

Garland – Radio Amateur Civil Emergency Service – Training
Presented by Bob Brunskill – KC5GMZ

Thank you, _____ and good evening to the NET.
This is _____ Tonight's training is titled:

***Operating in a Tactical Radio Net
Procedures and Equipment - Part I***

Before I begin, I would like to give credit to the Santa Clara County RACES organization for portions of this presentation and allowing me to use this information on the training net. As the title implies, this is part one of a two part series.

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Emergency radio communications nearly always use formal nets, as do National Traffic System (NTS) nets. Casual everyday ham operation mostly doesn't. Tonight, we'll discuss how to operate as part of a formal radio net, probably one where most operators are using handi-talkies in unfamiliar locations.

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First, lets review the definition of a Net

For the purposes of this discussion, a radio net consists of several stations on one frequency (more if linked), following organized procedures, and directed by a net control station. This arrangement makes for efficient use of the frequency, and helps ensure that urgent matters get handled before less urgent ones. In short, the net functions as a team to work towards the common goal of effective net operation.

Keep in mind that any licensed amateur radio operator can start a net to get assistance with a situation. However, emergency nets are nearly always recognized and requested by agencies or authorities outside of the Amateur Radio Service through a local amateur radio *Emergency Coordinator*

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Next, what is a Net Control Station?

A net control station or NCS is the net’s moderator, boss, team captain, or traffic cop; you take your pick. The net control station exists for the purpose of exercising control of the net as the name implies. The amount of control depends on the type of net that is being run.

The Net Control Station has absolute control of the frequency until the net is closed. All communications must pass through NCS. You must ask the NCS for permission before making a direct contact. All communication should be important and relevant to the net; no personal transmissions, except during *Open* or *Informal Directed* nets with that as a purpose. You can tell if a net is in progress by the single tone versus the “bubble up” that is normally on the repeater. This is true for the Garland and Dallas county repeaters. It may not be the case when you are working an event.

NCS will give check-in instructions. During an a *Formal Directed Net*, these could be your *phonetic Call sign*, your **Unit Number**, possibly your first name, whether you are *Mobile*, your *location*, special *Training/Qualifications*, *Availability* for how long, *Band/Equipment* (including Power Source) availability, *Condition* of your radio and *Power source*, approximate *Range* of your system, and *Other information* as directed. Have information available before checking in. Always have paper and pen or pencil handy.

If requested by NCS to check-in to a *sub-net*, instructions will include all frequency information as well as information needed to complete check-in. Listen carefully. The Sub-net NCS has absolute control (as above) until the sub-net is closed.

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Now, let's review the different types of Nets

Open Net -- Net declared; not much is happening; normal use of repeater or frequency.

Informal Directed Net -- Public service **nets** and practice **nets**.

Formal Directed Net -- Activation of specific **nets** for a specific purpose. Most of our nets fall under this category.

Formal Directed or Declared Net -- Begins with a statement that a net is being started for a particular purpose; there is an identified Net Control Station and perhaps an identified backup or logging station. The NCS declares the net active and actively controls the frequency. Normal usage of the frequency is stopped. Specific topic, conditions, and/or instructions for check-in are given.

Sub-nets – Net Control Station may establish sub-**nets** with their own frequencies and NCSs, reporting to the main net. Typical sub-**nets**: *Resource* (personnel, standby, relief, scheduling), *Logistics* (supply, transportation), *Health & Welfare*, *Search & Rescue*, *Damage Assessment*, and *Security*

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Now let's review the differences between a Directed Net and an Open Net

During a directed net, the net control station typically exercises strict control, requiring every station to get its permission before passing traffic. A directed net is essential if the frequency is busy since net control must be able to select the stations with the most urgent traffic first.

During an open net, net control is relaxed considerably. Stations may be permitted to call one another directly, and even have casual conversations on the frequency. Net control will intervene only when there is net traffic to pass. An open net may be appropriate in anticipation of an impending event such as when a storm is moving into the area. It may also make sense when activity on the net dies down for extended periods of time.

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Net Control is always responsible for choosing the best way to run the net; when you join an ongoing net, you should observe how it is being run and fit in accordingly. Until you know otherwise, assume the net is operating as a directed net.

