MIPT ReadyNet
BEST PRACTICE

Use of Amateur Radio Operators to Augment Emergency Communications: Overview

PURPOSE
These best practices provide procedures for incorporating amateur radio operators into an emergency management structure.

SUMMARY
Communications are the cornerstone of effective emergency response at the local, state, and federal levels. Ineffective communications can result in additional damage to property, injuries, casualties, duplication of efforts, and gaps in response. A secondary, nonstandard system of communications may be invaluable for an effective emergency response.

DESCRIPTION
Emergency management agencies should consider using amateur radio operators to augment emergency communications during a crisis. This best practice outlines a process for integrating amateur radio operators into emergency management planning. It consists of the following elements:
- Amateur Radio Operator Points of Contact
- Planning
- Training
- Equipment
- Implementation Challenges
- Background

Amateur Radio Operator Points of Contact
Effective planning is essential for successfully integrating an amateur radio organization into an emergency communications structure. The first step is for emergency managers to identify an experienced amateur radio operator to serve as the point of contact (POC), most likely from one of the major amateur radio organizations that specialize in emergency communications. The three most prominent organizations are:

- **Radio Amateur Civil Emergency Service** (RACES) is a volunteer organization of licensed amateur radio operators who provide communications to affiliated government agencies during emergencies. The Federal Communications Commission (FCC) regulates RACES under Title 47 Code of Federal Regulations (CFR), Part 97, subpart F and was originally sponsored by the Federal Emergency Management Agency (FEMA). FEMA has turned over administration of RACES to the individual states, where, in most cases, their emergency management offices manage RACES's operations. [http://www.races.net/] It should be noted that in the case of RACES, the Emergency Manager will likely have an existing working relationship with the POC, since it is the Emergency Manager (or another position within the Emergency Management chain of command) who may activate a RACES unit.

- **Amateur Radio Emergency Service** (ARES) is a group of FCC-licensed amateur radio operators who volunteer their services and equipment to public or private

agencies during emergencies. ARES operates under the auspices of the American Radio Relay League (ARRL), a national, not-for-profit organization, which is now a recognized affiliate program with the Department of Homeland Security's Citizen Corps initiative. ARES is also a member of the National Voluntary Organizations Active in Disasters (NVOAD). [http://www.ares.org/] For the American Radio Relay League's (ARRL) Amateur Radio Emergency Service (ARES), the POC usually is the Emergency Coordinator (EC). An area's EC can be determined by consulting the following two websites:

– http://www.arrl.org/FandES/field/org/smlist.html
– http://qrz.com/i/names.html

- **Military Affiliated Radio System** (MARS) is sponsored by the Department of Defense and supplements emergency communications locally, nationally, and internationally. It provides auxiliary communications for military, federal, civil, and/or disaster officials in emergencies. MARS also assists in restoring normal communications in emergencies. MARS covers all fifty states and U.S. territories and can augment communications with a unique set of frequency allocations. MARS can also transmit military encrypted messages from military senders to military receivers. [http://www.marsgateway.net]

Several other national amateur radio organizations work with pre-disaster or emergency relief communications.

- **Salvation Army Team Emergency Radio Network** (SATERN) provides amateur radio operators to both the incident and vital relief-distribution sites during emergencies. SATERN operators have relayed critical information such as the status of relatives, damage assessments, and availability of hospital beds. [http://satern.org/satern.html]

- **SKYWARN** is a group of individuals that monitor and relay weather information to the National Weather Service. Some SKYWARN operators are also licensed amateur radio operators, and use amateur radio equipment and frequencies. SKYWARN operations aid in warning communities of impending natural disasters such as tornados and other severe weather incidents. [http://www.skywarn.org/]

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BEST PRACTICE

Use of Amateur Radio Operators to Augment Emergency Communications: Amateur Radio Information and Emergency Planning

PURPOSE

This best practice outlines procedures for integrating amateur radio operators into a jurisdiction's emergency planning processes.

