

# ***INTRODUCTION TO NET OPERATIONS***



**A training course for REACT Teams and members**

This is a revised edition of *Net Operations*, a 1999 article incorporated into the manual for new REACT teams. It has been rewritten to provide a more in-depth coverage of the actual procedures of managing and participating in a net.

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Note: If you know the names of any of the members involved in writing previous editions of this course, please contact the Training Committee so that we can give them appropriate credit.

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## **I. WHAT IS A NET?**

A net is a formal way of organizing radio stations designed to allow efficient communications between two or more radio stations engaged in a coordinated activity on a single channel or frequency. By creating structure to control when and how the stations transmit to other stations in the net, the net provides for efficiency and rapid communications while avoiding congestion and conflict between the transmissions of the stations.

REACT nets serve REACT members, REACT teams, and the organizations we support through memorandums of agreement or understanding. A REACT net exists to conduct REACT training and administrative work or to support our operations or a supported agency in an emergency or disaster. A well-run net projects an image of professionalism that increases REACT's reputation among communicators. This may result in other communicators expressing an interest in joining your Team. However, REACT nets should not be the focus of your recruiting effort and should not be a social activity for the general amateur or other communications communities.

## **II. TYPES OF NETS**

### **MODES**

There are two basic modes of net operations, based on the level of control exercised by the net control station. Based on the net control station's assessment of the situation and communications needs, nets may remain either directed or free or may transition from one the other as needed.

(1) **DIRECTED NETS** - In a directed net, the net control station maintains control of all communications with stations requesting permission to contact other stations and pass traffic from net control. The net control station establishes the order in which the business of the net is conducted and manages the process. All stations must check-in with the Net Control Station and request permission to leave the net if leaving before the net is completed.

(2) **FREE NETS** - In a free net the net control stations retains authority and responsibility for the operation of the net, but individual stations may call other stations participating in the net without obtaining net control's permission in advance. The net control station will conduct a roll call at the start of the net, and stations joining or leaving the net check-in and request permission to close station.

## COMMUNICATION FUNCTIONS

Nets are also identified by the basic communication function the net performs:

(1) **TACTICAL NETS** - A tactical net is activated whenever there is a need to coordinate the work of radio stations supporting a specific disaster, emergency, or public service event. These nets manage the flow of information between stations working for the supported agency or organization. Typically, these are voice nets, although digital communications can be used if large volumes of information or sensitive information must be transmitted. In voice nets messages are typically informal messages, transmitted without the use of standard formats. Tactical nets can be managed as either directed or free nets. Most emergency and public service event nets will be tactical nets.

(2) **TRAFFIC NET** - The mission of a traffic net is to receive, transmit, and deliver formal written messages using either voice or digital means. Traffic nets can be used during emergencies to handle traffic for which a written record is required, for training, or for routine administrative radio traffic. Membership in a traffic net requires a high standard of operator proficiency, both in net operations and in message handling, with a focus on rapid transmission of messages. Messages are transmitted as formal written messages using either the American Radio Relay League/ International Amateur Radio Union or the ICS/IMS Form 213 formats. Traffic nets normally will be scheduled and directed nets.

(3) **TRAINING NET** – A training net is conducted to provide training for operators. This may be training in net procedures, training in hazard recognition and characteristics, training in response procedures, even training in managing a REACT team. Training nets require that the station presenting training have developed a specific lesson tailored to delivery over radio frequencies. There should be a script for the lesson that can be posted afterwards for review by those who attend. The instructional portion should be restricted to 10-15 minutes with approximately the same amount of time for questions or discussion. Training nets normally will be scheduled and are a mix of free and directed features. However, a training net can be used effectively for just-in-time training for specific jobs in a disaster.

(4) **STAND-BY NET** – During a period where developing conditions may result in a request by an agency for communications support, a stand-by net can be activated. A stand-by net is not intended to pass formal or informal messages or to conduct any business. Instead it is an electronic staging area in which stations

check-in to indicate their availability should a rapid net activation be required, and then monitor the net. At intervals, the net control station may call all stations checked-in one-by-one to confirm they are still available, or may ask for all stations to check-in at a specific time to confirm they are still on frequency.

In summary, there are two types of scheduled nets: Traffic and Training. There are two types of normally unscheduled nets: Tactical and Stand-By. In this context, scheduled is in terms of a regular published monthly or yearly net schedule. Any of these nets may be conducted as a directed net. A traffic net is almost always a directed net; the Tactical, Stand-By, and Training nets can operate as either directed or free.

### **III. NET ORGANIZATION**

#### **GENERAL PRINCIPLES**

Nets are formal organizations, with leadership and functional positions and with an established membership. Net assignments can be semi-permanent or be rotated on a published schedule. If you cannot perform a net assignment for a scheduled net, you must contact the individual who is assigned to manage staffing for the net far enough in advance to allow a substitution. Simply abandoning the job you have been assigned to do something else, even if you view that something else as more fun or more important, is a major and disqualifying breach of communications discipline.

The leadership and functional structure of a net typically includes the following assignments:

- Net Manager – the Net Manager is the individual responsible for (1) publishing procedures for a net, (2) maintaining the net membership list, (3) appointing Net Control and Back-Up Net Control Stations, and (4) the general effectiveness of the Net as an emergency communications tool.
- Net Control Station – the Net Control Station (1) opens and calls the net on schedule, (2) determines whether the net is directed or free, (3) determines how informal and formal traffic will flow in the net, (4) maintains good communications discipline and adherence to procedure in the net, (5) records net participants, and (6) closes the net on schedule or, if earlier, when all net business is complete.

- Back-Up Net Control Station – the Backup Net Control Station may be at either a separate location from Net Control or collocated. The primary purpose of Backup Net Controls is to assume control of the net in the absence of or outage to the Net Control Station. Backup Net Control may be assigned other duties by Net Control as needed – for example, maintaining the net log in a large and busy net.
- Liaison Station – Liaison Stations operate between nets, either simultaneously being a participant in both nets, or sequentially checking in to one net and then when that net terminates checking in to another net. The purpose of a liaison station is to transfer traffic from one net to another.
- Bulletin Station – Bulletin Stations are responsible for transmitting specific types of information from other sources to the net. For example, in a severe weather response, a bulletin station could be assigned to relay National Weather Service watches and warnings to the participating stations.