Tactical vs. FCC Call Sign Use

Tactical call signs may be issued by NCS to facilitate operation during Formal Directed emergency or Informal Directed public service/emergency practice nets. Use them.

FCC call sign ID is required every 10 minutes. However, let common sense prevail, do not interrupt emergency traffic to FCC ID.

NCS may call for FCC ID from all stations, or station should ID with both tactical call sign and FCC ID on next net contact, to meet FCC requirement.

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During a directed net, you will be called by your tactical call sign, not your FCC amateur radio call sign. You should use the tactical call sign to identify your transmissions, and you should call other stations by their tactical call sign. Of course, you must also comply with FCC regulations and identify properly with your FCC call sign. Remember, part 97 requires that "Each amateur station . . . must transmit its assigned call sign . . . at the end of each communication, and at least every ten minutes during a communication . . ." That means your FCC call sign. To comply, simply add your FCC call sign to your last transmission in a series.

Listen for your Tactical Call Sign

The use of tactical call signs allows the net to be conducted without regard to what operator is at the radio at any particular location. Different individuals may operate the radio at different times. Changes will occur due to shift changes, meal breaks, errands or movement of operators to other assignments, just to name a few. For all these reasons, it is awkward and error-prone to use an operator's FCC call. However, Net Control should and will try to keep track of the FCC call of each operator. Sometimes an inattentive or distracted operator will answer his FCC call when he does not catch his tactical call. You are more familiar with your call sign than "Shadow One" for example. It is very important to pay attention at all times.

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Answer Promptly When Called

Unless you make other arrangements, you are expected to listen continuously to the net, and answer immediately when called. If you have to step away from your station briefly, tell Net Control before you do so, and check in with Net Control when you return. Otherwise, net control can waste a lot of time attempting to call you when you aren't there. Always ask for permission not forgiveness.

NEVER, Never Leave a Net without checking out

Unless in immediate danger, or at the direction of the on-scene authorities or have the NCS, never leave your post, your transmitter/receiver, or the person to whom you have been assigned. Do not switch back and forth between the net and sub-nets. If assigned to a sub-net, contact main NCS only through the sub-net NCS. Pay attention to your power source and be prepared with backup.

If authorities ask you to leave your post or the person to whom you have been assigned, *comply* immediately and without comment. Notify NCS of your change in status as soon as possible. Absolutely no whining to anyone, especially on the air.

If you have to leave your station before you are relieved, make sure that you notify net control of this fact, before you leave. You properly should ask Net Control to release you but as a practical matter, we are volunteers and Net Control cannot compel anyone to stay who wants to leave. But we owe it to the people and agencies we serve, and to our reputations as individuals, as Radio Amateurs and as a RACES organization, to be reliable. Once we agree to support an agency's activity, we should do our best to deserve that agency's trust.

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Brief the Operator that Relieves You

If another operator has your assignment after you, don't leave before briefing them. If your relief is late and you must leave your station, at the very least leave a written list of the "needs to know" for the next operator. If possible, write down the information they'll need during lulls in activity. If they do arrive on time, go over the list with them in person. You would want the same thing if you were coming onto a shift.

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Here are some examples of the kind of information your relief might find useful:

1. The frequencies being used
2. The tactical call signs in use and where the stations are located
3. Who is at each location; their name and call sign.
4. If a telephone is available; what is its location and phone number.
5. The names of the officials or others you are serving; how you find them and recognize them.
6. Any pending activity, i.e. messages you have sent and replies you expect; also, who gets the reply?
7. What is your station's purpose?
8. What's going on in general? What changes are expected?
9. Where is the restroom, water, food, etc.
10. Any other radio, power, or antenna details.
11. Are "clear codes" in use? If so, what is the code for your shift?

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Arrive For Your Assignment Ahead of Time

Arrive at your assigned operating point at least 30 minutes before your shift starts so that you can get set up and be briefed by the start of your shift. The operator you are relieving would like to leave at the end of his shift also. If the operator you are relieving doesn't have written information for you, you can use the same list we just discussed (with any additions you need) to guide your questions.

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As participants in a net, there are several things we can do to ensure that urgent traffic gets through when necessary.

1. **Don't start talking until your transmitter is active.** I hear more call signs that start with number, such as 5, than I do a letter. This is especially true when you are reporting an incident. It is very easy to give your entire report and not key up your transmitter at all.