SUMMARY

Amateur radio operators will be most effective during an emergency if certain key issues are addressed in the emergency planning process. This best practice reviews the amateur radio operator elements that should be included in emergency plans.

DESCRIPTION

The amateur radio point of contact (POC) should be involved in the development and/or review of the jurisdiction's emergency plan. If a jurisdiction uses a committee for reviewing its local emergency plan, an amateur radio POC should be included in the committee. For example, some areas have included amateur radio POCs in Community Emergency Response Team (CERT) planning.

Emergency management plans or standard operating procedures (SOP) should address the following subjects with regard to amateur radio:

- **Area(s) requiring coverage**. Plans must address all natural and man-made limitations on radio propagation within the covered area. This includes geological characteristics such as mountains or forest density. It should be noted that valleys and canyons pose the greatest challenge to clear transmissions. Borrowing portable repeaters from individual amateur radio operators or groups can remedy this problem. The number of repeaters must be sufficient to meet the agency's communication needs. Local ordinances against tall antennas could impact the quality of coverage in a given area. Memoranda of understanding between local repeater owners and local government (e.g., the Emergency Manager) should be established. This would allow responding units to have channels pre-programmed into their radios.

- **Operating frequencies.** The amateur radio POC should know the frequencies used by the local amateur radio agencies in the area. Agencies served by operators with dual membership in both ARES and RACES use frequencies from either organization, assuming the local emergency manager has activated RACES. Generally, most emergencies will use channels on VHF and UHF. The plan should reflect any designations of frequencies for specific traffic (e.g., health and welfare, family support, tactical nets). The task will dictate which frequencies will be used. For example, health and welfare messages transmitted from Ohio to Texas could be served on HF Single Sideband or Morse Code whereas tactical messages from an incident resource manager to a resource in a neighboring county could be handled by packet, APRS, or VHF/UHF FM over a repeater.

- **Verification of support for amateur radio operators' equipment and records**. This can include such considerations as space in the EOC or served agency for amateur radio operators, antennas (if necessary), power sources to meet amateur radio's needs, and a digital pager for the POC if the served agency uses this method for call up. The EOC or agency should also have the records of any amateur radio operators supporting it. According to Jerry Boyd's *Management of the Amateur Radio Emergency Communications Function*, this information can include the operators':

  – Application for membership;
  – Documentation of acceptance;
  – Issuance of identification;
  – Training documentation;
  – FCC license copy.

  The plan should also include guidelines for periodic updates of operators' contact information and for ensuring that their credentials are current. These guidelines should be stringent in order to separate the casual volunteers from the serious volunteers.

- **Clearly delineated chain of command**. The amateur radio POC should outline for the served agency those operators who will participate in a response, their organizational strata, and ensure they understand the hierarchy in the EOC. Moreover, plans should delineate the types of nets (i.e. on-air meetings directed by a moderator) that could emerge during the course of an emergency, as well as which operators will be responsible for the "subnets" (i.e. nets designated for specific message types). For example, the POC may assign specific nets for logistical traffic (e.g., equipment requests). If the agency uses the Incident Command System (ICS), operators should understand where their position rests in this hierarchy, as well as the basic concepts of the ICS system itself.

- **Determining emergency conditions that warrant activation of the amateur radio network as well as those who are charged with activation**. Judging when to activate the network can be difficult and subjective. RACES activates at the order of the director of the jurisdiction's emergency management agency. An ARES unit is usually activated by its leader, the Emergency Coordinator, when an emergency arises. However, ARES and other organizations can be self-activating in the absence of adequate direction by leaders (for example, when phone lines are down). Therefore, it should be determined in advance what level emergency will activate the local nets. Many jurisdictions are deliberately vague about the type of emergency that will cause activation of amateur radio units, and leave the decision to the appropriate local officials. For example, in Hayward, California, activation occurs "when it becomes obvious that a local emergency exists or may exist…" [http://www.qsl.net/hwdraces/emergcom.html#trnpln]. Many areas simply instruct operators to tune in to a pre-determined frequency (a.k.a. "resource and rally frequency") for instruction in the event an emergency has likely occurred.