Successful nets have an identifiable membership based on the function the net performs. For example, a traffic net should have stations that are experienced in message origination, transmission, and delivery, with geographic representation to allow rapid delivery of messages to the end addressee. A Team level net should have as its members the members of the Team that are licensed or capable in the particular radio service of the net. A state or regional net should have representation by one station from each team. A national or international net should have representation from each REACT region, and possibly from each state.

There is an effective upper limit to the size of a net – for example, if your net has 80 stations check-in, you will end up using all of the net’s scheduled time doing check-ins. More than 20 stations becomes difficult to manage as a directed net if the net is conducting any volume of traffic handling, training, or emergency operations. More than 10 stations can become unmanageable in a busy free net unless the net members are very familiar with each other and used to the rhythm of the net.

Scheduled net membership creates an obligation for you, as a member, to regularly check-in to the net and participate in its business. Checking in means that you are there at net start ready to do business. Being late and checking in late disrupts the flow of the net and may mean that you miss an important announcement or frequency switch, or that traffic that your station could have and should have

accepted is routed to another station. If the net is a traffic net, you check-in and transmit or receive messages for delivery. If it is a training net, you check-in and either deliver or participate in the training session. Tactical nets create an obligation for you, as a member, to participate in the emergency response or public service event for which the net is being operated. Standby nets create an obligation for you to respond when alerted if you can to open your station, monitor the net frequency and be ready to respond as needed. Bottom line – we are a communications organization, and we cannot communicate with our radios turned off at net time.

And then there are the stations that are not members of the net. Having a number of stations check-in who are not regular members of the net may inflate the net check-in totals. Some see this as a good thing and regularly brag about how many stations were on the net tonight. However, the question becomes how do these extra stations contribute to accomplishing the business of the net, and are they trained to do the functions the net performs? If an informal net is being held to conduct social activities or ragchew or swap and sell equipment, it does not matter. However, if the net is conducted to perform REACT's communications mission, we want REACT members who are trained in the net's procedures and functions as net members. If a station wishes to join a net, the operator should contact either the Net Control Station or the Net Manager and inquire as to membership.

## **TACTICAL NETS**

Tactical nets are organized based on the command system used and the complexity of the event. Their size is based on the number of stations and organizations they support on a functional or geographical basis. Typically, tactical nets are structured to mirror the incident command system structure in use.

A key concept is that only those stations that need to be active participants transmit. Everyone else turns off their radios. Having a team of five people all working on one task, all with their radios on, all wanting to talk on their radios, all distracted by what is going on on the radio, and all contributing to the general noise on scene is a recognized source of bad outcomes. In general, this leads to unit leaders, group or division supervisors, branch directors, and general staff chiefs being the key participants in tactical nets.

For example, a small public service event might require one net on one channel or frequency. This one channel net might have net control at the command post, medical unit leader, and four check point leaders for a total of 6 participants.



A large event might have a command net coordinating between the various agencies and the section chiefs, multiple different public safety nets on their own agency frequencies covering divisions of the scene (geographical and functional nets), a scene to hospitals medical net run by the local Amateur Radio Emergency Services (functional net), and a REACT run net coordinating and gathering reports from leaders of the area Community Response Teams (functional net). Coordination of these nets becomes the role of the Incident Command System Communications Unit. The structure and assignment of frequencies or channels is developed in the Incident Communications Plan.

## **IV. BASIC NET PROCEDURES**

### **SCHEDULE**

One of the most basic concepts of radio communications is that radio users should use a frequency for the minimum amount of time necessary to complete their communication task. This is best achieved when a traffic or training net has an established schedule, and keeps to that schedule. A scheduled net should start on time, every time. Variable start times do not encourage operators to check-in on time, and eventually encourage them to drop their participation – busy people have more to do than to sit around waiting for someone to call a net.

Open ended nets that are kept open to maximize check-ins are a violation of basic communications doctrine and teach procedures that are ineffective in emergency communications. No scheduled net should extend beyond its scheduled closing time. Routinely extending operations after the scheduled closing time encourages a lack of operating discipline that is highly undesirable in emergency operations.

Note that when we talk about scheduled nets, creating a net schedule requires permission and flexibility. If you are going to operate a net on a simplex frequency, the only real limit you should observe is in amateur radio. Be familiar with the American Radio Relay League band plan (<http://www.arrl.org/band-plan>) and comply with it. Scheduling your voice net on a frequency in the middle of a portion of a band allocated for other types of amateur communications is not a way to make friends.

However, if you are going to run a net on a repeater, you should first listen at the time you want to use for a net to see what the regular usage is. If you select the repeater and the time that is used by the hosting club's members for ragchewing on

the way home from work, you may end up with a personal invitation to stay off their repeater, forever. In contrast, a polite request to the repeater license holder for use during a low usage period may well result in approval. This is very important in the case of General Mobile Radio Service repeaters. Some GMRS repeaters are open use. On the other hand, a quick survey of repeaters in the myGMRS.com repeater database shows at least as many that are permission required or members only.

Second, understand that no net owns a specific time on a frequency, unless the frequency is specifically and exclusively licensed to your Team (hint – no REACT Team has an exclusive license to any frequency). If you routinely conduct your net on Multi-Use Radio Service Channel 1 and get ready to open your net at your scheduled time, only to find that a clothing optional 1%er biker stamp collecting club is having a discussion of perforations on postage stamps picturing flowers, guess what? They were there first. You can ask very politely if they could move to another channel. If they say no, you best have a plan to move to another channel in place and your net members trained in its use.

## **LENGTH**

A well-run traffic or training net should be able to complete its business in 30 minutes or less – and it should end when there is no more business to do. If there is no traffic to pass or no training to do, the net achieves its purpose simply by opening, checking-in the members, and closing. This serves as a test of equipment and operational conditions, and a verification of the availability of the membership.

If there is message traffic, the net should end when all traffic is cleared. A training net should generally have a designated individual to present training, and that member should have a concise 5 to 10 minute presentation on the topic, followed by 5 to 10 minutes of questions and discussion.

