Section 2: The Networks for Messages

Topic 6a

Basic Net Operations

Objectives

Welcome to Topic 6a.

This topic will provide you with a brief review of basic net operations as a foundation for other material to follow in this section of the curriculum.

Student preparation required:

If you are unfamiliar with network (net) operations, monitor several sessions of an Amateur Radio scheduled or emergency net.

Why We Have Nets

Any list of the major strengths of Amateur Radio in an emergency setting includes our abilities to share information in a "group setting" in real time across multiple locations and even multiple served agencies. Unlike many other types of communications, our radio messages can be heard by everyone in the group at once — and they can respond. This gives flexibility to emergency response managers, which is very useful.

During an emergency communication situation, a high volume of disorganized messages can quickly turn an overloaded communication system into a disaster of its own. To prevent this from happening, Amateur Radio operators use regular protocols called a "network" or "net" to organize the flow of messages. The mission of the net is to effectively move as much traffic as accurately and quickly as possible. Nets can be either formal or informal, as needs dictate. Nets can be conducted via voice, Morse code, or digital modes, depending on the situation.

Anatomy of Net Operations

The Net Manager is the person in charge of a net and is most often not the person who conducts the net on the air. Net Managers ensure that there is a Net Control Station (NCS) with enough operators for each shift, and monitor net and band conditions to see if changes in frequency are needed. If more than one net is operating, a Net Manager may be responsible for a group of nets.

The Net Manager coordinates the various nets and their NCSs to ensure a smooth flow of traffic within and between nets. Net Managers may assign various human and equipment resources to meet the needs of each net.

Net Managers may be responsible for a regularly scheduled net, or they may be temporarily appointed to manage one or more ad hoc nets created for a particular emergency incident.

A Net Control Station directs the minute-by-minute operation of the net on the air. The NCS controls the flow of messages according to priority and keeps track of where messages come from and where they go, as well as any that have yet to be sent. They also keep a current list of which stations are where, their assignments, and their capabilities. In a busy situation, the NCS may have one or more assistants to help with record-keeping.

Liaison stations handle messages that need to be passed from one net to another. The NCS or Net Manager may assign one or more stations to act as liaisons between two specific nets. These stations can monitor one or both nets, depending on resources. It is easier to monitor only one net at a time. This can be accomplished by having one station in each net assigned as the liaison to the other, or by having a single liaison station check into both nets on a regular schedule. In the event that an “emergency” precedence message needs to be passed to another net when the liaison is not monitoring that net, any net member can be assigned to jump to the other net and pass the message.

Learning proper NCS technique and handling such duties is one of the most important functions in emergency communications. During an emergency or disaster, the first operator to arrive on frequency is the NCS operator — at least until a Net Manager or a leadership official arrives on frequency to take control and perhaps to assign someone else to be the NCS.

Net Types

Open (Informal) Nets

During an open emergency net, there is minimal central control by a Net Control Station, if indeed there is an NCS at all. Stations call one another directly to pass messages. Unnecessary chatter is usually kept to a minimum. Open nets are often used during the period leading up to a potential emergency and as an operation winds down, or in smaller nets with only a few stations participating.

https://www.dropbox.com/s/stbcps6y5cjstx8/nondirected_net.mp3?dl=0

Click on the link above to listen to an example of an informal net.

Directed (Formal) Nets

A directed emergency net is created whenever large numbers of stations are participating, or where the volume of traffic cannot be dealt with on a first-come, first-served basis. In a communication emergency of any size, it is usually best to operate a directed net. In such situations, the NCS can prioritize traffic by nature and content.

https://www.dropbox.com/s/rx9etkowlzz6dhc/directed_net_-_nurses_trapped.mp3?dl=0

Click on the link above to listen to an example of a formal net.

In a directed net, the NCS controls all net operations. Check-ins may not "break into" (interrupt) the net or transmit unless specifically instructed to do so by the NCS, or unless they have an emergency message. The NCS will determine who uses the frequency and which traffic will be passed first. Casual conversation is strongly discouraged, and tactical call signs or tactical designators will probably be used. Tactical call signs or designators can be assigned to stations at various sites and locations, and for different purposes. For example, mobile operators can often be assigned the signs "rover 1," "rover 2," and so on.

At his or her discretion, the NCS operator may often elect to create a "sub net" depending on the volume of traffic and its content and nature. In this case, a "sub net" NCS may be appointed to take over the newly created net.

