Amateur Radio
Emergency Communications
First Level Training

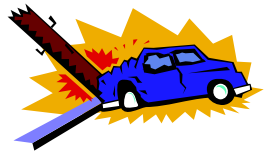
Revision 3.1 Final

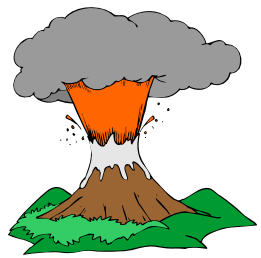
February 2008

DEVELOPED FOR SPOKANE COUNTY ARES/RACES TEAM TRAINING BY AD7FO SPOKANE COUNTY AEC

What is a Communication Emergency

- Occurs when a critical communication failure exists that puts the public at risk.
- A variety of circumstances can overload or damage critical day to day communication systems
  - Storms that knock down communications infrastructure or lines
  - Fires in telephone equipment buildings
  - Vehicle penetration into communications centers like 911 or other CCB
  - Disruption in power
  - Terrorist attack
  - Disaster like earthquakes, tsunami's, hurricanes, ice storms, forest fires, volcanic eruptions, etc





ARES/RACES EMCOMM Volunteers

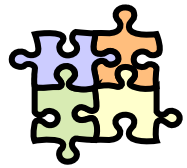
- Volunteers come from a wide variety of backgrounds and have a wide range of skills.
- Share a desire to help others without personal gain of any kind
- Train and practice to improve their communication skills

- Can work together as a team and take direction from others

- Can think and act quickly under the stress and pressure of an emergency

LU 1

Where does Amateur Radio Fit In?



- A Skilled and equipped communications resource for our Served Agencies*
- We do Public service events to practice our skills
  (Bloomsday, Lilac Parade, multiple bike races, etc)
- We do practice drills with our Served Agencies to improve our skill in a more realistic scenario and to demonstrate our skills
- We are not a single communication channel, system or network, we are dynamic and can adjust to the needs of the situation

* Served Agencies are those we have commitments both local and national through ARRL agreements to provide communications when called upon like NOAA (SKYWARN), Red Cross, Spokane DEM, Hospitals, etc.

LU 1

Where does Amateur Radio Fit In?

- We are "***communications commandos***"
- We are licensed and have allocated frequencies for local, national and international communication
- We can dynamically enlarge and expand our communications network as the situation changes.
- We practice many of the needed skills for emergency communication in our daily amateur radio activates
    - Directed nets
    - HF communications, Changing bands as necessary to maintain communication
    - Field Day
    - Mobile operation

What Amateur Radio ECOMM is not

- We are not first responders, will not be the first on scene
- We have no authority and can not make decisions for others
- It is your decision if you can participate or not, especially if these decisions affect your own health and welfare
- You are not in charge
- You are there to temporally fulfill the needs of a Served Agency who's communication system is unable to do it's job
- It is not your job to backfill another job when the agency is short of personnel. Your job is communications. You can however help in other areas if you are qualified and do not compromise your primary job of communications

Day to Day versus Emergency Comm.

- In day to day communications there is no pressure to get a message through and no one's life is dependent on your getting a message through

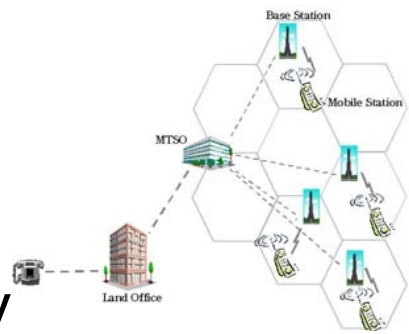
- Emergency communication can involve non-Amateurs and Amateur operators working together
- Emergency operations occur in real time and can not be put off to a more convenient time

- Emergency communications must be staffed and set up quickly with little or no warning
- Following net protocol and giving short, concise messages is imperative

LU 1

Day to Day versus Emergency Comm.

- Unlike home operations emergency stations must be portable, and easy and quick to set up
- Emergency operation may carry over several hours to several days
- Emergency communicators may need to interact with several organizations simultaneously
- Emergency communication fills in where
- Commercial systems fail from not having enough reserve capacity. Amateur operator skill, equipment, and knowledge can create additional communications capacity in a very short time



LU 1

Communicating is job #1

- While we are skilled operators, with impressive equipment, and systems in place, our job is to communicate for our Served Agency by any appropriate communication method available to us
- If asked to pass a complex message or detailed lists and a fax machine is available then it might be a better choice than radio voice communication.
- Always use the best method available and appropriate for the traffic that needs to be communicated
- If the target recipient only has an FRS radio or CB radio it would be appropriate to use them. Our message handling skills will work on any communication link, including using a telephone

A Communications Emergency Anatomy

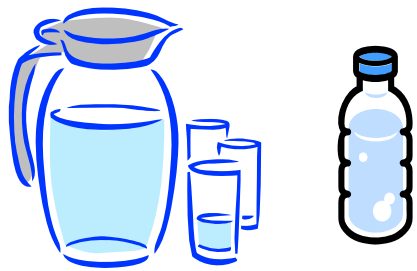
- In early phases of many disasters there is no immediate need for communications services. This phase might occur during a severe storm watch.
- You can use this time to monitor the situation to prepare to deploy If and when a request for assistance comes.
- Once a potential need for more communications resources is identified, a Served Agency will put out a call for volunteer communicators.
- You could be asked to operate from an emergency operations center or field location.
- Do not count on electrical power being available at the location you are sent to.

A Communications Emergency Anatomy

- In some ARES/RACES organizations there is a designated Rapid Response Team (RRT) that can deploy with a minimal capability in a very short time. The RRT would be backed up by a more robust response in an hour or two.
- In a larger response a resource or logistics team may be needed to coordinate incoming volunteers and resources to direct those volunteers and resources to where they are needed most.
- In a large event there may be multiple nets in operation on different frequencies.

Communications Emergency Anatomy

- As an event progresses traffic may increase, be sure you prepare for this during the initial phase when traffic is lighter.
- For a long term event, operator rotation, food & water, and sleeping accommodations will need to be considered.



LU1 Review

1. A communications emergency exists when critical communications systems fail or are not available and the public is put at risk.
2. At the end of a communications event or exercise it is important to review the effectiveness of the response and look for ways to improve the next time.
3. It is not appropriate for an emergency communicator to make demands on the agency being served.
4. The function of a Rapid Response Team (RRT) is to deploy a quick response in a short time.
5. Do not use person to person voice (grapevine) to transmit you messages.

LU 2

Amateurs as professionals

The served agency relationship

- Your attitude is everything! It is more important than your radio skills and equipment. Historically speaking attitudes of some Amateur Radio volunteers has been our weakest point. As one Served Agency once put it “working with ham radio operators is like herding cats”
- Although our name says “amateurs” it’s real reference is to the fact that we are not paid for our efforts. We are professional and have the skills and equipment to do an excellent job when called upon.

LU 2

Who Works for Whom

- When serving an agency keep in mind that we are and are viewed as un-paid employees of that organization. If we keep this in mind our relationship with the agency will be on track.
- It does not matter if you are an ARES/RACES member or one of the agencies regular volunteer force, they will treat us the same.
- It is a misconception that volunteers do not need to take orders. You are expected to comply with instructions from a Served Agency as long as you are able to carry them out safely and do not constitute something that is against FCC regulations (such as going onto the police frequencies).

LU 2

Professional Emergency Responder View

- Unless a positive long term relationship exists between the professionals and volunteers, Professionals are likely to view the volunteers as less than useful. They do not want to do OJT (On the Job Training) during an emergency event and need to know they can depend on the folks they are working with.

- Volunteers may be viewed as “part-timers” whose skill level and dedication can not be depended upon when needed.
- Working successfully with our Served Agencies during drills and exercises can make a big difference in the way ARES/RACES operators are viewed.

LU 2

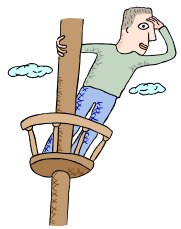
Performing Non-Communication Roles

- It has been said that it is a hard and fast rule that communication should be our only role. The answer is yes and no.
- In today's fast paced emergency responses there is not enough time for a rigid set of rules. Communication must move at the same speed. Today's reality is that any job that involves communication may be what we are asked to do. For this reason we need to have an understanding of what our Served Agencies expect of us.

LU 2

Typical Radio Roles We Might Perform

- Radio operator using Amateur or Served Agency radios systems.
- Dispatcher organizing the flow of personnel, vehicles or supplies.
- Field observer watching and reporting weather or other conditions.



- Damage Assessment, recording & reporting conditions.
- Searcher, providing communications for a search and rescue team.

LU 2

Specific Agency Relationships

- At a national level ARRL has agreements in place with many agencies:
  - Memorandums of Understanding (MOU's)
  - Statements of understanding, (SOU)
  - Statement of affiliation (SOA)
- Some of the agencies where agreements exist are:
  - Red Cross
  - Salvation Army
  - Department of Homeland Security
  - Federal Emergency Management Agency (FEMA)
  - SKYWARN
  - Local Department of Emergency Management (DEM)

LU 2

Talking to the Press

Do Not Talk to the Press

- The press is looking for any information they can find and you will most likely know something they would like to know.
- It is <u>not</u> your role to be disseminating information to the public. There will be a Public Information Officer assigned to the event or as part of the responding agency you are serving . Refer all questions from the press and others to the event or agency to the PIO.
- No mater how persistent the questioner is you are not authorized to disseminate information and if they do no leave when asked talk with your ARES/RACES or Agency management personnel and ask them to resolve the problem.

LU 2

Operating Where You Are Not Known

- When you are in an area away from home monitoring a local net and hear an emergency called **local ARES/RACES members do not just show up.**
- If you are willing and able to help check into to the net and advise the net control your capabilities and your availability. They will determine if you can be utilized.
- Do not be offended if your offer to help is refused. The local net control is thinking about his/her team dynamics, operator skill level needed (yours is unknown to them), specialized training, whether or not more operators are required, local access credentials (background checks) and insurance issues.

LU 2

Workman compensation & Legal Issues

- In some States Workman's Compensation is extended to volunteer workers working on behalf of a government or non profit organization. This is a complex issue and needs to be explored in advance of a call out.
- Volunteers providing services to government agencies are provided immunity from liability by federal law through the Volunteer protection act of 1997, 42 U.S.C. section 14501. There are exceptions, check details of the act before assuming your activity is covered.

LU2 Review

1. Your main job as an emergency communicator is as a radio operator using amateur or Served Agency radio systems.
2. In the role of a modern emergency communicator you may be asked to serve any function that includes communication.

3. If you are asked by the Served Agency to do a task that falls outside the FCC rules, discuss the situation with them and develop an alternative solution.

LU2 Review

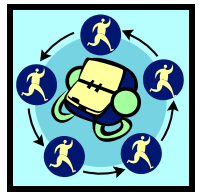
5. If you are operating as an emergency EMCOMM group and receive an inquiry from the press refer them to the Served Agencies PIO (Public Information Officer).

6. Your attitude will have the most effect on your relationship with a Served Agency

LU 3

Network Theory

The Design of Emergency Comm. Systems

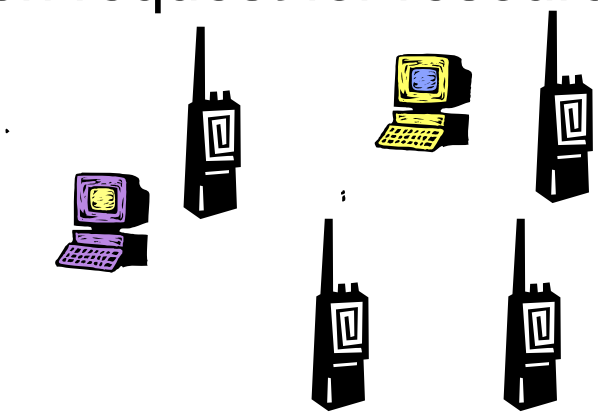


- The study of information transfer between multiple points is know as ***"Network Theory"***
- Network theory can be thought of as the process of ***matching a particular message to the best communication pathway***. The best pathway efficiently transfers the information utilizing the minimum of the available communication resources while accurately and dependably transferring the information.
- By participating in Served Agency emergency planning hams can incorporate fundamental concepts of network theory into their plans so that appropriate modes and resources are available for a real emergency

LU 3

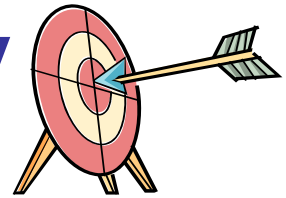
Single vs. Multiple Destinations

- In most cases our communication is from one person/site to another. This is point to point communication that may be monitored by other sites or individuals who need to know what is going on, or who may be able to provide requested resources.
- Messages for multiple destinations are called broadcast messages. This might be a weather advisory that is of interest to everyone or an open request for resources from anyone on the net.



LU 3

Message Precision vs. Accuracy



- Precision is not the same as accuracy. Accuracy is important in all our message handling.
  - "The hiker has been found in the meadow and in good health" some mistakes in this message at the character level (spelling) will still allow the information to be accurately received and understood.
  - A list of names, request for medical supplies, etc require precision at the character level when being sent or received, especially when voice communication is used.
- It is important to understand the level of precision needed. Packet is a good choice for high precision messages but may be to cumbersome for simple communication where voice is quicker and easier.

LU 3

Complexity -Timeliness - Priority

- Detailed instructions may be simple to send via voice but if the instructions are too long, the person on the other end may not get it correct. Precision may not dictate written communication, but complexity might.
- Timeliness of a message needs to be considered. As you plan you message transmission order, consider if a delay can be tolerated or not.
- Priority traffic: If you receive a message that you are told is a priority message stop what you are doing and send it immediately by the fastest appropriate method.