Tactical and stand-by nets run for the duration of the event or until no longer needed for ongoing operations.

## **WHAT IS AND IS NOT NET BUSINESS**

Nets exist to perform five functions:

- (1) Transmit and receive information related to emergency and disaster response by REACT or by a supported organization. Nets in support of public service

events exist to train operators for the primary and most challenging duty of emergency communications. [traffic, tactical, standby, and just-in-time training nets]

(2) Conduct administrative business for a REACT team, council, region, or REACT International. [traffic nets]

(3) Train our members in radio procedures. [traffic, tactical, and training nets]

(4) Alert and warn our teams, and manage resources in major emergencies and disasters. [traffic, tactical, and standby nets]

(5) Ensure radio equipment is working and that the net membership is available. [traffic, training, and standby nets]

This means that what goes on during a net should fit one of these five purposes. Remember that almost anyone might be lurking in the background listening to the net and making an assessment of the level of professionalism of the stations participating. That could include the agencies or voluntary organizations that you support or with which you are trying to develop a working relationship. What you say and how you say it could cement a good working relationship or terminate it.

There are some things that do not belong on a REACT net:

- Profanity or lewd, obscene, sacrilegious, sexist, insulting or aggressive language. Being offensive offends people, including our members, and drives people away.
- Criticism of the organizations we support with memoranda of understanding or agreement. We depend on having people who want our service. Saying bad things about one of the organizations we support will get back to them, and will have an impact on their desire to work with us.
- Criticism of other communications organizations. We may have to work with those organizations in the future. Burning a bridge before you have built it is not an obvious path to success.
- Criticism of other REACT members, teams, councils, regions, or elected officers. Think about it – would you want to work with a group of people who spend all their time bad mouthing each other?

- Personal details – names of operators, phone numbers (unless operationally necessary), home addresses, etc. Refer to our course on Protecting Personal and Sensitive Information.
- Information that is transmitted just to fill up air space – about what the weather is like, how much you like your new radio, how good your grandmother’s recipe for apple pie is, etc. If you are using time wasters, it is probably a sign that the net has finished what it needs to do (or that there was nothing planned for the net to do), and the net should be closed.

## PLANNING FOR CONTENT

Traffic nets and training nets need formal message traffic and training topics to work. That means that:

- Traffic nets should be regularly looking for messages to transmit. These may be administrative messages for the net members, messages for tabletop exercises or drills, or just test messages. As a guideline a traffic net should try to have at least 3 messages for each net session.

We are emphasizing formal written messages because the ability to accurately pass message traffic is a key skill in disasters. On a day to day basis you could do the same thing by e-mail. In fact, our REACT Traffic System does send standard format radio messages by e-mail regularly. However, we cannot count on e-mail being available in a crisis. If you can write and transmit a standard message, that message can be relayed and eventually passed over the National Traffic System or Radio Relay International’s traffic system to its destination.

- Training nets should have a posted schedule of topics that will be addressed, along with an instructor for each session. One topic per session will fill a 30 minute net, allowing for time for questions and answers.

Make an effort to have substantive activity planned for each traffic or training net. Doing so will increase operator proficiency, help maintain membership, and generate more interest in what the net is doing.

## CALLING THE NET

Net control stations should conduct the net's business concisely. Many nets have developed procedures that involving thanking stations for checking-in, that explain how a net works, that encourage stations to return to the net in the future, etc. These are time wasters that prolong the length of the net and contribute nothing to the tactical, traffic handling, or training function of the net. Operators participating in a net should already know the procedures of the net and, if they are serious about volunteer service, should not require effusive praise or thanks for performing our basic purpose of communicating.

The initial net call should identify the function of the net, identify the net control station, establish the type of net and level of control, and then transition to the net's business.

*All Stations, this is KAE7730 net control calling the High Country REACT directed training net.*

In this example *KAE7730* has established that he is *net control*, identified whose net it is (*High Country REACT*), that it is a *directed* net and the net function is *training*. All in one sentence of 15 words. Time to move on.

## ESTABLISHING PROCEDURE

Most nets publish a net script for the use of the net control station. All stations should have a copy of this script available so that they can follow and anticipate what net control will do next in the process. This allows stations to be ready when called, speeding up management of the net. In addition, any station may be forced to assume net control in the case of outages, interference, or disaster impacts to other stations – in this case the script will keep the net on track. Example scripts are attached as appendices to this course.

Immediately after the opening call, the net control station will call for any waiting high precedence (Emergency or Priority) traffic.

*Any station with Emergency traffic?*

*None heard. Any station with Priority traffic?*

After any Emergency or Priority messages are listed and cleared (see Managing Message Traffic below), the net control station will ask for check-ins.

## CHECK-INS

Net control stations call the membership of the net for check-ins. In smaller nets, this can be by calling each call sign (Amateur or GMRS) or unit number (Citizens Band, Family Radio Service, Multi-Use Radio Service). With larger nets, the call for check-ins can be by organization, by call sign group, or by geographic location. For example:

- A small net (this example is for a net conducted in a radio service that does not require license based call signs):

Net Control Station	Station Called
<i>Following stations check-in now:</i>	
<i>Unit 1</i>	
	<i>Unit 1, no traffic</i>
<i>Roger, no traffic ... Unit 2</i>	
	no answer
<i>Unit 2, not heard ... Unit 3</i>	
	<i>Unit 3, one routine for the net</i>
<i>Copy one routine ... Unit 4</i>	
	<i>Unit 4, informal Unit 1</i>
<i>Copy informal ... Unit 5</i>	

Net control in this case is calling by the active Unit numbers. Units checking-in answer with whether they have either formal message traffic giving the precedence (Unit 3 did this), they have informal traffic, in other words need to contact another unit (Unit 4 did this), or have no formal or informal traffic (Unit 1). Net control acknowledges by repeating the traffic or no traffic. When a station is not heard, net control so indicates – if the station can be heard by another station, that station should call Net Control and offer to relay. Net Control’s acknowledgement is followed with a short break to allow either stations with Emergency or Priority traffic that have missed the initial call for higher precedence traffic, stations with a need for immediate close, or stations with a relay to call.