- **Procedures for activating the amateur radio network**. This varies by area and the resources afforded the operators in that area. Some plans call for amateur radio POCs to carry a county pager for activation. Many prefer packet radio since these devices provide a written record. Other plans call for phone trees. The nature of the emergency may also dictate what means of call out will be employed. A "predictable" emergency (e.g., a hurricane) may allow time to use telephone for

activation whereas an unpredictable emergency (e.g., an act of terrorism) may call for operators to monitor a designated frequency.

- **Standard documentation formats**. Maintaining logs of operations is essential not only to the execution of tasks *during* the emergency, but to assist in investigations and litigation *after* the emergency. Various amateur radio agencies use different formats for documenting messages, which could vary from the responding agency's formatting standards. For example, SKYWARN's method of documentation varies from ARES's (see ARES 1.8). Also, many emergency organizations use or are in the process of adopting the ICS. If the served agency uses the ICS, then documentation formats should conform to their standard. Indeed, the recently adopted Emergency Communications courses of the ARRL prepare amateur radio operators to adopt the message format of their served agencies.

Background Checks for Amateur Radio Operator POCs

Many jurisdictions require background checks and/or the signing of a non-disclosure agreement for all Emergency Operations Center (EOC) personnel, including amateur radio operators. Background checks are often mandatory for all RACES members, who, at a minimum, undergo a check through the FBI's National Criminal Information Center (NCIC) and a driver's license check through the Law Enforcement Data System (LEDS). Even if they are not mandatory, emergency managers may consider conducting background checks (preferably during the volunteer's application phase) for amateur radio operators since they will have access to sensitive information. In such cases, protocols should be developed to determine how the background information will be applied and stored.

Amateur Radio Emergency Communications Plans

Plans will vary by location, available resources, and many other factors. Numerous plans may be accessed via the internet. Some examples include:

Alaska
ARES Alaska
http://www.qsl.net/ccares/ARES_Emergency_communications_guide.htm

California
CERT Fremont-Union City, California
http://www.qsl.net/kg6adr/CERTComm/Resources/Resources.html

Florida
ARES Northern Florida
http://home.att.net/~wa4pup/sectionplan/northern-florida-section-ares-plan-2003.pdf

Massachusetts
Massachusetts Amateur Radio Emergency Communications Plan
http://www.qsl.net/n1cpe/racesplan.pdf

Montana
Missoula County Amateur Radio Emergency Services Communication Plan
http://www.riversdreams.com/k7vk/emergency.htm#ARES%20plan

Oregon
Oregon State Amateur Radio Communications Plan
http://www.osp.state.or.us/oem/Organization/Technology%20and%20Response/areop.pdf

Pennsylvania
RACES Commonwealth of Pennsylvania Operational Plan
http://www.pema.state.pa.us/pema/LIB/pema/races.pdf

Wisconsin
Volunteer Emergency Communications Support Plan **(VECS Plan, both ARES & RACES)**
http://wi-aresraces.org under "Other Downloadable Documents of Interest"

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City of Hayward Office of Emergency Services' Emergency Communications Committee. *Emergency Communications and Operations Manual First Edition*. 1995.

Radio Amateur Civil Emergency Service. *Commonwealth of Pennsylvania Operational Plan*. April 2000. pp. 19.

Stafford Amateur Radio Association. *Stafford Amateur Radio Standard Operating Procedures for ARES & RACES Personnel*. American Radio Emergency Service. September 2001. pp. 48.

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BEST PRACTICE

Use of Amateur Radio Operators to Augment Emergency Communications: Training

PURPOSE
This best practice describes emergency management training for amateur radio operators.

SUMMARY
Amateur radio organizations conduct periodic, autonomous training for their members. These activities can provide opportunities for amateur radio operators to train with other emergency responders or to test elements of emergency plans.