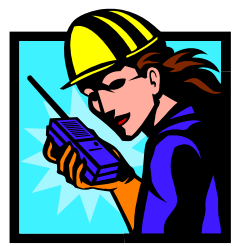
LU 3

Communication Methods

- Telephone- (land line and cellular)
  - One to one
  - Requires infrastructure
  - May be overloaded
  - Not good for high precision messages
  - May not have coverage (cell phones)

- Fax
  - Utilizes phone network
  - Good for high precision messages

- Two way Voice Radio
  - One to one or broadcast messaging
  - Not good for high precision messages



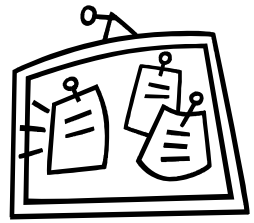
Communication Methods

- Trunked Radio systems
  - Already at high utilization, an d sky rocket during an emergency
  - Radios (users) have assigned priorities, getting a higher priority requires reprogramming the radio
- Packet Radio
  - Good for high precision messages
  - Can provide permanent record of message (printed/stored)
  - Good for broadcast messaging (multiple addresses)
  - Easily forwarded to another station (with or without notes)
  - May not be reliable for marginal transmission paths
  - Not good for graphics transmission

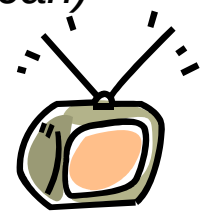
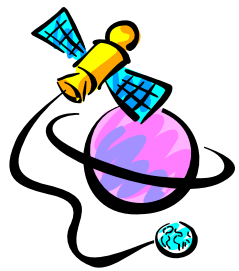
LU 3

Communication Methods





- Store and forward systems
  - Bulletin boards
  - Mailboxes
  - Good when sender and receiver are not simultaneously available
- Other
  - ATV –Amateur TV *(fast and slow scan)*
  - Satellite communication
  - Internet
  - Human courier

LU 3

Planning and Preparation

- The key to successful emergency communication is effective planning and preparation.
  - What kind of information will need to be communicated?
    - Long detailed messages
    - Simple status checks, information, questions
    - Maps or other graphic content
    - How frequent will messages need to be sent and received
    - Think about where you may be deployed and how you would operate from there. (Special Needs: Food, Water, Medications?)
    - Think about the problems you will encounter and plan to handle them in advance
    - Go kits for simple communication and more complex communication such as packet and Win Link-2000
    - Periodic checks on the gear and supplies in you go bags

LU3 Review

1. A secure mode should be used to communicate a list of injuries or causalities
2. Fax would be good for sending high precision, lengthy and complex messages, and graphics like maps.
3. A packet bulletin board would be good for non time critical messages and reference material when sender and receiver can not be available simultaneously

LU3 Review

4. The pitfall of Telephones, Cellular Phones and Trunked Radio systems is that they all require a complex central switching system that is subject to failure in a disaster situation

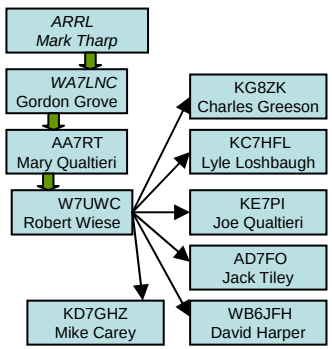
5. Sending a shelter list via on office FAX would be an example of efficient communication. Remember efficient communication does not need to involve a radio.

LU 4

Emergency Communication Organization & Systems

- To be effective in an emergency situation;
  - Your team must know and trust each other and each others capabilities
  - Must understand their role as a leader or follower
  - Must be able to solve problems that arise

- ARES provides structure, training and practice to accomplish the above. ARES has been part of the ARRL since 1935



LU 4

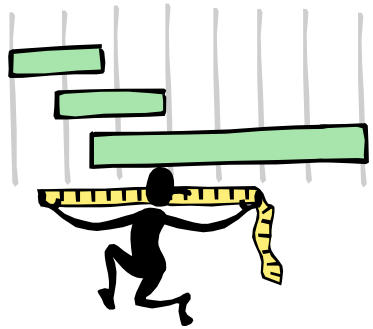
Emergency Communication Preparation/Training

- Unless a positive long term relationship exists between the professionals and volunteers, Professionals are likely to view the volunteers as less than useful. They do not want to do OJT (On the Job Training) during an emergency event and need to know they can depend on the folks they are working with.

LU 4

Emergency Communication Planning & Organization

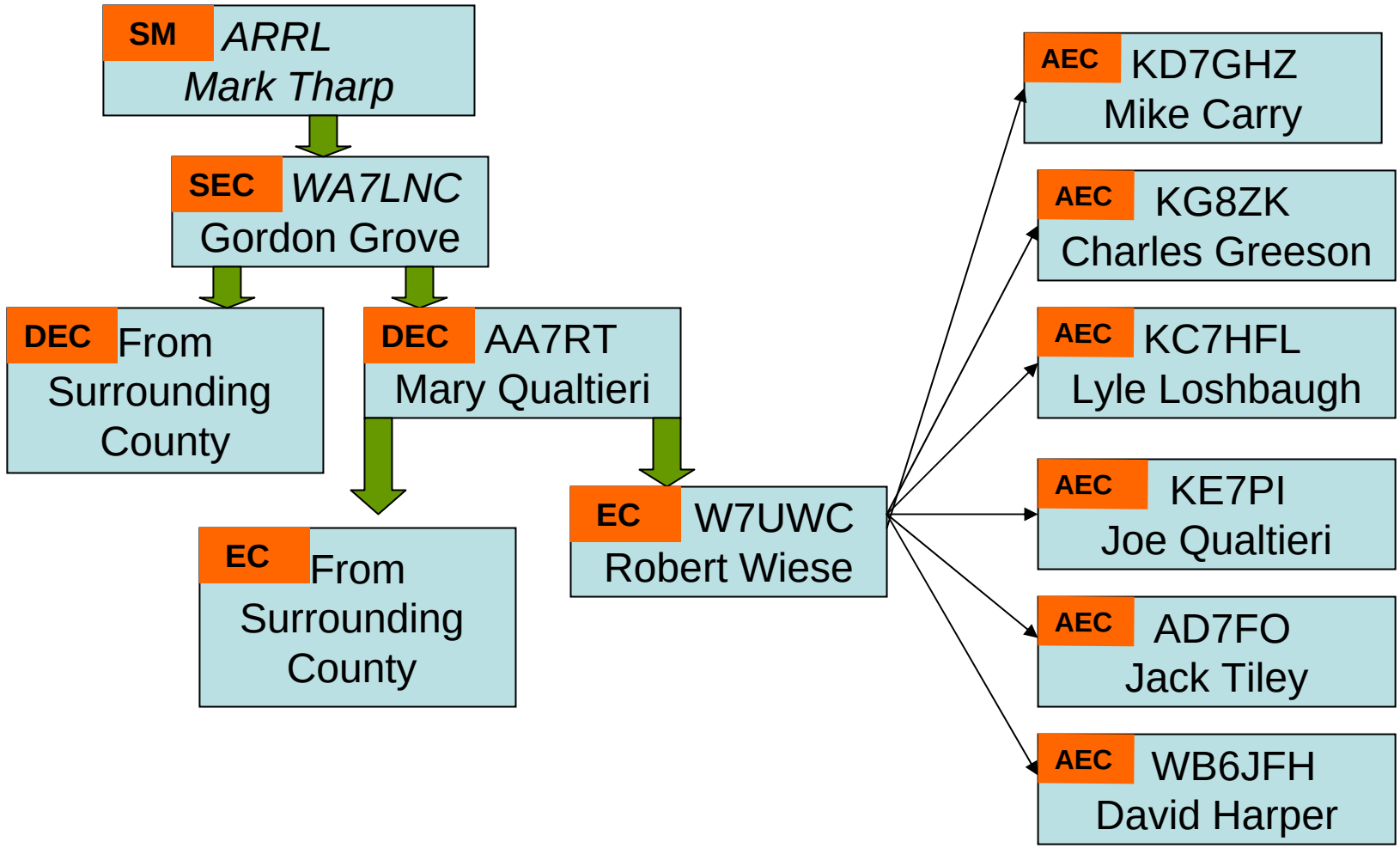
- The key to successful emergency communication is effective planning and preparation.



- Organization is critical to any emergency response. Without an organization that plans and prepares in advance, an Amateur Radio emcomm response is likely to be disorganized and ineffective

LU 4

EWA ARES Organization



LU 4

Washington ARES/RACES Regional Organization

LU 4

RACES

Radio Amateur Civil Emergency Service

- Created by the Federal Government after World War II
- Provides rules to address the need for Amateur Radio operators as an integral part of state, county or local Civil Defense agencies (now known as Emergency Management) during a time of national emergencies or war.
- RACES has authorization to operate even if the President or FCC suspend normal Amateur Radio operation.
- At one point in time some Civil Defense agencies were RACES licensed for Amateur radio with amateur licenses. These are no longer issued, but can continue to be renewed.

LU 4

Other Organizations

Salvation Army Team Emergency Radio Network (SATERN)

- Used for logistical communication between offices and health and welfare messages
- At local level ARES, REACT and other groups help support their radio operations

National Traffic System (NTS)

- Organized and scheduled nets on amateur radio to pass messages, including third party messages.
- Can be used to get messages over long distances
- Trained and experienced at message handling

LU 4

Other Organizations

Military Affiliate Radio Service (MARS)

- Department of Defense Sponsored Auxiliary Communication network
- Three separate managed and operated programs
  - US Army
  - US Navy/Marines
  - US Air Force
- Nets on special assigned/allocated military radio frequencies adjacent to the Amateur bands.
- Special Call signs are issued for MARS use
- Strict rules on message content and structure
- Mars is a backup military, federal, state and local communications network during times of emergency

LU 4

Other Organizations

Federal Emergency Management Agency (FEMA) & FEMA National Radio System (FNARS)

- A FEMA high Frequency Radio network designed to provide minimal essential emergency communication capability among federal, state, local commonwealth and territorial governments in time of emergencies.
- FEMA monitors the FNARS frequencies on a daily basis at the state level, typically located in the state emergency Operations Center (EOC).

LU 4

Other Organizations

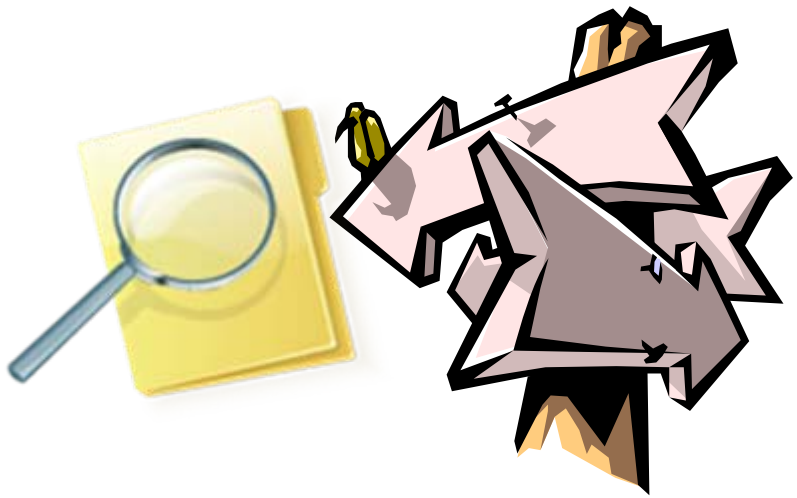
National Communication System (NCS)

- A federal agency that consists of 23 government organizations tasked with ensuring the federal government has the necessary communications capabilities under all conditions from normal day to day to national emergencies. The manager of NCA is also the Director of Defense Information Systems Agency (DISA), Usually an Air Force General.

LU 4

Emergency Communication may be more than ARES/RACES

- A variety of government and private emergency communications groups assist in time of disaster. While Amateur Radio groups operators may not interact with many of these systems, it may help to know that they exist, since a served agency with which we may work may utilize or interact with one or more.



LU 4

Other Organizations

REACT

- A national EMMCOM group whose operators include Citizen Band radio operators, Hams. They may also use GMRS, and MURS.
- Has an organizational structure similar to ARES with local teams who directly work with some of the same Served Agencies that are supported by ARES
- REACT's mission is somewhat broader that ARES. They can provide:
  - Crowd control
  - Logistics
  - Public education
  - May not include communication

LU 4

Other Organizations

Emergency Alert System (EAS)

- The Emergency Alert System (EAS) is a national public warning system that requires broadcasters to provide their communications capability to the President to National emergency.
- The system also may be used by state and local authorities to deliver important emergency information such as AMBER alerts and weather information targeted to a specific area.

LU 4

Organization for rapid Response

Rapid Response Team (RRT)

- An RRT is a small group within a larger EMMCOM organization that can put a few strategically placed stations on the air quickly
  - A level 1 team can deploy within ½ hour of the start of an emergency with short term Jump kits for 12 to 24 hours
  - A level 2 team will deploy within hours with more communications and a 72 hour longer term deployment kit that might include:T
    - Tents, sleeping gear, change of clothes, portable repeaters, extended food and water, personal medications as needed, spare radios, Generator, etc.
  - These teams may go by other names such as Quick Response team (QRT), or Rapid Emergency Deployment team (RED team)

LU 4

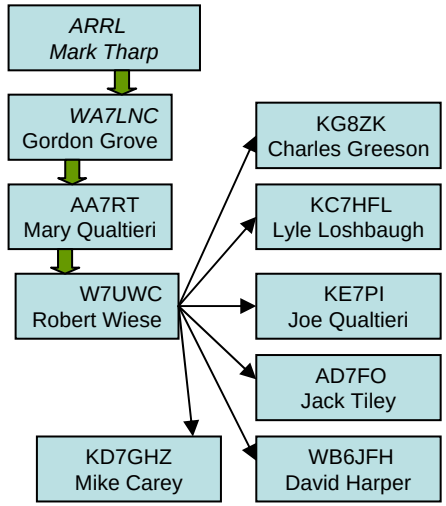
Organization

ARES Mutual Assistance Team (ARESMAT)

- An agreement with other ARES groups to provide assistance and resources in the event of:
  - A communications emergency lasting longer than a day or two
  - An emergency that requires more resources than are available locally.
- Teams consist of hams who are willing to travel to another location
  - As an ARESMAT member you are under the direction of the local group that made the request. They are in essence a Served Agency that you are working for.

LU 4

LU4 Review



1.&2. The ARES Chain of command is:

Section Manager (SM)
Section Emergency Coordinator (SEC)
District Emergency Coordinator (DEC)
Emergency Coordinator (EC)
Assistant Emergency Coordinators (AEC)

3. A level 2 RRT (Rapid Response Team) responds within a few hours and is prepared with 72 hour jump kits for a longer duration of service.

4. An ARES Mutual Assistance Team (ARESMAT) is an ARES team willing and able to travel to another area.

5. A REACT teams resources may include CB, Amateur Radio, GMRS, FRS, and MURS radio equipment

LU 5

Served Agency Communication Systems

- Most Served Agencies may have their own equipment ranging from modest to complex.
- You should work in advance with the served agency to determine if you will bring and operate your equipment or use theirs.
- Served Agency equipment may be quite different than Ham Radio Equipment. You will need to understand how to operate it.
- Operating protocol and terminology may be different. Practice drills will help prepare you to use served agency radio equipment.
- All communication needs to be succinct and professional.

