - F. [How you can get involved](#)
2. Communication
   - [Basic Communication Guidelines](#)
   - B. Public Service and Emergency Communications
     1. [Getting the message through - Power isn't everything](#)
     2. [Message Handling](#)
     3. [ARRL Format Radiograms](#)
     4. [Personal Safety Considerations](#)
     5. [Modes of Communication](#)
     6. [Security Considerations](#)
     7. [Operating Stress](#)
   - C. [Served Agency Communication Systems](#)
3. Nets, what they are and how they work
   - [Net Types](#)
   - B. [Net Participant Guidelines](#)
   - C. [Traffic Handling](#)
   - D. [CW Nets](#)

J. [Shortcut to being a good NCS - Practice Practice Practice](#)

2. [Working with Volunteers](#)

3. [Liaison - Connecting the Parts](#)

4. [Training others - stay on subject](#)

III. Level III - Management Aspects

A Level 3 certification indicates that the person certified has attained sufficient grasp of leadership and management knowledge that the person can develop and lead a team of volunteer emergency communicators.

1. [Role of the Leader/Manager](#)

    . [Define a Vision](#)

        1. [Components of a Viable Vision for Emergency Communications](#)

        2. [Communicate the Vision](#)

        3. [Organize, Develop and Coach the Team](#)

        4. [Promote the Team](#)

        5. [Exercise and Test](#)

        6. [Improvement](#)

        7. [Recognize and Reward the Team](#)

        8. [Develop New Leaders](#)

        9. [Developing Peer Organizations](#)

        10. [Communicate with DEC/SECs](#)

        11. [Additional Resources](#)

2. [Developing District Plans](#)

    . [Identify the DEC Responsible for the District](#)

    B. [Developing a District Plan](#)

    C. [Workmen's Compensation](#)

    D. [Education and Training Sessions](#)

    E. [Exercise the Plan](#)

    F. [Enhancing the Plan](#)

        1. [Lessons Learned](#)

        2. [Exchange Expertise](#)

3. [Working with Agencies](#)

    . [Help Agencies Understand The Need For Emergency Communications and Available Options](#)

    B. [Help Agencies Understand The Role Of The Amateur Radio Operator](#)

    C. [Three Page Handout](#)

    D. [Determination and Assessment](#)

    E. [Briefing Area](#)

    F. [Strategies](#)

        1. [Assign to an Existing Operations or Logistics Team](#)

        2. [Relay and Monitor Stations](#)

        3. [General Transportation and General Labor Assignments](#)

Other items to be included are:

8. [Established MOUs with the ARRL and served agencies.](#)

9. [EMP - Electromagnetic Pulse](#)

Changes to Emergency Communications (EmCom).

Latest Update: 8/18/00

Change Summary: 8/18/00

Converted level III to the material Ron Hashiro AH6RH proposed. (8/17) and expanded to fit outline format (8/18).

Change Summary: 8/05/00

Moved EMP from level I to level III until we get input.

Change Summary: 8/04/00

Added an introduction/disclaimer prior to Level I material.

Change Summary: 8/01/00

Added Acronym List to Level I material. This will be used for all levels.

Change Summary: 7/31/00

Added NCS Questions list between Learning to be an NCS and NCS Hints and Kinks.

Change Summary: 7/19/00

Added contributor list.

Change Summary: 7/05/00

Moved "Working with Volunteers" to Section II

Change Summary: 7/04/00

Merged I.3.C.1 into other areas handling the subjects.

I.3.C.2 becomes I.3.C, I.3.C.3 becomes I.3.D and I.3.D,E & F become I.3.E,F & G

Moved EMP from nets to communication.

Changed the title of I.2.B to Pub. Serv. & Emer. Comm. to reflect the subject content.

Change Summary: 6/20/00

Added additional - equipment - sub page and segments.

Change Summary: 6/14/00

Removed link to UK volunteers pages
Added "Training others" to Section II - NCS

Change Summary: 6/08/00 Evening

Moved I.1.A.4&5 (Fed Standards and MOUs) to Management Aspects.
Added links to PSCM for RACES, MARS and I.1.C.4. Two orgs
Condensed (folded back Communication.Guidelines into Basic Communication (I.2.A)
Added pointer (link) to ATV overview from I.2.B.5 Modes of communication
Changed I.3.C.2 (traffic handling) to point at PSCM sec2-ch6. and split out EMP as separate sub-page.
I.7. Nat Traf Syst now points (link) to PSCM sec2-ch1.
III.2. Emerg. Plan # D now points (link) to PSCM sec1-ch7

Change Summary: 6/08/00

Added Packet overview

Change Summary: 6/06/00

Added Liaiason to section II (NCS)

Change Summary: 6/02/00

Added prerequisite to the outline (Attitude!).

