ARRL Introduction to Emergency Communication Course

Indian River County FL ARES®

Introduction to Emergency Communication

Section 2: Topic 16 Through Topic 29

Presented for

Indian River County FL ARES®

With Thanks to:

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ARRL ARECC Field Instructor

Introduction to Emergency Communication

A Course Book is also available from ARRL: The ARRL Introduction to Emergency Communication Course, 4th Edition

Test Preparation Suggestions :

- Read each topic through completely.
- Questions and answers are included at the end of each section.
- Learn the actual answer. Do not memorize "A, B, or C"; they are different on the actual test.
- Be cautious of the True/ False statement of a question.

The Incident Command System Topic 16

Introduction

- **In the early 1970s, a disorganized and ineffective multi-agency response to a series of major wild fires in Southern California prompted municipal, county, state and federal fire authorities to form an organization known as Firefighting Resources of California Organized for Potential Emergencies (FIRESCOPE).**

- **California authorities had found that a lack of coordination and cooperation between the various responding agencies resulted in over-lapping efforts, and gaps in the overall response.**

The Incident Command System Topic 16

Introduction (Continued)

- **Many specific problems involving multi-agency responses were identified by FIRESCOPE.**

  - **These included:**

    - ➢ **poor overall organization,**

    - ➢ **ineffective communication between agencies,**

    - ➢ **lack of accountability,**

    - ➢ **lack of a single, universal, and well-defined command structure.**

- **Their efforts to address these difficulties resulted in the development of the original Incident Command System.**

The Incident Command System Topic 16

Introduction (Continued)

- **Although developed for wild fires, the system ultimately evolved into an "all-risk" system, appropriate for all types of fire and non-fire emergencies.**

- **There are other versions of the ICS in use, but the Incident Command System (ICS), as developed by the National Fire Academy (NFA), has been widely recognized as a model tool for the command, control, and coordination of resources and personnel at the scene of an emergency and is used by most fire, police, and other agencies around the country.**

The Incident Command System Topic 16

Introduction (Continued)

- **The use of the ICS is now required by various federal laws for all hazardous material incidents, and in other situations by many state and local laws. The ICS has also been adopted for use in many other countries.**

- **Looking at a larger scale, the success of the ICS also led to development of protocols that would guide whole regions of the country, including non-government responders. This became NIMS – the National Incident Management System.**

The Incident Command System Topic 16

NIMS

- **The National Incident Management System (NIMS) provides a systematic, proactive approach to guide departments and agencies at all levels of government, nongovernmental organizations, and the private sector to work seamlessly to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment.**

- **NIMS works hand in hand with the National Response Framework (NRF). NIMS provides the template for the management of incidents, while the NRF provides the structure and mechanisms for national-level policy for incident management.**

The Incident Command System Topic 16

What is the ICS?

- **The Incident Command System (ICS) is a management tool that preserves the command structure of each responding agency, while bringing them all together under a common plan and leader.**

- **Under ICS, each agency recognizes one "lead" coordinating agency and person, will handle one or more tasks that are part of a single over-all plan, and interact with other agencies in defined ways.**

The Incident Command System Topic 16

What the ICS is Not

- Not a fixed and unchangeable system.
- Not a means to take control or authority away from agencies or departments.
- Not a way to subvert the normal chain of command.
- Not always managed by the fire department.
- Not to big and cumbersome to be used in small every day events.
- Not restricted to use by government agencies.

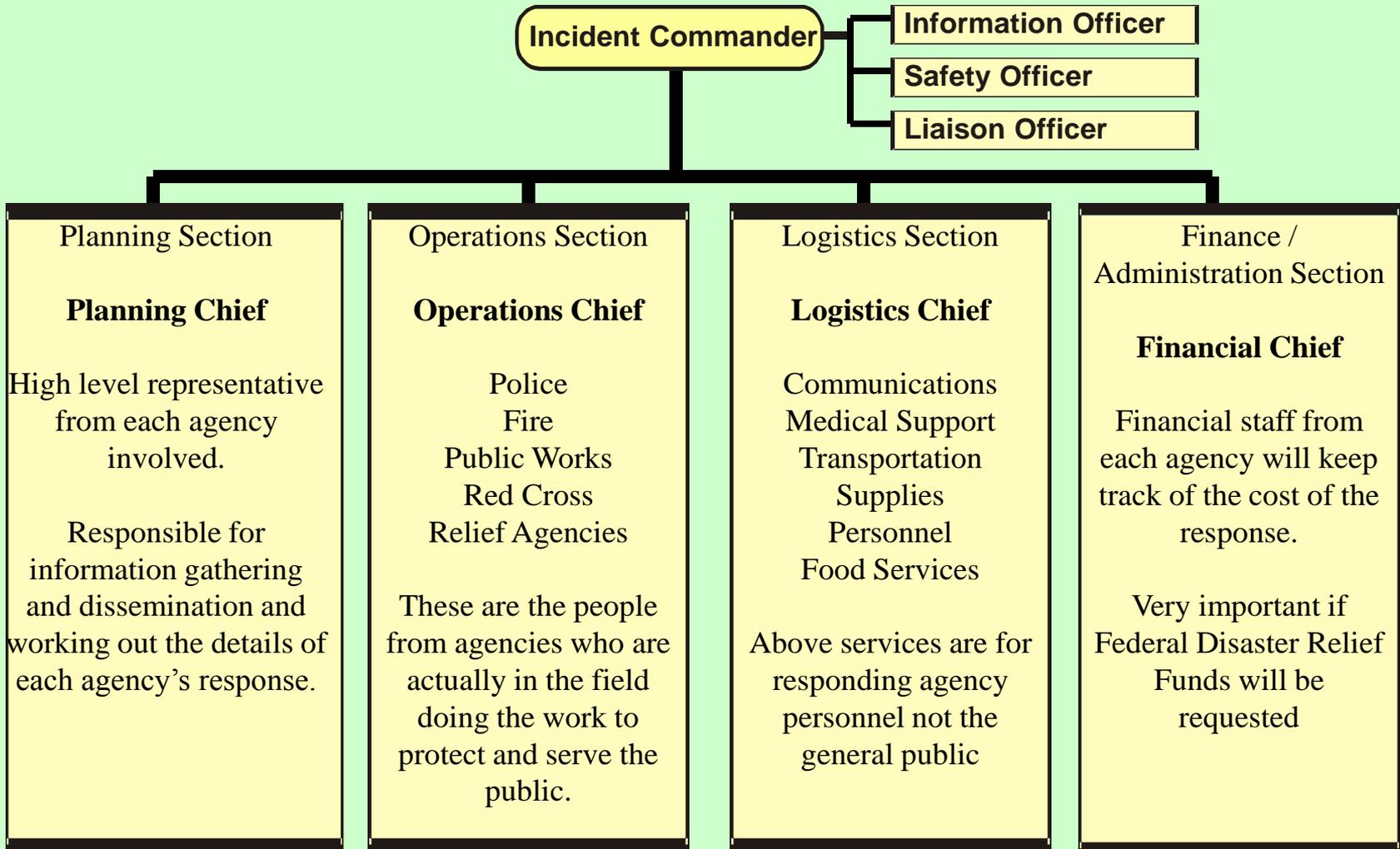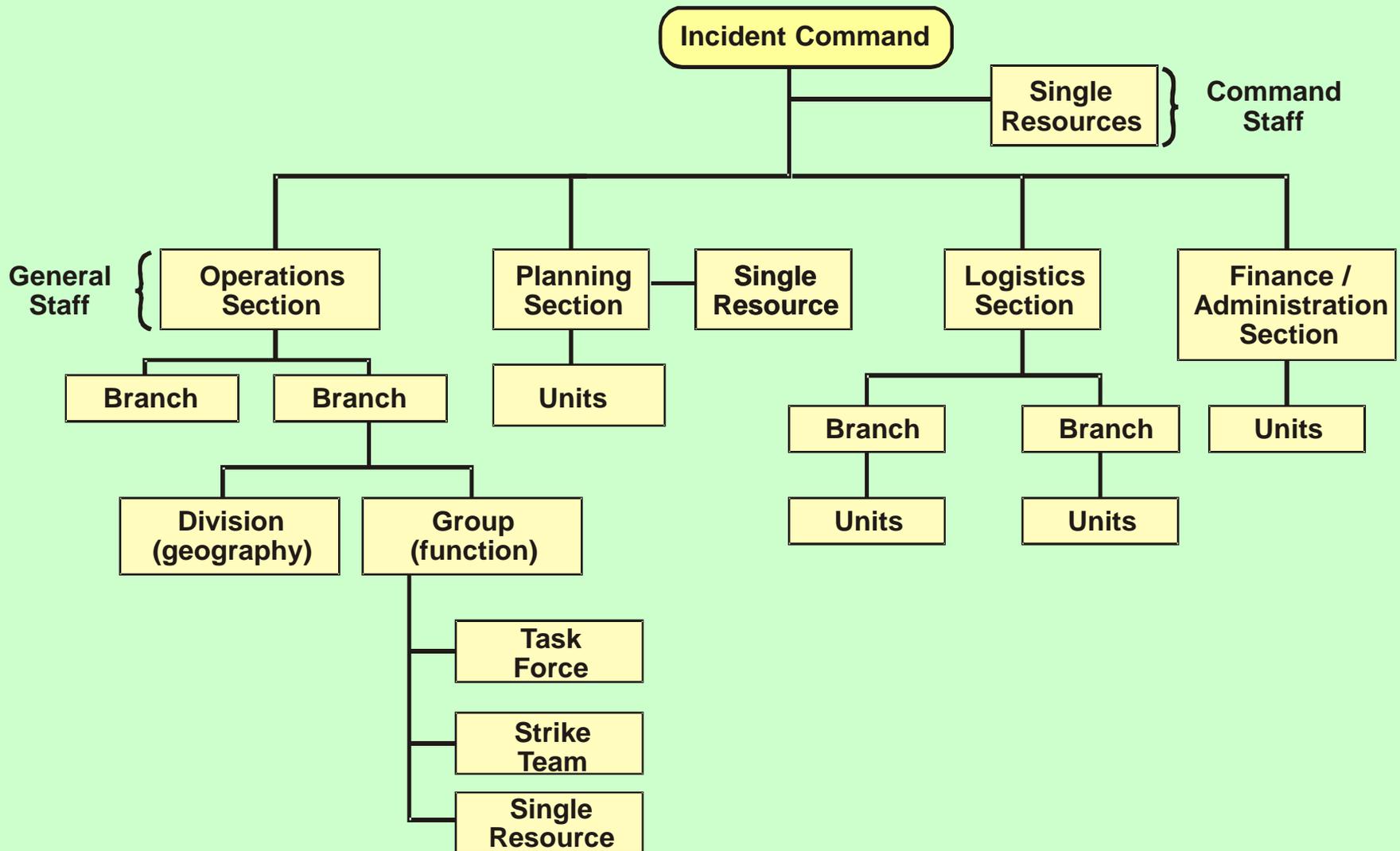# The Incident Command System Topic 16

The ICS Structure

- There are two interrelated parts:
  - ❖ Management by Objectives – Four steps –
    - ➢ Understand the policies, procedures and statutes.
    - ➢ Establish incident objectives.
    - ➢ Select appropriate strategies for cooperation and resource utilization.
    - ➢ Apply tactics most likely to succeed.

ICS Organizational Structure

Incident Commander

Information Officer

Safety Officer

Liaison Officer

Planning Section	Operations Section	Logistics Section	Finance / Administration Section
Planning Chief	**Operations Chief**	**Logistics Chief**	**Financial Chief**
High level representative from each agency involved. Responsible for information gathering and dissemination and working out the details of each agency's response.	Police Fire Public Works Red Cross Relief Agencies These are the people from agencies who are actually in the field doing the work to protect and serve the public.	Communications Medical Support Transportation Supplies Personnel Food Services Above services are for responding agency personnel not the general public	Financial staff from each agency will keep track of the cost of the response. Very important if Federal Disaster Relief Funds will be requested

Expanded ICS Organization

The Incident Command System Topic 16

The Incident Commander (IC)

- The IC is usually the most senior on-scene officer from the first responding agency.

- The IC is responsible for the management of the incident and starts the process by helping setting initial incident objectives, followed by an "Incident Plan" (IP).

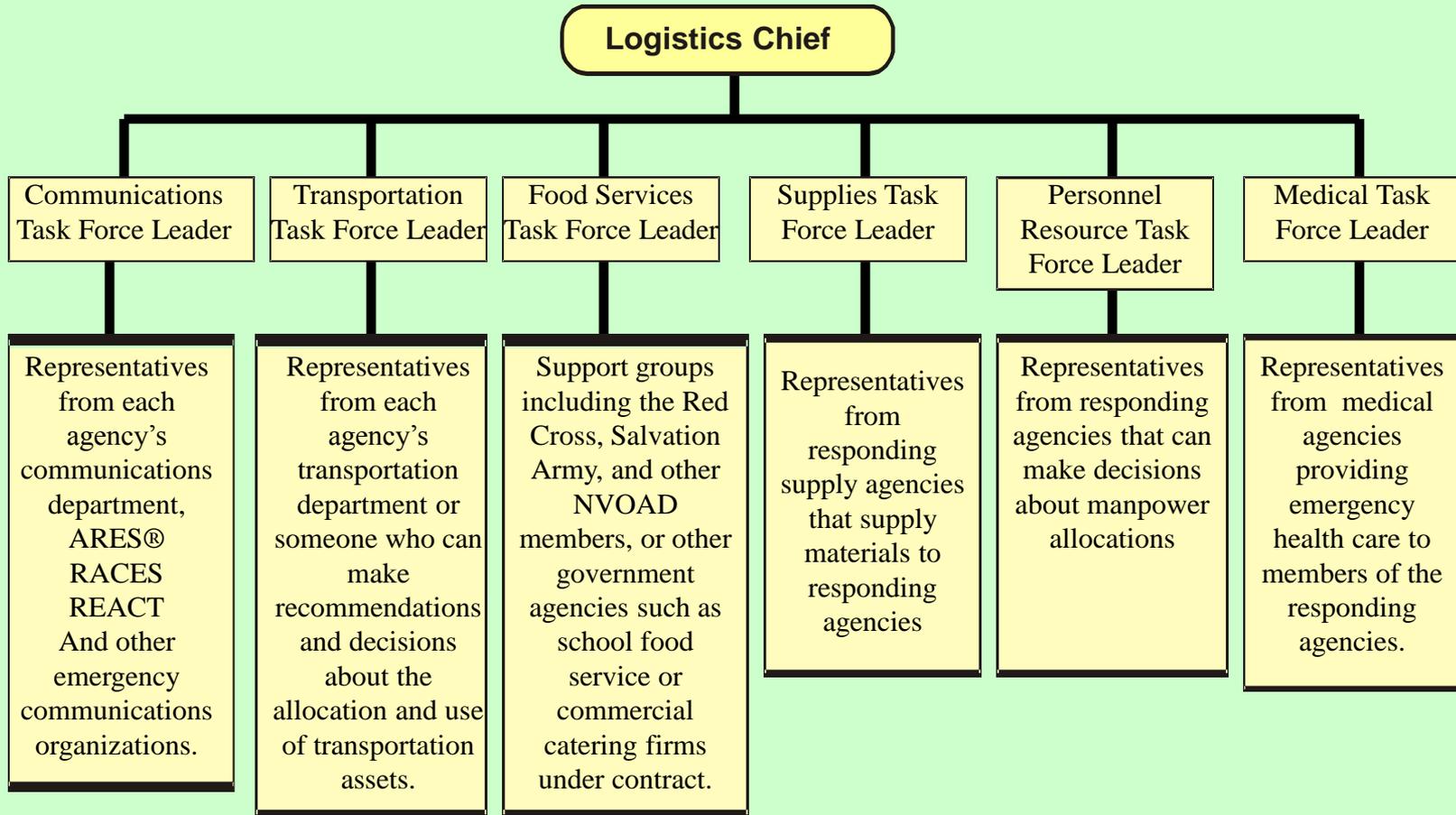- The IC has overall responsibility for the incident, regardless of the duties delegated.