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2. **Keep all transmissions short.** Keep your transmissions short and to the point. Short transmissions allow other stations to interrupt if they have more urgent traffic. Similarly, it lets Net Control exercise its control more promptly. Less time is lost if the transmission was partly or completely unreadable due to radio problems, simultaneous transmissions (doubles), local noise, etc.

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3. **Stop transmitting when you stop talking.** Stop transmitting when you **stop talking**. I know that sounds silly, but it happens. Always release the push-to-talk button if you need to pause for any reason. You may need to think of a street name, remember something else you needed to report, or listen to an urgent message that someone is trying to pass to you. When you pause, others should stand by and wait for you to resume; they shouldn't just jump in and start transmitting. However, if something more urgent does arise, the other station should interrupt while you are not transmitting ... that's the point of allowing breaks! Just remember, don't crowd in and transmit just because it's quiet. The original station may not be finished passing its traffic; just pausing. When you have traffic and you haven't been monitoring all along, listen for at least 10-15 seconds before transmitting.

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4. **Avoid unnecessary transmissions.** If you are curious about the weather wait for the NCS to share a weather update with everyone. Don't talk just to hear yourself. If you make a call to a station and they do not answer, don't transmit just to say that you are "clear". If it is apparent from the context of your message that you are finished, it is not necessary to sign "clear". Provided you have identified with your FCC call sign at the end of your transmission, no further transmissions are required.

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5. **Don't call endlessly.** The NCS may have stepped away to handle another matter and will be right back. If you get no answer to your first two calls, wait for a minute or two and let others use the frequency. Call again in a few minutes. If urgency warrants, however, disregard this advice. Break break will always get a response from the NCS but you better have a real emergency on your hands before you use Break Break.

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6. **Breaks** Wait a second before keying after the previous speaker. Listen for the tone if you are on a repeater. Give other stations a chance to break in - it might be urgent!

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- 7. Contacting Net Control.** When you need to contact net control, key your transmitter briefly, just long enough to ID. For example, "Shadow One" or "KC5GMZ" If net control does not notice you in time and transmits at the same time that you do, nobody will be able to understand either one of you for the next 30 seconds or however long the two of you are "doubling". Make sure that net control acknowledges you before proceeding with your traffic. Normally the NCS will say "Go ahead Shadow One". Use short, simple phrases. There are lots of ways to word an idea; pick one of the shorter ways. That helps you "keep all transmissions short". It helps the listener, too; the fewer words you say, the fewer he has to understand. Again, establish contact **before saying messages longer than 2-3 words**. That may mean calling the other station, and hearing it tell you to proceed. Or it may mean hearing the other station reply to Net Control's call. Net procedures vary. But don't spend airtime saying a long message until you have reason to believe you have the other operator's attention.

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- 8. Acknowledge transmissions to you.** Acknowledge transmissions promptly, even when it's obvious from the context that you were asked to do something that you can't do immediately. Until you acknowledge, people don't know if you received the transmission, and don't know if a repeat or fill will be needed. Once you acknowledge, the net can assume you will continue with your assignment, and the frequency can be used for other traffic.

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- 9. State questions in a positive form** Ask a question directly. For example "Should I go to Checkpoint Alpha?" That question can be safely answered by "affirmative" or "negative." Avoid turning it into a negative question. For example, "Shouldn't we go to Checkpoint Alpha?" A yes/no answer to that question is ambiguous, so the answer will have to be a complete sentence.

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10. **Answer questions as directly as possible; do not explain.** That is, avoid unnecessary transmissions. If asked a question, just answer it; do not volunteer additional detail or an explanation of why something is so. As always, use good judgment. You may believe that the simple answer is misleading. Or the question may indicate that the person asking it does not understand the actual situation. If you think it's necessary, volunteer some more information. But be brief, let the questioner ask for more detail if he chooses to. Always remember that there are host of interested parties listening to the net. Do not embarrass yourself or the organization that you are working with. All criticism, constructive or not, needs to be done off-line and face-to-face.