LU 5

Served Agency Communication Systems

- Potential Served Agency Systems
  - Medical Radio Systems
    - HEAR System
    - Newer Hospital Emergency Radios have 10 UHF duplex frequencies and 10 VHF simplex frequencies
    - Amateur Radios are at all 7 Hospitals in Spokane

  - American Red Cross – *National Freq 47.42 MHz*
    - ECRV Vehicle as well as ERV vehicles
    - Chapter Radios
  - Police – *National Frequency 155.475 MHz, Spokane Police Repeater is on 155.130 MHz*
    - Public Safety groups moving to a new digital communications system, APCO-25

  - DEM
    - Communications Trailer

Communication Systems

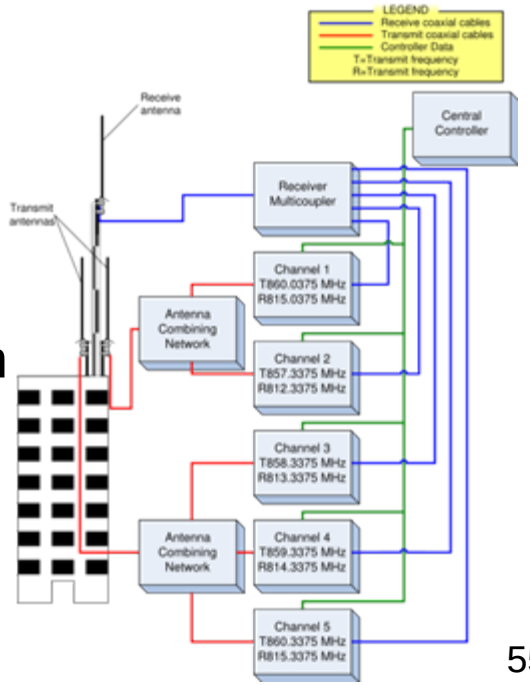
- There are three types of shared or multiple user radio systems you may encounter:
  - **Community (or city wide) repeaters** where multiple using agencies share the same repeater frequencies. The users are differentiated by CTCSS tones from the repeater. You must press the monitor button on your radio to see if the frequency is in use by another agency before transmitting.
  - **Shared simplex frequencies** which share the same concept of differentiating users by CTCSS tones except on simplex. Again press the monitor button to insure the frequency is not in use before transmitting.

Communication Systems

- **Trunked Radio Systems**
  - In a trunk radio system, all users share a pool of frequencies from five up to a maximum of twenty-eight. Users are assigned a "group id" and field radios are programmed to only pick-up transmissions for that group. A computer, called the "site controller", automatically assigns a frequency for users belonging to the same group to communicate with each other. This is done over a data channel called the "control channel", which carries data that tells field radios what frequency they are on. Trunk radio systems may have one or more control channels.

Communication Systems

- Trunked Radio Systems
  - Since communications on a Trunked System never stay on one frequency, monitoring these communications with a conventional scanner is virtually impossible, especially in large metro areas where a Trunked System can have dozens and dozens of users.
  - Because Trunked Systems require complex repeaters and radios in addition to designated/reserved frequencies they are not currently used for amateur radio communication
  - Trunked systems can prioritize users when there are a lot of traffic

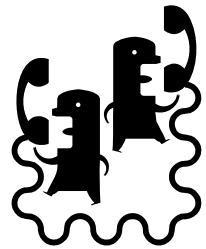


Served Agency Communication

- Additional Communications Equipment you may be asked to operate
  - Fax Machines
  - Copiers
  - Computer terminals – To send or forward messages via e-mail

LU5 Review

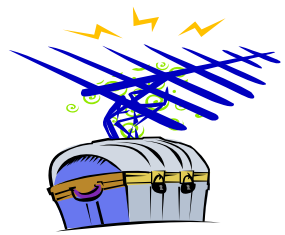
1. *When emcomm members are called upon to operate on public safety radio they may not engage in casual conversations.*



2. *Motorola's trade marked name for CTCSS is PL or Private line*

3. *The newer medical emergency medical radio service uses 10 UHF Duplex frequencies and 7 VHF simplex channels.*

4. *Amateur Radio does not currently use (or allow) the Trunked Radio System format.*



LU5 Review

5. When EMMCOMM teams work with Served Agencies the Served Agency must provide training if Amateur Radio operators are to be used effectively.

Basic Communication Skills

The job of an Emergency Communicator is to get the message through to an intended recipient quickly and accurately. Your ability to do this may be limited by:

- Operator Skills
- Communication method
- Noise –Electrical in the transmission path and acoustical at the receive and transmit site when voice is used.

Important skills for a communicator are:

- Listen - Tune out distractions (use a headset if possible) and when unsure of what you heard ask that it to be repeated.
- Be sure the message you copy is correct, ask for a
- read-back to be sure.

Use Good Microphone Technique

- Speak across the microphone not into it (unless you use a desk mike)
- Use your normal clear, calm voice. Do not raise you voice or shout
- Determine the voice level and microphone gain works best for you
- Wait a second or two after keying the Microphone before speaking to allow the repeater to come up
- VOX is **not recommended** for emergency communication
- Pause between transmissions to allow for emergency traffic
- Remember if using a repeater most have a 3 minute time out, but try to limit your transmissions to one minute then break to check for emergency traffic

Use Plain Language

- Do not use slang or jargon (technical slang)
- Do not use Q signals in voice transmissions
- Use simple language, “big words” may not be understood by all
- Avoid words and phrases that carry strong emotion

Use Proper Phonetics:

A- ***Alpha***
B- ***Bravo***
C- ***Charlie***
D- ***Delta***
E- ***Echo***
F- ***Foxtrot***
G- ***Golf***
H- ***Hotel***
I- ***India***
J- ***Juliet***
K- ***Kilo***
L- ***Lima***
M- ***Mike***
N- ***November***
O- ***Oscar***
P- ***Papa***
Q- ***Quebec***
O- ***Oscar***
R- ***Romeo***
S- ***Sierra***
T- ***Tango***
U- ***Uniform***
V- ***Victor***
W- ***Whiskey***
X- ***X-ray***
Y- ***Yankee***
Z- ***Zulu***

Use Pro-words

Clear- end of contact

Over- used to let a specific station know when to respond

Go ahead- Used to indicate that a station(s) may respond

Out- Leaving the air, will not be listening

Stand by- A temporary interruption of the contact

Roger- Indicated the transmission has been received correctly and in full

Using Tactical Calls

- You do not need to know called stations FCC call sign
- Makes the function/station location you are calling clear
- Avoids confusion during shift changes
- Use tactical call signs for public service and emergency events
- You still need to identify with your FCC call sign every 10 minutes
- Identifying at the end of each transmission will indicate the end of transmission and insure you meet the FCC identification rule

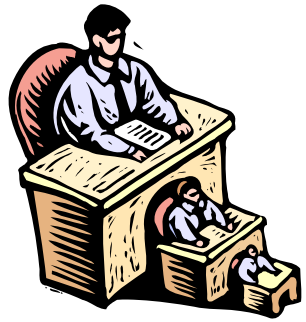
LU6 Review

1. In emergency communication listening is 50% or greater, **not 10%**
2. When transmitting, talk across the microphone rather than directly into it
3. In emergency communications **never use 10 codes on Amateur Radio**
4. On a tactical net it is still necessary to identify with your call sign at a minimum of every 10 minutes and at the end of your last transmission.
5. Giving your call sign is the most effective way to end an exchange on a tactical net.

LU 7

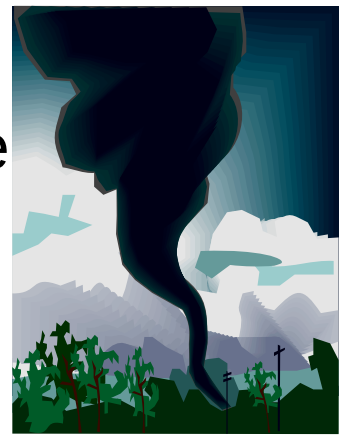
Introduction to Emergency Nets

Information:



- The Purpose of any net is to provide a means for orderly communication within a group of stations

- An emergency net is a group of stations who provide communication to one or more Served Agencies or the General public in a communications emergency.



LU 7

Introduction to Emergency Nets

Information:

- A formal or directed net is one with a NCS (Net Control Station) who organizes and controls all communication on the net. To send a message you must ask permission from the NCS. Then NCS will authorize message transfer in an orderly fashion, frequently on another frequency, based on message priority.

  Directed Nets are the best format when there are a large number of stations and/or a lot of traffic.

LU 7

Introduction to Emergency Nets

Information:

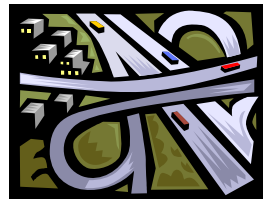
- On Open, or Informal Nets, the NCS is optional allowing stations to call each other directly. The NCS, if there is one, steps in only if necessary when there is a large amount of traffic or problems arise. Open Nets are usually used when there is little traffic and only a few operators.

- Most of the local ARES / RACES activities will use formal nets.

LU 7

Introduction to Emergency Nets

Types of Nets:



- **Traffic Net** – Handles formal written traffic in a specified (ARRL) format. Traffic Nets operated by the National Traffic System (NTS) are excellent examples of how an ARES / RACES formal traffic net should operate.

- **Tactical Nets** are used for real time coordination of activities related to the emergency. A tactical net usually has an NCS but may be directed or open.

- **Resource or Logistics Nets** may be needed to acquire resources (food, water and other supplies), accept volunteer check-ins and hand out assignments. This is usually a directed net.

Introduction to Emergency Nets

Types of Nets:

- **Information Nets** are usually Open Nets used to collect and share information on a developing situation without overly restricting the use of the frequency by others. Net members send updated local information as needed and bulletins from Served Agencies.

A good example of an Information Net is a SKYWARN weather net activated during a severe storm.

LU 7

Introduction to Emergency Nets

Checking into an Emergency Net

- You need to “check in” to a net:
  - When you first join the net
  - When you have messages, questions or information to send
- To become part of a directed net wait for NCS to ask for “check-ins” and listen to any specific instructions such a “check-ins with emergency traffic only”
- At the appropriate time (or when directed) check in with:
  - Your call sign only
  - Your call sign followed by “with traffic”
  - Your call sign followed by “with Priority Traffic”
  - Your call sign followed by “with emergency Traffic”

  Then wait for NCS to respond before offering more information

Introduction to Emergency Nets

Checking into an Emergency Net

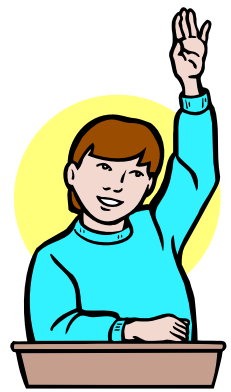
- If there is a long time and NCS has not asked for check-ins and you have traffic or information you may briefly call NCS when there is a break in activity by stating your call sign
- If you have emergency traffic do not wait to be called. Call Net Control as soon as there is a break in the conversation

LU 7

Introduction to Emergency Nets

Checking into an Emergency Net

- If you are not part of the organization, do not just check in and offer to assist. Listen for a while to understand the situation, what may be needed and what you might offer the organization.
- If you feel there is a need and something you can offer to meet that need, you can check-in briefly and ask NCS if there is a resource net in operation, and go there. If there is no resource net in operation make a brief offer of assistance to NCS.



LU 7

Introduction to Emergency Nets

Checking into an Emergency Net

- Do not be too surprised if you receive the “cold Shoulder” when checking into a net where you are not a member. The NCS on that net does not know your technical skills or or ability to work with their team. If you have a specific skill you feel may be useful to their operation be sure to mention it.
- If offered a menial task, take it, The NCS will get to know you and you could be freeing up a needed member of their team.

LU 7

Introduction to Emergency Nets

Passing Messages

- When Checking into a net, tell the NCS you have traffic to pass. They will usually ask you to "list your traffic" with it's destination and priority.
- You will not send your traffic until NCS tells you to do so, more than likely on a different frequency. Normally, NCS will tell the receiving station to contact the sending traffic station for traffic.
- If you went to another frequency after passing your traffic, return to the net frequency and tell NCS you have passed your traffic so they can remove it from their list.
- If using Tactical calls be sure to also add your call at the end of your transmission.

LU 7

Introduction to Emergency Nets

"Breaking" into the net

- If the net is in progress and you have emergency traffic to send, you may have to "break" into the net
  - Wait for a pause between transmissions and simply say "break <your call>" and wait for NCS to respond by saying "<your call> go with your traffic"
  - You would reply "<your call> with emergency traffic"

LU 7

Introduction to Emergency Nets

Checking out of an emergency net

- Always let NCS know you are leaving the net, even if it is for a few minutes. If you do not respond NCS may become concerned and be forced to use valuable resources to check on you.
- There are three reasons for leaving a net:
  - The location of your station is closing
  - You need a break and there is no relief operator
  - You have turned the station over to another operator (be sure to tell NCS the new operators name and call).

Introduction to Emergency Nets

Checking out of an Emergency Net

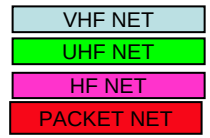
- If you are asked to shut down or move your station by someone in authority, do so immediately. Do not wait to notify NCS. There is usually a good reason for such a request, such as you could be in danger or there may be explosive vapors that could trigger with RF energy.
- As soon as you have moved or given permission to transmit and can do it safely, let NCS know what happened and your current status.

LU 7

Introduction to Emergency Nets

Levels of Nets

- Network systems are often Layered for greater operating efficiency. These Levels could be:
  - By Area (LOCAL, County, National)
  - By Function (Command, Traffic, Logistics, etc)
  - By communication medium (UHF, VHF, HF, Packet, ATV)



- Nets do not have to be voice nets. They can be CW, Packet, PACKTOR, AMTOR, and more. Many in the Emcomm community are experimenting with HF,VHF PSK31 and WinLink-2000.

Review

1. A net can be best described as a group of stations who gather on one frequency with a purpose.
2. The major difference between an “open net” and a “directed net” is the presence or absence of full control by the NCS.
3. A tactical net may be directed or open but usually will have an NCS.

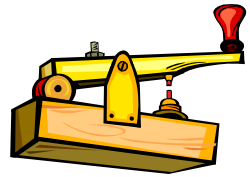
Review

4. You should check into an emergency net when you first join the net or when you have messages, questions or relevant information.

5. The most frequent cause of errors on voice nets is speaking too rapidly.

Basic Message Handling-Part I

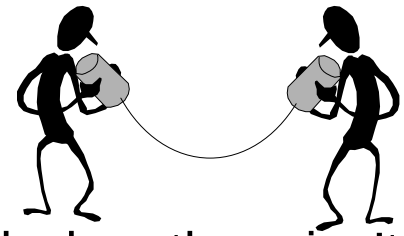
Formal and Informal Messages



- Formal Traffic
  - Formal traffic is done using the ARRL radiogram form or format.
  - Formal traffic messages have all the necessary information for tracking and determining the authorizing or originating person.
  - If the message is going through more than just the originator and recipient, formal written traffic is needed to prevent errors.
  - Using the standard format in a formal message helps in the accuracy of the received message.