The Incident Command System Topic 16

How Does an Emcomm Group "Fit Into" The ICS

- Involvement in any incident where ICS is used is by "invitation only" – there is no role for off-the-street volunteers.

- Your group may not have a part in the ICS structure except through your served agency.

- If your group is tasked with handling inter-agency communications it is likely that you will have a representative on the Logistics Section's "communications task force."

- Whether to use your emcomm group services may be made by the served agency, Communications Task Force leader, Logistics Chief or Incident Commander.

Logistics Organizational Structure

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                           ┌─────────────────┐
                           │ Logistics Chief │
                           └─────────────────┘
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Communications Task Force Leader	Transportation Task Force Leader	Food Services Task Force Leader	Supplies Task Force Leader	Personnel Resource Task Force Leader	Medical Task Force Leader
Representatives from each agency's communications department, ARES® RACES REACT And other emergency communications organizations.	Representatives from each agency's transportation department or someone who can make recommendations and decisions about the allocation and use of transportation assets.	Support groups including the Red Cross, Salvation Army, and other NVOAD members, or other government agencies such as school food service or commercial catering firms under contract.	Representatives from responding supply agencies that supply materials to responding agencies	Representatives from responding agencies that can make decisions about manpower allocations	Representatives from medical agencies providing emergency health care to members of the responding agencies.

The Incident Command System Topic 16 Review

- **The ICS is a management tool that preserves the command structure of each responding agency, while bringing them all together under a common plan and leader.**

- **Emcomm groups often operate as part of the Logistics section of the ICS.**

- **If the emcomm group serves the internal communication needs of only one agency, it may not be a formal part of the ICS structure.**

Introduction to Emergency Communication

Topic 16-1

What do the letters "ICS" stand for?

    A.   International Correspondence School

    B.   Incidence Command System

    C.   Institutional Control System

    D.   Internal Control Sequence

Topic 16-2

What is ICS?

    A.   A management tool for coordinating the resources of several agencies within a single command structure.

    B.   A fixed and unchangeable system for managing an incident.

    C.   A means of subverting the normal command structure within an agency or department.

    D.   A managed system restricted to use by government agencies and departments.

Introduction to Emergency Communication

Topic 16-3

The ICS has two interrelated parts. What are they?

- A. A mission statement and management objectives.
- B. **Management by objectives and organizational structure.**
- C. Organizational structure and a financial plan.
- D. A financial plan and an operational plan.

Topic 16-4

Aside from the Incident Commander, there are four major operating sections within an ICS. What are they?

- A. Planning, Operations, Logistics and Public Relations.
- B. Personnel, Planning, Operations and Finance/Administration.
- C. **Planning, Operations, Logistics and Finance/Administration.**
- D. Payroll, Finance/Administration, Logistics and Operation.

Introduction to Emergency Communication

Topic 16-5

What is an emcomm group's relationship to the ICS structure during an incident?

A. **The emcomm group always serves within the Logistics area.**

B. The emcomm group may or may not be a formal part of the ICS structure.

C. The emcomm group always serves the Task Force leader directly.

D. The emcomm group always serves the Incident Commander Directly.

Preparing for Deployment Topic 17

Prepared for what?

- Being prepared for an emergency communication deployment involves a wide range of considerations, including radio equipment, power sources, clothing and personal gear, food and water, information, and specialized training.

- Pre-planning and physical preparation are essential to an effective and timely emergency response. Know in advance where you are going, and what you are going to do when you get there.

- Keep a stocked and updated "jump kit" ready to go at a moments notice. Be sure that your kit is adequate for the types of deployments you are most likely to encounter.

Preparing for Deployment Topic 17

Jump Kits

- **The last thing you should need to do when a call for assistance comes is think of and locate all the items you might need.**

- **Any experienced emergency responder knows how important it is to keep a kit of the items they need ready to go at a moment's notice.**

- **This is often called a "jump kit" or "go kit."**

- **Without a jump kit, you will almost certainly leave something important at home, or bring items that will not do the job.**

- **Gathering and packing your equipment at the last moment also wastes precious time.**

- **It is important to think through each probable deployment ahead of time, and the range of situations you might encounter.**

Preparing for Deployment Topic 17

Jump Kits

- Most people seem to divide jump kits into two categories:
    - one for deployments under 24 hours,
    - one for up to 72 hours.
- For deployments longer than 72 hours, many people will just add more of the items that they will use up, such as clothing, food, water and batteries.
- Others may add a greater range of communication options and backup equipment as well.

❑   Let's take a look at a few basic questions you will need to answer.

Preparing for Deployment Topic 17

Jump Kits:

Here are a few basic questions you will need to answer:

- **Which networks will you need to join, and which equipment will you need to do so?**

- **Will you need to be able to relocate quickly, or can you bring a ton of gear?**

- **Will you be on foot, or near your vehicle?**

- **Is your assignment at a fixed location or will you be mobile?**

Preparing for Deployment Topic 17

Jump Kits:

Here are a few basic questions you will need to answer: (Continued)

- **How long might you be deployed—less than 48 hours, or even a week or more?**

- **Will you be in a building with reliable power and working toilets, or in a tent away from civilization?**

- **What sort of weather or other conditions might be encountered?**

- **Where will food and water come from?**

Preparing for Deployment Topic 17

Jump Kits:

Here are a few basic questions you will need to answer: (Continued)

- **Are sanitary facilities available?**

- **Will there be a place to sleep?**

- **Do you need to plan for a wide variety of possible scenarios, or only a few?**

- **Can some items do "double duty" to save space and weight?**

Introduction to Emergency Communication

Preparing for Deployment Topic 17

Jump Kits Idea List

- **Backpacks, plastic tubs, suitcases, etc. make it easily to store and stage.**
- **Package individual items (including clothing) in zip-lock bags. It can get wet out there.**
- **Radios and Accessories – VHF/UHF HT, spare batteries, speaker mic and headset, VHF/UHF gain antennas, etc.**
- **Personal Gear – Seasonal clothing, toilet kit, sleeping bag, money, first aid kit, personal meds, telephone calling card, etc.**
- **Information – ID cards, copy of ham license, frequency lists and schedules, maps (street & topographic), key phone numbers, etc.**
- **The LCRACESARES Yahoo Group web site has a more detailed list of jump kit items tailored to our area and the weather that we will probably experience.**

Preparing for Deployment Topic 17

Sub-Dividing Your Kits

- **Quick deployment kit: hand-held radio kit, personal essentials, in a large daypack**

- **VHF/UHF, HF kits for fixed locations**

- **Accessory and tool kit**

- **Emergency power kit**

- **Short and long term personal kits in duffel bags**

- **Field kitchen and food box in plastic storage tubs**

- **Field shelter kit (tents, tarps, tables, chairs, battery/gas lights) in plastic storage tubs**

Preparing for Deployment Topic 17

Pre-planning

- When the time comes, you need to know where to go & what to do.

- What frequency should you check in on? Is there a back up repeater? What is the simplex frequency?

- Is there emergency power available? Are antennas or cables permanently installed? Will you need a gain antenna?

- Will you need a long antenna cable to get to the roof? Will long power cables be required?

- If inside, does the building have a reliable water supply?

- You can not get enough information. However, you can stock reasonable supplies and equipment for most events you will be activated for.

Preparing for Deployment Topic 17

Training & Education

- **If the served agency offers emcomm volunteers job-specific training in areas related to communication, take it.**

- **For instance, the American Red Cross offers self-study or classroom course in mass care, damage assessment and other areas that either directly involve or depend upon effective communication.**

- **FEMA's Emergency Management Institute offers a wide range of courses, some of which may be related to your agency's mission.**

- **The ARRL offers two courses in Emergency Communications, this introductory course, and a online course for those who are serving in leadership or management roles, *Public Service and Emergency Communications Management for Radio Amateurs* (course # (EC-016). These courses are specifically tailored to Amateur Radio emcomm group training and education.**

Introduction to Emergency Communication

Topic 17-1

Of the following, which is the best reason for preparing a jump kit in advance?

   A. **You will not leave something important at home or waste valuable time.**

   B. You are spared the added expense of shopping for something after an emergency arises.

   C. You can be fully rested on the day of the emergency.

   D. You can test the batteries on your hand-held VHF before leaving home.

Topic 17-2

Which of the following would you omit from a jump kit prepared for a 12-hour deployment?

   A. Hand-held VHF or dual-band radio.

   B. Spare rechargeable batteries for the hand-held radio.

   C. High energy snacks.

   D. **Camp cot and tent.**

Introduction to Emergency Communication

Topic 17-3

Among the following, which are the most important items of information to include in your jump kit?

A. **ID cards and other authorizations.**

B. Field cookbook.

C. Automobile repair manual.

D. Instruction book for your chain saw.

Topic 17-4

Among the following, which is the least important item of personal gear to include in your jump kit?

A. Frequency lists and net schedules.

B. Contact information for other members of your group, EC, DEC and SEC.

C. Key phone numbers, email and internet addresses.

D. **A deck of playing cards.**

Introduction to Emergency Communication

Topic 17-5

If you are assigned in advance to a particular location for emcomm operations, what is the least important thing to know in advance?

A. The escape routes from the facility itself.

B. The regular business hours maintained at the facility.

C. The availability of radio equipment at the facility.

D. The location of your operating position and the planned location of the antenna.

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18

ARRL – ARES® Branded apparel standard

- There are many articles of ARES branded clothing on the market.

- Some is from ARRL itself, but much more is from other manufacturers and sellers with the ARES logo added.

- HOWEVER…When on actual deployments, there is a great need for a uniformed look to ARES volunteers.

- Other organizations have instituted standards for volunteers that provide identity, support public relations and comply with new emcomm standards (the American Red Cross is an excellent example of this).

- ARES people, however, continue to appear in all sorts of garb, are not easily recognized, and may fail to meet the increasing clothing and ID requirements of NIMS applications.

Equipment Choices for Emergency Communication Topic 18

ARRL – ARES® Branded apparel standard (Continued)

- **Garment colors**
  - **Safety Green (many people call it yellow) with silver reflective tape that meets ANSI Class 2 standards.**
- **Garment Types**
  - **3 types to accommodate climate conditions:**
    - **1. Tee shirts - long and short sleeve, 50/50 cotton/poly.**
    - **2. Vests - Velcro or zip front, break away, 100% polyester, solid or mesh.**
    - **3. Jacket or coat**

Equipment Choices for Emergency Communication Topic 18

ARRL – ARES® Branded apparel standard (Continued)

- **Apparel: The Specifics: The Back**
  - **All garments shall be imprinted on the back with 2 inch tall Arial Black font, black in color, three lines, center justified:**

AMATEUR RADIO
EMERGENCY
COMMUNICATIONS

- **If the size of the vest does not allow for that size font, the next closest Arial Black font size that fits should be used.**

- **Those in a leadership position may add their title (SEC, DIRECTOR, EC, PIO, etc) below Emergency Communications in not less than 3" tall Serpentine font, black.**

Equipment Choices for Emergency Communication Topic 18

ARRL – ARES® Branded apparel standard (Continued)

- **Apparel: The Specifics: The Front**
  - **Front left chest shall be imprinted with the ARES logo, no less than 3.5", and black in color.**
  - **The right chest area of the garment shall be left blank to allow wearer to affix their name/call badge or official ID badge.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18

ARRL – ARES® Branded apparel standard (Continued)

- **Apparel: The Specifics: Adding Organizational Names**
    - **Local jurisdictions may elect to add their organization name in the either or both of two places:**
    - **1. On the front below the ARES logo, Arial Black, black color, in not larger than 1/2" lettering.**
    - **2. On the back by adding their organization name (such as SUSSEX COUNTY, DELAWARE ARES) above Amateur Radio Emergency Communications with no larger than 1" Arial Black lettering, color black.**

Equipment Choices for Emergency Communication Topic 18

ARRL – ARES® Branded apparel standard (Continued)

Apparel: The Specifics: Implementation

- **A three year period has been given for the attrition of deployment clothing purchased before these standards were adopted.**

- **Beginning January 1, 2013, ARES volunteers in deployments, both emergency and community service related, will be encouraged *and expected* to wear outermost garments meeting these standards.**

- **Clubs and other groups are encouraged to make *group buys* through ARRL which may provide discounts for such purchases for ARRL affiliated clubs and groups.**

Equipment Choices for Emergency Communication Topic 18

ARRL – ARES® Branded apparel standard (Continued)

- **This standard (adopted January 2010, specifics in following pages) does not affect or change the availability or marketing of ARES branded clothing in non-deployed uses.**

- **It refers only to periods when ARES volunteer personnel are deployed for public service or emergency response situations.**

- **The result is easier identification, better recognition of the services that ARES performs by and for the public, more professional and peer acceptance, and an espirt de corps across ARES groups that surpass localized identities.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18

Transceivers – VHF/UHF

- **The most universal choice for emcomm is a dual band FM 35-50 watt mobile transceiver.**

- **Handheld transceivers should be used only when extreme portability is needed, such as "shadowing" an official, or when adequate battery or other DC power is not available.**

- **Both handheld and mobile dual-band radios can monitor more than one net, and several models allow simultaneous reception on more than one frequency on the same band.**

- **Many dual-band transceivers also offer a "cross-band repeater" function, useful for linking local portables with distant repeaters, or as a quickly deployable hilltop repeater.**

- **The Net Control or EOC locations should have a separate radio for each net.**

Equipment Choices for Emergency Communication Topic 18 Transceivers - HF

- Operation from a generator equipped EOC can be done with an ac powered radio, but having both ac and dc capability ensures the ability to operate under all conditions.