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11. **Ask whom a message is for, if you don't know.** As you copy a message, consider what you're going to do with it. If it isn't obvious, then ask the station that's sending it; this may be the most expedient way for you to learn how to handle it. The sender might even notice that the message should not be sent to your station after all, and cancel the message. It is easy for the sender, who knows all the players, to overwhelm you. If you do not understand the instructions, ask for clarification.

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12. **Let third parties speak over your radio.** This is often better and faster than passing messages back and forth. It's just as legal as passing third-party messages. However, don't expect to reserve the frequency for several minutes while one of the operators gets someone to come to the microphone. Instead, agree with the other operator about who is needed at each end for the contact, then release the frequency for others to use until everyone is available.

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13. **Don't answer too many stations at once.** This is a hint for a net control station. If two or more stations call you at the same time, and you miss or garble some of the call signs, just answer the stations that you copied. When done with all of them, ask if there are any other stations? This is faster and simpler than trying to call stations with fragments of their call signs, such as "the station ending in XZ", particularly if it was really W5XYC! (This often happens during netcheck-ins.)

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**THIS CONCLUDES PART I OF
OPERATING IN A TACTICAL RADIO NET**

Are there any comments, words or wisdom, questions or anyone that needs a fill regarding tonight's subject?

Thank you, _____

I now return the net to Net Control.

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Thank you, _____ and good evening to the NET. This is Kilo Charlie Five Golf Mike Zulu. Tonight's training is titled:

***Operating in a Tactical Radio Net
Procedures and Equipment - Part II***

Before I begin, I would like to give credit to the Santa Clara County RACES organization for portions of this presentation and allowing me to use this information on the training net. I have made various editorial changes to make it more readable over the air.

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Summary of Part I

Remember, last week we defined the meaning of a net, and a net control station. We also defined the difference between an Open Net and a Directed Net. We discussed tactical versus FCC call sign usage as well as the need to need to always work thru net control during a directed net. We also discussed briefing of your relief and arriving for assignments 30 minutes early. We talked about keeping transmissions short and avoiding unnecessary transmissions. Last, but not least, WT5Q and KC5MXN re-emphasized the importance of concentrating on the task at hand and listening to the NET.

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OK, let's begin with Part II

Minimize Misunderstandings

If you use "QSL" and "Roger" Be sure you are clear about what the other party means. They can be ambiguous as some Hams use these terms all the time with various meanings. You could hear each one used with any of several meanings, and not know for certain which meaning was intended.

Here is the definition of QSL:

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The definition of QSL as far as Morse code "Q signals" is concerned is in two parts. First it may be a question: Can you acknowledge receipt? or second it may be a positive response: I am acknowledging receipt. In both cases it is normally related to your last message or your last transmission.

Now, let's define Roger.

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Roger is defined as "copy," "check," "understand". It means, "I understood all of your last transmission."

Let me suggest that instead of using Roger you:

1. Use "affirmative" or "yes", OR "negative" or "no" in response to a question that clearly needs a yes/no answer.
2. Use "affirmative," "okay," "will do," etc. in response to a requests that you take some action.

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Preparing a basic message - Getting and organizing the information

There are 5 parts to every message:

- 1) Originator (From:)
- 2) Destination (To:)
- 3) Message Text
- 4) Message Number (For tracking purposes) if used
- 5) Priority

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Do's & Don'ts re: message handling

- DO be accurate and DON'T change the message; Copy the message exactly as received; legible handwriting is important.
- DO be timely; remember, lives may be at risk.

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Personal Information Get the person's name, but keep it off the air. When you are asked to send a message about some person, immediately try to get a specific name if it seems appropriate. However, avoid saying the name over the radio unless you are told it is permitted. For example, someone may need first aid, or may be lost.

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It may not seem important while someone is standing next to you, asking you to send the message ... but they may wander off and be unavailable when that information is needed. Knowing names helps match up lost and found persons, and helps eliminate duplicate reports of the same injury (or lunch request, or transportation request).

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Similarly, do not, I repeat do not, pass victim or patient names over the radio. Generally the only personal names that belong in traffic are the names of agency officials, even then use first names only if possible. Remember, anyone can monitor ham radio channels. There may be exceptions to this policy at certain events, such as for matching up lost children. Always, make sure that Net Control approves any exceptions.