Basic Message Handling-Part I

ARRL Radiogram Form



- Informal Traffic
  - Informal traffic is verbal or written and used when there isn't time to do a formal traffic message. Informal traffic is more difficult to track and determine originators and authoring persons.
  - Some emergency messages are best sent informally in the interest of saving time such as requesting an ambulance for a severely injured person.
  - Some messages do not require a formal written message because the message is of low value beyond the moment.

LU 8

Basic Message Handling Part II

ARRL Radiogram Form

Message Preamble

Assign a number Number	Priority level Precedence	HX	*Originating Station Call* Station of origin	*Number of words* Check
Station Call or Tactical place of origination Place of Origin			*actual time message originated* Time Filed (PDT)	Date originated Date
Address, call sign or tactical destination of message				
Address				

Number: A letter or number assigned by originating message to track messages

Precedence: R -Routine, W- Welfare, P -Priority, Emergency

Handling: Instructions for operators handling and delivering the message (see next slide)

Check- Number of words or word groups in the text of this message (continuous characters with no spaces)

Place of origin: The location (city and state) of party for whom message was created, not necessarily the originating station location

Address: Name, address, city, state, Phone number of intended recipient

Basic Message Handling Part II

ARRL Radiogram Form

What goes in the HX Block?

Pro Sign	**Instruction**
HXA *(number)*	Collect land line authorized within *(number)* miles, unlimited if no number is sent
HXB *(number)*	Cancel delivery if not delivered within *(number)* hours of filing
HXC	Report date and time of delivery to originating station
HXD	Report to originating station the identity of the delivering station, plus date and time. Report identity of station which relayed, plus date and time, or if delivered report date and time and method of delivery.
HXE	Delivering station get message from addressee, originate message back to sender.
HXF *(number)*	Hold delivery until *(number)* date
HFG	Delivery by mail or landline toll call not required. If toll or expense involved, cancel message and service originating Station

Basic Message Handling Part II

The Message Text

the	**quick**	**brown**	**fox**	**jumped** 5
over	**the**	**lazy**	**dog**	**X** 10
the	**dog**	**was**	**asleep**	15
				20
				25
				30
	The Check for this message would be *14*			35

Basic Message Handling Part II

Signature and Tracking

Signature					
Received From	**Station Call**	**Time (PDT)**	**Date**		**By Operator** (Call)
Sent or Delivered	**Station Call**	**Time (PDT)**	**Date**		**By Operator** (Call))

- **Signature is**: Name, Call or Tactical name of originator of the message
- **Additional information:** Used for logging when and from who the message was received and how and to whom the message was re-sent if the message is relayed

Basic Message Handling Part II

Sending Voice Messages

- Speak at a slow pace that allows receiving station to write it down.

- Annunciate words for clarity. Use phonetics if needed.

- Use pause in the message sections by saying “break” to allow receiving station to ask for repeats.

- For messages where accuracy is critical you can ask receiving station to read back the message.

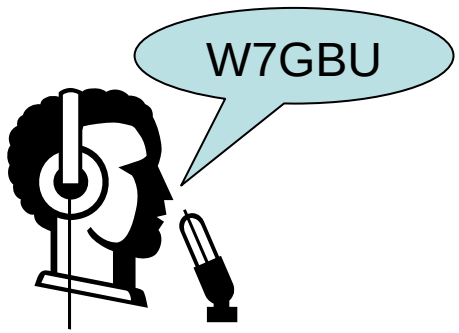
Basic Message Handling Part II

Sending Voice Messages

- Do not add unnecessary words or comments to your transmission.
- Numbers are spoken individually i.e.: “Three Two One ” not “Three hundred twenty one”

- Confirm the receiving station has the message and no further questions before terminating the contact.

- End contact with your call sign

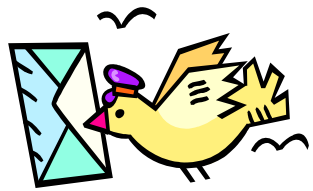


Review

1. The preamble to an ARRL Radiogram message will use the word “Emergency” not letter or abbreviation.

EMERGENCY

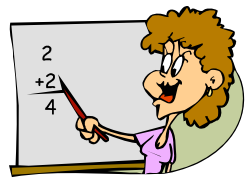
2. If the preamble to an ARRL Radiogram message contains the letters HXE the delivering station is to get a reply from the addressee.



3. In the preamble to an ARRL Radiogram message the Time Filed block is usually stated in UTC but during emergencies should always be local time.

Review

4. The Check block in the preamble to an ARRL Radiogram message contains the count of words in the text of the message.



5. In the text of an ARRL Radiogram message punctuation should only be used when it is essential to the meaning of the message.

Basic Message Handling Part II

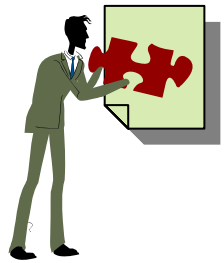
Message Handling Rules

- Do not speculate on anything relating to an emergency. There may be hundreds of people listening in on your communication such as other amateurs, general public and the media (using scanners). Consider more secure methods of transmission like Packet for sensitive information.

- Pass messages exactly as written or spoken. Your job as a communicator is accuracy along with speed. When relaying messages do not correct what you believe to be errors. Only the original Author can make changes.

Basic Message Handling Part II

Message Handling Rules



- Non-standard format messages can be sent using the ARRL message format by placing the entire non-standard message in the text body of the ARRL Message form.

Importance of the Signature

- Some items requested in an emergency are of high dollar value or have limited shelf life, and may not be restockable. Without proper authorization, requests may be delayed. Be sure to have a name and title of the sender in the signature block.

Basic Message Handling Part II

Message Handling Rules

- Apparently misspelled words or confusing words must be sent exactly as received. If you are relaying a message you can ask the sending station for read back to be sure you copied it down correctly.

- If you think the message is incorrect or confusing you have the option to send it back to the originator. This is a judgment call and should only be done if apparent error may affect the message meaning.

LU 9

Basic Message Handling Part II

ARRL Numbered Radiograms

- ARRL Numbered radiograms are a standardized list of often-used phrases.
- To send the standard phrase you would send the letters ARL followed by the number of the phrase you wish to communicate.

- A complete list of phrases is contained on the ARRL web site.
- When sending the following message “ARL, six , four” (arrived safely at _____) would count as 3 words in the text of the message.

LU 9

Basic Message Handling Part II

Modified Message Formats

- The ARRL message form can handle most situations, but sometimes Served Agencies may request changes or the use of another form, Like ICS-213. Each EMCOMM group should work with their Served Agencies to determine which format best fulfills their needs prior to an emergency call out.

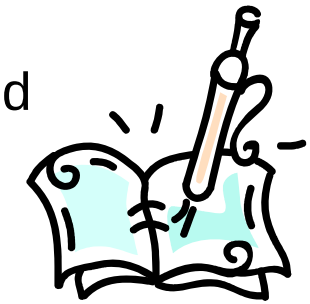
Logging and Record Keeping

- An accurate record of formal messages handled and your station operation can be very useful and may be required by law in some cases.

Basic Message Handling Part II

Logging and Record Keeping

- What do you log?
  - All Formal Traffic, important informal traffic
  - Time and date received and transmitted/delivered
  - Message routing (received from and sent to)
  - Copy of the message
  - Setup, operation and teardown issues and time.
  - Power/communication failures
  - Any comments you think may be useful
  - As a minimum NCS should be keeping a Log.



- Plan for how and who will log before the event, generate forms that you will use in advance.
- Your records will help in the debriefing and in critiquing your organizations performance so improvements can be made.

LU 9

Basic Message Handling Part II

Logging and Record Keeping

SEND 27
COTS x 24
MEALS x 1
FIRST AID KIT

- Your logs should be clear and legible. Others may be reading and using what you log. Printing with neat block letters is recommended.
- Logs that may become legal documents should be written with a pen.

- Logs kept in notebooks will prevent sheets from becoming lost.

LU 9

Basic Message Handling Part II

Authoring the message

- Usually the Served Agency official will author the message. You can help them to be sure the message will be clear.
- Agency officials have the authorization and if you are the author the request may not be approved.

LU 9

Basic Message Handling Part II

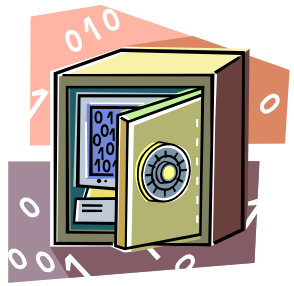
Message Security and Privacy

- Information transmitted over amateur radio can never be totally secure because FCC rules prohibit us from using codes that obscure the actual meaning of the message.
- Anything you transmit may be monitored by the media and can legally be used by them.
- This does not mean your communication is public information. You should treat the information you communicate as privileged and private.

Basic Message Handling Part II

Message Security and Privacy

- Messages that contain personally identifiable information such as names of victims or injured should be sent by FAX, Landline Phone or Served Agency secure links.
- While there is no way to insure our messages are not overheard there are some things you can try
  - Use an uncommon frequency
  - Use digital modes like PSK31, RTTY, AMTOR



Review

1. As part of an EMCOMM group handling message traffic in an emergency and given a message with typographical errors, you should forward the message exactly as received.

2. As part of an EMCOMM group handling message traffic in an emergency you are asked to forward a message in non standard format, you should forward the message exactly as received.

3. You have been asked to send an ARRL Radiogram dealing with a birthday greeting. The correct way to send this message is “ARL 4 6”

Review

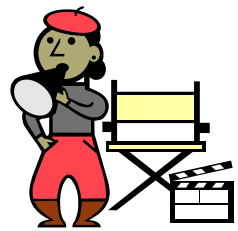
4. When delivering an ARRL numbered radiogram you should decode the message into plain language.
5. During an emergency, service messages should only be sent for “Emergency” and “Priority” traffic.

LU 10

Net Operating Guidelines

Net Control Stations

- Every organization needs an executive level manager to ensure everything runs smoothly. For an Emergency Communication Net this is the NCS (Net Control Station).
- The NCS is the “ringmaster” or traffic cop”. The NCS decides what happens and when it happens on the net.
- NCS can be located anywhere but should be in a location where they can hear everyone else on the net.

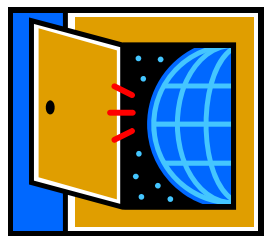


LU 10

Net Operating Guidelines

Net Scripts

- Nets are usually opened and closed with a standard to insure the net will operate in a similar format every time. Typical net script format includes:
  - Opening –
    - <your call>, name and purpose of net, and type of traffic that will be passed.
    - If a repeater is being used the frequency, offset and tone are usually given
    - Rules or procedure to break for emergency traffic



  - Closing
    - Thank Participants
    - Time and date of net closing
    - Return Repeater or frequency to normal use

LU 10

Net Operating Guidelines

Acting or Fill-in NCS

- Filling in for an NCS to relieve them for a short time can be excellent training.
  - Watch what the NCS does and you will be able to do it.
  - This is not a military operation, treat members with respect .
  - Speak Clearly in a normal tone of voice.
  - Make instructions clear and concise.
  - Keep notes of what is going on.
  - Have stations pass traffic on an alternate frequency.

LU 10

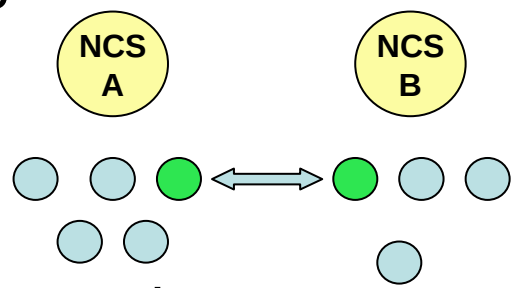
Net Operating Guidelines

Relay Stations

- When NCS cannot hear one of the stations on the net because of their location they may ask one of the other stations on the net to relay information back and forth.

Liaison Stations

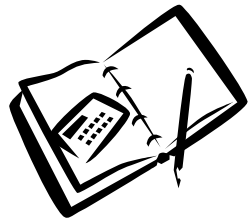
- When it is necessary to coordinate with another net, NCS will assign a liaison station role.
- The liaison station role is to pass messages between the two different nets.
- This can be periodic check-in interval for coordination or continuous monitoring of the other net.
- The other NCS may also assign a Liaison Station.



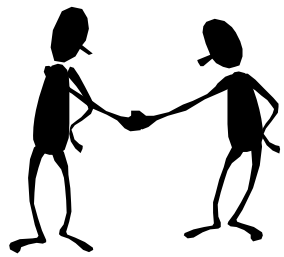
LU 10

Net Operating Guidelines

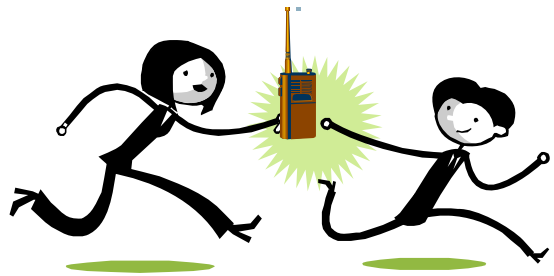
Net Members



- Operators at each site are responsible for messages to and from their location.
- Must listen to all traffic on the net and maintain contact with the Served Agency.



- Whenever possible there should be two members at each site (one can log while the other operates).
- Use Relay Stations to reach members of the net that can not make direct contact with NCS.

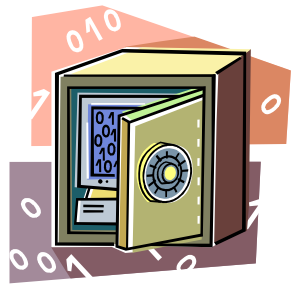


LU 10

Net Operating Guidelines

Other Modes Than Voice

- Digital modes can have some advantages for an Emergency Net
  - Packet modes like FM Packet, HF Packet and PACTOR can provide automatic connection between two stations.
  - Provide some security since most folks with scanners will not be able to read your messages.
  - Does not require an NCS.