Change Summary: 5/31/00

Corrected "fat fingers" of duplicate line items and added links to Skywarn and ARRLs Dos and Don'ts.
Revised ATV items and added text

Change Summary: 5/30/00

Broke up the sub pages into QUITE a few more to facilitate work assignments (finest granularity and all that).

Change Summary: 5/23/00

Added links to all of the additional material that was available in the base outline. Base outline is no longer online.

Change Summary: 5/21/00

Revised base outline into three sections to correspond to the three proposed segments in EmCom Certification.

Latest Update: 8/23/00

Electro Magnetic Pulse

Electromagnetic Pulse and It's Potential Effects on Emergency Communications

Radio amateurs have long been concerned with protecting their radio installations against lightning. Many have applied lightning protection techniques. Traditionally, the installed protection is designed to combat "slow" lightning strikes (having rise times on the order of tens of microseconds) with protection from direct overhead strokes obtained from sheltering important conductors with a grounding system.

To address the transient threat, including lightning-voltage surges and Electromagnetic Pulse (EMP), it would be necessary to protect installations against electromagnetic fields rising to a peak intensity of 50kV/meter in several nanoseconds. While some modern lightning-protection devices are effective against a lightning transient threat, the majority of them will not act in time to prevent the faster EMP from entering the radio equipment.

Protection of Amateur Radio installations is becoming more difficult as circuit components become more sensitive to transients. ICs are susceptible to damage at transient levels smaller than those of discrete transistors, which are more susceptible than vacuum tubes. **Protection devices such as metal-oxide varistors (MOVs) offer protection within one nanosecond of the arrival of a transient pulse such as EMP. When properly selected and installed, such devices show promise of providing protection against the universal transient threat.**

Electromagnetic Pulse (EMP) is defined as a large, impulsive type of electromagnetic wave generated by a nuclear explosion. EMP commonly refers to a nuclear electromagnetic pulse (NEMP). In this usage, it is a plane-wave, line-of-sight electromagnetic phenomena that occurs as a result of an above-ground nuclear detonation. NEMP has an electric field strength of 50 kV/meter horizontally and 20 kV/meter vertically, with a pulse rise-time to peak of 5 to 10 nanoseconds.

There are several different types of EMP resulting from a nuclear detonation. One of the more significant types is the High-Altitude EMP (HEMP) that results from a nuclear explosion above 30 miles in altitude. The HEMP is created by the interaction of high-energy photons (gamma rays) with atmospheric molecules, producing Compton electrons. These electrons decay in the Earth's magnetic fields, emitting photons in the process.

System Generated EMP (SGEMP) is produced by the direct interaction of high-energy protons with systems (equipment), rather than through their interaction with atmospheric molecules. SGEMP is important because of its effects on satellite systems and in-flight missiles.

The third type, Magnetohydrodynamic EMP (MHD-EMP), is different because of its distinct physical

generation mechanism, later occurrence, smaller amplitude, and longer duration. It is sometimes referred to as late-time EMP. MHD-EMP poses a treat for very long landlines (including telephone cables and power distribution lines) or submarines cables.

Detailed information on EMP is available in the following issues of QST articles written by Dennis Bodson, W4PWF, who is the current Roanoke Division Director:

- August 1986 QST, Page 15, Electromagnetic Pulse and the Radio Amateur - Part 1
- September 1986 QST, Page 22, Electromagnetic Pulse and the Radio Amateur - Part 2
- October 1986 QST, Page 38, Electromagnetic Pulse and the Radio Amateur - Part 3
- November 1986 QST, Page 30, Electromagnetic Pulse and the Radio Amateur - Part 4

National Traffic System (NTS) Training (Part 3)

This is the third of a series of briefings on traffic handling.

Today we'll spend a couple of minutes going into more detail of the preamble. The preamble is the section of the amateur message form where all the administrative details of the message are recorded. There are eight sections or blocks in the preamble (two of them are optional fields).