DESCRIPTION
Both ARES and RACES regularly test their members in emergency procedures. Some states request that RACES members test their equipment and emergency procedures, though this testing should not exceed one hour per week (see FCC part 97.407 (e) (4)). The ARRL holds several training exercises each year, including the Field Day exercise in June and the Section Emergency Test (SET) held each fall. For the history of the Field Day exercise, see http://www.arrl.org/pio/press_releases/9912028.pdf.

In 2000, the ARRL instituted a series of three online training courses for ARES members. Mentors with experience in emergency communications guide students along in their work, which culminates in a certificate of completion. This is the first nationwide effort to train licensed amateur radio operators in emergency communications. Local ARES members should be encouraged to participate in this training.

Emergency managers should work with these training programs when integrating amateur radio operators into auxiliary emergency communications. This could be done in coordination with SETs or some other amateur radio training exercise or activities. Many emergency managers conduct training sessions at monthly meetings of ARES units. These training sessions provide amateur radio operators with experience in emergency operations and test procedures. Emergency training topics for amateur radio operators should address:

- How to identify and meet the agency's emergency communications needs
- Fundamental ICS training
- Types and effectiveness of the operator's radio equipment
- How to adapt to responders' communications procedures
- Net procedures and how to pass messages rapidly and accurately
- Determining the amateur radio operator's previous training or planning experience with his or her respective amateur radio organization (e.g., the annual "Field Day" exercise sponsored by ARES).

These training opportunities should allow amateur radio operators and other volunteers to interact with the public safety colleagues with whom they will work during an emergency. Emergency responders tend to trust volunteers with such training more than those who do not. Many training courses exist at low cost or no cost. Some managers may require

amateur radio operators to take emergency communications courses such as the ARRL-sponsored Amateur Radio Emergency Communications Course (ARECC) Level I, II, or III. Additionally, some managers make state Emergency Management Courses available to amateur radio operators, when such training would enhance their effectiveness for emergency management.

It is important that amateur radio operators follow through on their commitments and training. Emergency managers are dissatisfied by amateur radio organizations that insert themselves into an emergency plan, commit to making themselves available for training, and then fail to show up. Therefore, it is crucial that amateur radio organizations deliver on their obligations to train with their served agencies.

Information on Field Day Simulated Emergency Tests and other exercises can be found at:

ARRL (American Radio Relay League)
http://www.arrl.org/contests/forms/03fdpack.pdf
http://www.arrl.org/contests/results/2000/FDAY.pdf

Massachusetts
Eastern Massachusetts
http://www.townonline.com/billerica/news/local_regional/bil_covbihams07012003.htm

Mississippi
Meridian
http://www.strato.net/~mcarc/sparkgap/2003news/06.htm

New York
Long Island
http://www.limarc.org/

Virginia
Virginia Beach
http://www.vbgov.com/dept/fire/emergencymanagement/pdf/oem_sepoct.pdf

Canada
Toronto, Ontario
http://www.ecf.utoronto.ca/~radio/fieldday/2003/index.html

Information on SETs can be found at:

ARRL
http://www.arrl.org/FandES/field/setguide.html

Iowa
Middle Iowa
http://www.midiowa.com/casefam/ares/SETCritique.pdf

Virginia
http://www.va-ares.org/html/district_7_races_set.html
http://www.va-ares.org/html/charlottesville_set.html

Wisconsin
http://www.wi-aresraces.org/training/setideas.html

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BEST PRACTICE

Use of Amateur Radio Operators to Augment Emergency Communications: Equipment

PURPOSE

This best practice describes basic equipment requirements for amateur radio operators to be incorporated into emergency management operations.

SUMMARY

Amateur radio operators' ownership of their own equipment is a major benefit to first responders and emergency managers. They may require little or no additional funding from police, fire, or emergency management budgets for new hardware.