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Try to get fully worded messages, not paraphrases. When someone asks you to send a message of any substantial length, agree with that person on the exact wording that constitutes the message. If someone asks you to "tell Captain Smith so and so . . .", then you are going to have to paraphrase the meaning. If you reword the message, you can introduce errors, omit details, or change the emphasis or urgency.

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A practical way to handle a message that you get verbally in the "tell them that" format is to write down what you think is the entire intended message, then read it back verbatim to the author for approval.

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Use your judgment whether this much care is needed with tactical traffic. If the officer you are shadowing says to you, "Tell Wilson that his driver came back," you might reasonably not worry about transmitting his exact words. As an operator, what do you do if you are asked to get help for a problem? If possible, work with the person who asked, and try to understand who should handle the problem, then notify net control of this need. Many times the ultimate recipient of the traffic will be obvious, but not always.

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If you instead tell your problem to Net Control without first finding out whom the message is intended for, and Net Control isn't the one who can handle it, you may have to tell your problem at least one more time. The person who brought you the request may know better than Net Control who should get the message. However, when you are asked to report information to Net Control, this advice doesn't apply.

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When passing a message Say your message straight through, in phrases, without any repetitions. Say the message in logical phrases of about four to twelve words. Pause and release the key while you wait for the other operator to write each phrase. Remember to always release the microphone button when you stop speaking. Speak clearly, and slowly as clarity requires, and use the phonetic alphabet to spell items that cannot be understood reliably by pronouncing them.

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The receiver should ask for any necessary repeats, until they have copied the whole message. If they ask you to repeat something, repeat it exactly the same way as you did the first time; do not paraphrase. The receiver is trying to copy your words; if you use different words, you are moving the target. If the receiver heard your words but did not understand what you said, then explain what was said.

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The receiver should then read it back to you, while you compare what you hear with the message you have sent. Once any disagreements are resolved.

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the other person acknowledges receipt of the message saying "Okay -- got it," or "copied" and that ends the matter.

The receiver may omit the read-back step, if confident she or he has the message correctly, and simply acknowledges receipt. Some groups prefer this procedure.

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Very short, simple messages may go a bit differently. You send the entire text, and the receiver may simply say "copied." Or he may say the text back to you, and you say "affirmative." However, don't say "affirmative" and also say parts of the message again. Doing that gives the other station mixed signals. Are you agreeing or aren't you?

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From the sender's viewpoint:

1. Say the message in short phrases; release the button between phrases.
2. Do not repeat without being asked (in most cases).
3. If asked for repeats, repeat verbatim what you said before; do not paraphrase.
4. If the receiver's read-back is correct, say so without repeating any of the message.
5. Be sure that the receiver says that he has copied the message.

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From the receiver's viewpoint:

1. Ask for any repeats or explanations you need.
2. When you've copied the whole message, read it back to the sender.
3. When the sender agrees with your-read-back, say you copied the message.

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When copying a message, if the sender continues before you are ready, mark where you left off and continue copying the message being sent.

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Later, ask for the missing text; for example, "say again the words after SHELTER and before EQUIPMENT." This gets the message through faster than most other techniques.

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GENERAL OPERATING PRACTICES

As I go thru this section there will be some repeats, I assure you that this subject bears repeating more often than just twice.

If on-scene authority requests that **radio** be shut off, or that no transmissions be made, **comply** immediately and without question. Do not notify NCS from that location. There may be a danger that could be triggered by the RF energy from your radio or from an electronic spark. If possible, ascertain whether you can leave the location of the danger in order to notify NCS of the circumstances

During *Formal Directed* emergency or *Informal Directed* public service/emergency practice **nets**, keep all your transmissions short and to the point. Always be ready to record messages transmitted to you or to be transmitted to NCS. Again, Keep pencil and paper handy at all times.

More Rules

Think it, Write it down, Say it, Get on the PTT button and the appropriate time and Get off the PTT when finished.

Listen, listen, listen -- Pay attention to everything that is going on. Effective performance and personal safety require all operators to be aware of all events in order to be able to respond promptly and accurately during net operations.