The FIRST BLOCK is the MESSAGE NUMBER. This is any number assigned by the amateur who first put the message into NTS format. While any alpha-numeric combination is acceptable, usually, traffic handlers use a numeric sequence starting with the number 1 at the beginning of each year.

The SECOND BLOCK is the PRECEDENCE. The precedence tells each traffic handler the relative importance or how urgent a message is. Within the NTS format, there are four levels of precedence:

Routine

- abbreviated with the letter "R". Most amateur traffic is handled using this precedence; it's for all traffic which does not meet the requirements for a higher precedence.

Welfare

- abbreviated with the letter "W". This precedence is for an inquiry as to the health and welfare of an individual in a disaster area or a message from a disaster that all is well.

Priority

- abbreviated with the letter "P". This precedence is for important messages with a time limit; official messages not covered by the EMERGENCY precedence or notification of death or injury in a disaster area. This precedence is usually associated with official traffic to, from or related to a disaster area.

EMERGENCY

- there is no abbreviation for this precedence; the word EMERGENCY is always spelled out in full. This precedence is for any message having life and death urgency which is transmitted by amateur radio in the absence of regular communications facilities. This includes official messages of welfare agencies requesting

supplies during emergencies; or other official instructions to provide aid or relief in a disaster area. The use of this precedence should be limited to traffic originated by officials. If there is any doubt as to the use of this precedence, it should NOT be used.

The THIRD BLOCK is for HANDLING INSTRUCTIONS. This is an optional field at the discretion of the originating ham. These are a set of specified additional handling instructions - there are 7 of them; they are standard; and they are identified as HXA, HXB, HXC, etc through HXG.

The FOURTH BLOCK is the STATION OF ORIGIN. This is the first ham that put the message into NTS format. If a non traffic handling ham NØAAA wants to send a message and he gets his traffic handling buddy next door NØBBB to format it and send it, NØBBB's call sign is the station of origin.

> This is <YOUR CALL SIGN>. Are there any questions so far?
> *PAUSE*

The FIFTH BLOCK is the CHECK. The check is the number of words in the text. This excludes the preamble, address and signature. We'll have a whole session on the check next week.

The SIXTH BLOCK is the PLACE OF ORIGIN. This is the city and state, or in Canada, the city and Province, or the city and county if elsewhere than the originator of the message lives. This is NOT the city and state of the ham who originated the message - it is, rather, the location of the individual - whether they are a ham or not. I live in Colorado Springs - but if a ham friend (or non ham friend) who lives in Monument, CO calls and I originate the NTS traffic, NØWPA is the station of origin, but Monument, CO is the PLACE OF ORIGIN.

The SEVENTH BLOCK is the TIME FILED - and is an optional field unless handling instruction BRAVO is used. Although we haven't covered HANDLING INSTRUCTIONS in detail - HANDLING INSTRUCTION BRAVO means cancel if not delivered within X hours of filing time - and so obviously you would have to have a filing time. Unless the message is time sensitive, this field is normally left blank for routine messages. If it IS used, it is usually the ZULU time the message was first placed into the National Traffic System.

The **EIGHTH and last BLOCK of the preamble is the DATE.** THIS IS USUALLY the ZULU date the message was first placed into the National Traffic System.

In our next session, we'll go into more detail on a subject that sometimes causes confusion - the check and how to count words.

de <YOUR CALL SIGN>

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Colorado Amateur Radio Emergency Service http://www.iex.net/ares/
Comments, suggestions to [Rob Roller, N7LV](#)

National Traffic System (NTS) Training (Part 4)

This is the fourth of a series of briefings on traffic handling.

This morning we'll spend a little time discussing the CHECK on the amateur message form - and how to count words in the text.

The CHECK is, in essence, a very basic manual error checking figure which can alert traffic handlers to a missed word in the passing of traffic.

After receiving a message, traffic handlers count the WORDS in the message and compare to the CHECK. If the two numbers do not agree, a re-read of the message may be necessary to detect the error.

When passing formal message traffic, the format is to send the preamble, then the address, a BREAK (which is the prosign BT on CW and the word "BREAK" on phone) then the text, followed by another BREAK, then the signature, then END OF MESSAGE - prosign AR on CW or the word "END" on phone.

All of the words between the two BREAKS are counted as part of the text, and this is what the check refers to.