Net Missions

Each net has a specific mission or set of missions. In a smaller emergency, all the communication needs may be met by one net. In a larger emergency, multiple nets may be created to handle different needs. Here are some examples:

Traffic Net

Traffic nets handle formatted written messages between partners' locations or between other nets. In emergency operations, these nets may handle the majority of message originations and deliveries. Messages to or from outside the immediate area may be handled by a Section-level net and depending on the distances involved and the degree to which the public telephone network and internet are impaired, by region nets and area nets. Even if you expect to handle traffic primarily on VHF/UHF repeaters, understanding how these layers of nets operate will help you to optimize your use of the system. HF traffic nets can provide you additional practice and expose you to traffic handling that you might not encounter on VHF/UHF. During an emergency American Radio Emergency Service® (ARES®) and the National Traffic System (NTS) work together closely, so it's a good idea to understand emergency traffic from the NTS operator's perspective.

Resource Net

When incoming operators arrive on scene, this is the net that they would check into to receive assignments or to be reassigned as needs change. A resource net may also be used to locate needed equipment, or operators with specific skills. Several different resource nets may be used in large-scale events. One might be used for collecting new volunteers over a wide area, and other local nets could be used for initial assignments. If required due to geography or high net activity, a third net could handle ongoing logistical support needs.

Tactical Net

In general, the tactical net(s) handle the primary on-site emergency communication. Their mission may be handling communications for a partner, weather monitoring and reporting, river gauging, or a variety of other tasks that do not require a formal written message. Often a tactical net may be set up as a "sub net" to handle specific types of traffic during high-volume emergency situations. In such cases, an additional NCS may be assigned for the sub net.

Information Net

An information net might be used to make regular announcements, disseminate official bulletins, or answer general questions that might otherwise tie up other nets that are busy handling incident-related communications.

Health and Welfare (H&W) Nets

These nets usually handle messages between concerned friends, families, and persons in the disaster area. Most H&W nets will be on HF bands, but local VHF or UHF "feeder" nets may be needed within a disaster area. Band conditions, operator license constraints, and specific use needs will almost always determine which mode may be the best choice of the mode of certain net operations.

Reference Links

To learn about Nets in your area, contact your Section Manager (SM), or Section Traffic Manager (STM). To locate your Section Manager (SM), see the ARRL Section Manager List at: http://www.arrl.org/field-appointments You can also find your SM listed on page 16 of every issue of QST.

For a list of ARES and NTS nets in your area, see: http://www.arrl.org/arrl-net-directory-search

Review

Amateur Radio allows for multiple participants to hear and pass messages in a group setting. This capability is a major strength of Amateur Radio and is put to its best use by using nets. Nets are used to control the flow of message traffic on a specific frequency. The net's mission and overall operation are handled by a Net Manager, while the Net Control Station (NCS) is like a traffic cop directing the flow of traffic on the air. Liaison stations pass messages between two different nets. Nets can be directed (formal) or open (informal), depending on the number of participants and volume of messages. Nets can serve many needs, including welfare message handling, resource management, and tactical message handling.

Activities

1. Outline a net plan for a possible disaster in your own area. Describe the types of nets you would include and the links between them.

2. Monitor three HF or VHF/UHF traffic nets. Identify each net by category. If you do not have a receiver capable of monitoring such nets, contact your local ARES group or Amateur Radio club – a member may be able to let you listen to a few nets at their station.

Welcome to Topic 6a Knowledge Review

Please review the following questions to improve your understanding of this topic:

Question 1:

Which of the following requires no NCS to control net operations?

a) An open net.
b) A directed net.
c) An NTS net.
d) A health and welfare net.

Question 2:

Which of the following is true of directed nets?

a) There is minimal direction from a Net Control Station.
b) There is no clearly assigned mission.
c) They serve only as liaison nets between several simultaneous nets during large operations.
d) They are used when the volume of traffic is too great to be handled on a first-come, first-served basis.

Question 3:

Who is responsible for ensuring a smooth flow of traffic within and between nets?

a) The Volunteer Mentor.
b) The Net Manager.
c) The liaison station.
d) The NTS Emergency Coordinator.

Question 4:

Which type of net would handle informal communications for a partner?

a) A health and welfare net.
b) A tactical net.
c) A resource net.
d) A traffic net.

Question 5:

Which of the following statements concerning nets is true?

a) Resource nets are used to assign operators as they become available.
b) Health and welfare nets operate only on HF bands.
c) NTS traffic nets handle both formal and informal long-distance messages.
d) Tactical nets handle only formatted, written messages.