- A large net, by call sign group (this example applies to stations in radio services with assigned call signs):

Net Control Station	Station Called
<i>Stations check-in by call sign. Stations starting with November:</i>	
	<i>N0PSB, no traffic N0RSS, no traffic N0WGG, one routine for Colorado Springs, CO N4KTT, informal KN4EFM N2LP, no traffic</i>
<i>Copy PSB, RSS, WGG one routine, KTT informal, LP, Any additional?</i>	
<i>None heard, stations starting with Whiskey:</i>	

The same procedure can be used for a net that covers several REACT teams, calling for stations to check-in by teams, or in large Teams calling by area within the team’s geographic coverage.

In tactical nets the call for check-ins will typically be by the Net Control Station calling each tactical call sign.

Some nets ask for station operator’s names, locations, and other information. This is not desirable for several reasons. First, a net has an established membership – that means that the net control station has a roster which should include any information needed for conducting the net’s business. Asking for information that should already be on a roster wastes time. Second, nets work off call signs or unit number – knowing the operator’s name does not fulfill any useful purpose in establishing contact or conducting the net’s business. In a tactical net the tactical call sign gives you all the information you need to know. Third, names and locations are potentially operationally sensitive information (see our training course on protecting personal and sensitive information).

## IDENTIFYING YOUR STATION

Normally stations identify solely by call sign in nets with established membership on Amateur Radio or General Mobile Radio System nets. In some cases, net control may ask for stations to indicate locations, organizations, or facilities for which the station can accept traffic. Based on this request, a station would check-in as:

## *WQZN678, Hanover and Henrico Counties, Virginia*

Stations checking-in to nets on Citizens Band, Family Radio Service, or Multi-Use Radio Service nets identify based on what organization the net serves. For a Team net, check in by unit number. For a net that serves an area, multiple teams, or a specific event, check-in by team name and unit number.

For tactical nets, check-ins are by assigned tactical call sign (see Tactical Call Signs below).

Remember that on Amateur or General Mobile Radio System nets you are required to identify your station at specific times established in the current FCC rules.

### **TACTICAL CALL SIGNS**

Because tactical nets serve specific events, the key to identifying who is doing what is the call sign. And here we have to depart from normal Unit Number or FCC call signs because they do not identify the function being performed. WQZN678 may be assigned as a communications relay station, but that is not obvious from the FCC call sign, and it is impractical to distribute new lists of what call sign station is assigned to what function every time an operator changes. If, instead of WQZN678, you call for NORTH POINT RELAY, whichever operator is on duty will answer. Note that this does not change the requirements to identify using the license call sign according to the regular schedule for the radio service.

### **OPS NORMAL CHECKS**

In any form of emergency work, accountability for your people is a critical management task. The same is true for nets. This is not an issue for Traffic or Training nets because of their typically short duration. However, it is a concern for tactical and standby nets.

The first step toward accountability is to schedule operations normal checks. At a set interval when other transmissions permit each station should transmit their call sign and status to net control. Net control acknowledges these so that the station knows they have been heard. For example:

*Net Control, North Point Relay, Ops Normal, over.  
North Point Relay, roger, out.*



If no contact is established at the scheduled time by either net control or the reporting station, take immediate action to contact the other station by other means or to initiate a physical search for the station.

## **EMERGENCY CLOSURES OR RELOCATIONS**

In emergency nets there is always the possibility that emergency impacts will endanger one or more stations operating in the net. In this case the station should use a break tag (see below) and inform net control of the situation and the action being taken for survival. For example:

*Emergency.*

*Station breaking, net control, go ahead.*

*WQZN678 closing station. Frequent cloud to ground lightning strikes vicinity. Out.*

*Emergency.*

*Station breaking, net control, go ahead.*

*High Country REACT Unit 2, 4 miles east of Peterson Air Force Base on Highway 94 relocating, Twin rotating vortices overhead. Out.*

## **MANAGING MESSAGE TRAFFIC**

Message traffic is either formal (written standard format messages including the ARRL/IARU/RRI radio gram and the ICS/IMS Form 213) or informal (voice messages in no standard format). Traffic nets handle predominantly formal messages. Tactical nets handle mostly informal messages, although depending on the function of the net, formal messages may be a significant part of the workload. Training nets handle both forms of message based on the type of training being conducted. Standby Nets have very little message traffic, and that there is primarily informal.

The key to managing message traffic is the precedence system (see the next section). When stations check-in to the net, they should list the messages they have with Net Control, giving precedence and destination. There are several options for doing this (our examples are for an imaginary Team net in Miami, Florida):

- For messages for any or all stations in the net – *one routine for the net.*

- For messages for a specific station (in a tactical net) – *one priority for Emergency Operations Center.*
- For messages headed to a distance or through other services, such as the National Traffic System – *one emergency for Colorado Springs, Colorado.*

To take our three examples above, Net Control should call the station listing the emergency message first, the priority second, and the routine third. In general, all of a single precedence should be cleared first before moving on to the next precedence. Obviously in a rapidly moving situation, a station with an emergency message just received may break in the middle of the priorities or routines and be handled at that time.

The three examples above provide three different handling problems for the Net Control:

The emergency precedence message for Colorado Springs is not going to get delivered by this net, so Net Control directs it to the Liaison Station for transfer to an Amateur Radio traffic net:

Net Control – *N0WGG, call KN4EFM Liaison to the South Florida Traffic Net*

The station with the message – *KN4EFM, N0WGG*

The Liaison Station – *N0WGG, pass your emergency for Colorado Springs*

The priority precedence message for the Emergency Operations Center in the tactical net is also routed to a single station, but in this case will stay in the net:

Net Control – *North Point Relay, call EOC*

The station with the message – *EOC, North Relay Point*

The destination station – *North Relay Point, pass your priority for EOC*

The routine precedence message for the Net is a message that impacts all stations:

Net Control – *KAE7730, pass your routine*

The station with the message – *All stations, this is KAE7730, copy number 324 ...*

Note that we have not used the procedural words “over” and “out” here. In a net that rarely passes traffic or that has a shifting or new membership that may not be

used to the rhythm of a net, you may need to use the more formal procedural words. With a net that regularly passes traffic and with experienced operators used to working together, the “overs” and “outs” in these examples are understood by the use of standard wording. However, if there is any doubt, use them.