- Do not use dc to ac converters to power HF radios. Most use a high-frequency conversion process that generates significant broad-spectrum RF noise at HF frequencies that is difficult to suppress. The best inverters are those with a true sine wave output.

- Direct dc powering is more efficient in any case.

Equipment Choices for Emergency Communication Topic 18

Voltage Tolerance and Current Drain

- **Some transceivers nominally powered using 12 volts DC actually have a rather narrow range of voltage (e.g., 13.0 to 13.8 volts) over which they will operate properly, and even a high-quality battery part way through its discharge cycle can easily fall below such a tolerable range.**

- **Transceivers with a wide range of acceptable input voltages (e.g., 11.5 to 15 volts) are preferable in limited-power situations.**

- **Similarly, some transceivers draw much more power than others during receive.**

- **If your chosen rig has a current drain on the high side, look for menu settings that will lower the overall drain, especially if you will be operating from a limited power source.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18 Radio Receiver Performance

- Several aspects of a radio receivers performance suitable for emcomm include sensitivity, selectivity and intermodulation rejection.

- Mobile radios generally have better intermodulation rejection characteristics than handheld radios.

- Digital Signal Processing (DSP) may be the single most important filtering feature available.

- "Noise blankers" are used to reduce impulse noise from arcing power lines, vehicle and generator ignition systems, and various other sources.

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18 Antennas

- **VHF/UHF**
  - ❖ A good antenna, mounted as high as possible, is more important than high transmitter power. It provides TX and RX gain and may also allow output power to be reduced and extend battery life.
  - ❖ In relatively flat terrain, use a mast-mounted single or dual-band antenna with at least 3dBd gain.
  - ❖ For permanent base stations, a more rugged 2-way collinear antenna should be considered.
  - ❖ A magnetic mount mobile antenna for operating in someone else's vehicle and can be mounted indoors on a metal file cabinet.
  - ❖ "Rubber duck" hand-held radio antennas have negative gain!

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18 Antennas (Continued)

- **HF Antennas**
  - ❖ **For local operations (up to a few hundred miles), a simple random wire or dipole hung less than 1/4 wavelength above the ground works well and is easy to deploy. This is known as an NVIS antenna.**
  - ❖ **An antenna tuner is necessary for most portable wire antennas as the impedance of the antenna will vary with its height above ground.**
  - ❖ **For communication beyond 200 miles, a commercial trapped vertical may work.**
  - ❖ **Directional (beam) antennas offer the best performance for very wide area nets on 10 and 20meters since they maximize desired signals and reduce interference from stations in other directions.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18 Antennas (Continued)

- **Feedline**
  - ❖ **Feedline used at VHF and UHF frequencies should be low-loss foam dielectric coaxial cable. For short runs, RG-58 may be suitable, but for longer runs consider RG-8X or RG-213.**
  - ❖ **Feedline for HF may be coaxial or "ladder line." The choice will depend on the situation.**
  - ❖ **However, coaxial cable is much less susceptible to problems induced by routing near metal objects or other cables.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18 Operating Accessories

- **Headphones – They are useful anywhere, in a high ambient noise environment in the field, in a high radio traffic area like the EOC, or when your communications may disturb shelter residents.**

- **A microphone/headset and a foot switch works very well.**

- **Do not use voice operated transmit (VOX) during emcomm operations as ambient noise could inadvertently trigger the transmit switch.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18 Batteries

- Battery power is critical for emcomm operations!

- Batteries must be chosen to match the maximum load of the equipment, and length of time that operation must continue before they can be recharged.

- NiCad, NiMH, and Li-Ion: These battery types have higher power densities that AA alkaline cells. Many hand-held radios have optional AA alkaline battery cases and are recommended emcomm accessories.

- Anderson power pole electrical connectors are the standard connectors for ARES equipment.

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18 Batteries (Continued)

- **Lead Acid – There are three common types of lead-acid batteries:**
  - ❖ **Flooded (wet) – Can spilled if tipped.**
  - ❖ **Valve Regulated Lead Acid (VRLA) – Use gelled electrolyte and cannot spill.**
  - ❖ **Sealed Lead-Acid (SLA) – Similar to VRLA batteries, but can be operated in any position, even upside down.**
  - ❖ **Deep cycle batteries are a better choice than the common automotive batteries. For radio operation, the best choice would be one specified for UPS or RV use.**
  - ❖ **SLA batteries are used in alarm or emergency lighting systems.**

Equipment Choices for Emergency Communication Topic 18

Battery "Power Budgeting"

- The number of ampere/hours (Ah—a rating of battery capacity) required, called a "power budget,"

- Can be roughly estimated by multiplying the radio's receive current by the number of hours of operation,

- and then adding the product of the transmit current multiplied by the estimated number of hours of transmission and by the duty cycle for that mode.

- For a busy net control station, the transmit current will be the determining factor because of the high percentage of transmit time.

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18

Battery "Power Budgeting"

- For low-activity stations, the receiver current will dominate.

- The value obtained from this calculation is only a rough estimate of the ampere/hours required.

- The Ah rating of the actual battery or combination of batteries should be up to 50% higher, due to variations in battery capacity and age.

- Don't confuse the percent of time transmitting with "duty cycle," which is mode-specific (e.g., 100% for FM and digital, 50% for CW and 30% for uncompressed SSB).

Equipment Choices for Emergency Communication Topic 18

Battery "Power Budgeting"

- Estimated 24-hour power budget example:

- Receive current: 1 amp x 24 hours = 24 Ah

- Transmit current: 8 amps x 6 hours = <u>48</u> Ah (figuring 6 hours as the 25% transmit time)

- Total AH: 72 Ah estimated actual consumption

- Actual battery choice 72 x 1.5 = 108 Ah figuring 50% higher due to variations

Introduction to Emergency Communication

General			TM-V71A	TM-V71E	TM-V71A
			K Type	E Type	M4 Type
Guaranteed range	Band A & B	TX & RX	144 ~ 148 MHz	144 ~ 146 MHz	
			438 ~ 450 MHz	430 ~ 440 MHz	
Frequency range	Band A	RX	118 ~ 524 MHz		—
	Band B		136 ~ 524 MHz		—
			800 ~ 1300 MHz (excluding cellular band)		—
Mode			F2D/ F3E		
Antenna impedance			50 Ω		
Operating temperature range			−20°C ~ +60°C (−4°F ~ +140°F)		
Power requirement			13.8 V DC ±15% (Negative ground)		
Frequency stability			Within ±5 ppm (−10°C ~ +50°C)		
Current	TX	VHF Hi	Less than 13.0 A		—
		VHF Mid	Less than 5.5 A		Less than 9.0 A
		VHF Low	Less than 4.0 A		
		UHF Hi	Less than 13.0 A		—
		UHF Mid	Less than 6.5 A		Less than 9.0 A
		UHF Low	Less than 5.0 A		
	RX		Less than 1.2 A (at 2W audio output)		
Dimensions (W x H x D)	Without projections		Panel: 140 x 43 x 38.2 mm (5.51" x 1.69" x 1.50") Body (with Panel): 140 x 43 x 180.7 mm (5.51" x 1.69" x 7.11")		
	With projections		Panel: 140 x 43 x 55.4 mm (5.51" x 1.69" x 2.18") Body (with Panel): 140 x 43 x 213.1 mm (5.51" x 1.69" x 8.39")		
Weight (approx.)			Body (with Panel): 1.5 kg (3.3 lbs)		

Introduction to Emergency Communication

Part #	Group	CCA	MCA	RC (Min.) 25A	Warranty (Mo.) Free/Prorate	Amp Hrs @ 20 Hrs.	Dimensions (in.) L | W | H			Weight (lbs)	Terminal
SC31DM	31	900	1125	155	18/36	75	12-13/16	6-1/2	9-3/8	59.8	Stud and Auto
SC34DM	34	750	870	120	18/36	55	10	6-7/8	7-13/16	43.5	Stud and Auto
SC34M	34	800	1000	110	18/36	50	10	6-7/8	7-13/16	38.4	Stud and Auto

MCA: Marine Cranking Amps - The amount of amps a battery can produce at 32°F.

CCA: Cold Cranking Amps -

RC: The amount of minutes a battery can be discharged to 10.5 volts by 25-amp discharge at 80°F.

Amp Hour (Ah or ah): A unit of measure for a battery's storage capacity obtained by the amount of amps a battery can be discharged (typically 1.75vpc) multiplied by the amount of hours @ 80F (26.7C) .

Most auto/marine and light truck batteries are tested at a 20-hour discharge rate.

 Example: A 12-volt 100ah rated marine battery means that 5 amps can be discharged for 20 hours at 80°F (26.7C) before falling below 10.5 volts (6 cells X 1.75v)

Equipment Choices for Emergency Communication Topic 18

Chargers, Generators and Solar Power

- **Battery chargers – You should have two or more batteries so that one is charging while the other is in use.**

- **Most NiCad chargers will also charge NiMH, but not Li-Ion batteries.**

- **Lead-acid batteries**

  - ❖ **Wet batteries should be charged at about 14.5 VDC, and VRLA batteries about 14.0 VDC. The charging current should not exceed 20% of the battery's capacity.**

  - ❖ **SLA or "gel-cell" batteries must be charged slowly to avoid production of hydrogen sulfide gas which could over pressurize the cell and cause mechanical damage.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18

Chargers, Generators and Solar Power (Continued)

- **Solar Panels and charge controllers are readily available at increasingly lower costs. Many import cars have units installed by the manufacturer at the plant and are designed to provide a trickle charge to keep the automobile's battery at full charge while parked in storage lots. They are generally removed by the dealer before the vehicle is sold.**

- **DC to AC converters – While direct DC power is more efficient, inverters can be used for equipment that cannot be directly powered with 12VDC. The best inverters are those with a "true sine-wave" output.**

- **Large uninterruptible power supplies (UPS) are designed for continuous duty and produce true sine-wave outputs. They can also be used to charge batteries external to the units.**

Equipment Choices for Emergency Communication Topic 18

Chargers, Generators and Solar Power (Continued)

- **Generators – Usually located at EOC's or Shelters.**
  - ❖**Be sure that co-located multiple generators are bonded with a common ground system for safety..**
  - ❖**Load regulation can be highly variable on these units.**
  - ❖**You may want to obtain a high quality surge suppressor, line voltage regulator and or a power conditioner to help protect your equipment from defective generators.**
  - ❖**Have voltmeter handy to measure the generator voltage.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18

Equipment for Other Modes

- If you plan to operate one of the digital modes (packet, APRS, AMTOR, PSK31, etc), then you will also need a computer and probably a TNC or computer sound card interface.

- Some newer radios have built-in TNCs.

- Be sure to identify all the accessories, including software and cables, needed for each mode.

- Include the power required to operate all of the radios and accessories when you are choosing your batteries and power supply.

Equipment Choices for Emergency Communication Topic 18

Equipment for Other Modes (Continued)

- **The internal battery in your laptop computer will probably not last long enough for you to complete your shift.**

- **Be prepared with an external dc power supply and cable, or a dc to ac inverter.**

- **If you need hard copy, then you will also need a printer, most of which are ac powered.**

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18

Scanners and Other Useful Equipment

In addition to your Amateur Radio equipment, you may find a few other items useful.

- Multi-band scanning radio (to monitor public service and media channels)
- FRS, GMRS (separate license required) or MURS handhelds
- Cellular telephone (even an unregistered phone can be used to call 911)
- Portable cassette tape recorder with VOX (for logging, recording important events)
- AM/FM radio (to monitor media reports)
- Portable television (to monitor media reports)
- Weather Alert radio with "SAME" feature (to provide specific alerts without having to monitor the channel continuously)
- Laptop computer with logging or emcomm- specific packet software

Equipment Choices for Emergency Communication Topic 18

Testing the Complete Station

- After making your equipment selection (or beforehand if possible), field test it under simulated disaster conditions.

- This is the fundamental purpose of the annual ARRL Field Day exercise in June, but any time will do.

- Try to test all elements of your system together, from power sources to antennas, and try as many variations as possible.

- Use the generator, and then switch to batteries.

- Try charging batteries from the solar panels and the generator.

- Use the NVIS antenna while operating from batteries and then generator.

- This procedure will help reveal any interactions or interference between equipment and allow you to deal with them now—before proper operation becomes a matter of life and death.

Introduction to Emergency Communication

Equipment Choices for Emergency Communication Topic 18

Review

- All equipment chosen should be flexible and easy to use, rugged, and capable of being battery powered.

- Antennas should be compact, rugged, and easily erected.
    - Directional or omni-directional gain antennas for VHF and UHF are essential in many locations, and the higher they are mounted, the better as long as feedline losses are kept low.

- Battery power is essential, as is a means of charging batteries.

- Testing equipment under field conditions before assigning it to emcomm uses ensures fewer surprises in an actual deployment.

- All equipment should be tested periodically for proper operation, and inspected for damage or deterioration..

Introduction to Emergency Communication

Topic 18-1

In considering power sources for HF radios, which of the following is true?

    A.   DC to AC inverters can be used to power HF radios.

    B.   Standard automobile batteries last longer than deep cycle batteries.

    C.   AC powered HF radios are suitable for all emcomm use.

    D.   **Whenever possible, use deep cycle batteries to power HF radios.**

Topic 18-2

In considering antennas for VHF/UHF radios, which is the best rule?

    A.   High transmitter power is more important than having a good antenna.

    B.   Transmitter power and antenna selection are equally important.

    C.   **A good antenna is more important than high transmitter power.**

    D.   If properly used, "rubber ducky" antennas can compensate for low transmitter power.

Introduction to Emergency Communication

Topic 18-3

Beam antennas have many advantages. Which of the following is the best reason for selecting a beam antenna?

A. They are inexpensive and easy to transport.

B. They are easy to erect and very stable in storm conditions.

C. They are compact and easy to store.

D. **They maximize desired signals and reduce interference from other stations.**

Topic 18-4

Which of the following statements about ARES deployment clothing is true?

A. Three years (until 2013) are being given to "wear out" and replace older clothing.

B. The standards increase recognition and acceptance of ARES units.

C. The standards apply only to clothing worn on actual ARES deployments.

D. **All of the above**.

Introduction to Emergency Communication

Topic 18-5

In comparing the 30 amp Anderson power pole connector with the 10 amp Molex connector, Which of the following is true?