DESCRIPTION

Emergency managers may choose to enhance amateur radio operations through the purchase of other goods. Some items to consider may include:

- "Go kits" (12hr./24hr./72hr.); see RACES guidelines at http://races.org/gokit.htm
- Power sources, both primary and auxiliary
- Administrative necessities (e.g., pens, papers, maps)
- Antennas, mobile and/or fixed
- Sun block; insect repellant
- Portable General Mobile Radio Service (GMRS), Ham, or CB radios with batteries and chargers
- ID Cards (personal and organizational)
- Change of clothes
- Vests
- Uniform
- Any other emergency equipment, antennas, batteries, power supplies, flashlights, etc.
- Any medications, comforts, back packs, change of clothing, and any other unique needs
- Digital pagers (for recall)

For a more comprehensive list, see the Cumberland County, Maine Amateur Radio Relay League web site http://www.qsl.net/ccares/equip.html.

Amateur radio response can be expedited if an emergency agency allows the appropriate equipment to be pre-positioned in agency facilities or if the agency invests funds for the purchase of hardware to be permanently housed within the agency. Such actions can reduce amateur radio operators' response times by removing tasks as:

- Locating equipment
- Transporting the equipment to the incident or site
- Installing hardware such as cables and antennas.

DISCLAIMER

MIPT READYNET BEST PRACTICE

Use of Amateur Radio Operators to Augment Emergency Communications: Implementation Challenges and Background

PURPOSE

This best practice reviews potential implementation challenges to integrating amateur radio operators into an emergency management structure.

SUMMARY

Many emergency managers recognize amateur radio operators as invaluable resources and have well-developed working relationships within the local amateur radio group. Still, some emergency management officials and first responders have sometimes reacted negatively to amateur radio for a variety of reasons. Most of these problems can be obviated by proper training of the operators and a more careful examination of amateur radio capabilities by first responder leadership.

DESCRIPTION

Some emergency managers have regarded amateur radio as an outmoded form of communication in a world of cell phones and the Internet. Occasionally, an amateur radio operator may interfere with responders doing their job or may assume a managerial, rather than a support role, to the dismay of the emergency agency. Other problems have come from an amateur radio agency overstating its capabilities or available personnel, leaving an emergency management agency with a lack of radio operators in the event of an actual emergency.

Several unintended consequences may result from use of amateur radio operators for auxiliary emergency communications. The two most prominent are the possibility of competition between amateur radio organizations and skepticism on the part of first responders.

Emergency managers need to be aware of the competition that sometimes exists between amateur radio organizations that operate within the same jurisdiction. This competition between volunteer radio groups can be counterproductive and detract from the objective of providing auxiliary emergency communications. Some states, such as Wisconsin, lessen the potential for conflict by requiring cross-membership in the two most prominent groups, RACES and ARES.

First responders who are unfamiliar with amateur radio operators' capabilities may treat them with suspicion. Amateur radio operators are sometimes confused with citizen band radio (CB) enthusiasts, who have been known to monitor emergency radio traffic and even hinder response efforts at the incident scene. These and other doubts of amateur radio usefulness have been largely put to rest by the professional and efficient performance of amateur radio operators during emergencies. Amateur radio groups can allay any lingering concerns of responders and emergency managers by:

- Conducting forums and demonstrations of amateur radio capabilities

- Purchasing uniform shirts or vests so amateur radio operators can be readily identified by other response personnel
- Maintaining a rigorous training program to increase skill and professionalism.

Background

On September 11, 2001, communications were restored in many areas thanks to the determination and professionalism of local amateur radio operators. Within five minutes of the first plane's impact in New York City, amateur radio nets were activated. Amateur radio operators shadowed officials throughout the course of the disaster and provided communications for them. Amateur radio operators also positioned themselves in Red Cross shelters, hospitals, and wherever else they could pass critical information. In the eyes of many, the tragedy validated the role of amateur radio's role in providing emergency communications.

Since the advent of radio, amateur radio operators have been involved with the transmission of crucial information during emergencies and other incidents of concern to the public. Though September 11th is perhaps the most dramatic example, amateur radio's value has withstood repeated tests during numerous other crises over the years. These include tornadoes, hurricanes, floods, thunderstorms, accidents, and technological disasters such as the blackouts in the American northeast and Canada, and Hurricane Isabelle, to name a few.

Bibliography

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