Generally, informal messages do not have a formal precedence, and are passed after all formal messages. However, it makes sense to use Emergency or Priority with short informal messages, and accord the message the same expedited handling in a tactical net.

## PRECEDENCES

Precedences are handling instructions based on the immediacy or importance of the information in a formal written message. They establish the order in which messages should be transmitted. There are four standard civilian precedences, in order of priority:

<i>EMERGENCY always spelled out in written message preambles</i>	Message requiring the highest priority regarding immediate threats to life or life-saving operations. This precedence has been broadened to include the operations of relief organization such as ordering supplies or distributing relief aid. The intent is that these messages should be delivered in minutes after their origination.
<i>Priority letter P in written message preambles</i>	All other official messages related to emergency response. The intent is that these messages should be delivered in hours after their origination.
<i>Welfare letter W in written message preambles</i>	Request for or report of an inquiry into the welfare of an individual with whom the message originator cannot otherwise establish contact. Welfare messages typically are held until disaster victim registration systems are in place in the impact area, sometimes up to a week or more after impact.
<i>Routine letter R in written message preambles</i>	All other messages. Routine messages should be delivered within one to two days of origination.

## TRANSMITTING MESSAGES

The majority of REACT nets will be voice nets. Voice nets rely on the receiving station being able to accurately copy the text. This depends upon two factors, a

good rhythm in transmitting the message, and the use of a speed that allows the receiving station to copy it.

The format of messages varies, but in general, they have a preamble with the message routing information, an address to which it is to be directed, the text, and a signature. For example, an actual message sent by our traffic system for hurricane warning:

*Number 23/P/Taffic241/20/Glen Allen VA/2120EDT/23 September 2017/All REACT Teams SC NC VA DC MD NJ/EARLIEST EXPECTED ARRIVAL HURRICANE MARIA STORM FORCE WINDS SC NC MONDAY 1400EDT VA TUESDAY 0800 DC MD 1400EDT NJ 2000/Walter Green/REACT Training*

This would be transmitted by voice as:

*Number 23 Priority Traffic 241 Glen Allen Virginia mixed group 2120 Echo Delta Tango figures group 23 September figures group 2017 break for address*

*Address follows All REACT Teams South Carolina North Carolina Virginia District of Columbia Maryland New Jersey break for text*

*Text follows Earliest expected arrival Hurricane Maria Storm Force Winds South Carolina North Carolina Monday mixed group 1400 Echo Delta Tango Virginia Tuesday figures group 0800 District of Columbia Maryland mixed group 1400 Echo Delta Tango New Jersey figures group 2000 break for signature*

*Signature follows Walter Green REACT Training*

The fields in the preamble are not separated – the ARRL/IARU radiogram message format that we use fits on the standard radiogram message form, and it is obvious where each item is placed.

In this case the operator could have transmitted the state abbreviations as *letter group SC*, etc. However, because the meaning was clearly the states the abbreviations symbolized, using the full text helps to avoid error.

There are two speeds for passing a message:

- Reading speed – the message is read at the normal speed with which you would read any set of instructions or passage from a book out loud. Reading speed is much too fast for copying the text. However, it is used for read back, the receiving station reading the text back to the sender to confirm that it is correct. Read back may be initiated as a request from the sender, or by the receiver.

Sender – *read back my number 7, over.*

Receiver – *I read back number 22 ...*

- Copying speed – the message is read at a slow enough speed that the receiving station can copy it down on a message form. For an experienced operator with good typing skills and a word processing program running on his or her computer, this may be quite fast. Even in this case, we speak normally at approximately 200 words a minute, and type at 30 to 40 words per minute. For an inexperienced operator copying by writing down the message, it will be slow. A good way to pace transmitting a message to any station is to write the message as you say it. Keep an even speed and rhythm so that the message flows, making it easier to copy.

## **ACCEPTING AND SERVICING MESSAGES**

Accepting a message means that you agree to copy it accurately and make every effort to deliver it within the expected delivery time. Do not accept a message if you cannot make that effort. The integrity and reputation of our communications abilities depends on you getting the message through.

Delivery can be in person or by runner, for example from the communications center to the appropriate member in an emergency operations center. Delivery can be by telephone or by e-mail (the REACT version of the message form has a block for e-mail address) or by radio.

When you deliver a message, service that message by sending a short message back to the originator, with a text as simple as:

*Your message 237 delivered to EOC Operations Section 2205 local*

If the originator knows the message has gotten through, this service message eliminates the need for further attempts to reach the addressee, and it establishes that we have done our job. In a disaster some communications just disappear into black holes, never to arrive at the intended destination. The result can easily be loss of life, duplication of effort, delay, etc.

## BREAK TAGS

Break tags are single words that replace the word BREAK on a net to signal to the Net Control Station that you have an immediate need to transmit. When properly used they speed up net management. Break tags can be used on traffic nets, but are most commonly used on tactical nets. They may be used in either directed or free nets.

PRIORITY or EMERGENCY	you have traffic not previously listed that requires expedited handling or that is a direct threat to the breaking station.
CALL SIGN or UNIT NUMBER	you have routine traffic that does not require an interruption of the current transmissions – this is a request to be put in the queue for eventual acknowledgement by the net control station in a directed net - it is different from calling the net control station to request to pass traffic to another station at the current time. Use sparingly.
INFO	when you have time sensitive information that is needed immediately by the net or the net control station
QUESTION	when the answer to a question is needed immediately
ANSWER	you have the complete, current, and correct answer to a question that has been asked on the net

A break tag is transmitted to identify that your station has a need to be heard at specific points in the flow of transmissions:

- when another station breaks for a transition from preamble to text or text to signature in a formal message.
- during check-ins.
- any time that a transmitting station pauses in its transmission or there is a pause for an answering transmission.