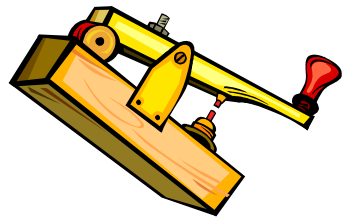


LU 10

Net Operating Guidelines

Other Modes Than Voice

- Key board to keyboard packet, PSK31, AMTOR and GTOR can be used
  - May require an NCS station
- CW with experienced operators can be very effective.
  - Clean and accurate code is better than 30 wpm sloppy code
  - Make sure your sending speed is compatible with the receiving stations ability to accurately copy.



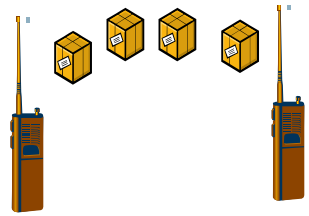
Review

1. In an EMCOMM operation the NCS is responsible for all aspects of the nets operation.
2. As acting fill in NCS you should avoid asking stations to pass messages on the main net frequency.
3. A “liaison station” is a station that passes messages between two nets.

LU 10

Review

4.Packet modes of operation include FM Packet, HF Packet, and Pactor.



5.If you are the NCS of a net involved in EMCOMM operations and you notice some other station is intentionally interfering with your net move the net to an alternate frequency ***(note1)***

(note 1) *Usually we do not respond to a station that is intentionally interfering with a formal net, if possible ignore them. If they persist, follow number 5 in this review*

The Incident Command System

The Incident Command System (ICS) is an outgrowth from the early 70's when multi agency responses to wild fires in Southern California ended so disorganized that it prompted Municipal, State, and Federal agencies to form an organization to review the problems. The problems uncovered were:

- Poor overall organization
- Ineffective communication between agencies
- Lack of accountability
- Lack of single well defined Command Structure and commander

LU 11

The Incident Command System

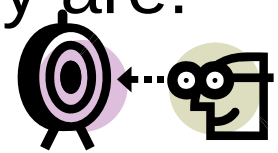
The review team originally developed an Incident Command System for wildfires, but the system ultimately developed into an all risk system appropriate all types of fire and non fire emergencies.

The ICS developed by the National Fire Academy (NFA) has been widely recognized as a model and tool for the command, control, and coordination of resources at the scene of any emergency and is used by Fire, Police and other agencies around the country.

LU 11

The Incident Command System

The ICS has two interrelated parts. They are:



1. Management by objectives

- Understanding policies, procedures and statutes affecting response
- Establishing incident objectives (desired outcome)
- Selecting appropriate strategies
- Applying tactics likely to or necessary to accomplish objective

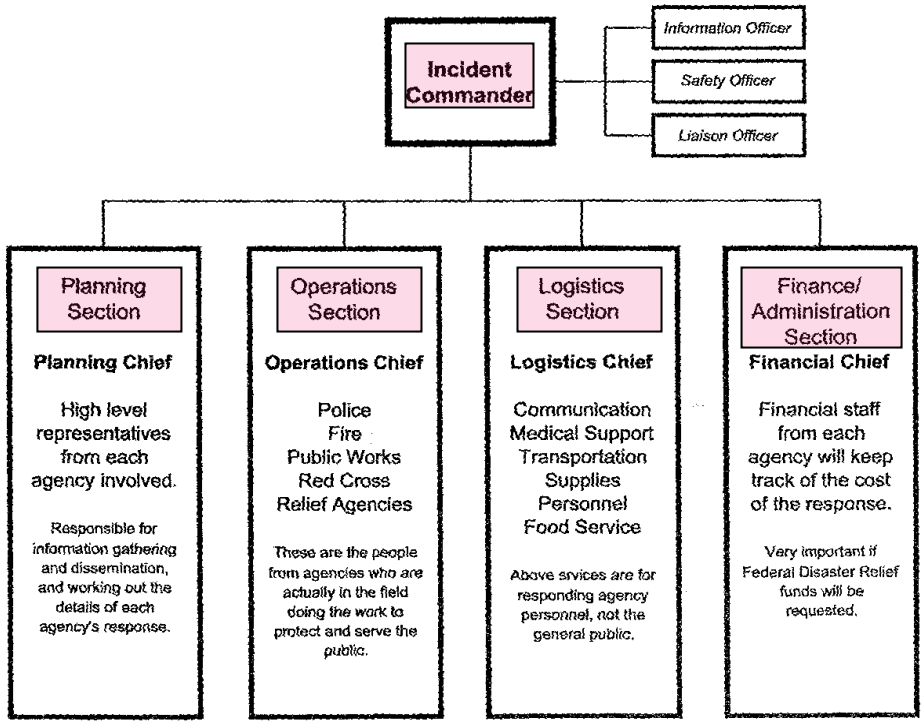
2. Organizational structure.

- Flexible organizational structure
- One person is in charge of all resources
- Tasks are sub divided into four major sections
- Operating sections can be scaled up or down as needed

LU 11

The Incident Command System

In addition to the incident commander there are four major operating sections in an ICS. They are planning, operations, logistics and finance/administration.



LU 11

The Incident Command System

The Incident Command System (ICS) is a management tool designed to bring multiple responding agencies, including those form different jurisdictions together under a single overall command structure.

ICS is not

- A fixed unchangeable structure
- A means to take control authority away from agencies or departments that participate in the response.
- A way to subvert normal Chain of command
- Always managed by the fire department or first agency on scene
- To big and cumbersome for small everyday incidents
- Restricted to use by government agencies and departments

The Incident Command System

The incident commander is usually the most senior on scene officer from the first responding agency. As the incident continues for an extended period or grows the person filling the Incident Commander position may change but the role of the incident commander does not change.

Involvement in any Incident Command System is by “invitation only” – There is no role for “off the street” volunteers. The relationship between an emcomm group to the ICS structure will vary with a specific situation. You may not have any part in the ICS Structure except through your served agency or agencies.

The Incident Command System

Emcomm volunteers are encouraged to learn and understand the Incident Command Structure by completing the on line **ICS 700 NIMS** training on the FEMA website (let your EC know if you take and successfully complete this class):

http://training.fema.gov/EMIWeb/IS/is700.asp

Emergency Management Institute

FEMA

This Certificate of Achievement is to acknowledge that

Students name

has reaffirmed a de... continued professional development and completion of the independent study course:

IS-00700
National Incident Management System
(NIMS) an Introduction

Issued this 19th Day of August, 2005

Stephen G. Sharro
Director, Training Division

0.3 CEU

LU11 Review

1. The letters ***ICS*** stand for Incident Command System

2. ICS is a management tool for coordinating the resources of several agencies within a single command structure.

3. The ICS has two inter-related parts. They are management by objectives and organizational structure.

4. In addition to the incident commander there are four major operating sections in an ICS. They are planning, operations, logistics and finance/administration.

5. The emcomm group may or may not be a formal part of the ICS structure during an Incident .

LU 12

Preparing for deployment

When preparing for a deployment or callout, remember the Boy Scout Motto "*Be Prepared*". What should you be prepared for? As the Founder of the Boy Scouts Baden Powell said "*be prepared for any old thing*". The same preparedness goal applies to emcomm volunteers.

Being prepared requires advance planning and having a kit of the things you will need ready to pick up and go. These are called Go Bags or Jump Kits. With out prepared jump kit you will likely leave a critical item or two home or take valuable time looking for items when you are called

LU 12

Preparing for deployment

Before planning your Jump Kit you will need to consider:

- How long you might be deployed (12, 24, 72 hrs or more)?
- Will you have reliable power or will you need your own power?
- Weather that might be encountered (en-route and at site)?
- Will food, water and sanitary facilities be available?
- How will you and your equipment get to the site?

  Carrying an 80 AH battery may not be practical if you hike in
- Can some kit items do double duty to save space and weight?
- Will your emcomm post be fixed or mobile?
- Will operating position shelter be needed (tarp, tent, Vehicle)?
- What networks and nets will you operate in?

LU 12

Preparing for deployment

Your emcomm course book has a list of jump kit ideas on page 74. (there is also a list on the ARES/RACES web site)

Radios and Accessories

- Hand-held VHF or dual-band radio (some people also like to bring a spare)
- Spare rechargeable batteries for handhelds
- Alkaline battery pack for handhelds
- Alkaline batteries
- Speaker mic and earphone for handhelds
- Battery chargers, ac and dc for handhelds
- Mobile VHF or dual-band radio
- HF radio
- Multi-band HF antenna, tuner, heavy parachute cord or nylon mason's twine
- VHF/UHF gain antennas and adapters (roll-up J-Pole, mobile magnetic mount, etc)
- Coaxial feed lines, jumpers
- Ground rod, pipe clamp and wire
- Ac power supplies for VHF/UHF mobile and HF radios, accessories
- Large battery source for VHF/UHF mobile and HF radios, with charger
- All related power, data, audio and RF cables and adapters
- Small repair kit: hand tools, multi-meter, connectors, adapters, fuses, key parts
- Materials for improvisation: wire, connectors, small parts, insulators, duct tape, etc.
- Photocopies of manuals for all equipment
- Headphones, for noisy areas and privacy with proper connector, adaptors
- Specialized gear for packet, ATV or other modes
- Multi-band scanner, weather radio
- Personal cell phone, pager, spare batteries and chargers
- Pencils, legal pads, pencil sharpener

Personal Gear

- Clothing for the season, weather, and length of deployment
- Toilet kit: soap, razor, deodorant, comb, toilet paper
- Foul weather or protective gear, warm coats, hats, etc. as needed
- Sleeping bag, closed-cell foam pad, pillow, earplugs
- High-energy snacks
- Easily prepared dried foods that will store for long periods
- Eating and cooking equipment if needed
- Water containers, filled before departure
- First aid kit, personal medications and prescriptions for up to one week
- Money, including a large quantity of quarters for vending machines, tolls, etc.
- Telephone calling card

Information

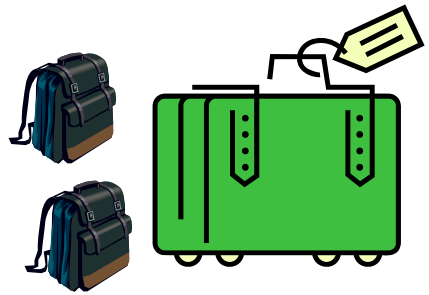
- ID cards and other authorizations
- Copy of Amateur Radio license
- Frequency lists and net schedules
- Maps, both street and topographic
- Key phone numbers, e-mail and Internet addresses
- Contact information for other members in your group, EC, DEC, SEC and others
- Copy of emergency plans
- Resource lists: who to call for which kinds of problems
- Log sheets, message forms
- Operating Supplies
- Preprinted message forms
- Log sheets or books
- Standard forms used by the served agency
- Letter or legal size notepads
- Sticky notes

LU 12

Preparing for deployment

It may be efficient to sub-divide your kit into multiple kits so you can take what you need for a particular callout with out carrying everything. Some ideas are:

- Quick deployment kit
- VHF/UHF/HF kit for fixed location
- Accessories and tools kit
- Emergency power kit
- Field Shelter kit



Pre-planning and physical preparation is the key to an effective and timely emcomm deployment. Check your Jump Kits / Go Bags regularly and rotate perishable items like food and water.

LU 12

Preparing for deployment

Know the frequencies in your area:

- Know the local repeater frequencies and coverage.
- Know which repeater will be used and where the nets are likely to be.
- Know Where the nets may move to in case they experience interference.
- Know what simplex frequencies will be used in case of a repeater failure.

In Spokane County the Hospital Radio Frequency List is a good starting point for our area. This list is available from your ARES Races Staff Members and has been passed out at previous meetings.

LU 12

Preparing for deployment

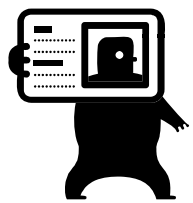
Train with our served agencies:

- Learn their expectations/needs
- Learn their operation methods and protocol
- Learn their organization
- Identify possible operating locations
- Determine if radio gear is available and how it operates

LU12 Review

1. Preparing a Jump Kit in advance will insure you will not leave something at home or lose valuable time looking for critical items when called.

2. A 12 hour deployment Jump Kit would not contain a camp cot or tent. Your 12 hour Jump Kit would contain an VHF HT or VHF/UHF HT, spare batteries, high energy snacks and bottled water.
3. Your ID cards and other authorization documentation should be among the most important items to be included in your Jump Kit.



LU12 Review

4. A deck of playing cards is one of the <u>least important</u> items for a Jump Kit.

A Jump Kit should contain:

- frequency list and net schedules
- Contact information for your group and group leaders (EC, DEC, SEC)
- Key Phone Numbers, e-mail and internet addresses

5. If you are assigned to an emcomm operation location in advance one of the least important things you would need to know is the regular business hours maintained at the assigned location.

LU 13

Equipment Choices for Emergency Communication

VHF / UHF Transceivers

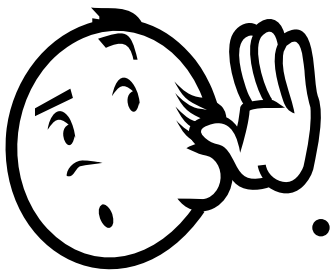
- The most universal choice for emcomm is the dual band 30-50 watt FM transceiver. This class of radio is generally rugged, reliable and can operate at fairly high duty cycles (an external cooling fan is always a good idea and will prolong the life of the radio).

- A second radio to monitor other nets can be quite useful. This can be an HT or just a scanner programmed for the amateur frequencies likely to be used (many of the newer HT's have a scanning function built in)

Equipment Choices for Emergency Communication

- When using a second radio be sure to use enough separation between the antennas to prevent de-sensing the monitor receiver when transmitting

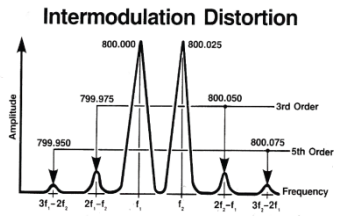
- **Radio Receiver Performance**
  For radios on all bands there are several aspects of their performance that can effect its suitability for emcomm.



  - **Sensitivity** – The ability to receive weak signals- This is primarily a function of the receiver front end noise figure or how much noise the receiver front end adds.
  - **Selectivity** – The ability to reject signals on adjacent frequencies while selecting the desired frequency.