Each WORD is counted as one. In addition to whole words, there are GROUPS which are also each counted as ONE. Some examples are:

- A LETTER GROUP such as: LETTER GROUP ARES
- A FIGURE GROUP such as: FIGURES 80919 or FIGURES 719-636-1290
- A MIXED GROUP such as: MIXED GROUP 27TH or MIXED GROUP NØWPA

Telephone numbers in the TEXT sometimes present confusion.

An example: FIGURES 719 FIGURES 535 FIGURES 1568 would be counted as THREE WORDS and according to the Public Service Communications manual, this is correct way to send a telephone number in the TEXT.

If, however, a telephone number is sent as: FIGURES 719 dash 535 dash 1568; it would be one group and would be counted as one word. The easiest way to remember this is that each SPACE, except for the one between the

last word of the text and 'BREAK', begins a new word.

Punctuation marks consist of the period and the question mark - they are really the only punctuation used in the text. The period is written as the single letter X as in X-RAY (and on phone is spoken as "X-RAY") and this counts as one word. The question mark is spoken as the word QUERY I SPELL QUEBEC UNIFORM ECHO ROMEO YANKEE and also counts as one word.

The first ham who creates the message should exercise care to be as brief as possible and avoid the use of contractions. The apostrophe is not really used in CW - and contractions are often misunderstood on phone.

NEXT, we'll talk about ARRL NUMBERED RADIOGRAMS- But I'll pause here to see if there are any questions so far, if so, please call. This is <YOUR CALL SIGN>.

ARRL NUMBERED RADIOGRAMS are a standardized list of often used phrases in NTS messages. Each phrase on the list is assigned a number. 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. The complete list is available in ARRL publication FSD-3 dated February 94. Earlier versions of this list do not contain the latest additions.

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 (ALHPA ROMEO LIMA) as one word, followed by the number written out in text - not numerals. For example:

ARL FIFTY SIX - This needs to be emphasized when using voice and 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 FIVE SIX.

The preceding example- 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.

Another example:

ARL SIXTY TWO: Greetings and best wishes TO YOU for a pleasant BLANK holiday season.

or ARL SIXTY FOUR: ARRIVED SAFELY AT BLANK

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

Here's an example of a message to convey a Christmas greeting, indicate safe arrival and send regards from family members: You may wish to copy this for practice.

> **NUMBER FIFTY SEVEN, ROUTINE, NOVEMBER**
> **ZERO WHISKEY PAPA ALPHA, ARL 16, PUEBLO, CO**
> **DECEMBER 10**
>
> **RICHARD RYAN**
> **FIGURES 3820 INITIAL S SUNNYRIDGE LANE**
> **NEW BERLIN, WISCONSIN FIGURES 53151**
> **FIGURES 414 FIGURES 555 FIGURES 1234**
>
> **BREAK**
>
> **ARL FIFTY ARL SIXTY TWO**
> **CHRISTMAS ARL SIXTY FOUR HOME**
> **MOM AND DAD SEND THEIR**
> **LOVE**
>
> **BREAK**
>
> **BOB AND ALICE**
> **END, NO MORE NØWPA.**

No XRAY needs to be added between parts of this message. The numbered radiogram assumes a period at the end of the phrase, so adding X-RAYs would unnecessarily drive up the word count.

When copying the text of a message, receiving stations should write five words on each line. The yellow and green ARRL Radiogram form is set up to do this; but if copying on whatever happens to be handy, grouping the words five at a time allows for a very quick count after the message is received. After receiving the message, the receiving operator compares the word count with the check. If okay, the message is rogered; if not, the message is repeated at reading speed.

There are variations used when passing traffic via CW; especially when both stations are operating full break-in. The receiving station can "break" the sending station at any point for needed fills, instead of waiting for the entire message to be sent. There are additional special prosigns used and interested amateurs should obtain ARRL publication FSD-218 dated February of 91 - this publication is referred to as the "Pink Card" and contains CW NET procedures as well as a description of the Amateur Message Form, precedence and Handling Instructions.

In our next and final session, we'll discuss some of the unwritten hints for handling NTS traffic. *de <YOUR CALL SIGN>*

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Colorado Amateur Radio Emergency Service http://www.iex.net/ares/
Comments, suggestions to Rob Roller, N7LV

National Traffic System (NTS) Training (Part 5)

This is the fifth and last of a series of briefings on traffic handling and the National Traffic System.