Break tags are not used to interrupt ongoing transmissions which have an obviously higher precedence. For example, in a directed traffic net, a CALL SIGN break tag is not transmitted when a listed message is being transmitted. It also should not be transmitted during check-in (if you have formal or informal traffic it should be listed when you are called). However, a PRIORITY break tag could be used when net control is ready to call Routine precedence traffic. Or in a free net, if several stations are trying to determine the answer to a specific information need, transmitting ANSWER in a break in transmission is perfectly appropriate.

## THE PHONETIC ALPHABET

There are many phonetic alphabets in which words are substituted for individual letters to clarify transmissions. The most widely understood is the international alphabet used by the military, at sea, amateur radio, and in civil aviation:

ALPHA	NOVEMBER
BRAVO	OSCAR
CHARLIE	PAPA (pronounced pah-pah)
DELTA	QUEBEC (pronounced kay-beck)
ECHO	ROMEO
FOXTROT	SIERRA
GOLF	TANGO
HOTEL	UNIFORM
INDIA	VICTOR
JULIET	WHISKEY
KILO	X-RAY
LIMA	YANKEE
MIKE	ZULU

Amateur radio operators often make up “cute” phonetic spellings of their call signs. Emergency communications are not a time to be cute. The ability to use the standard phonetic alphabet smoothly and clearly is a mark of professionalism that is instantly recognized by other communicators.

## PROCEDURAL WORDS

Procedural words, or prowords, are words that have standard meanings and that are used to shorten communications. The following prowords are commonly used in a net environment:

AFFIRMATIVE	Yes. In poor transmission conditions may be confused for NEGATIVE – consider using YES.
BREAK	(1) I am pausing to allow any station that has higher priority traffic to transmit, or (2) a call to net control to recognize a station desiring to transmit. Meaning (2) not recommended because it leads to additional transmissions to identify the station and determine the reason for the BREAK. Better is call sign and traffic: <i>WQZN routine</i> .
BREAK FOR ...	I am pausing to allow any station that has higher priority traffic to transmit before I resume my message. ... FOR ADDRESS – the address group of the message follows next ... FOR TEXT – the text group of the message follows next ... FOR SIGNATURE – the signature group of the message follows next
CLEAR	Not recommended because its meaning can be confused by stations not familiar with radio procedures or that receive only part of a transmission. Means OUT.
CLOSING STATION	The station is shutting down.
COPY	I have received your information and recorded it.
FIGURES	The following are numbers written as individual numbers.
FIGURES GROUP	The following is a group of numbers, for example, 375.
FORMAL	A message in a standard format (ARRL/IARU/RRI radiogram or ICS/IMS Form 213) filed and delivered as a physical written message.
I READ BACK	I repeat your entire transmission back to you. Used to verify that instructions are received.
I SPELL	I am transmitting this word as individual letters.
INFORMAL	A voice message not in a standard format and not necessarily intended to be delivered as a physical written message.
LETTER GROUP	The following is a group of letters, not a word, for example an acronym or abbreviation, that should be handled as a word.
MIXED GROUP	The following set of numbers, letters, and/or symbols should be handled as though a word.



NEGATIVE	No. In poor transmission conditions may be confused for AFFIRMATIVE – consider using NO.
NONE HEARD	(1) No traffic of the called precedence is heard by net control, or (2) no additional check-ins are heard. Alternate is NOTHING HEARD.
NUMBER GROUP	The following set of individual digits forms a complete number that should be handled as a word.
OUT	I have completed my transmission, have no further for your station, and do not expect a reply. Never used with OVER.
OVER	I have completed my transmission and expect a reply from you. Never used with OUT.
READ BACK	Please repeat my entire transmission back to me. Used to verify that instructions are received.
ROGER	I have heard and understand your transmission. Never used with WILCO.
SAY AGAIN	Repeat your transmission.
SAY AGAIN ALL AFTER ...	Repeat the part of your transmission that follows a specific word or phrase or number.
SAY AGAIN ALL BEFORE	Repeat the part of your transmission that is before a specific word or phrase or number.
SILENCE	Do not transmit. Can be for the entire net or for an individual station.
WAIT	Standby for a short period and do not transmit.
WAIT OUT	Standby for a longer period. I will call your station when you should transmit.
WILCO	I have heard, understand, and will comply with the instructions in your transmission. Never used with ROGER.
WORDS TWICE	Split sentences into small groups of words and repeat each group twice. Used when communications conditions are poor to increase the probability of other stations being able to copy a message.

In addition, there are three international prowords used in aviation or on navigable waters that every communicator should know – these are transmitted as groups of three:

MAYDAY	I, my vessel or aircraft, or a person aboard my vessel or aircraft is in grave and imminent danger, send immediate assistance.
PAN	I, my vessel, aircraft, or a person aboard my vessel or aircraft requires immediate assistance but is not in distress
SECURITE	I have important meteorological, navigational or safety information to communicate.

## CLOSING THE NET

Closing the net should be just about as simple as opening it.

*Is there other traffic for the net? ... None heard. ... This is KAE7730 closing the High Country REACT Training Net at 2230 Mountain Time. KAE7730 closing station, out.*

## V. DEALING WITH FAILURES AND INTERFERENCE

### OUTAGES

So there you are – operating your voice net on the XYZ Amateur Radio Club repeater in the midst of the big one. And the repeater goes down. This could be because of impacts of the disaster, or it could be because of scheduled maintenance, or because someone timed-out the repeater with an extra-long transmission, and the repeater turned off. The maintenance one happened to the computer system of the Emergency Operations Center the author managed in the midst of a hurricane – the information technology staff had set the computer to shut down to run internal routines every Saturday night at 2300 hours. The timed-out problem happened in the midst of a search with aircraft in the air and ground teams deployed. Neither was a happy event.

Know where your net members live. Get out a map (or do it on Google Earth), plot their station locations, test who can talk to whom, and draw a spider diagram that shows how relays will have to work to continue simplex operations when the repeater goes down. Make sure everyone has a copy of the map showing how the linkages are structured. And practice operating your net simplex with relays.