LU 13

Equipment Choices for Emergency Communication



- **Intermodulation Rejection** – This is the ability of the receiver front end to prevent undesired signals from causing interference. Intermodulation distortion frequently is caused by interfering signals outside the amateur band. Today's radios have wide frequency range beyond the amateur bands that allow interfering signals into the receiver front end. External bandpass filters solve this problem.
- In the field changing to another frequency will most likely eliminate the problem

LU 13

Equipment Choices for Emergency Communication

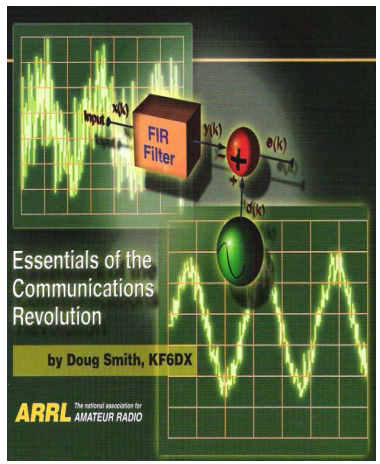
HF Transceivers

- Unless you are running QRP HF radios require significant power from emergency generators or large batteries. Having an HF radio with both AC and DC power (external Power supply or battery) is desirable.
- Do not use DC to DC Converters to power HF rigs. They may generate a lot of RF “hash”.
- HF radios with adjustable power output allow the use of low TX power to extend battery life and High power when needed to get through.

LU 13

Equipment Choices for Emergency Communication

- Receiver filters are very important for HF receivers. Choice of filters will depend on the mode of operation (PSK, RTTY, CW and phone).
- Digital Signal Processing may be the single most important filtering feature available. Internal and external DSP circuits can allow clear reception of signals that otherwise might not be possible in situations with high RF location or path noise.

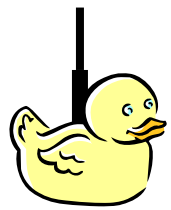


LU 13

Equipment Choices for Emergency Communication

VHF/UHF Antennas –

- A good antenna mounted as high as possible is more important than high transmitter power. Gain antennas increase your effective signal strength allowing lower power operation for longer battery life.
- A unity gain antenna like a J-Pole with fatter lobes may be better for getting out of a valley
- Directional antennas are a better for Packet to prevent multi-path interference.
- Hand held antennas known as “rubber duckies” have negative gain (loss). Use at least a ¼ wave flexible antenna for most operations and a 5/8 wave for more range in open areas.



LU 13

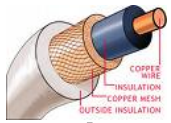
Equipment Choices for Emergency Communication

HF Antennas – There is no single perfect antenna for HF operation.

- For local operation a simple dipole antenna mounted less than ¼ wavelength above the ground works well and is easy to deploy. This is known as a NVIS antenna. An antenna tunner is required.
- A random length wire antenna with a tuner could also be effective. (needs a good ground connection)
- For long range, wire dipoles mounted high above the ground are effective and if properly constructed will not need an antenna tuner
- A trapped vertical antenna may work and a vehicle mounted antenna (Hamsticks, screw driver,etc.) could also be used.

LU 13

Equipment Choices for Emergency Communication

Feedline (COAX) – 

- You will need enough coaxial cable to connect your radios to the antennas.
- Open wire feed line is generally not a good choice because of the difficulty of running it into a building and possible undesired human exposure.
- For short runs RG58 may be useable but for longer runs use lower loss cable like RG8X, RG8, RG213 or 9913. RG8X is a compromise but because of its ease of transport it can be a good choice.

Equipment Choices for Emergency Communication

Operating Accessories –

- Headphones are useful in any location, mandatory in others to avoid disturbing others and where multiple radios are in use.
- If you have a VOX (Voice Operated Xmit.) headset/mike, turn off the VOX function and use manual push to talk during emcomm events.
- If you need hands free operation consider a desk microphone with a foot switch

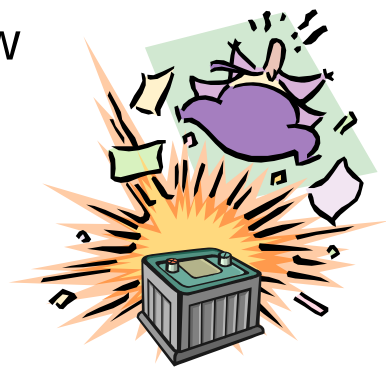
Equipment Choices for Emergency Communication

Batteries –Battery operation is critical for emcomm operations. You can not rely on AC power being available. Choosing the right battery is a function of the anticipated current drain (dependent on transmit power setting) and expected duration of operations. Keep in mind that you may not be able to recharge your batteries in the field.

- The ability to operate your hand held on disposable AA alkaline batteries is a plus. Alkaline AA battery holders are available for most HT's.
- Have a cable to connect your HT, mobile, or HF rig to other batteries by using Anderson Power Pole connectors

Equipment Choices for Emergency Communication

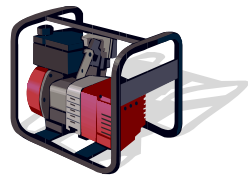
- For higher power needs, lead acid based batteries are available from a few amp hour capacity to over 100 Amp Hour capacity common types available include:
  - Flooded cell automotive type (not recommended) and Marine deep cycle type (recommended).
  - Sealed Lead acid (Gel Cells)
  - Absorbed Glass Mat (AGM)
- Whenever charging batteries make sure you follow the manufactures or industry standard guidelines. Batteries can be damaged or explode if they are charged with too high a current or too high a float voltage.



Equipment Choices for Emergency Communication

Other Power Sources –

- Solar Panels and controllers
- Gasoline driven generators
- Wind and water driven generators
- Human powered generators
- Vehicle power and charging
- DC to AC inverters to power computers



Equipment Choices for Emergency Communication

Other useful equipment –

- Multi Band Scanners
- A voltmeter to check power sources (with leads)
- FRS/GMRS/MURS hand held's
- Cell Phone to dial 911 (does not need to be registered to dial 911)
- Battery operated AM/FM radio
- Weather Alert Radio
- Laptop Computer
- Desk Microphone
- Foot operated transmit switch

LU 13

Equipment Choices for Emergency Communication

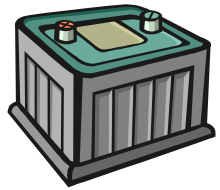
And Most Important:

1. Test your station to be sure it all works and you have all the necessary cables, coax, adapter fittings, charged or fresh batteries. Field day and SET (Simulated Emergency Test) would be an ideal time to verify you have a complete operational station.

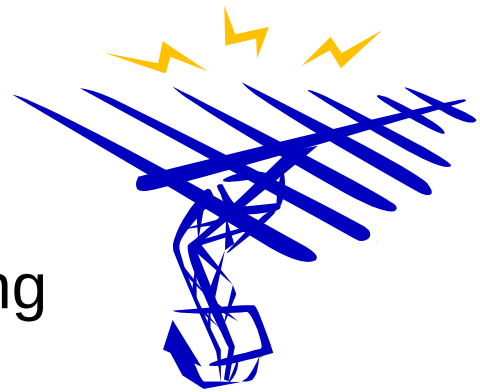
2. Be sure you have identified / marked all your items so they can find their way home after the event.

LU13 Review

1. When Powering HF radios whenever possible use deep cycle batteries rather than automotive batteries.

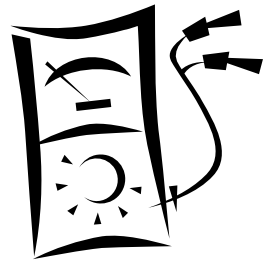


2. When setting up a VHF/UHF radio a good antenna is more important than high transmit power
3. If space and resources permit, a beam antenna has an advantage of maximizing the desired signal path and reducing interference from other stations.

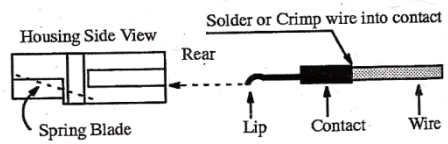


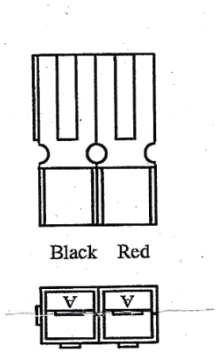
LU13 Review

4. The optimum charging voltage for a 12 volt lead acid battery is two volts more than the rated voltage, or 14 volts



5. The 30 amp Anderson power pole connector can be plugged and unplugged a greater number of times without deterioration than the 10 amp Molex connector found on many VHF/UHF mobile rigs





Emergency Activation

- The actual way emcomm volunteers will be notified of an activation will be determined locally and as a function of the emergency. In this lesson we will look at some of the most popular methods.

- First every emcomm group should have a formal written plan with its served agency to activate their members when needed.

- The plan should be developed in detail and then reduced to a simple check list that both served agency and emcomm managers can keep nearby at all times

Emergency Activation

The plan should detail the circumstances under which emcomm activation might occur and should contain a emcomm member names with phone numbers that are periodically verified and kept up to date.

Possible group allerting systems

- Phone Tree
- Paging (a real pager or an HT with a channel and specific CTCSS tone sent from the repeater)
- E-Mail Activation
- Self Activation (prepare and listen to repeater)

Emergency Activation

I have been notified, now what?

- In most cases go to the emcomm net or meet frequency.
- If heading home to pick up your Go Bag
  - Fill your vehicle with fuel
  - Pick up supplies you may need for activation
  - Notify your spouse and Family about what is happening and set up contact times and method for communication during the activation
- Check in and let NCS know your availability
- Have your Jump Kit / Go Bag ready to go
- Do not go anywhere utill instructed to do so

LU 14

Review

1. If a telephone tree is activated and you are unable to reach one of your assigned contacts on the list you should call all of those assigned to the person on the list who could not be reached.

2. An “emcomm activation liaison” for a served agency is the member of the emcomm group who is alerted first by the agency.

3. Regarding emcomm alerting systems it is best not to rely exclusively upon any single alerting system.

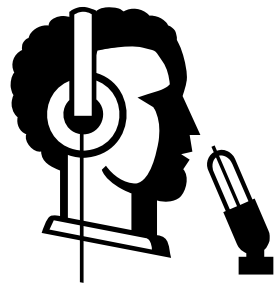




Review

4. E-mail is best used as a backup alerting system

5. The NCS (Net Control Station) is so important that several members should be trained to take on the duties until the assigned NCS checks in.



Set Up, Operation & Teardown

- If you have a known assignment or are available for assignment check into the net and let NCS know you are available.

- Get your equipment loaded up and be ready to go.

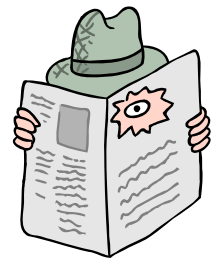
- When proceeding to your assignment check in with NCS on your progress, especially when travel is hazardous.

LU 15

Set Up, Operation & Teardown

- Check in with the person in charge at your assigned location and tell them who you are, why you are there and what you can provide for them.

- If you are asked to brief the staff of a served agency about the privacy of amateur radio you should tell them that there are no methods by which the security of any message can be assured on Amateur Radio

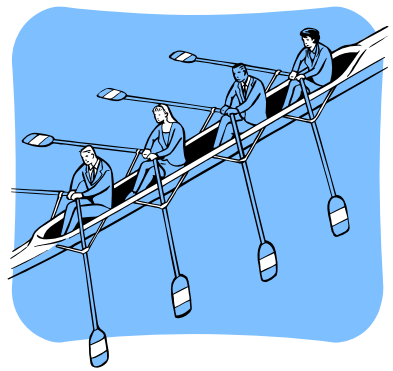


- Expect the situation and assignment to be fluid. Each incident is unique and may change quickly.

Set Up, Operation & Teardown

- At each station the EC or emcomm manager should appoint one member to take a leadership role as the station manager for all operations at that station.

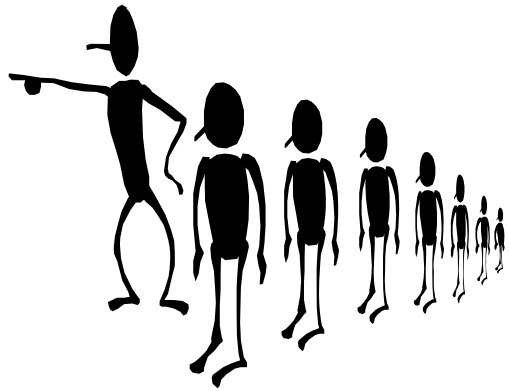
- When you accept the role of an emcomm volunteer you do so knowing you will often need to follow the directions of another person. Cooperation and teamwork are essential.



LU 15

Set Up, Operation & Teardown

- Expect that sometimes you may be a leader and at other times you will be a follower

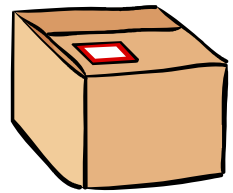


- Plan ahead, if no building or inside space is available for you and your radio gear be prepared to operate out of you vehicle or bring a tent or other shelter.

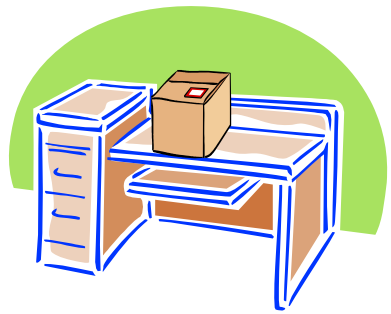
W6GMQ and N6QKE set up a portable emergency communications station on a soccer field during the 2004 San Diego County fires.

Set Up, Operation & Teardown

- When setting up your gear on a desk, table or other location where someone else's “stuff” is in your way, carefully store it in a safe place, like a cardboard box you can seal, label it so it can be safely stored out of the way until the event is over.



- After the event is over place the box of “stuff” back on the desk or table but leave it in the box. Do not try to remember how it was set up and try place it back that way.



Set Up, Operation & Teardown

- Your first order of priority will be getting a station setup and checking in with NCS.
- Once your station is on the air and you have checked in with NCS you can check your location to determine what other resources may be available:
  - Computer/internet, fax machines, telephone lines
  - Determining what frequencies and signal paths are available (repeaters and simplex paths)
  - Learn about the Served agency role at this location and their communication needs
  - Food Water, Sanitary facility availability
  - Setting up additional radios (may need to wait for help)

Set Up, Operation & Teardown

- Directions to end operation may come from the served agency or from NCS.

- Unless there is eminent danger, when a served agency manager tells you to end operations you should notify NCS before closing your station.

- If you had to close the station quickly because of an emergency contact NCS as soon as it is safe and let them know what is going on.

Set Up, Operation & Teardown

- Before leaving clean up the area you occupied and remove any trash, coffee cups and pop cans that accumulated during the event.

- After the event collect your messages and notes and save them for an emcomm team debrief session (sometimes your notes and message copies will be turned over to the served agency manager before leaving).

Set Up, Operation & Teardown

- After an emergency station operation your emcomm group (and possibly the served agency) will want to hold a debriefing session.

- The purpose of the debriefing sessions to review what worked well, issues that may have arisen and where improvements are needed for future operations.

- Jolting down notes during the event will help your memory for the debrief session that follows the event.