A. The Molex is better for high power applications.

B. The Molex is better for heavy duty cycles.

C. The Anderson is capable of being plugged and unplugged a greater number of times without deterioration.

Emergency Activation Topic 19

How Will I Know?

- **The actual method by which emcomm volunteers are notified of activation will be determined locally.**

- **You must be registered in advance in order to be on the served agency's notification list.**

- **"Last Minute" volunteers are extremely difficult to integrate into an already confusing emergency response.**

- **A formal, written plan to activate emcomm members is necessary.**

- **The plan should be developed in detail and then reduced to a simple "checklist" that both served agency officials and emcomm managers can keep nearby at all times.**

- **Each member should know the plan and follow it closely.**

Emergency Activation Topic 19

Initial Notification by the Served Agency

- Several members act as "activation liaisons" to the served agency.

- When emcomm volunteers are needed, it is one of these members who is called first.

- If that person is unavailable for any reason, the served agency should contact the next "activation liaison" member.

- ## Never rely on a single point of contact!

Emergency Activation Topic 19

Group Alerting Systems

- **No one method should be relied upon, since emergency conditions may render it useless.**

- **Telephone Tree**
  - ❖**The liaison calls two members, who each call two members and so on until the entire group has been notified.**
  - ❖**If one or both persons can not be reached, the person calling must then call the members that that person would have called.**
  - ❖**This method ensures that the "tree" is not broken.**

Introduction to Emergency Communication

Emergency Activation Topic 19

Group Alerting Systems (Continued)

- **Text Messaging: Even when voice cell phone systems are overloaded, there may be text messaging capabilities.**

- **Paging and Email Systems are also recommended. However, email activation systems may not reach emcomm members immediately.**

- **E-mail: While e-mail might not immediately reach members anywhere they happen to be, it is a good backup method as long as it continues to function.**

Introduction to Emergency Communication

Emergency Activation Topic 19

Group Alerting Systems (Continued)

- **Self-Activation**
  - ❖ **If you become aware of an incident or situation that might require the activation of your emcomm group, you should take immediate steps to make yourself available.**
  - ❖ **Your group's activation plan might require that you monitor the assigned net frequency, or make contact with the served agency.**
  - ❖ **SKYWARN members might also monitor National Weather Radio.**
  - ❖ **Do not contact a served agency if you are not specifically authorized to do so.**

Emergency Activation Topic 19

I have been notified – Now What?

- ▪ **In most cases, the first step should be to check in on a specific simplex or repeater frequency.**

- ▪ **If a repeater is used as the primary gathering point for members, a back up simplex frequency and/or another repeater.**

- ▪ **Some members may have been assigned specific tasks in the event of activation and they should go and complete those tasks.**

- ▪ **The assigned NCS should activate the net when he or she arrives on frequency. The first emcomm member should assume temporary NCS until the assigned NCS arrives.**

- ▪ **It is important to have more than one person assigned to take on the NCS duties in the event that anyone is unavailable.**

Emergency Activation Topic 19

En Route

- **While you are headed home to pick up your jump kit or other gear, or while on the way to your assigned location, there are several things you need to do:**
  - ❖ **Check into and continue to monitor the activation net for further instructions.**
  - ❖ **Fill your vehicle with fuel and pick up any supplies you may need, including alkaline batteries for radios and lights, food, water, and other supplies on your checklist.**
  - ❖ **Contact your spouse, children or other family members to let them know what is happening and where you will be.**
  - ❖ **Give them any instructions they will need to be safe.**

Emergency Activation Topic 19

Review

- The "emcomm activation liaisons" are several people who can be contacted by the served agency to activate the emcomm group.

- Notification systems that can be used are telephone trees, commercial or amateur paging systems, email, or simple CTCSS receiver activation.

- Regardless of which primary notification method your group uses, there should be several backup methods as well.

- Each member should know where to go, what frequencies to monitor, and what nets to check into immediately after notification.

Introduction to Emergency Communication

Topic 19-1

When the telephone tree is activated, what should be done when a caller cannot reach one of their assigned contacts ?

   A. Call all those assigned to the person who cannot be reached.

   B. Call the liaison to report the difficulty.

   C. Ignore that person and go on to the next assigned contact.

   D. Stop calling at that point and "break" the tree.

Topic 19-2

What is an "emcomm activation Liaison" for a served agency?

   A. A phone answering service employed by the agency.

   B. An automatic paging service employed by the agency.

   C. An agency employee who arrives early to turn on equipment

   D. A member of an emcomm group who is alerted first by the agency.

Introduction to Emergency Communication

Topic 19-3

Regarding emcomm alerting systems, which of the following is true?

- A. All systems are equally useful.
- B. As an alerting system,, commercial paging is clearly superior to all others.
- C. As an alerting system, the telephone tree is clearly superior to all others.
- D. **It is best not to rely exclusively upon any single alerting system.**

Topic 19-4

Which if the following is true of e-mail as an alerting system?

- A. With e-mail. Emcomm members can be reached immediately anywhere they happen to be.
- B. With e-mail, High-Speed Internet connections guarantee that the messages will be reviewed quickly.
- C. **E-mail is best used as a back up alerting system.**
- D. With email, the CTCSS tone assures that all members will be quickly alerted.

Introduction to Emergency Communication

Topic 19-5

**Which of the following statements
is true about NCS?**

   A.   **The NCS is so important that it should never be assigned on a temporary basis.**

   B.   **The NCS is so important that temporary assignment as NCS should be limited to only one member of the group.**

   C.   **The NCS is so important that several members should be trained to take on the duties until the assigned NCS checks in.**

   D.   **The first member to sign on to a net is always the NCS for the duration of the incident.**

Setup, Initial Operations, and Shutdown Topic 20

Responding After The Activation

- If you already have your assignment, confirm that it is being activated by monitoring and checking into the local activation net.

- If you do not have an assignment, you should check into an activation net and make yourself available for assignment.

- You may be asked to proceed to a "staging" or "volunteer intake" area to wait for an assignment.

- You should expect the situation to be fluid as each incident is unique and to respond accordingly.

Setup, Initial Operations, and Shutdown Topic 20

Who is in Charge?

- The "station manager" has full responsibility for the site.

- This person serves as a point of contact, provides information and makes decisions for the team along with the incident commander and with other groups aiding in the response.

- When you accept a position as an emcomm volunteer, you do so knowing that you will often need to follow the directions of another person.

- Cooperation and good teamwork are key elements that result in an efficient and effective emcomm operation.

Setup, Initial Operations, and Shutdown Topic 20

Arriving at the Site

- If you are assigned to a facility operated by the served agency, such as a shelter, introduce yourself to the person in charge as an "emergency communicator" assigned to serve that location.

- Inform them that you would like to set up your equipment and get on the air. And ask if they have a preference for the location for that station.

- If no building or other suitable shelter is available, you may need to set up your own tent, or work from your car.

Setup, Initial Operations, and Shutdown Topic 20

Being a Good Guest

- You may be assigned to occupy a space that is normally used by someone else for another purpose. Respect and protect their belongings and equipment in every way possible.

- For example, if you are in a school and using a teacher's desk, find a way to remove all items from the surface for the duration of the operation. A cardboard box, sealed and placed under the desk usually works well.

- Avoid using duct tape to fasten cables to walls or ceilings. These surfaces may be damaged when you remove the duct tape.

- Make a log entry in you log identifying any damage in the area caused during the operation.

Setup, Initial Operations, and Shutdown Topic 20

Initial Set Up and Information Gathering

- Your first priority will be to set up a basic station to establish contact with the net.

- Use the lowest power setting that produces reliable communication, especially if you are operating with battery or generator power, to conserve power for extended operations.

- Once your basic station is on the air, you can begin to work on other needs:

  - Check out the telephone, faxes, Internet and other means of communication that are operating and available.

  - Find out what are the immediate needs of the site.

  - Make a list of repeaters and other stations that can be contacted by simplex operations in the area.

Setup, Initial Operations, and Shutdown Topic 20

Initial Set Up and Information Gathering (Continued)

- **Once your basic station is on the air, you can begin to work on other needs:** (Continued)

  - **Determine, food, water, sanitary, etc arrangements in the area.**

  - **Review overall conditions at the site, and how they will affect your operations**

  - **Find a place to get some occasional rest**

Setup, Initial Operations, and Shutdown Topic 20

Initial Set Up and Information Gathering (Continued)

- **As soon as possible, ask a member of the served agency's staff to spend a few minutes with you and explain their needs and communication concerns.**

- **Determine what type of messages can you expect, long, short, detailed, formal informal, etc.**

- **What message forms will be used? Do you or they need training in how to use the forms.**

- **Let them know that their communications will not be private and "secure" if sent by Amateur Radio, and discuss possible alternatives.**

Setup, Initial Operations, and Shutdown Topic 20

Ending Operations

- Emcomm operations may end all at once and shelters may be closed.

- You should check in with the emcomm commander before closing your station even though the shelter manager has told you to do so.

- Clean up the area you were operating in and return any borrowed equipment or materials.

Setup, Initial Operations, and Shutdown Topic 20

Departure

- First, leave the space you used in as good a condition as possible.

- If you sealed desk top items in a box for safekeeping simply place the box on the top of the desk. DO not attempt to replace the items on the desk. This procedure will provide proof to the desk's owner that you took steps to protect their belongings, and helps keep them secure until the owner takes possession again.

- Thank all those who worked with you. Make apologies if necessary and do you best to repair any damaged relationships before you leave.

Setup, Initial Operations, and Shutdown Topic 20

The Debriefing

- After each operation, your emcomm group will probably want to hold a meeting to review the effectiveness of the operation.

- Events may have occurred within the served agency that involve communications you handled. If you try to rely on your memory or logbooks, you will probably forget key details or even forget certain events altogether.

- To prevent this, keep a "de-briefing" diary, specifically for use during this meeting especially if you will be required to turn over your station logs immediately at the end of the operation.

Introduction to Emergency Communication

Topic 20-1

Suppose that you have been activated during an emergency and have been told to report to an agency that is different from your usual assignment. Which of the following is your best course of action upon arriving at the agency?

A. Take charge and set up a communication center right away.

B. Check around the site and find the best place to set up a communication center.

C. Ask the receptionist about the best location for setting up a communication center.

D. Introduce yourself to the person in charge as the emergency communicator assigned to that location.

Topic 20-2

You are to brief the staff of a served agency about privacy on Amateur Radio. Which of the following is the most accurate statement you can make?

A. Speaking quietly into a microphone assures that no one will overhear private information.

B. It is permissible to use code words to assure privacy on the air.

C. There is no privacy with Amateur Radio voice communications.

D. There are no methods by which the security of any message can be assured on Amateur Radio.

Introduction to Emergency Communication

Topic 20-3

Suppose that you have been assigned to a site and the emergency ends. If the site manager asks you to close your station, what is the best course of action?

    A.   Do as the site manager tells you and close down your station immediately.

    B.   Ignore the site manager and await further instructions from higher authority.

    C.   **Check in with the emcomm manager or NCS before closing down.**

    D.   Have your emcomm manager or NCS speak directly with the site manager before you take any action.

Topic 20-4

In preparing to leave a site after an emcomm event, which of the following actions is NOT appropriate?

    A.   Clean up any mess, discard trash, and move furniture back to its original position.

    B.   **Unpack all desk items that you have placed in boxes and put them back in their original locations.**

    C.   Thank all of those who worked with you.

    D.   Repair any relationships that may have been strained during the event.

Introduction to Emergency Communication

Topic20-5

A debriefing should be scheduled after each emcomm event. What is the primary purpose of this debriefing?

A. It provides an occasion to swap "war stories."

B. It serves as a legitimate forum for complaints.

C. It serves to improve future emcomm activities.

D. It provides an occasion for resolving interpersonal issues.

Operations & Logistics Topic 21

Choosing Phone Net Frequencies

- Most local and regional emcomm communication takes place on 2 meter or 70 centimeter FM, or on 40, 60 or 80 meters SSB/CW.

- VHF and UHF FM are preferred for most local operations because the equipment is common, portable, has a clear voice quality and the coverage is extended by repeater stations.

- Most local emcomm HF operation is on 40 or 80-meter bands using Near Vertical Incidence Skywave (NVIS) propagation.

- For long haul communication needs and international operations, 15 or 20-meter nets may be the best option.

- The complete list of these frequencies should be in your jump kit, and pre-programmed into your radios.

Operations & Logistics Topic 21

Know your Resources in Advance

- Become familiar with the coverage and features of each permanent repeater and digital message system in your area, and pre-program your radios with frequencies, and offsets and CTCSS tones.

- Know your repeaters
  - ❖ How does it ID itself?
  - ❖ Are there dead spots in critical areas?
  - ❖ How much power is necessary to key the repeater?
  - ❖ Does it have a courtesy tone?
  - ❖ How long is the "time out timer"?
  - ❖ Is it part of a linked system of repeaters?
  - ❖ What features does it have, and which touch-tone commands or CTCSS tones activate them?

Operations & Logistics Topic 21

Know your Resources in Advance (Continued)

For net frequencies that support digital communication systems, such as packet radio bulletin board messaging systems, PACTOR, PSK31 and RTTY:

❖ Which software do they use? ARESPACK, Fnpack, FNpsk?

❖ Do the digital systems have mailboxes or digipeater functions?

❖ Which other nodes can they connect to?

❖ Can traffic be passed over an Internet link automatically or manually?

❖ How many connections can they support at once?