## INTERFERENCE

Interference to voice communications nets can originate from technical problems in one of the net member's radio, by dongle failure if you are operating voice over Internet protocol with a headset, with a malfunction in the repeater, from industrial operations that generate spurious signals, from atmospheric effects, etc. and from inadvertent or deliberate interference by other radio operators. The steps to deal with the problem are the same for any source:

- (1) Net Control identifies the start of interference. If it is associated with one station's attempt to check-in, as opposed to unspecific coverage of the frequency, it is probably the station is the cause. Call *last station transmitting transmit your call sign*. If interference results, direct *station checking-in silence*. Silence is a command indicating do not transmit; the station can still listen to the net.
- (2) Simultaneously, every net member checks his or her radio meters and connections to confirm normal operations. Be aware of the types of failures your equipment might experience, and know how to identify those that you can without transmitting. If a problem is found, go silence until you can replace the equipment with an operational spare.
- (3) If the interference is general, for example is continuous, or only occurs after any station starts to transmit, or is obviously harassing or spoofing valid transmissions, implement a channel change. In doing so, **DO NOT**:
  - Engage the harasser or tell him to get off the frequency because you are doing official communications or that you are going to report him. This inflates his or her sense of importance.
  - Say that you are changing frequency because of the interference or harassment – this validates the intruder's activities for him.
  - Give the channel or frequency to which you are going to shift.
  - Say that you are experiencing interference.
  - Instruct stations to change frequency or channel.

Instead transmit a word that indicates to all net members that the net will change to a specific alternate frequency. There should be no discussion of this, for example, *blue plate special* and everyone changes to the frequency that *blue* indicates. Say it no more than twice – if you keep repeating the word or phrase, even the slowest harasser will figure out that you are doing something to thwart his efforts. It is a good idea to have a number of alternates planned, representing random jumps, including even a return to your original frequency.

(4) Pick up operations as though there had been no disruption. If you go through a complete recalling of the net on the new frequency, the delay makes it easier for the deliberate intruder to find you again.

## READINESS

Dealing with problems requires that you take the necessary steps to ensure you can operate well in advance.

(1) Develop standard operating procedures for failures or harassment. Do not post these on your website.

(2) Train in the procedures in orientation or tabletop drills in your Team meetings.

(3) Practice your procedures at least once every 3 months so that they become second nature and automatic. Don't broadcast to the world that you are going to do so – that is an invitation for someone to study how you do things.

## VI. LOGS

Net Control Stations maintain a log for the Net. This is an important document – as a contemporaneous document there is a legal presumption that what is written on the log formed actually happened when the log says it happened. If there is ever a question about whether your net passed a specific message in a major emergency or disaster, your log establishes the facts.

There are many varieties of net log forms. An example is attached to this text as a model if you do not have a preferred version. You can also develop a computer based log form to complete during, and print at the end of, the net. If you do, we strongly recommend that you have a paper version that you can complete with pen and ink in the case of a power failure. If you do have a paper version, it is

important to practice with the form at least once a month – using an unfamiliar form in the midst of the pressure of check-ins and traffic listings is not necessarily a pleasant or efficient experience.

In a small net everything can be recorded on the log form by the Net Control Station. However, in a larger net or very busy net maintaining the log may need to be delegated – it is logical to give this job to the Back-Up Net Control Station. Also with a large net, a net roster is an important tool. This can be combined with a check-in sheet that has a preprinted list of all of the net members, their locations, and any information that will help with routing traffic. An example form is attached.

## Net Script – Traffic Net

*All Stations, this is (call sign) net control calling the (REACT organization hosting the net) (directed or free) traffic net.*

*Any station with Emergency traffic?*

*(call sign) pass your traffic. If multiple stations acknowledge each by Copy, (precedence of traffic listed), and call each in order of check-in to pass traffic.*

*Any station with Priority traffic?*

*(call sign) pass your traffic. If multiple stations acknowledge each by Copy, (precedence of traffic listed), and call each in order of check-in to pass traffic.*

*Net member stations check in (as called or by call sign group or by area) with routine, informal, or no traffic. Do not call stations already checked in with higher precedence traffic.*

*As called* – call each station listed on the net membership form by call sign

*By call sign group* – in large nets by the first letter of FCC call signs

*By area* – call by Region, council, team, or subdivisions of team area of responsibility as appropriate

Acknowledge check-ins by call sign (may use abbreviated call signs in large membership nets), or *Copy, (precedence of traffic listed)*, or *Roger, no traffic* if station checks in with no traffic.

*(call sign) pass your traffic. Start with the highest precedence traffic currently listed work through the list in order of check-in. Unless informal is emergency or priority, call informal after all routine.*

When all listed traffic has been passed *Late check-ins or additional traffic?*

Acknowledge any added checks-ins and pass any additional traffic.

*This is (net control call sign) closing the (REACT organization hosting the net) traffic net at (current time in 24 hour clock time plus time zone name), out.*

## Net Script – Training Net

*All Stations, this is (call sign) net control calling the (REACT organization hosting the net) (directed or free) training net.*

*Net member stations check in (as called or by call sign group or by area).*

*As called* – call each station listed on the net membership form by call sign

*By call sign group* – in large nets by the first letter of FCC call signs

*By area* – call by Region, council, team, or subdivisions of team area of responsibility as appropriate

Announce the instructor and topic

Instructor delivers presentation

Announce any materials participants should reference.

Deliver lecture or guided discussion. As appropriate Break to allow questions or to allow emergency or priority traffic. If preference is to hold questions to the end, announce Please hold questions to the end of the presentation.

On conclusion instructor returns net to net control.

*Are there any training announcements?*

If heard, call in order (call sign) *your announcement.*

*The next training net will be held on (date). Topic for the net will be (give topic).*

*Any late check-ins? If heard Copy (call sign).*

*This is (net control call sign) closing the (REACT organization hosting the net) training net at (current time in 24 hour clock time plus time zone name), out.*

## Net Script – Tactical Net

All Stations, this is *(call sign)* net control calling the *(net designator established by the event Communications Plan)* *(directed or free)* net.

Any station with Emergency or Priority traffic?