Review

1. If you have been activated during an emergency and have been told to report to an agency that is different from your usual assignment you should introduce yourself to the person in charge as the emergency communicator assigned to that location

2. If you are asked to brief the staff of a served agency about the privacy of amateur radio you should tell them that there are no methods by which the security of any message can be assured on Amateur Radio

Review

3. If you have been assigned to a site and the emergency ends and the site manager asks you to close your station; you should you should check in with the emcomm manager or net control before closing down.
4. In preparing to leave a site after an emcomm event you should not unpack all desk items you placed in boxes and put them back in their original locations.
5. The primary purpose for a debriefing after each emcomm event is that affords an opportunity to improve future emcomm activities.

LU 16

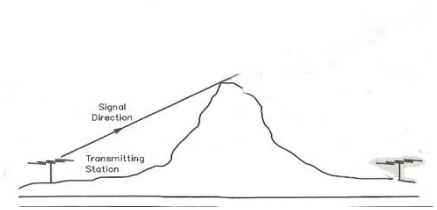
Operations and Logistics

- One of the values Amateur Radio brings to the table is a vast amount of radio spectrum;
- Most local and regional emcomm traffic will be on 2 meter and 70 cm FM, or on 40, 60 or 80 meter SSB and CW.
- VHF and UHF FM are preferred for most local operation because the equipment is common, antennas are smaller, and communications are clearer.

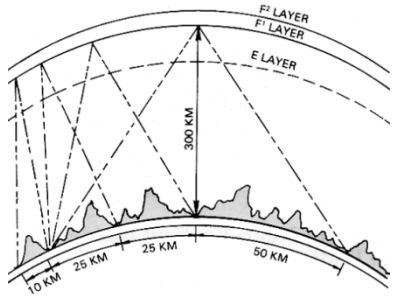
LU 16

Operations and Logistics

- VHF and UHF communication range is determined by terrain, antenna height and availability of repeaters .



- For larger areas or those with out repeaters most local emcomm operation will be on the 40 and 80 meter bands using NVIS (Near Vertical Incident Skywave) antennas.



- Your jump kit should have a list of frequencies commonly used for emcomm.

Operations and Logistics

- You should become familiar with coverage, and features or each permanent repeater
  - Are there dead spots in the repeater coverage?
  - How much transmit power required to hit the repeater?
  - What features are available (like phone patch, Echo Link etc.)?
  - How does the repeater identify?
  - Does it have a courtesy tone?
  - Does it have a time out, how long, how is it reset?
  - Are there inks to other repeater systems?

Operations and Logistics

- You should become familiar with coverage, and features or each permanent Packet node, digipeater and other means of digital communication like Packet-Pactor, WinLink, PSK31, RTTY, etc in your area.
    - Are there mail boxes?
    - Do they have digipeater functions?
    - Do they have bulletin boards?
    - Which software do they use, how can you communicate through it?
    - What other nodes can they connect to?
    - How many communications can the support simultaneously?

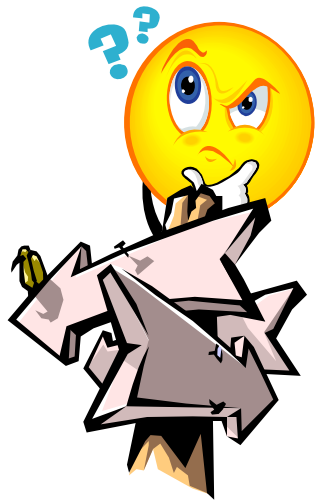
Operations and Logistics

- If all else fails and simplex communications are spotty consider placing a mobile station or portable repeater on a hill top or on the top of a tall building.

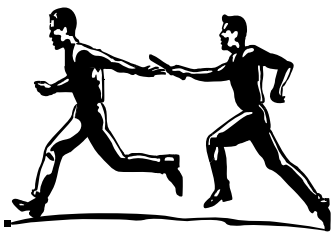
- Portable Battery operated repeaters are a good resource to have available. They are easily and quickly deployed when and where needed.

- Permanent repeaters designated for emcomm use should have backup power available (batteries and/or generator)

Operations and Logistics



- In addition to the main net frequency each net should have several alternate frequencies available. A couple in case of interference on the main net frequency and a couple for stations to pass traffic “off net”.



- If there is no direct path between NCS and the emcomm station a relay station should be identified to relay incoming and outgoing traffic.

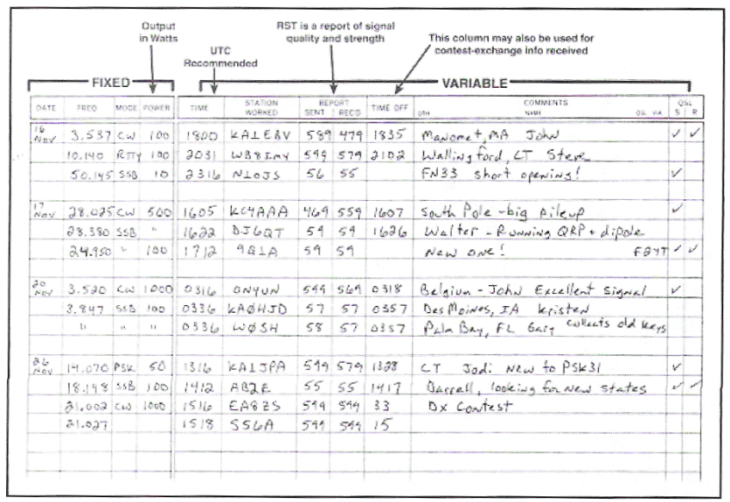
Operations and Logistics

- Most served agencies will expect you to keep records of your operations. Your records should include copies of messages received and sent, station log memos and any official correspondence.
- In Some agencies your station records are permanent and important legal documents and must be treated as such.
- To protect equipment and the messages you handle an prevent distractions it is best to allow only the operators who are on duty to be in the communications room.

LU 16

Operations and Logistics

- Station logs should contain:
  - Arrival and departure times
  - Times for nets you can you checked into
  - Times for nets you can you checked out of
  - Message number, sender and addressee
  - Special handling instructions
  - Critical events (damage, power loss, injuries, earth tremors)
  - Other emergencies



Operations and Logistics

- An unusual event such as an emcomm emergency response to a disaster can create incredible amounts of stress. When under extreme stress individuals can become:
  - Disoriented & Confused
  - Unable to make decisions
  - Loose their tempers
  - Behave in ways they would not at any other time

Operations and Logistics

- Extreme stress can lead to nervous breakdowns
  - Take a break. You can't do it all now
  - Step back and take a few deep breaths and relax
  - Prioritize your assignments and duties
  - Delegate some of your responsibilities
  - Do not take comments personally \ Look at them them as constructive criticism
  - Pay attention to your own needs (Food, water, medical needs, sleep)
  - If someone is loosing control of a situation bring someone else in to assist (or let your manager know they need help)
  - Take a minute to think before responding to a stress causing challenge

Operations and Logistics

- If operating from battery power you will need to:
  - Have enough batteries for the expected duration
  - Find a way to recharge them if long operating times are required (may not be practical for slow charge batteries)
  - Have standard connectors on the battery and radio
- If using a gasoline generator think about it's placement to prevent Carbon Monoxide from entering inhabited areas and insure its acoustical noise causes minimum disturbance to others.

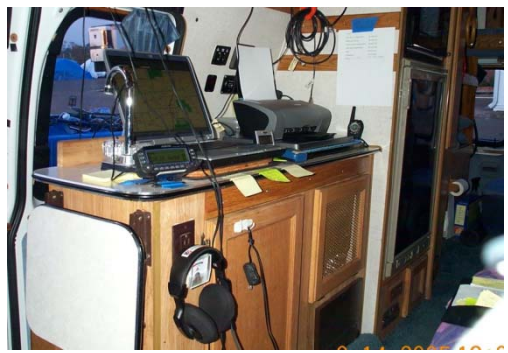
Operations and Logistics

- In the world of modern emcomm you may be asked to handle other assignments for the served agency that may or may not include communications.
  At one time the answer was a hard and fast “NO”

- Today most emcomm groups will let their volunteers be cross trained to perform a variety of served agency skills that also involve communications:
  - SKYWARN weather spotting
  - Red Cross Damage Assessment
  - Red Cross logistics Jobs
  - Situations where you could do both jobs

Operations and Logistics

- Some Portable stations used during Katrina ranging from an HT with gel cells to a kilowatt HF station



Review

1. Terrain, output power and antenna gain will limit VHF simplex communication range.
2. Increasing antenna height, increasing transmitter output power and moving the antenna away from obstructions will improve simplex reception (range). Switching to a non-directional antenna will not improve reception.
3. The FCC rules do not permit unattended operation of simplex repeaters.

Review

4. Driving a delivery vehicle for a served agency would not be an appropriate assignment for an emcomm volunteer.
5. Prioritizing you actions with the most important and time sensitive first on the list is a good means of dealing with stress during an emcomm event.

Personal Safety, Survival & Health

- As a disaster relief volunteer be do not get so involved in helping others that you forget to take care of yourself. You need to keep yourself in good condition so you are able to assist others.

- Before leaving home for an assignment be sure you have made all the necessary arrangements for the security, safety and general well being of your family.

- Set up a communication plan with your family.

Personal Safety, Survival & Health

- In addition to your emcomm checklist you may want to create a home and family checklist.
- Some things to consider:
  - If you will be without power In an area where it will freeze drain your water pipes.
  - Heating fuel tanks should be filled
  - Shut off power and gas
  - Board up windows
  - Move valuables to an upper level
  - Insure your family has reliable transportation with a full fuel tank
  - Emergency food and water supply.
  - Prescription medications

Personal Safety, Survival & Health

- When You leave
  - Food (2000 calories a day) Freeze dried camping food, Energy bars, military style Meals Ready To Eat (MRE) and small camp cook stove.
  - Water (4 gallons per day recommended, 1 gallon per day to survive). Questionable water can be purified by adding 2-4 drops of Clorox laundry bleach to a gallon of water and leaving it sit for 30 minutes.
  - Personal Hygiene items- Tooth paste, tooth brush, deodorant soap or waterless hand cleaner

Personal Safety, Survival & Health

- When You leave (continued)

  - Prescriptions
  - Extra glasses (or safety glasses) in a hard felt lined case.

  - Cash – Do not assume there will be a cash machine or that food an fuel can be paid for with a Credit/Debit card.

There is a sample personal survival and comfort check list on pages 108 and 109 in your Emcomm I Training manual

Personal Safety, Survival & Health

- **Safety in unsafe places**. Many times you will be sent to areas that can be dangerous and pose safety risks.
  - Understand the environment before entering.
  - Wear appropriate clothing and if appropriate gloves and boots.
  - A hard hat might be appropriate in some situations
  - Avoid industrial areas where toxic chemicals nay be stored.
  - Always be sure you have more than one exit from you operating location.
  - Carry a Police or signaling whistle so you can let rescuers know where you are if you need to be rescued
  - Flashlight and if possible a chemical light stick

Review

1. Water purification tablets will not remove Bacteria and dirt (it will kill bacteria but not remove dirt).
2. It is best to use two to four drops of plain chlorine to a gallon of water to purify it for drinking .
3. Keep spare eyeglasses or safety glasses in a hard felt lined storage case in your go bag.

Review

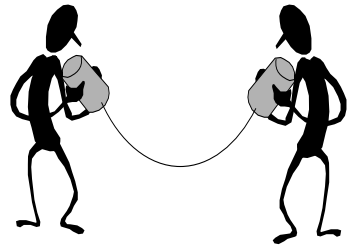
4. Because many disaster assignments are in unsafe places you should always plan more than one escape route from buildings and other hazardous locations.

5. An average person requires at least four gallons of drinking water per day

6. An MRE meal is a package meal that can be stored for a long period of time and requires a minimum of preparation. MRE stands for Meals, Ready to Eat.

LU 18

Alternative Communication Methods



- Amateur radio may not be the only radio service for the job.

- Handing an official a hand held radio to stay in contact with the ARES/RACES team may be better than shadowing the official, epically when the official is involved with sensitive issues.

- The amateur radio emcomm team should be equipped to communicate with other communication networks and types.

LU 18

Alternative Communication Methods

- Some of the alternative communication radio services require licenses, others require group licensed and still others require no license at all.

- You can easily modify many of today's 2 meter/70cm radios to operate on a nearby public service or business band radio service frequencies. You should think carefully about how you will use the modified radio vs. the risk of accidentally transmitting on a frequency in another service.

LU 18

Alternative Communication Methods

- CB (Citizens Band) radios
  - No License required (you can use your old CB call if you had one when the FCC issued licenses.
  - AM (Some SSB) - Voice communication only.
  - 5 watts input to final maximum.
  - Operate on 11 meters (26.965-27.405) on 40 assigned channels.
  - Used by emergency teams like REACT
  - Typical range is 2-8 miles for mobiles, 25 for base to mobile operation,. FCC limits the max allowable communication range to 75 miles.
  - Chanel 9 is still monitored for emergency traffic by some emergency responders in more rural areas.

LU 18

Alternative Communication Methods

- FRS (Family Radio Service) radios
  - No License required
  - No Base Stations, only HT's
  - FM voice communication only.
  - 100-500 mw transmit power .
  - Operate in the 462 MHz range
  - 14 channels with CTCSS tone capability
  - Used by emergency teams like REACT
  - Typical range is 1-5 miles
  - Chanel 1 is monitored by REACT for emergency traffic

LU 18

Alternative Communication Methods

- MURS (Multi Use Radio Service)
  - No License required (the new Citizens Band)
  - Personal and business communication allowed.
  - Primarily for mobile and portable use.
  - Maximum of 2 watt transmit power .
  - Operate on 151-154 MHz, FM Voice only.
  - 14 channels with CTCSS tone capability.
  - Used by emergency teams like REACT.
  - Range is similar to a 2 meter hand held on simplex.

LU 18

Alternative Communication Methods

- GMRS (General Mobile Radio Service) radios
  - License required – No Call sign
  - No Base Stations, only HT's
  - FM - Voice communication only.
  - 5 watt max transmit power on channels shared with FRS
  - 50 watts on non FRS Channels
  - UHF Frequencies between 462.5625 to 462.7250 MHz
  - FM Voice only.
  - 15 channels with CTCSS tone capability.
  - 8 channels are paired with a repeater frequency 5 MHz higher.
  - No Frequency Coordination or assigned frequency for users.

LU 18

Alternative Communication Methods

- Public Service Radio (Police, fire)
  - May allow you to train to use their radios.
  - Only use if directed by an officer
  - Keep transmissions short.
  - Cease transmitting if they tell you to
  - Do not modify your radios for these bands.