Operations & Logistics Topic 21

Network Coverage Concerns

- **Most emcomm managers rely on simplex operation when planning their VHF or UHF FM nets for one reason—repeaters often do not survive disasters or are overwhelmed with the amount of traffic.**

- **Repeaters that do survive and are usable are considered a bonus.**

- **Simplex range is limited by terrain, output power, antenna gain and height, operation over a wide area can be a challenge.**

- **Almost any structure or hills can block signals to some degree.**

- **Don't overlook SSB on our VHF or UHF bands; it can support communication over surprising distances and over rough terrain.**

- **To avoid last minute surprises, your group should pre-test all known fixed locations in your area for coverage.**

Operations & Logistics Topic 21

Network Coverage Concerns (Continued)

- **If you are serving the Red Cross, test simplex coverage from each official shelter to the Red Cross office and the city's EOC or other key locations, and mobile coverage in the same areas.**

- **There are several ways to improve simplex range:**
  - **Use an antenna with greater gain**
  - **Move the antenna away from obstructions**
  - **Use a directional antenna**
  - **Increase antenna height**
  - **Increase transmitter output power as a last resort.**

Operations & Logistics Topic 21

Network Coverage Concerns (Continued)

- **There are several ways to improve simplex range:** (Continued)
  - **In a fast moving situation with poor simplex coverage and no repeater, it can be helpful to place a mobile station on a hilltop or office building where they can communicate with, and relay for, any station in the net.**
    - **A mobile relay station can also allow communications to follow a moving event, such a wildfire or flash flood.**
    - **That station becomes, in effect, a "human repeater."**

Operations & Logistics Topic 21

Network Coverage Concerns (Continued)

- **Although an expedient "work-around," this slow and cumbersome process can reduce net efficiency by more than half.**

- **A modern aid to this kind of operation is the "simplex repeater."**

- **This device automatically records a transmission, and immediately re- transmits it on the same frequency.**

- **Remember that FCC rules do not allow unattended operation of simplex repeaters, and that you must manually identify it.**

Operations & Logistics Topic 21

Network Coverage Concerns (Continued)

- **A better solution is a portable duplex repeater that can be quickly deployed at a high point in the desired coverage area.**

- **The coverage of this repeater does not have to be as good as a permanent repeater—it just has to reach and hear the stations in your net.**

- **Portable repeaters have been used successfully from the back seat of a car, using a mobile antenna, and parked on a ridge or even the top floor of a parking garage.**

- **Portable masts and trailer-mounted towers have also been used successfully.**

Operations & Logistics Topic 21

Network Coverage Concerns (Continued)

- **If all stations in the net have dual-band radios or scanners, a strategically located mobile radio may be operated in "cross-band repeater" mode.**

- **If you use your dual-band mobile in this manner for an extended period, use the low or medium power setting to avoid overheating and damaging your radio.**

- **Consider using a fan to further reduce the likelihood that your radio will be damaged from overheating.**

Operations & Logistics Topic 21

Network Coverage Concerns (Continued)

- **For a permanent repeater to be useful in a disaster, it must have emergency power and be in a location and of such construction that it can survive the disaster.**

- **Agreements with repeater owners should be in place to allow emergency operations to the exclusion of regular users**.

Operations & Logistics Topic 21

Frequency and Net Resource Management

- Net managers may have to shift resources to meet changing needs. In the early stages of an emergency, the tactical nets may require more operators, but in later stages, the health and welfare traffic might increase.

- There should be one or more "back up" frequencies for use in the event of interference, and one or two frequencies to pass traffic "off net."

Message Relays

- When one station can not hear another, a third station may have to "relay" the messages. Best to move the station involved off the main net frequency to avoid tying up channel for an extended period.

Operations & Logistics Topic 21

Radio Room Security

- It is best to allow only operators who are on duty to be in the room.

- Avoid leaving the radio room and equipment unattended and accessible.

- It is never a good idea to allow members of the press to be in the room without specific permission from the served agency.

Operations & Logistics Topic 21

Record Keeping (Continued)

- Station records will certainly include original copies of any messages sent, station logs, memos, and official correspondence.

- You may be required to turn these records over to the served agency. These may be permanent legal documents! Use permanent ink and numbered pages.

- It is important to know your served agency's policy on recordkeeping in advance so that you can comply from the very beginning of operations.

Operations & Logistics Topic 21

Record Keeping (Continued)

Your station operating logs should probably contain the following information:

- Your arrival and departure times

- Times you check in and out of specific nets

- Each message, by number, sender, addressee and other handling stations

- Critical events—damage, power loss, injuries, earth tremors, other emergencies

- Staff changes—both emcomm and site management, if known

- Equipment problems and issues

Operations & Logistics Topic 21

Record Keeping (Continued)

- **Every individual message or note should be labeled with a time and date.**

- **In the case of scratch notes, place dates and times next to each note on a sheet, so that information can be used later to determine a course of events.**

- **If you expect to operate from the location for more than a day or two, establish a message filing system so that you can retrieve the messages as needed.**

- **A "portable office" type file box, expanding file or any other suitable container can be used to organize and file the messages.**

Operations & Logistics Topic 21

Dealing With Stress and Egos

- **Any unusual situation can create personal stress – disasters create incredible amounts of it.**

- **Especially in the early hours of a disaster, the tendency is to regard every situation or need as an "emergency," requiring an immediate response.**

Operations & Logistics Topic 21

Dealing With Stress and Egos (Continued)

- **Tips to help manage stressful situations:**
  - **Delegate some of your responsibilities to others.**
  - **Only take on those tasks that you can handle.**
  - **Prioritize your actions—the most important and time-sensitive ones come first.**
  - **Do not take comments personally—mentally translate "personal attacks" into "constructive criticism" and a signal that there may be an important need that is being overlooked.**
  - **Take a few deep breaths and relax. Do this often, especially if you feel stress increasing. Gather your thoughts, and move on.**
  - **Watch out for your own needs—food, rest, water, medical attention.**

Operations & Logistics Topic 21

Dealing With Stress and Egos (Continued)

- **Tips to help manage stressful situations:**
  - **Do not insist on working more than your assigned shift if others can take over.**
  - **Get rest when you can so that you will be ready to handle your job more effectively later on.**
  - **Take a moment to think before responding to a stress-causing challenge—if needed, tell them you will be back to them in a few minutes.**
  - **If you are losing control of a situation, bring someone else in to assist or notify a superior.**
  - **Do not let a problem get out of hand before asking for help.**
  - **Keep an eye on other team members, and help them reduce stress when possible.**

Operations & Logistics Topic 21

Dealing With Stress and Egos (Continued)

- **Tips to help manage stressful situations:**
  - **Some within the emergency response community have "big egos," and still others with a need to be in full control at all times.**
  - **Depending on the official position of the "problem" person, you might:**
    - **Do your job as best you can, and deal with it after the emergency is over**
    - **Politely decline and state your reasons**
    - **Refer the issue to a superior**
    - **Choose in advance to volunteer in another capacity and avoid that person altogether**

Operations & Logistics Topic 21

Long Term Operations

- As soon as you see that the situation is not going to return to normal for a while, start making plans for extended emcomm operations.
    - Additional operators to allow for regular shift changes, and those who go home.
    - Replacement equipment, as operators leave with their own gear or gear fails.
    - Food and water.
    - A suitable place to sleep or rest.

Operations & Logistics Topic 21

Long Term Operations (Continued)

- Generator fuel.
- Fresh batteries, sanitation facilities (bring your own TP), shelter.
- Message handling supplies, forms.
- Alternate NCS operators, backups.
- Additional net resources to handle message traffic.

Operations & Logistics Topic 21

Battery Management

- If you are operating on battery power only, you will need to recharge your batteries. Remember, some batteries take longer to charge than others.

Generator and Power Safety

- Internal combustion engines are still the number one cause of carbon monoxide poisoning. Propane powered engines produce as much or more carbon monoxide as gasoline or diesel engines.

- Earth grounding of portable or vehicle mounted AC generators is not required as long as only plug and cord connected equipment is used.

- AC generators connected to a building's permanent electrical system will require an earth ground.

Operations & Logistics Topic 21

Generator and Power Safety (Continued)

Ground Fault Interrupters (GFIs)

- ▪ **GFIs add a further degree of safety when working with portable power systems. They detect any difference between the hot and neutral conductors, and open the circuit.**

- ▪ **Always test GFIs!**

AC Extension Cords

- ▪ **Most extension cords are only rated for their actual lengths, and cannot be strung together to make a longer cord without "de-rating" the cord's capacity, i.e., two 50 ft, 16-gage, 10 amp rated cords strung together have to be "de-rated" to 7 amps.**

- ▪ **Romex – solid copper core cables – should never be used for long extension cords as repeated bending, rolling and abrasion can cause the insulation to break down.**

- ▪ **Use only flexible insulated extension cords that are UL rated for temporary portable use.**

Operations & Logistics Topic 21

Equipment – Leaving Yours Behind?

- **If you feel comfortable that someone you know and trust will look after your gear, you may choose to leave some or all of it behind. However, remember, you still have the ultimate responsibility for its operation and safety.**

- **Mark every piece with your name and Amateur call.**

Accepting Specialized Assignments

- **Today, most emcomm groups will permit their members to be cross-trained for, and perform, a variety of served agency skills that also include communicating. Examples include SKYWARN weather spotting, Red Cross damage assessment and many logistics jobs**

Operations & Logistics Topic 21

Review

- Simplex operation is often preferred over repeaters because repeaters may fail in a disaster situation.

- Frequencies and operators are a resource that should be managed for maximum efficiency and effectiveness.

- Record keeping is essential to an effective emcomm operation. It allows messages to be tracked, and preserves continuity when personnel change.

- Demanding situations like disasters can breed disagreements, especially when strong egos and short-fused tempers are introduced.

Operations & Logistics Topic 21

Review (Continued)

- Take steps to reduce the level of stress on yourself, and do not respond in kind to an angry person.

- When an operation looks like it will be an extended one, begin immediately to prepare for the additional people and resources necessary to sustain the operation.

- Arrange to charge batteries as needed.

- Use generators and power distribution equipment safely.

- Leaving your equipment behind is a choice only you can make.

Operations & Logistics Topic 21

Review (Continued)

▪**Think about this well in advance to be sure other arrangements are made before you leave with all your equipment.**

▪**Modern emcomm groups often accept other agency tasks beyond just communications.**

Introduction to Emergency Communication

Topic 21-1

Which of the following will NOT limit VHF simplex range?

    A.   Terrain.

    B.   Output Power.

    C.   Antenna Gain.

    D.   **Digipeaters.**

Topic 21-2

Which of the following actions will NOT improve simplex receptions?

    A.   Increase the antenna height.

    B.   **Switch to a non-directional antenna.**

    C.   Increase transmitter output power at both stations.

    D.   Move the antenna away from obstructions.

Introduction to Emergency Communication

Topic 21-3

Which of the following is true about a simplex repeater?

A. **The FCC rules do not permit unattended operation of simplex repeaters.**

B. They work best in the "cross band repeater" mode.

C. They require the use of two radios.

D. Is the same as a "human repeater."

Topic 21-4

Which of the following is a good means of dealing with stress during an emcomm event?

A. Take every comment personally.

B. Pay no attention to other team members.

C. To reduce personal stress, insist on working more than your own shirt.

D. **Prioritize your actions – the most important and time sensitive ones come first.**

- **Lunch**
- **½ hour**

Safety & Survival Topic 22

Home and Family First

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

- Take whatever steps you can to protect your own property from damage or looting, and let a neighbor or even local police know where you are going, when you plan to return, and how to reach you or your family members in an emergency.

- There are times when your family may need you as much or more than your emcomm group. If there is any doubt, your decision must be to stay with your family.

Introduction to Emergency Communication

Safety & Survival Topic 22

Home and Family First (Continued)

In addition to your emcomm deployment checklists, you might want to create a home and family checklist.

Here are some ideas to get you started:

- House Checklist:
    - Board up windows if you are in a storm's path
    - Put lawn furniture and loose objects indoors if high winds are likely
    - Move valuables to upper levels if flooding is possible
    - Heating fuel tanks should be filled
    - Drain pipes if below-freezing temperatures and power loss are possible
    - Shut off power and gas if practical and if structural damage is possible
    - If you live in earthquake country, have an automatic shutoff valve on the gas line
-

Safety & Survival Topic 22

Home and Family First (Continued)

- **Family Checklist:**
  - **Designate a safe place to stay if needed, preferably with friends or relatives**
  - **Reliable transportation, with fuel tank filled**
  - **Adequate cash money for regular needs and emergencies (not ATM or credit cards)**
  - **House, auto, life and health insurance information to take along if evacuated**
  - **Access to important legal documents such as wills, property deeds, etc.**
  - **Emergency food and water supply. AM/FM radio and extra batteries**
  - **Flashlight and extra batteries, bulbs**

Safety & Survival Topic 22

Home and Family First (Continued)

- ▪ **Family Checklist:**
  - • **Generator, fuel and safe operating knowledge**
  - • **Adequate supply of prescription medications on hand**
  - • **List of emergency phone numbers**
  - • **Pet supplies and arrangements (shelters will not take pets)**
  - • **List of people to call for assistance**
  - • **Maps and emergency escape routes**
  - • **A way to contact each other**
  - • **A plan for reuniting later**

  –

Safety & Survival Topic 22

Should You Leave At All?

- **There are times when your family may need you as much or more than your emcomm group.**

- **This is a decision that only you and your family can make.**

- **If a family member is ill, your spouse is unsure of their ability to cope without you, if evacuation will be difficult, or any similar concern arises, staying with them may be a better choice.**

- **If there is ever any doubt, your decision must be to stay with your family.**

- **This is also something you should discuss, and come to an agreement with your spouse about well before any disaster, in order to avoid any last minute problems.**

Safety & Survival Topic 22

You First—the Mission Second

- **Once you are working with your emcomm group, you will need to continue to take care of yourself.**

- **If you become over-tired, ill or weak, you cannot do your job properly.**

- **If you do not take care of personal cleanliness, you could become unpleasant to be around.**

- **Whenever possible, each station should have at least two operators on duty so that one can take a break for sleep, food and personal hygiene.**

- **If that is not possible, work out a schedule with the emcomm managers or your NCS to take periodic "off-duty" breaks.**

Introduction to Emergency Communication

Safety & Survival Topic 22

Food – Most people need 2000 calories a day.

- **High calorie and high protein snacks will help keep you going.**
- **You may need to bring along some freeze-dried camping food, a small pot, and a camp stove with fuel, or some self-heating military-style "Meal, Ready to Eat" (MRE) packages.**

Water – You will need four gallons of water per day.

- **Purification tablets, such as Halazone, give the water an unpleasant taste, and will do nothing for particulate (dirt) or discoloration.**
- **The CDC says you can use unscented household chlorine bleach. After filtering out any particulates by pouring the water through several layers of densely woven cloth, put 1/8 teaspoon of bleach in a gallon of water, mix well, and allow it to sit for thirty minutes. If it still smells slightly of bleach, you can still use it.**
- **Boiling for at least five minutes will kill any bacteria and other organisms, but will not remove any particulate matter or discoloration**

Safety & Survival Topic 22

Sleep & Personal Hygiene

Sleep

- **Try to get at least six continuous hours of sleep in every twenty-four hour period, or four continuous hours and several shorter naps.**

- **Bring fresh soft foam earplugs and a black eye mask to ensure that light and noise around you are not a problem.**

- **An appropriate sleeping bag, closed-cell foam pad or air mattress, and your own pillow will help give you the best chance of getting adequate rest.**

- **If caffeine keeps you awake, try to stop drinking coffee, tea, or other beverages containing caffeine at least four hours before going to bed.**

- **Allowing yourself to become over- tired can also make falling asleep difficult.**

Safety & Survival Topic 22

Sleep & Personal Hygiene (Continued)

Personal Hygiene

- Pack only a few personal items, be sure they include toothpaste and toothbrush, a comb, and deodorant.