*(call sign)* pass your traffic. *If multiple stations with traffic acknowledge each with Copy, (precedence of traffic listed), and call each in order of precedence to pass traffic.*

Stations check in as called. *Call all stations in the order that is consistent with ICS assignments to those stations. Do not call stations already checked-in with traffic.*

*Make any special announcements about the status of the event (remember to exercise caution in announcing sensitive information) or special instructions not already covered in the event briefing. End with Out, Over, or Break.*

All stations make ops normal reports *(give schedule for these – or better simply confirm per briefing)*. *End with Out, Over, or Break.*

*As stations call with incident or event traffic:*

*If reporting information to net control - Net Control copies.*

*If calling to contact another station – (call sign) call (desired station call sign)*

*If station calls for permission to close because his or her portion of the activity is complete:*

*Any station have traffic for (call sign)?*

*If yes, (call sign) pass your traffic.*

*If none heard, unless there is a reason to keep the station on the net – (call sign) you may close.*

This is *(net control call sign)* closing the *(net designator)* net at *(current time in 24 hour clock time plus time zone name)*, out.



## Net Script – Standby Net

All Stations, this is *(call sign)* net control calling the *(REACT organization hosting the net)* *(directed or free)* standby net.

Net member stations check in *(as called or by call sign group or by area)*.

As called – *call each station listed on the net membership form by call sign*

By call sign group – *in large nets by the first letter of FCC call signs*

By area – *call by Region, council, team, or subdivisions of team area of responsibility as appropriate*

Acknowledging *by call sign (may use abbreviated call signs in large nets)*.

Next roll call at *(specify time)*. Any station needing to close contact Net Control before closing. Out.

*At next specified time:* This is *(call sign)* net control with a roll call of stations on the *(purpose or event)* standby net – all report if operations normal.

*Call those stations by call sign which checked in on the initial call. You may call by order of check-in or by order on the net roster.*

*Copy by call sign (may use abbreviated call signs in large nets).*

Are there any additional stations joining the net?

*Copy by call sign (may use abbreviated call signs in large nets).*

Next roll call at *(specify time)*. Any station needing to close contact Net Control before closing. Out.

*If the net is ordered to commence operations, recall using the script for a Traffic or a Tactical net as appropriate. Unless there has been a significant delay since the last roll call, a new roll call is not necessary.*

*When net released:* This is *(net control call sign)* closing the standby net at *(current time in 24 hour clock time plus time zone name)*. Out.





EXAMPLE NET LOG AND NET ROSTER COMPLETED



# REACT NET LOG

Date: <i>2 Nov 2017</i>		Event: <i>Scheduled Traffic Net</i>	Page: <i>1</i>
Service/Frequency/Channel: <i>CBRS Channel 40 USB</i>	Net Control: <i>Unit 2</i>	Back-Up Net Control: <i>Unit 4</i>	
Net: <i>High Country REACT Traffic</i>	Liaison: <i>Unit 7 to Southern Colorado Traffic Net</i>	Bulletin Station: <i>none</i>	

EPWRI is precedence: Emergency, Priority, Welfare, Routine, Informal – check when passed

Time:	Event:	EPWRI	To:	Pass:
<i>1928</i>	<i>Early check-in Unit 21</i>	<i>n/a</i>	<i>n/a</i>	
<i>1930</i>	<i>Opened net – 7 check-ins and traffic listed on net roster</i>	<i>n/a</i>	<i>n/a</i>	
<i>1935</i>	<i>Back-up Net Control and Liaison designated</i>	<i>n/a</i>	<i>n/a</i>	
<i>1936</i>	<i>Unit 6 traffic no. 24 to Teller County Emergency Management</i>	<i>P</i>	<i>Unit 7</i>	<i>X</i>
<i>1938</i>	<i>Unit 7 no. 146 NOPSB to Unit 4 support for snow emergency</i>	<i>P</i>	<i>Unit 4</i>	<i>X</i>
<i>1941</i>	<i>Unit 5 no. 36 to REACT International</i>	<i>R</i>	<i>Unit 7</i>	<i>X</i>
<i>1943</i>	<i>Late check-in Unit 23</i>	<i>n/a</i>	<i>n/a</i>	
<i>1944</i>	<i>Unit 4 informal for all stations on tomorrow's shifts at EOC</i>	<i>I</i>	<i>Units 1,2,4, 5,6,7,21,23</i>	<i>X</i>
<i>1945</i>	<i>Closed net – 8 check-ins, 2 priority, 1 routine messages passed.</i>	<i>n/a</i>	<i>n/a</i>	
	<i>Walter G. Green III net control Station</i>			

Operator signs signature and call sign/unit below last entry at end of his or her shift. Pages are numbered sequentially for the date or event. Make entries in ink, cross through incorrect entries.



# REACT NET ROSTER

Date: <i>2 Nov 2017</i>		Event: <i>Scheduled Traffic Net</i>	Page: <i>2</i>
Service/Frequency/Channel: <i>CBRS Channel 40 USB</i>	Net: <i>High Country REACT Traffic</i>		Time: <i>1930</i>

Check early for before start, on time for at start, late for after start to at end of schedule time.

Call Sign	Early	On Time	Late	EWPRI	Name:	Location and/or Telephone:
Unit 1					Juan Gomez	Security
Unit 2		<i>X</i>			Walter Green	Airport
Unit 3					Alex Evans	Pueblo
Unit 4		<i>X</i>		<i>/</i>	Cathy Griffiss	Broadmoor
Unit 5		<i>X</i>		<i>P</i>	Rob Smith	Cimmaron Hills
Unit 6		<i>X</i>		<i>P</i>	George Cavens	Stratmoor Hills
Unit 7		<i>X</i>		<i>P</i>	Juliana Renoit	Fountain
Unit 8					Rose Jackson	north Academy Blvd
Unit 12					Bill Lester	Manitou Springs
Unit 17					Charles Williams	Fort Carson
Unit 21	<i>X</i>				Lee Duffy	Black Forest
Unit 22					Dudley Cox	Falcon
Unit 23			<i>X</i>		Linda Genovese	Old Colorado City

Prefill call sign/unit number, name, and location data for the standard net membership. Can use to record traffic on check in. Use form with Net Log to record check-ins; file with the net log.