Emergency. Priority. -- During *Formal Directed* emergency or *Informal Directed* public service/emergency practice **nets**, everything STOPS with the transmission of **Emergency** or **Priority**. The highest, **Emergency**, is reserved for **only danger-of-death or serious-injury-if-message-is-not-heard-immediately** messages. The second, **Priority**, means the traffic concerns an *immediate safety issue regarding Human life or injury, or impending property damage*. NCS will stop everything and answer these calls immediately. Rely on NCS to dispatch assistance. We also use Break Break to indicate an emergency.

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Remember, Break Break is to be used only in a true emergency. This is true any time, whether in a net or just in an open repeater environment.

Never, never, never transmit the name of an injured, trapped or deceased subject. Request only that the NCS send the appropriate authorities and help to your location on a priority basis as outlined above. Never transmit the name of a minor lost or separated from responsible adults. Be prepared to respond to NCS with description and or identifying information established ahead of time.

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I personally do not recommend transmitting the following at any time for any reason:

Full names of anyone.

Phone Numbers.

Exact locations of repeaters, stations that could be used by the media or persons unknown to your operation.

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Never make any comment to a member of the media regarding information about injuries, deaths, addresses of the most severe damage, license numbers of vehicles, rail car numbers, and possible reported causes which might lead them to a “trail-of-responsibility/blame.”

I can't answer that question is always a good response. Refer them to the Public Information Officer or to the authorities. If you don't recognize people, beyond a shadow of a doubt, to be part of the authorized on-site operations team, don't discuss the situation with them. You *may* discuss the role of the communications volunteers and **amateur radio** in the overall, but not the specific, situation. Always Be Careful. Think before you speak.

Allow authorities to communicate directly as third-party traffic. Hand the microphone to the person who wishes to pass a message and if necessary, remind them that they can't use foul language or conduct commercial business. Relays often become incorrectly "translated" by the relay operator, especially if there is a high percentage of special agency terminology, technical terms.

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Turn down your emotional sensitivity; always try to be objective. Do not criticize. Be patient with NCSs. Do not be an “ambulance chaser.” Check-in to the net and follow orders. Let me say that again, Check-in to the net and follow orders. **Amateur Radio** Service volunteers must respect and cooperate with the served agencies or authorities. Often that means being a “servant” in order to provide "service" in Public Service activities.

Our prime task as an Amateur radio operators is to be a communicator. The authorities are in charge. Our only job is to communicate, when asked to do so, what the authorities want communicated. Identify yourself and tell them you are available for communications service when needed.

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Wait after keying, before speaking Wait a fraction of a second after pressing the mike button before speaking. This ensures that you don't clip off the first syllable of your transmission. Your radio may take a moment to change over to transmit, and the repeater may introduce its own delay. Once you are used to your own radios and usual repeaters, you might still find yourself using unfamiliar equipment some day. This is particularly important for a one-syllable message such as: yes, four, or Bob. If that syllable doesn't make it, the transmission is useless.

If the station you are calling has their HT in battery-saver mode, and the channel has been quiet, the first second or two of your transmission might go unheard. If you suspect that, give the entire call sequence twice, as in "Net Control, this is Back Gate; or N5QT this is K5XYZ."

<PAUSE for the Repeater to reset>

Don't talk louder in a noisy environment. It's natural to talk louder if it gets noisy around you, but don't do that on the radio; it generally makes your signal less understandable, not more. You should always speak loudly enough into your microphone to achieve full modulation. If you speak any louder, the radio clips your voice to avoid over modulating the transmitter. Your voice then becomes distorted and reduces the readability. The only way to overcome loud noise is to reduce it somehow, or wait until it passes. You might consider using a noise-canceling microphone, which work by favoring sound from nearby, over the more distant noise.

<PAUSE for the Repeater to reset>

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Shield your microphone from the wind. Wind blowing across the microphone can make it impossible to understand you. Try to keep the wind from hitting the microphone. Simple measures to shield the mike from the wind often work well enough, provided you remember to use them. If you pin your microphone to your shirt front and then speak by looking down at the mike, odds are you will not be transmitting a clear message.

Don't use VOX or a locking PTT switch on a tactical net, PERIOD. Even if you are sure that it won't cause problems. VOX operation may be appropriate for informal intercom-style coordination, when no hands are available to push a button. But in a noisy location, a VOX control may key your transmitter and jam the frequency, without you even noticing. Even in a quiet area, you may transmit unintentionally from time to time, due to stray noises or fumbles, disrupting the frequency. Push-to-talk operation is better than VOX on a tactical net because you can explicitly control when to transmit. Avoid locking PTT switches also.