- If possible, bring a bar of soap or waterless hand cleaner, a small towel and washcloth, and a few extra shirts.

- You also might want to include, several rolls of toilet paper, hand towels and any brand of flushable moist towelettes.

- If you do not take care of personal cleanliness, you could become unpleasant to be around.

Safety & Survival Topic 22

Safety in an Unsafe Situation

- Natural disasters can bring flying or falling debris, high or fast moving water, fire, explosions, building collapse, polluted water, disease, toxic chemicals, and a variety of other dangers.

- Always have an escape plan.

- Do not allow yourself to be cornered. Identify at lease two escape routes from the station.

- Carry a police or signal whistle, a chemical light stick or small flashlight in your pocket.

- Always let others know where you are going.

Safety & Survival Topic 22

Shelter

- **In most cases you will not need your own shelter for operating or sleeping.**

- **Tents should be rated for high winds, and should be designed to be waterproof in heavy weather.**

- **Your tent should have a full coverage rain fly rather than a single waterproof fabric.**

- **The tents bottom should be waterproof, extending up the sidewalls at least six inches in a "bath-tub" design, but bring an extra sheet of plastic to line the inside of your tent.**

Safety & Survival Topic 22

Medical Considerations

- If you are a diabetic, you will need to avoid going for long periods without proper food and medication, and stress may affect your blood sugar level.

- Persons with heart problems may need to avoid stressful situations.

- Even if your doctor says you can participate safely, be sure you have an adequate supply of appropriate medications on hand, and a copy of any prescriptions.

- Wear any medical ID jewelry you have and keep a copy of any special medical information and emergency phone numbers in your wallet at all times.

Safety & Survival Topic 22

Protect Your Eyes and Sight

- **If you wear eyeglasses or contact lenses, bring at least one spare pair. Bring a copy of your lens prescription.**

- **Sunglasses may also be necessary in some situations. Working without them in bright sun can cause fatigue and possibly eye damage.**

- **If you do not normally wear eyeglasses, consider a pair or industrial safety glasses or goggles to protect your eyes from wind blown water, dust and debris.**

Safety & Survival Topic 22

Review

- As important as the mission might seem, you must first take steps to protect your own home, family, and health.

- Plan well ahead, and include other members of your family in your planning.

- Let others know where you will be and how to reach you.

- To avoid becoming part of the problem, bring along the items you will need to be comfortable, clean, and safe.

- Take time to meet your own needs during your deployment so that you do not become part of the problem.

Introduction to Emergency Communication

Topic 22-1

Which of the following statements concerning water purification is FALSE?

A. **Boiling water for a full 5 minutes will kill most harmful bacteria.**

B. **Boiling water to purify it can leave it with a flat taste.**

C. **Filters may or may not remove harmful bacteria.**

D. **Purification tablets will remove bacteria and particulate matter (dirt).**

Topic 22-2

Which of the following is true about using chlorine to purify water?

A. **It is best to use 8 tablespoons of chlorine bleach per gallon of water.**

B. **Adding the proper amount of chlorine bleach to water will improve the taste.**

C. **After adding bleach, water must sit for 3 hours before drinking.**

D. **It is best to use 1/8 teaspoon of plain chlorine bleach per gallon of water.**

Introduction to Emergency Communication

Topic 22-3

Which of the following is true about the personal gear you bring to a long-term incident?

A. Include several pairs of warm cotton socks.

B. Lightweight summer clothing is all you will ever need.

C. **Keep spare eyeglasses or safety glasses/goggles in a hard-shell felt-lined storage case.**

D. As a volunteer communicator, you will need to bring specialized protective **clothing.**

Topic 22-4

Many Disaster assignments are in unsafe places. Which of the following is true about such locations?

A. Always plan an escape route from buildings and hazardous areas.

B. **Always plan more than one escape route from buildings and hazardous areas.**

C. The only dangers that you need be concerned with in any location are fire, flood, and falling debris.

D. Dams, bridges and buildings can generally be thought of as "safe zones."

Introduction to Emergency Communication

Topic 22-5

Which of the following statements about safety and survival is true?

    A.   The mission takes priority over everything else.

    B.   A person requires at least four gallons of water per day just for drinking.

    C.   If caffeine keeps you awake, stop drinking caffeinated beverages at least ten minutes before going to bed.

    D.   Your personal safety and well-being are a higher priority than the mission.

Introduction to Emergency Communication

ARES PIO: The Right Stuff Topic 23

- **More and more sections are appointing ARES-specific Public Information Officers (PIOs).**

- **These PIOs are specialists in covering media relations when ARES units are deployed in an emergency or community service operation.**

- **While general PIOs may also do this work, the entire emergency field is becoming more and more complex and special training is not only advisable, but strongly encouraged.**

Introduction to Emergency Communication

ARES PIO: The Right Stuff Topic 23

- **The goal of a PIO in an emergency is**:
    - ❖ **"Providing the Right information**
    - ❖ **to the Right people**
    - ❖ **at the Right time**
    - ❖ **so they can make the Right decisions."**
- **- FEMA Advanced PIO Course**
    - ▪ **In addition to the regular PIO duties and tasks of establishing media relationships, informing the public and attracting new members, the ARES PIO has the opportunity to become an integral part of the Incident Command System (ICS).**

Introduction to Emergency Communication

ARES PIO: The Right Stuff Topic 23

- **The public needs to know :**
  - ❖ **what is happening,**
  - ❖ **how big is the emergency,**
  - ❖ **what is being done about it**
  - ❖ **what they themselves may need to do.**
- **Silence or errors on any of these topics breed rumors – and some rumors get very interesting indeed!**
- **The ICS has standardized ways to coordinate this information in a unified voice.**
- **Short-circuiting that process will only make you unwelcome at best.**

Introduction to Emergency Communication

ARES PIO: The Right Stuff Topic 23

- As the gravity of a situation unfolds and more responders and agencies become involved, a Unified Command is activated.

- The UC comprises a group of trained and qualified individuals that work together to lead and orchestrate the effort.

- One component of forming the Unified Command is that of a group of Public Information Officers (PIOs) representing the various responders, agencies and disciplines will come together to form a Joint Information Center (JIC).

- It is the duty of the JIC to establish a unified message and become the voice of the event, providing consistent and unified information, dispel rumors, as well as providing a central location for media to receive information and ask questions.

Introduction to Emergency Communication

ARES PIO: The Right Stuff Topic 23

- A trained ARES PIO is very likely to be invited to represent Amateur Radio within the JIC.

- As an ARES PIO, your job is to be the "expert" on Amateur Radio efforts involved (number of ARES personnel involved, locations of ARES stations, etc.)

- You may be assigned multiple additional duties within the JIC to assist the Lead PIO.

- You will be expected to perform these additional duties as well as your ARES PIO duties simultaneously.

- Should the media inquire about ARES or Amateur Radio involvement, the Lead PIO will call on you to provide the facts and figures.

ARES PIO: The Right Stuff Topic 23

- **Your job will be to answer any questions regarding Amateur Radio and ARES.**

- **The ARES PIO will also be the person who guides reporters to meet and talk with other ARES members.**

- **For example, if a TV reporter wants to interview an ARES operator,**
  - **the PIO will set it up,**
  - **stay close to make sure it goes well,**
  - **aid the operator if the interview gets "sticky," and frame it in the best possible way.**

Introduction to Emergency Communication

ARES PIO: The Right Stuff Topic 23

The PIO is also responsible for seeing that the operator makes a good impression with appropriate clothing and appearance – not a stained, dirty T shirt with inappropriate logos on it! (It happens.)

ARES PIO: The Right Stuff Topic 23

- **UNDER NO CIRCUMSTANCES SHOULD YOU EVER SPECULATE AS TO THE OUTCOME OF THE SITUATION, OR PROVIDE ANY INFORMATION AS TO VICTIM NAMES, CONDITION OF INDIVIDUALS OR GRAVITY OF THE SITUATION TO THE MEDIA!**

ARES PIO: The Right Stuff Topic 23

- This is the job of others, not an ARES operator nor an ARES PIO.

- The PIO may be asked to speak to the media about Amateur Radio involvement, number of ARES personnel involved and the kinds of communications being supported by ARES, but even the PIO can only talk about ARES' own work and must refer other topics to more appropriate personnel.

- And always remember…especially during an emergency situation with risk of life and property, there is no such thing as **"off the record."**

- Anything you say directly or within earshot of the media, even in jest, can lead to disastrous results that could jeopardize the entire operation, cause your dismissal and risk exclusion of Amateur Radio from future incidents.

ARES PIO: The Right Stuff Topic 23

Can an EC also be the PIO?

- Not really. Each role, if being done right, is a full time job.

- The best media relations are done by specifically designated and trained people whose singular function is to work with media, allowing EC's and others to do their job.

- While the EC and the PIO should work closely together, they are different roles calling for different people.

Why can't just anyone talk to the press?

- While there will always be people who want their 15 seconds of fame in the media, they usually only end up (at best) promoting themselves, not ARES and Amateur Radio.

- Your job as an ARES operator is to relay messages for the served agency. Refer the media to your ARES PIO, the Lead PIO or the JIC.

ARES PIO: The Right Stuff Topic 23

Some rules you need to know

- **Amateur Radio must NOT be used to assist news media in gathering information when telephones or other normal means of communication are available.**

- **Amateur Radio operators may assist news media representatives in their efforts to gather information for relay to the public from areas where normal communications have been disrupted.**

- **Amateurs may ask questions of, or relay media questions to, other amateurs in the emergency area and their responses be recorded by media representatives.**

ARES PIO: The Right Stuff Topic 23

Some rules you need to know (Continued)

Who can record and transmit what

> **One constant area of confusion is in the recording and re-transmission of Amateur Radio messages.**
>
>> • **Amateur Radio operators can NOT record and re-transmit commercial radio and TV broadcasts.**
>>
>> • **Commercial radio and TV reporters CAN record and then broadcast Amateur Radio messages.**

Introduction to Emergency Communication

Topic 23-1

A Joint Information Center is established to:

A. Formulate a unified voice and message.

B. Dispel rumors.

C. Provide a central location for media questions.

D. **All of the above.**

Topic 23-2

As an ARES PIO you will be expected to:

A. Get coffee for the Lead PIO.

B. **Provide relevant information to media regarding Amateur Radio involvement.**

C. Give timely updates regarding the overall emergency effort and participants.

D. Provide a victim list including names and conditions.

Introduction to Emergency Communication

Topic 23-3

You are involved in an ARES deployment but not as a PIO. A reporter shows up at your location and starts to ask you questions. What should you do?

A. **If possible, refer them to the JIC, designated Lead PIO or ARES PIO.**

B. If possible, refer them to the EC and DEC.

C. Refer them to the Unified Commander.

D. Be friendly, tell them what you are doing and how the operation is going.

Topic 23-4

There's a flood in progress. A reporter for the local TV station comes to your location and asks you to get on the radio and talk to someone at the levees to find out if they think the sandbags will hold. What things need to be considered in this request?

A. Are other means of communication still available.

B. Amateurs can ask questions of other amateurs – not just "someone".

C. The question is speculating about things not specific to the Amateur Radio operation.

D. **All of the above.**

Alternative Communication Methods Topic 24

o **Some radio services require licenses, others do not. However, in a true emergency, FCC rules gives everyone special permission to use "any means necessary" to communicate in order to protect life and property – but only if no other normal means of communication is possible.**

o **Law enforcement agencies are not bound by FCC rules. Hams who have called for "help" on police frequencies have been convicted of "interfering with a police agency."**

o **It is not legal to modify VHF and UHF Amateur radios for operation in nearby public service and business bands. Doing so might indicate to a judge that you had "premeditated to interfere" in those bands.**

Alternative Communication Methods Topic 24

Using Modified Ham Radios

- ▪ **While it is easy to modify many VHF and UHF Amateur radios for operation in nearby public service and business bands, it is not legal to do so for regular "emergency" use.**

- ▪ **Radios used in those bands must be "Type Accepted" by the FCC for the purpose, and Amateur radios are not.**

- ▪ **If you plan to use other radio frequencies discussed here today, it is better to purchase the proper radio.**

- ▪ **However, if the need arises and your ham radio is all you have, the FCC will probably not prosecute you for using it—if the use falls within their strict rules for emergencies (see above).**

Permissible Modes on the Other Radio Services

- • **In most of the radio services listed here only voice communication is permitted.**

- • **Packet and other forms of data or image transmission are illegal.**

Alternative Communication Methods Topic 24

Citizens' Band (CB) Radio

- No licensing is required. They operate on forty designated channels from 26.965 to 27.405 MHz, with a maximum power of four watts. Operating modes are FM and SSB.

- DO not use your Amateur Radio Call sign on CB Radio!

- Channel 9 is reserved for emergency and motorist assistance traffic only. Channel 19 has been unofficially designated as the "trucker" channel. REACT teams monitor these channels.

Alternative Communication Methods Topic 24

Multi-Use Radio Service (MURS)

- No license required for either business or personal use. The MURS frequencies are 151.820, 151.880, 151.940, 154.570 and 154.600. Two watts output maximum power. Portable operation only. Base operation and data transmissions are not authorized.

Family Radio Service (FRS)

- No license required. There are 14 UHF channels and 38 different CTCSS codes to limit background chatter and noise. Maximum output power is 500mw.

- REACT recommends FRS channel 1 (462.5625 MHz) with no CTCSS tone as an emergency channel.

- The first seven FRS channels are shared with the General Mobile Radio Service (GMRS). GMRS operation on these channels is limited to 5 watts.

Alternative Communication Methods Topic 24

General Mobile Radio Service (GMRS)

- An FCC system license is required and granted only to individuals. A system includes any and all radios operated by family members, and may include fixed, mobile, and repeater equipment.

- There are fifteen UHF frequencies. Seven are common to the FRS and eight are paired with matching repeater inputs. Simplex only modes of operation are also authorized.

- Maximum output power is limited on the first seven channels shared with the FRS to 5 watts. The maximum power output on all other channels is 50 watts.

- 462.675 MHz is recognized for emergency and travel information use and is monitored by REACT.