- Cellular and PCS Phones
  - In smaller events these may still be viable
  - Offer more security than Amateur Radio
  - Can Send text messages

LU 18

Alternative Communication Methods

- Marine Radio
  - Allocated channels on the 160 MHz Band for Ports and Inland waterways.
  - No License requires for US waters operation.
  - FM Voice.
  - 25 watt transmit power
  - Chanel 16 monitored by Coast Guard.
  - Additional HF Frequencies allocated between 2 and 30 MHz for long range SSB Communication
  - IF you hear a vessel and no one is responding you are permitted to answer the distress call and determine the nature of the emergency and relay the message to the coast guard or other authority.

LU 18

Alternative Communication Methods

- Aviation Radio
  - 108 to 136 MHz (108-118 for navigation, 118-136 MHz reserved for Voice communication). Military aircraft use 225 MHz to 400 MHz
  - AM Voice.
  - Emergency frequency is 121.5 MHz for commercial aircraft and 243.0 for Military aircraft.

- Non-Radio Communication
  - Land line telephone if it is still working
  - FAX
  - Email
  - Courier

Review

1. You can not use your amateur call sign on citizens band even if you were a licensed amateur when 11 meters was an amateur band.

2. Call at regular intervals on channels 9 and 19 when trying to summon help on a citizens band radio.

3. FRS Radios are readily available at low cost, operation is simple and requires little training and there is no licensing requirement for FRS. FRS radios have limited range because they have low transmit power and can not be connected to an external antenna.

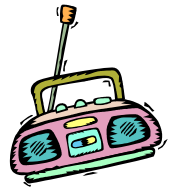
Review

4. Any individual can license a GMRS system for personal and family use.

5. Data Emissions are not permitted on MURS (Multi-Use Radio Service)

LU 19

What to Expect in Large Scale Disasters

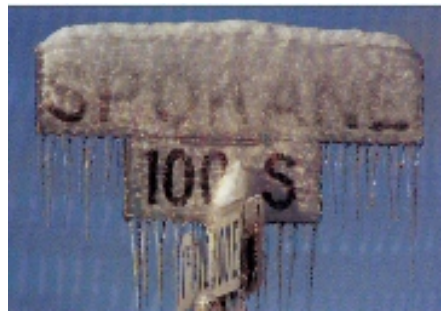


- At the onset of a disaster:
  - there is a huge increase of volume in traffic on public service radio channels.
  - Prolonged waiting periods to gain access to communications.
  - Outages may occur in key areas.
  - Messages are not handled in priority order and are sometimes lost.

- As additional agencies arrive:
  - There is a need for agencies to communicate with each other but may be unable to use each others frequencies.
  - Their communication procedures may be different.
  - Agencies are reluctant to have others operate their equipment

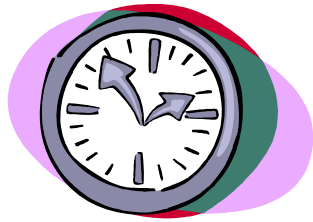
LU 19

What to Expect in Large Scale Disasters



- During initial phase:
  - Message reply delays are experienced.
  - Agencies may need to contact others more than 350 miles away.
  - Message reply delays are experienced leading to deferred decisions on crucial matters.
- Different modes of communication are required in addition to voice.
  - Volume data in printed form (High speed packet & Fax).
  - Morse code and PSK31 for difficult reception conditions.
  - Encoded data for privacy.
  - Telephone interconnects to and from radio systems.

What to Expect in Large Scale Disasters



- During the first 72 Hours of a disaster:
  - It takes precious time to overcome obstacles.
  - Communication is one of the vital resources that can be difficult.
  - The greatest concentration of relief effort generally found in incorporated cities served by agencies with paid professionals.
  - Rural areas suffer because of their remoteness and limited resources.
  - Frequently the public is isolated, unable to call out for help or determine what their course of action should be.
  - Lack of information leads to further attempts to use the already overloaded phone systems.

LU 19

What to Expect in Large Scale Disasters

- After the first 72 hours the disaster area usually remains in virtual isolation from the rest of the world.

- The American Red Cross is the organization that handles health and welfare on behalf of the victims.

- Amateur radio plays an important role of communicating health and welfare information.

Review

1. The first thing that happens afer a disaster occure is a massive increase in the volume of traffic on public service radio channels.

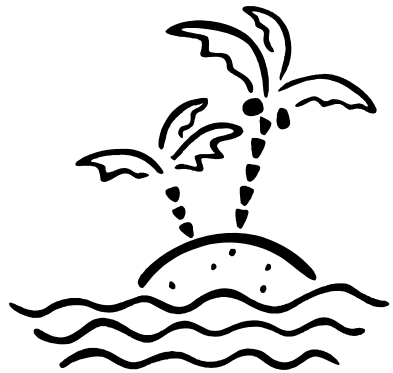
2. One of the big issues in an emergency is that agencies all use different frequencies and inter agency communication is not possible.

3. The greatest concentration of relief efforts during the first 72 hours of a disaster will be found in urban areas.

Review

4. The American Red Cross is the organization that handles health and welfare on behalf of the victims.

5. in the initial 72 hours following a disaster the disaster area usually remains in virtual isolation.



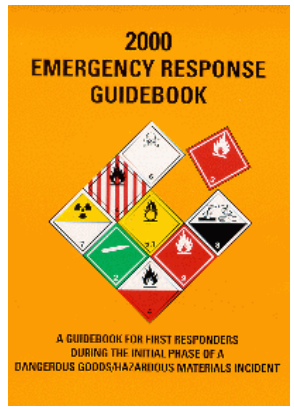
Hazardous Materials Awareness

- You may pass through a HazMat (Hazardous Materials) Incident in route to an assignment or be stationed at a HazMat incident.

- HazMat materials include liquids, solids and gasses that are corrosive, poisonous , or radioactive, explosive or otherwise hazardous to your health and that of others.

Hazardous Materials Awareness

- Proper training is required for your safety around HazMat incidents.
- The US Department of Transportation (DOT) is responsible for the safety regulations for the transportation of hazardous materials.
- DOT has defined Hazardous materials by a class designation and has established standardized Hazardous material in placards and other markings requirements for vehicles transporting them



Hazardous Materials Awareness

- All freight containers, railcars, and trucks transporting Hazardous materials must display the diamond shaped placard identifying the class (or classes) of materials they are carrying.

- A commonly seen placard is the one with the number 1203 (Petrol) will be seen on Gasoline tankers delivering fuel to your local service station.

- The sign placard with 1993 is for diesel fuel

Hazardous Materials Awareness

- The National Fire Protection Association (NFPA) has devised a marking system to alert fire fighters to the characteristics of hazardous materials stored in stationary tanks and facilities. The system is known as the NFPA 704M. In consists of a diamond shaped placard with 4 smaller diamonds.
- The numbers in the diamonds represent the hazard to humans on a scale of 1 to 4 (4 being the highest).

  The colors are
  - Red - Fire Hazard
  - Blue - Health Hazard
  - Yellow - likelihood to explode or react

Hazardous Materials Awareness

- You should report what y0ou see if asked, but do not get to close to the HazMat Incident. Information that would be helpful to report would be:
    - Location of incident and location
    - What kind of incident
        - Spill
        - Gaseous cloud
        - Any visible placards on building, tanks or vehicle

Review

1. You should be located as far away as necessary to ensure your safety when in the vicinity of a HazMat incident .

2. The Department of Transportation is Responsible for warning the public about hazardous materials containers and shipments.

3. You should be far away so that no vapors or fumes are present before transmitting in the area of a HazMat incident.

Review

4. On the sides of transporting vehicles different classes of hazardous materials are identified by placards, four digit numbers and warning labels or icons.

5. Gasoline tankers filling a neighborhood gas stations underground tanks are identified with a placard bearing the number **1203**

LU 21

Marine Communications

- The most common for marine communication is
  - VHF FM voice
  - Range is 1-15 miles ship to ship
  - Range is 20-30 miles ship to shore
  - In the 156-162 MHz range

- Vessels outside the FM communication range will have MW/HF or satellite radios for communication .

LU 21

Marine Communications

- Marine FM radios are marked in channels rather than frequency.
- Te Marine FM channels are assigned for specific purposes:
  - Channel FM16 – Calling frequency and distress calling frequency.
  - Channel FM 9 – Alternate calling frequency.
  - Channel FM83 – Coast Guard Auxiliary.
  - Channel FM22 – Communication with the Coast Guard, but only when specifically instructed to go there.
  - Channel FM 23 – Us Coast Guard

LU 21

Marine Communications

- Calling an emergency on a marine radio:
  - **MAYDAY-MAYDAY** - Highest priority distress signal, grave danger, immediate assistance is needed.
  - **PAN-PAN** (pronounced Pawn - Pawn) urgent call concerning safety of vessel or person.
  - **SECURITE** - Official message regarding safety of navigation or weather warnings.
  - **SILENCE –** The Coast Guard may order silence on a specific channel and limit it's use to activities involved in an incident or emergency.

LU 21

Marine Communications

- The following information should be obtained from the vessel in distress:
  - `Position of the vessel involves (GPS if possible)
  - Number of persons on board
  - Nature of distress
  - Name and call sign (if there is one) of the vessel
  - Type and length of the vessel
  - Description of the vessel including color.
  - Weather conditions on scene
  - If they have an EPIRB on board and it’s class.

Marine Communications

- Once you have the information advise all persons to don their life jackets.

- Then call the nearest USCG facility or 911. Let them know how to contact you in case you are the only link to the vessel in distress.

LU 21

Review

1. It is only permissible to use Marine FM channel 22 when Instructed to do so by the Coast Guard

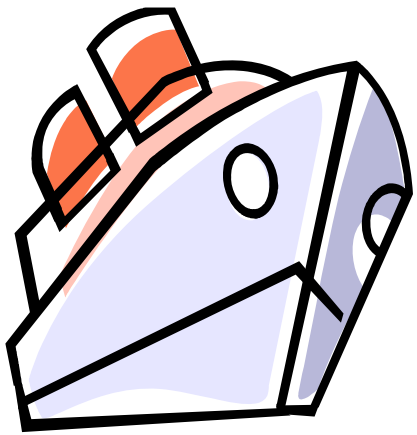
2. If you hear a marine distress call and it goes answered after listening you should respond and gather all the information possible then contact the nearest Coast Guard facility

3. You must identify yourself on all transmissions on a VHF Marine radio

Review

4. Only Seagoing vessels operating outside the range of VHF communication are authorized to transmit on the marine MW/HF SSB frequencies.

5 Marine FM channels 9 and 16 can be used to call another vessel



LU 22

Other Learning Opportunities

- Regularly scheduled nets provide an excellent opportunity to practice net procedure. Nets are also a good opportunity to practice being net control operator.

- Local ARES/RACES formal training and both on and off the air.

- Public service events and formal training like SET, SKYWARN recognition day and Field Day offer excellent setup and on the air practice.

LU 22

Other Learning Opportunities

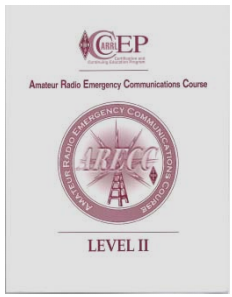
- There is additional training and resource material available on the ARRL website that can be dopwn loaded and printed for free:
  - ARRL Public Service manual
  - ARES Field Resources Manual
  - ARRL Net Directory
  - Spokane ARES/RACES web site

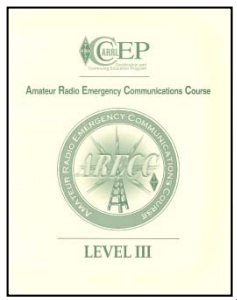
Check your training manual on page 129 and 130 for additional resources

LU 22

Review

1. Regularly scheduled nets, on air training sessions and public service events are recommended as a means of practicing actual emcomm skills. Discussion groups are not a means of practicing communication skills.
2. The purpose of the emcomm level II is to prepare individuals for the job of DEC or SEC.
3. The purpose of the emcomm level III is to prepare individuals for management level emcomm positions





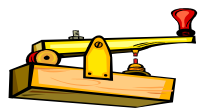
LU 23

Modes, Methods and Applications

You will need to choose the best method of communication for each situation in an emcomm environment.

Communications concepts to consider.

- Communications modes fall into several categories:
  - Point to point – Telephone and some digital modes
  - Multi-point – Voice and CW and some digital radio modes
  - High precision – Fax, e-mail and digital modes
  - Low precision – Voice, CW and Telephone
  - High priority – Voice, telephone
  - Low priority – Fax, e-mail, digital modes, CW



Modes, Methods and Applications

- Messages fall into similar categories:
  - Point to point – Messages intended for one party.
  - Point to multi-point – Messages intended for a group.
  - Multi-point to point – Messages from group members to one station .
  - High Precision – Lists of items, medical or technical terminology, specialized or detailed information.
  - High Priority – Fast delivery is critical.
  - Low priority – Messages can be delivered in a more relaxed time frame.

Modes, Methods and Applications

- Each message type should be sent using the most appropriate mode based on the message content and destination.

- Remember radio may not be the only means of communication available at a site. For example, if you are at a red cross shelter with power:
  - Consider using a power supply for the radio to save batteries.
  - If fax or telephones or internet are available at both ends use them, but be prepared should they go down on either end to use radio communication.

Modes, Methods and Applications

- Do not use voice for messages that are long, detailed , or technical in nature if an alternate means or mode is available.

- Think about who may be monitoring before sending sensitive or private information. Consider that the press, general public and thieves may be monitoring what you transmit.
  - Some modes provide an increased level of security
  - No amateur radio transmission is totally secure.

Modes, Methods and Applications

Digital modes:

- Can be useful in passing large volumes of traffic.
- Can provide error free transmission (many have error correction) of input data, can be saved at either end for re-transmission, printing or archiving.

– What digital modes are available?

- For HF the best digital modes are Packet, AMTOR mode B and PSK31.
- For VHF/UHF The TNC 2 (Terminal Node controller version 2) Packet is the most common

LU 23

Modes, Methods and Applications

Additional Modes

- APRS for location and short messages
- Amateur TV
  - Slow Scan images via HF
  - Real time TV on 70 cm and above

REVIEW

1. Your purpose as an emergency communicator is to provide accurate and rapid transfer of information from one place to another.

2. Tactical messages are generally low precision and not time critical.

3. Long lists and detailed messages are best handled by FAX or Digital mode transmissions.

REVIEW

4. If absolute privacy is required do not transmit the message by amateur radio.

5. The QPSK mode of PSK31 features error correction.

CONGRATULATIONS!!

YOU HAVE COMPLETED THE SPOKANE COUNTY ARES RACES ARRL EMCOMM LEVEL I TRAINING CLASS