<PAUSE for the Repeater to reset>

Your HT may not work on your belt

You may have to hold your HT in your hand to transmit reliably, or to even hear well. In marginal circumstances, you may be perfect copy while holding your HT in your hand, and barely detectable with it on your belt. Perhaps worse, with marginal reception, you may miss calls directed to you. In such situations you unfortunately can't take full advantage of equipment like a speaker mike or a headset with a boom mike. Also, keep your antenna vertical if at all possible. You will lose approx. 1% of your signal strength for every degree that you are off vertical.

<PAUSE for the Repeater to reset>

Don't misuse battery-saver mode

Don't configure your HT to sleep for several seconds in its battery-saving mode. You may miss calls.

In conclusion:

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Here are “10 Ways to Optimize Your Effectiveness in Public Service Events” by Willam L. Continelli, AB2CA

1) Make sure your radio is in top operating condition. Small problems (such as loose antenna connections, bad microphones, intermittent operation, etc.) may be just annoying during casual operation, but WILL cause major grief under the continuous/severe service of net/emergency operation. If your radio's not in 100% top shape, buy, beg, or borrow one.

<PAUSE for the Repeater to reset>

2) Don't operate your handheld with it hanging on your belt. Using the radio while it's strapped to your waist reduces your effective radiated power by more than 10 dB. That's a 90% reduction in power! Hold the radio in your hand, with the antenna in the clear.

<PAUSE for the Repeater to reset>

3) Regarding antennas, those 3" rubber dummy loads may be cute, but you're throwing away 3-6 dB of power when using one. (If you're REALLY into math, compute the loss of a 3" rubber dummy load used on a belt clip). A telescoping half-wave has a gain of as much as 10 dB over a 3" rubber duck and a quarter-wave provides a 4-6 dB improvement. Even a 12-15" rubber duck will boost your signal by 3-6 dB over the 3" ones. Remember that one dB can mean the difference in whether or not a critical message gets through.

<PAUSE for the Repeater to reset>

4) Have charged batteries and spare battery packs! If you have a dry cell battery case, fill it with alkaline batteries. Make sure you have enough batteries with you to carry you through the event, even on high power.

<PAUSE for the Repeater to reset>

5) Use headphones or an earphone rather than a speaker/mike. Most earphones

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will plug directly into your HT. Low cost stereo headphones are widely available and will work perfectly with your HT using a mono to stereo adapter. The headphones also have the advantage of concentrating the communications in your ears, while partially shutting out the outside noise. Headphones will also prolong battery life by allowing the radio to operate at lower audio output. A speaker/mike is the worst thing you can use—it doesn't cut the outside noise, it doesn't save batteries, and where is that HT while you're using the speaker/mike??

<PAUSE for the Repeater to reset>

6) Speak slowly and clearly when transmitting! You may take pride in your ability to run your words together and mumble, but the station on the other end may be in a noisy environment and may not receive your message.

<PAUSE for the Repeater to reset>

7) Check out your ability to use simplex. Even if the operation is being conducted on a repeater, there may be "dead spots", the repeater may go down, or, sad to say, there may be jamming. Even if you can only work the 2 or 3 stations closest to you, a message can still be relayed.

<PAUSE for the Repeater to reset>

8) Listen to net control and direct all communication through him/her. Identify your station when calling net control and keep all communications direct and to the point.

<PAUSE for the Repeater to reset>

9) If you must leave the radio or the area to which you have been assigned, first seek permission and acknowledgement from the net control station, make your "time off" as short as possible, and check back in with NCS immediately upon your return.

<PAUSE for the Repeater to reset>

10) Project a good image to the non-hams around you that are part of the event/emergency. This means acting professionally, using basic hygiene skills, etc.

**THIS CONCLUDES THE SECOND AND FINAL PART OF
"OPERATING IN A TACTICAL RADIO NET".**

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**ARE THERE ANY COMMENTS, QUESTIONS OR ANYONE THAT
NEEDS A FILL REGARDING THE MATERIAL THAT WE HAVE
COVERED TONIGHT?**

Thank you, this is _____.

I now return the net to Net Control.

GRACES