Introduction to Emergency Communication

Alternative Communication Methods Topic 24

Public Safety Radio

- **Fire, police and other government services. These organizations may train you to use their equipment or an individual officer may ask you to operate his unit to call for help when he cannot do so.**

Cellular and PCS Phones

- **In a widespread disaster situation, these phone systems can quickly become overloaded.**

- **In smaller emergencies, they may still be usable.**

- **If a message is too sensitive to send via any two-way radio, try your cell phone.**

- **Cellular and PCS phone transmissions, especially digital, are considerably more secure.**

- **Even when a cellular system is overloaded by normal calls, the text messaging still can get through, although delivery can be delayed several hours or more when the voice channels are in heavy use.**

Alternative Communication Methods Topic 24

Marine Radio

- FM marine radios operate on internationally allocated channels in the 160 MHz band. HF SSB radios operate on a variety of ITU channels between 2 and 30 MHz. Most land base operation is illegal.

- No license required for FM operation in U. S. waters. Operation on HF channels requires one.

- Channel 16 is the international calling and distress channel. Stay off of channel 22 – it is for Coast Guard use only unless invited to communicate on the channel by them.

Alternative Communication Methods Topic 24

Aviation Radio

- FCC licenses are required for all stations. AM radios operate in the 108 – 136 MHz band and are used in aircraft and in certain limited ground vehicle and ground stations.

- Emergency Locator Transmitters (ELTs) are automatic devices that transmit a distress signal on 121.5 MHz (civilian) and 243.0 MHz (military.)

- These frequencies are also used for marine Emergency Position Indicating Radio Beacons (EPIRB) and the new land based Personal Radio Beacons (PRB.)

Alternative Communication Methods Topic 24

Non-Radio Communication

- Do not forget the most obvious means of communication—the land-line telephones.

- Fax is also useful for sending long lists, and where accuracy is critical.

- Do not tie up a radio frequency sending a long list of supplies if a working fax or phone is available.

Couriers

- Since pre-history, runners have carried messages from place to place.

- When we are asked to deliver a sensitive or very lengthy message, and fax and phone lines are out of service, hand delivery might be the best choice if travel is possible.

- Acting as a courier does not eliminate the use of radio, since couriers need to be dispatched from place to place.

Introduction to Emergency Communication

Topic 24 -1

Which can you NOT use to identify your transmissions on Citizens' Band radio?

A. Your Amateur call.

B. Your "handle".

C. A self-assigned identifier.

D. A tactical callsign.

Topic 24 -2

Which is the best course of action for summoning help via CB?

A. Use channel 1, since the lowest frequency has the longest ground-wave signal.

B. Call at regular intervals on channels 9 and 19 for a response.

C. Call only on channel 9, since it is designated for assistance and emergencies.

D. Say "Break – Break" or "MAYDAY" on any channel.

Introduction to Emergency Communication

Topic 24 -3

Which is NOT an advantage of using Family Radio Service (FRS) systems?

   A.   **They are readily available at low cost.**

   B.   **Operation on FRS radios is simple and requires little training.**

   C.   **There is no requirement for licensing to use FRS.**

   D.   Low transmitter power.

Topic 24 -4

Who may currently license a GMRS system with the FCC?

   A.   **A privately owned business, for routine communications.**

   B.   An individual, for family and personal use.

   C.   **A charitable institution, for benevolent purposes.**

   D.   **A local repeater club.**

Introduction to Emergency Communication

Topic 24 -5

Which is NOT *true* of the MURS?

A. A station license is required.

B. Power output is limited to 2 watts.

C. Radios operate in the VHF band.

D. Data emissions are permitted.

Large Disasters Topic 25

Onset: Critical Communication Requirements in a Disaster

- **First, there is a huge increase in the volume of traffic on public-safety radio channels, accompanied by prolonged waiting periods to gain access.**

- **As agencies respond, the need arises for agencies to communicate with one another.**

- **In a large-scale situation, a need arises to contact locations at distances beyond the range of a given radio or system (50 to 350 miles or more).**

Large Disasters Topic 25

Onset: Critical Communication Requirements in a Disaster

Different modes of communication are required in addition to voice:

- **Volume data in printed form—data modes, high-speed packet and facsimile.**

- **Morse code or PSK31 under difficult reception conditions.**

- **Encoded data for extreme privacy.**

- **Television—mobile, portable, aeronautical and marine.**

- **Telephone interconnections from/to radio systems.**

Large Disasters Topic 25

Onset: Critical Communication Requirements in a Disaster

❑ **Simultaneously with a high volume of message traffic, stations must cope with messages having widely differing priorities.**

❑ **Priority and precedence designations differ among agencies if any are used at all.**

Large Disasters Topic 25

Onset: Critical Communication Requirements in a Disaster

❑ **Operational problems arise such as:**

- **High-volume traffic circuits with no supply of message forms.**

- **Using the only printed forms available that were designed for a different, unrelated agency or function.**

- **Attempting to decipher scribbling from untrained message writers;**

- **Using scribes who cannot understand radio parlance or read through QRM.**

- **Becoming inundated with traffic volume so heavy it results in confusion over which messages are to be sent, which were sent, which have been received for delivery, and which have been received to be filed for ready reference.**

Large Disasters Topic 25

What Happens in the first 72 Hours?

- **In the early hours of an emergency turning into a major disaster, it takes precious time to overcome the obstacles to placing fully activated mutual aid resources into operation.**

- **The greatest concentration of relief efforts is generally found in the incorporated cities served by agencies with paid professionals— assuming their equipment, facilities and personnel remain operable.**

- **While urban areas experience more concentrated damage, suburbs and isolated areas of a county suffer from remoteness from fire departments, public works, law enforcement and the services of all other agencies.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

▪ **All organizations scramble to respond to an unprecedented demand for service within their authorized jurisdiction.**

▪ **There may be indecision and conflicts between community leaders.**

▪ **In these circumstances the public is often isolated, unable to call for help or determine the nature and extent of the disaster so that they can make plans to:**

> • **"Wait it out."**
>
> • **Prepare to evacuate.**
>
> • **Actually, evacuate with some possessions to a safe place.**
>
> • **Obtain physical aid for an impending catastrophe.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **Lack of information results in further attempted use of the telephone when the system is already saturated, if indeed it is still operating at all.**

- **The opportunity to even call for help is often unavailable to most citizens during the first 72 hours.**

- **Occasionally, a passing public safety vehicle or one equipped with an operational commercial, utility, amateur or CB radio can be "flagged down" to make a call—assuming it can contact a person who can help.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **Too little information is gathered about the public's immediate needs, and ways to meet them.**

- **Distorted public perceptions develop through misinformation.**

- **Essential damage-assessment report data is needed by state and federal agencies to initiate relief aid from outside the disaster area.**

- **Many broadcast stations (*those still on the air*) initially disseminate rumors and speculation in the absence of factual information.**

- **Those few people who possess an operating battery-powered broadcast band radio can tune until they find a local station that can provide helpful information.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **Everywhere, people walk aimlessly seeking a route to family and friends.**

- **Many, fearful of looting, remain in hazardous buildings, or return, as do shopkeepers, to salvage valuables.**

- **As darkness falls, looting and rumors of looting are generated.**

- **Word circulates about shelter locations.**

- **Some displaced persons stay at homes of friends, relatives or strangers.**

- **Others are housed at public shelters for days, still searching for family members elsewhere, and without communication.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **The opportunity to notify concerned distant relatives is rarely available except via the American Red Cross' "Safe and Well" program – but that is computer based, and the Internet may not exist.**

- **Later, often too late, information trickles in about problem areas or cases that have been overlooked or mishandled due to the lack of communication. Some potential evacuees are overlooked.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- Once the immediate threat to life has passed, survival instincts prevail. People operate essentially on their own for an indefinite period while public agencies seek to organize and respond to the most urgent problems of which their communications make them aware.

- After-shocks, flare-up of fires, weakening or breaking of dams and new flood crests, build-up of winds, broken levees, etc., result in some relief work being undone and the posing of new threats.

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **Following Katrina, there were great strides made to achieve inter-agency communications, but it still has a long way to go.**

- **Inter-agency communication capabilities remain poor.**

- **At the end of 72 hours, the disaster area remains in virtual isolation except for helicopter service for known critical cases and official use.**

- **Little centralized information is available.**

- **Amateur Radio operators from neighboring counties and states offer to help but are often unable to cross the roadblocks established to limit access by sightseers and potential looters.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **Disorganized local volunteers often lack essential skills and orientation.**

- **Costly mistakes are made and systems bog down.**

- **The dead pose a serious health problem.**

- **Stress rises among the citizenry.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **Little overall assessment emerges in the first 72 hours about available emergency resources and relief supplies.**

  - **Shortages are apparent and growing.**

  - **Travel continues to be difficult and slow.**

  - **Relief supplies trickle in to uncertain storage locations.**

  - **Some supplies are useless.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **Restaurants remaining open are unable to cook without gas or to serve the masses that flood them.**

- **Food and water shortages have become critical.**

- **Normal water sources may have been cut off or contaminated.**

- **Gasoline is unavailable – the pumps need electricity to work, and there is no power.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **Eventually, essential functional communication networks evolve as priorities are asserted and clusters of traffic emerge.**

- **Relief efforts are mounted when someone takes charge, makes a decision and directs the efforts of others.**

- **The command and control process requires communication—the ingredient in short supply in all disasters.**

Large Disasters Topic 25

What Happens in the first 72 Hours? (Continued)

- **At critiques following a disaster, amidst the finger pointing blame and chest thumping claims, the cry is heard:**

 "Next time we must be better prepared!"

– and a committee is formed.

Introduction to Emergency Communication

Topic 25 -1

What is the first thing that happens after a disaster has occurred?

A.   The Federal Emergency Management Agency arrives on the scene.

B.   The Red Cross and Salvation Army arrive with food and bedding for victims.

C.   **Massive increase in the volume of traffic on public-safety radio channels.**

D.   The press provides up to date and accurate information to the public.

Topic 25 -2

Which of the following statements is NOT *true* of interagency communications?

A.   Many agencies use incompatible radio systems.

B.   Many agencies are reluctant to use each other's radio system.

C.   **Agencies all use the same radio systems and frequencies.**

D.   Amateur Radio can be used to link agencies.

Introduction to Emergency Communication

Topic 25 -3

In the first 72 hours of a disaster situation, where is the greatest concentration of relief effort to be found?

   A.   Urban areas.

   B.   Suburban areas.

   C.   Rural areas.

   D.   Outside the affected area.

Topic 25 -4

Which organization handles health and welfare messages on behalf of the victims?

   A.   Department of Homeland Security.

   B.   Hurricane Watch Net.

   C.   National Weather Service.

   D.   American Red Cross.

Introduction to Emergency Communication

Topic 25 -5

What is the usual situation in a disaster after the initial 72 hours?

A. **The disaster area remains in virtual isolation.**

B. The disaster is over and everybody can go home.

C. A few victims still need assistance.

D. Communication systems are back to normal.

Hazardous Waste Awareness Topic 26

Hazardous Materials (HazMat)

- **HazMat refers to any substances or materials, which if released in an uncontrolled manner can be harmful to people, animals, crops, water systems, or other elements of the environment.**

- **These materials include explosives, gases, flammable and combustible liquids, flammable solids or substances, poisonous and infectious substances, radioactive materials, and corrosives.**

Hazardous Waste Awareness Topic 26

Hazardous Chemicals On The Move

- The US Department of Transportation (DOT) has established several systems to manage HazMat materials. These include definitions of various classes of hazardous materials, placards and other marking requirements for vehicles, containers and packages to aid in rapid identification of cargoes and an international cargo commodity numbering system.

- All freight cars, trucks and freight containers display a diamond shaped placard, 10 inches on a side, color-coded and show a graphic symbol of the hazard class and include a four digit identification number. Warning labels are also displayed on most packages containing hazardous materials.

- Common four digit numbers you might see are 1993 (road tar, diesel fuel, etc.), and 1203 (gasoline).

Hazardous Waste Awareness Topic 26

Hazards in Buildings

- **The National Fire Protection Association (NFPA) has devised a marking system to alert firefighters to the characteristics of hazardous materials stored in stationary tanks and facilities.**

- **The NFPA label is diamond shaped, divided into four quadrants:**
  - ❖ **The left quadrant, colored blue, contains a 0 to 4 (highest) numerical rating of the substance health hazard.**
  - ❖ **The top quadrant, red in color, contains the substances fire hazard rating, 0 to 4 (highest.)**
  - ❖ **The right quadrant, colored yellow, indicates the substances likelihood to explode or react rating, 0 to 4 (highest.)**
  - ❖ **The bottom quadrant is white, contains information regards three special hazards, OXY – oxidizer, W – reacts with water, and the Radioactive symbol.**

Hazardous Waste Awareness Topic 26

Guidelines to Handling HazMat Incidents

- Once you are in a safe position, up-wind and up-hill, try and identify the material.

- If you cannot read the items on the placard using a spotting scope or binoculars, simply report what you can see from a safe position.

- If you can see from a safe position look for the four-digit number preceded by the initials "UN/NA" and the name of the material on a shipping paper, package or drum.

- When reporting a HazMat incident, identify yourself, give your current location and the location of the incident, briefly describe what you see and if a gaseous cloud or liquid spill exists, give the direction that the contaminant is flowing.

Introduction to Emergency Communication

Topic 26 -1

Which of the following BEST describes where you should be located when in the vicinity of a HazMat incident?

A. **Far away enough to ensure your safety.**

B. Downhill and downwind.

C. Close enough to read the numbers on any placards with your naked eyes.

D. Alongside emergency responders wearing exposure suits.

Topic 26 -2

Which Federal agency is responsible for warning the public about hazardous materials containers and shippers?

A. Federal Emergency Management Agency.

B. Federal Response Plan.

C. National Communications System.

D. **Department of Transportation.**

Introduction to Emergency Communication

Topic 26 -3

Before transmitting in the area of a HazMat incident what should you always do?

    A.   First identify the agents by reading the placard or container labels.

    B.   Be far enough away so that no vapors or fumes are present.

    C.   Wait to report the incident until police or fire officials have arrived.

    D.   Take action to stop or contain any agents that might be leaking.

Topic 26 -4

On the sides of transporting vehicles how are different classes of hazardous materials identified?

    A.   Placards.

    B.   Four-digit numbers.

    C.   Warning labels and/or icons.

    D.   All of the above answers are correct.

Topic 26 -5

Gasoline tankers filling the neighborhood gas station's underground tanks are identified with a placard bearing which of the following?

A. **1203.**

B.   1993.

C.   2003.

D.   2706.

Marine Communications Topic 27

Marine Communications

- **The most common marine radio mode is VHF – FM, (156 to 162 MHz), with an effective range from ship to ship of 10 to 15 miles, and ship to shore of 20 to 30 miles.**

- **Vessels that routinely travel outside this distance generally have MW/HF – SSB, satellite communications or both. Note: CW communication is no longer used on MW/HF.**

- **The use of VHF and MW/HF marine radios is restricted to vessels on the water. The use of portables or mobiles to communicate with crew on shore is not allowed.**

- **Certain commercial users, such as marinas, marine towing services and fish canneries may be licensed for limited base operations on certain channels.**

Marine Communications Topic 27

Channel Selection

- Marine FM frequencies have been assigned channel numbers, and all are designated for specific uses.