While preparing this series, a few things came to mind which didn't fit into a category which was covered during a specific briefing. Here, then, are miscellaneous tidbits for traffic handling after which we can go into an open forum to discuss traffic handling if any station has questions which weren't handled in the briefings.

- While attempting to keep the word count at a minimum, care must be exercised to keep from creating ambiguous messages.

- Letter greetings such as Dear Mom and Dad, are bad form - they are redundant.

- Reading speed versus regular sending speed. Transmitting station should trace over the words as you are speaking them to ensure you are not speaking faster than the receiving station can write.

- NO XRAY needed at end of message.

- RECEIVING station calls sending Station; NET controls should hand off to receiving station.

- The standard way of indicating that you are finished sending is to say "END, NO MORE, or END 1 MORE.. (call sign, back to net).

- Hams are not expected to spend money to deliver NTS traffic - toll calls, calls to directory assistance to obtain telephone numbers and stamps to mail locally all cost money.

- ARRL operating aids for the traffic handler:
  ❍ Yellow and green pad of Radiogram forms
  ❍ FSD-218 dated 2/91 Title: Amateur Message Form, known as "The Pink Card"
  ❍ FSD-3 dated 2/94 Title ARRL Numbered Radiograms - earlier forms do not contain the latest addition which is ARL SIXTY NINE

These items are available from the ARRL or any commercial establishment with an ARRL bookshelf.

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de <YOUR CALL SIGN>

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National Traffic System (NTS) Training (Part 2)

This is the second of a series of briefings on traffic handling.

As mentioned last week, the primary purpose of a standardized format is so persons can send and receive formal messages briefly, with the minimum amount of explanation. The RADIOGRAM is a specific format that everyone follows. This allows for the administrative handling of messages without having to go into lengthy discussions about where the traffic originated and or how important it might be and where it's going. One could imagine if there were no standardized format, the following exchange might occur:

> **"Hey Bud, I have a message here from a local ham in Colorado Springs; he took it from a lady who isn't a ham. I took the message yesterday evening and I'd like to see if there's a way we can get it passed to Tulsa, Oklahoma. There's no real urgency, the lady just wants to let her brother know that she received his letter and will be sending one back in a couple of days...."**

The preceding unformatted message consists of 76 words. And ... we still don't know where the message needs to go.

The same message in NTS format might read as follows:

> **Number 58, Routine, NØXXO, 11, Colorado Springs, Colorado, November 18**
>
> **Mark Smith**
> **573 Glenside Lane**
> **Tulsa, Oklahoma 74131**
> **918 635 0227**
>
> **BT**
>
> **RECEIVED YOUR LETTER XRAY WE WILL WRITE BACK SOON XRAY LOVE**
>
> **BT**
>
> **MARY**

Even counting the preamble (and the breaks), the message length is 35 words. Much more efficient use of time and spectrum. Also, the message has everything it needs to be delivered -- and to be traced back to its originator.

When passing formal traffic, hams should guard against adding superfluous, unnecessary extra words; since the parts of the message are standard, there is no need to identify each part as you pass the traffic -- a bad habit of many traffic handlers is to add these extra words. For example:

> **Number 56, Routine, station of origin NØXXO, check 11, Colorado Springs Colorado, November 18**
>
> **Going to: Mark Smith,**
> **Address 573 Glenside Lane, Tulsa, OK ZIP FIGURES 74131**
> **Telephone 918 635 0227**
>
> **BREAK**

I've just added 9 words to the length of the original message by adding superfluous words such as "station of origin", CHECK, "Going TO", ZIP, Telephone, and so on. If there is something about the message that deviates from the standard format, then additional discussion may be necessary; beyond that, adding extra words is counter-productive.

Keeping in mind that during routine, daily traffic nets we are practicing the handling of formal message traffic so that it becomes second nature -- it is imperative that we also practice being brief, and to the point so that in an emergency, being brief and to the point is also second nature.

When sending formal traffic, certain 'PROWORDS' are used to clarify portions of the message. These 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 NUMERALS.

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

Example: ARES, SCTN

MIXED GROUP

Example: 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**

Stay tuned!

In our next session, we'll take a closer look at the parts of the preamble and at the usage of the PROWORDS.

de <YOUR CALL SIGN>

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