- Channel 16 has been designated as the worldwide distress and calling frequency. All vessels are required to maintain a listening "watch" on FM 16 while underway.

- FM 9 has been designated as an alternate calling frequency.

- FM 22 is for public communication with the Coast Guard, but may not be used by boaters unless specifically instructed to do so by the Coast Guard radio operator on FM 16.

- FM 22 is also used by the Coast Guard to broadcast "Notice to Mariners" messages (NOTAMS), after announcing them on FM 16.

Marine Communications Topic 27

Frequencies for key marine VHF channels

- **FM 9 156.45 Calling**
- **FM 22 157.1 Coast Guard—NOTAMS**
- **FM 16 156.8 Calling/Distress**
- **FM 23 157.15 Coast Guard**
- **FM 17 156.85 State/local gov't. shore sta.**
- **FM 68 156.425 Intership**
- **FM 18 156.9 Commercial Intership**
- **FM 69 156.475 Intership**
- **FM 21 157.05 Coast Guard**
- **FM 83 157.175 Coast Guard Auxiliary**

Marine Communications Topic 27

Spoken Emergency Signals

- **"MAYDAY MAYDAY" – The highest priority urgency call. The vessel calling is threatened by grave or immediate danger and requires immediate assistance.**

- **"PAN PAN" – Known as an "urgency" call – the vessel calling has an urgent message concerning the safety of a vessel or person.**

- **"SECURITE" – The safety signal – used for official messages about the safety of navigation or important weather warnings.**

- **"SILENCE" – The Coast Guard may declare silence on a specific channel. Only those units actively involved in the incident may transmit on that frequency.**

Introduction to Emergency Communication

Marine Communications Topic 27

Incident Reporting

- There are two types of incidents that hams should report directly to the Coast Guard:
  - vessels in distress, and
  - oil or chemical spills into public waters.
  - ❖ The first, to the nearest Coast Guard station.
  - ❖ Oil and chemical spills should be reported to the Coast Guard's National Response Center at 1-800-424-8802 or via NRC Internet Web site **www.nrc.uscg.mil**.

Marine Communications Topic 27

Distress Information

- **If you hear a distress call, listen first to see if the Coast Guard responds within a minute or two. If not, attempt to get the following information:**
  - ❖ **Position of the vessel involved.**
  - ❖ **Number of persons on board.**
  - ❖ **Nature of the Distress.**
  - ❖ **Name of the vessel.**
  - ❖ **Call sign (if any)**
  - ❖ **Length and type of vessel.**
  - ❖ **Color.**
  - ❖ **Any descriptive features.**
  - ❖ **On board emergency equipment: Life raft, Emergency Position Indicating Radio. Beacon (EPIRB) and class of EPIRB if possible**

Marine Communications Topic 27

Distress Information (Continued)

- Once you have the information, advise all persons on board to don life jackets, and contact either 911 dispatch or the closest Coast Guard facility by phone.

- Identify yourself as an Amateur Radio operator relaying an emergency message. Pass on the information and assist as requested

Routine Communications

- If calling on FM 9, transmit the name of the vessel you want to talk with twice, followed by your station's name twice.

- FCC rules require that you identify your vessel on each transmission.

- The use of "Q" signals and "10 codes" is not permitted on marine VHF-FM.

Marine Communications Topic 27

Medium Frequency/High Frequency Single Side Band (MF/HF SSB)

- **Vessels that operate further offshore may operate a MF/HF-SSB unit on designated channelized international frequencies.**

- **Vessels using a MF/HF radio must also have a VHF-FM radio aboard. The US Coast Guard maintains "guard" on (they monitor) 2182 kHz, the calling and distress frequency, as well as other designated frequencies in this band.**

- **Many boaters traveling on the high seas carry HF Amateur Radio aboard.**

- **Amateur Radio Maritime Nets may also be used to pass emergency traffic.**

- **Distress traffic received over MF/HF-SSB should be handled in the same way as on VHF- FM.**

Introduction to Emergency Communication

Topic 27 -1

When is it permissible to utilize channel FM 22?

    A.   **At anytime after making an initial call on FM 16.**

    B.   **Whenever channel FM 9 and FM 16 are busy.**

    C.   **Only when directed by the Coast Guard.**

    D.   **At no time, it is for Coast Guard use only.**

Topic 27 -2

What should you do if you hear an unanswered marine distress call?

    A.   **Contact the nearest Coast Guard facility and advise them of the call.**

    B.   **Answer the caller immediately and ask what the emergency is.**

    C.   **Get in your own boat and attempt a rescue.**

    D.   **Listen for a response. If none, respond and gather all information possible and then contact the nearest Coast Guard facility.**

Introduction to Emergency Communication

Topic 27 -3

When must you identify yourself on VHF-FM marine Radio?

    A.   Only on the initial call.

    B.   Only on the initial call and the final call.

    C.   Only on the original call and then every ten minutes.

    D.   On all transmissions.

Topic 27 -4

Which vessels operate MW/HF SSB radios?

    A.   Any vessel that wants to.

    B.   Only sea-going vessels that operate outside the rage of VHF-FM radios.

    C.   Only those vessels that operate offshore and have a VHF-FM marine radio.

    D.   Only those vessels that have an Amateur Radio operator aboard.

Introduction to Emergency Communication

Topic 27 -5

Which channel(s) may be used for calling another vessel?

    A.   **FM 83**

    B.   **FM 9**

    C.   **FM 16**

    D.   **Both FM 9 and FM 16.**

Modes, Methods and Applications Topic 28

Your Purpose

- As emergency communicators is to provide accurate and rapid transfer of information from one place to another.

- To do that job well, you must understand the strengths and weaknesses of each mode of communications.

- Each type of message should be sent using the most appropriate mode, taking into consideration the message's contents, and its destination(s).

Modes, Methods and Applications Topic 28

Some Concepts to Consider

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

Modes, Methods and Applications Topic 28

Some Concepts to Consider (Continued)

- 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 members of a group directed to one station.
  - ❖ High precision – Lists of items, medical or technical terminology, specialized or detailed information.
  - ❖ Low precision – Traffic reports, damage estimates, simple situation reports.
  - ❖ High priority – Fast delivery is critical.
  - ❖ Low priority – Messages can be delivered in a more relaxed time frame.

Modes, Methods and Applications Topic 28

Some Concepts to Consider (Continued)

Mode Example

- Each type of message should be sent using the most appropriate mode, taking into consideration the message's contents, and its destination(s).

Modes, Methods and Applications Topic 28

Tactical Messages

- Tactical messages are usually low-precision and time critical, and can be passed, most efficiently using voice.

Lists and Detailed Messages

- The various digital modes (including land-line fax and email) offer the best means of handling these messages, since they are both fast and accurate.

Sensitive Information

- Names and addresses of evacuees should never be transmitted over voice channels, since thieves with scanners can use the information to loot unattended homes.

- If absolute privacy is required, the message should not be transmitted by Amateur Radio.

Modes, Methods and Applications Topic 28

Digital Modes

- Digital modes that do not provide automatic error checking should only be used when clean and interference-free signals can be guaranteed.

- HF – The best digital modes for HF operation are packet, AMTOR mode B, and PSK31 in QPSK mode.

- VHF/UHF – The TNC2 FM packet is the most common mode used on VHF and UHF frequencies.

- Packet – Packet communication is error-free in point to point "automated repeat request" (ARQ) or "forward error correction" (FEC) broadcast modes.

Modes, Methods and Applications Topic 28

Digital Modes (Continued)

- **AMTOR mode B – It is an advanced teletype mode with forward error correction, making it ideal for high precision messages over long distances.**

- **PSK31 – Usable in very poor conditions. This makes it ideal for HF emergency communications. There are two PSK31 modes:**

    ❖ **BPSK – Has no error correction.**

    ❖ **QPSK – Has forward error correction.**

    ❖ **Under all but the worst conditions, the BPSK mode, should be used, as it will provide almost perfect transmissions.**

Modes, Methods and Applications Topic 28

Digital Modes (Continued)

- **Packet Teleprinting Over Radio (PACTOR) – A combination of packet and AMTOR. PACTOR uses ARQ and FEC modes, and a standard keyboard.**

- **TCP/IP Packet – Internet protocols and network services are useable on packet radio.**

- **APRS – APRS is a digital information handling mode with applications in emcomm. One use is the automated reporting of data from digital weather stations.**

Introduction to Emergency Communication

Modes, Methods and Applications Topic 28

D-Star and WinLink 2000

- These two systems are rapidly growing in popularity and have already served well in emergency situations.

- WinLink 2000 is another digital, error-free mode that transmits conventional email messages over the Internet when it is available.

- If the Internet is down locally, the emails can be sent by radio to another WinLink station that has Internet service and enter the Internet there.

- Like normal email, the messages can be sent anywhere that has a functioning email address.

- Also like normal email, there can be a delay in their reception at times.

- Because it uses ordinary email forms, it is familiar to served agency personnel.

- WinLink operators mostly use VHF or UHF, but it can use HF too.

Modes, Methods and Applications Topic 28

D-Star and WinLink 2000 (Continued)

- **D-Star is also a digital system -but there are significant differences. D-Star allows for both voice and data communications.**

- **Even small hand-held radios can send and receive short digital messages.**

- **D-Star uses VHF which allows for a slow bit-rate, or UHF which is much faster. It does not currently have HF options.**

- **D-Star also uses the Internet for long-distance messaging.**

- **Both of these systems have their advantages and their devotees**

Modes, Methods and Applications Topic 28

Related Considerations

- **Become familiar with, and practice using, any digital mode or system well in advance of an emergency.**

- **Digital communications can be enhanced by composing the message off-line in a text editor.**

- **The high duty-cycle of many digital modes requires a rugged radio and power supply with adequate cooling.**

Amateur Television (ATV)

- There are two forms of ATV – slow-scan and fast-scan. Fast-scan ATV is live, full motion TV similar to what you see on commercial TV, but usually at reduced quality. Slow-scan ATV uses a voice-grade channel to send a still picture line by line. It can take more than a minute for a color picture to be transmitted.

Modes, Methods and Applications Topic 28

Related Considerations (Continued)

Amateur Television (ATV)

- **There are two forms of ATV – slow-scan and fast-scan.**

- **Fast-scan ATV is live, full motion TV similar to what you see on commercial TV, but usually at reduced quality.**

- **Slow-scan ATV uses a voice-grade channel to send a still picture line by line.**

Modes, Methods and Applications Topic 28

Related Considerations (Continued)

Amateur Television (ATV)

- ATV has a number of emcomm applications, but all involve letting emergency managers see what is going on in the field without ever leaving their offices.

- ATV crews usually take a passive "observer" approach, and avoid interaction with bystanders to ensure that a situation is accurately represented.

- No emcomm ATV transmission should ever be "staged" for the camera.

Introduction to Emergency Communication

Topic 28 -1

Which of the following best describes your purpose as an emergency communicator?

   A.   To operate the radio.

   B.   To coordinate communications for the EOC.

   C.   **To provide accurate and rapid transfer of information from one place to another.**

   D.   To provide internal communication support to one (and only one) responding agency.

Topic 28 -2

Which of the following best describes tactical messages?

   A.   They are high precision and time critical.

   B.   **They are low precision and time critical.**

   C.   They are point-to-point and NOT time critical.

   D.   They are point-to-multipoint and low precision.

Introduction to Emergency Communication

Topic 28 -3

Long lists and detailed messages are best handled by which of the following modes?

   A.   Voice or CW.

   B.   **Fax or digital.**

   C.   CW OR DIGITAL.

   D.   Phone or fax.

Topic 28 -4

During an emergency, you are using voice transmissions to pass messages. Which of the following "guidelines" should govern your action if you were asked to transmit the names and addresses of victims?

   A.   Transmit the information exactly as presented to you.

   B.   Use a pre-established code to transmit the information.

   C.   **If absolute privacy is required, do not transmit the information by Amateur Radio.**

   D.   Switch to a digital mode and be assured of complete privacy.

Introduction to Emergency Communication

Topic 28 -5

Which of the following PSK31 modes has an error correction feature?

    A.   BPSK

    B.   QPSK

    C.   RPSK

    D.   SPSK

Other Learning Opportunities Topic 29

- **If you want your performance in the next big disaster to be flawless, practice is essential.**

- **Regularly Scheduled Nets – Well-designed nets will vary the format and goals frequently in order to keep them interesting.**

- **Local Classroom and On-Air Training Sessions – Local agencies may offer job specific training, such as the American Red Cross' Introduction to Disasters and Disaster Damage Assessment courses.**

- **Public Service Events – Some of the best practice for tactical disaster communication is any local, walkathon, marathon, bike-athon, etc.**

Other Learning Opportunities Topic 29

Other Learning Opportunities (Continued)

- **Learning Resources on the Internet –**
  - ❖ **ARRL - Down load the ARRL Public Service Manual and the ARES Field Resources Manual.**
  - ❖ **The FEMA Institute - online courses are available for many areas involving emergency events.**
- **Books – The ARRL has a wide selection of books that can be ordered from them directly at www.arrl.org.**
- **Software – There are many specialized software packages available for Packet Radio.**

Other Learning Opportunities Topic 29

Other Learning Opportunities (Continued)

❖ **PR-101: The ARRL course for dealing with media and public relations.**

❖ **Public Service and Emergency Communications Management for Radio Amateurs (EC-016):**

❖ **The ARRL Digital Technology for Emergency Communications Course will introduce you to all the ways Amateur Radio operators are using digital technology as a valuable emergency communications tool.**

Introduction to Emergency Communication

Topic 29 -1

Which of the following was NOT recommended as a means of practicing actual emcomm skills?

    A.   **Regularly scheduled nets.**

    B.   **On-air training sessions.**

    C.   **Discussion groups.**

    D.   **Public service events.**

Introduction to Emergency Communication

Topic 29 -2

What is the purpose of ARRL's *Public Service and Emergency Communications Management for Radio Amateurs* course?

A. To review the skills and knowledge presented in this course.

B. To provide training for prospective Emergency Operation Center Managers.

C. To prepare individuals for the jobs of NCS and Net Manager.

D. To prepare individuals for management level jobs such as EC, DEC or SEC or other leadership or training roles.

Final Review
and
Questions

You will have 1 hour to review the question pool while the VE team sets up before testing starts.