

## Designing Successful Exercises

This article is based, in part, on a classic *QST* article by George Washburn, WA6YYM, a five-year veteran District Emergency Coordinator and Chief Radio Officer of Santa Clara County, California. Significant new material and clarifications have been added.

They might be called “drills,” “exercises,” or “tests.” Whatever they are called, these periodic practice sessions serve two key purposes:

1. Practice specific skills
2. Measure specific performance
3. Test specific plans and procedures

For the purpose of this Learning Unit, we will refer to them as “exercises.”

Exercises are particularly important tools used to measure the readiness of emcomm groups. They provide low risk – if not always low stress – opportunities for the leadership to determine what works and what needs further development, and for participants to sharpen their communication skills. This is why the ARRL strongly recommends participation in its annual Simulated Emergency Test (SET) and Field Day events.

1. Exercises are most valuable if five conditions are met: The skills or procedures to be tested have already been taught to the participants.
2. The goals of the exercise are clearly articulated (what exactly do you want to test?).
3. The correct type of exercise is chosen and designed (the method you choose to test it).
4. The exercise plan includes a definite means for measuring and evaluating the results.
5. Feedback and evaluations of exercise performance are promptly received from, and then shared with, all participants.

### Exercise Goals

To be meaningful, exercises must have clearly defined goals. These could include:

- Testing new procedures or skills.
- Testing a particular existing skill or network element.
- Re-testing some aspect of a prior exercise to measure any improvement in performance.
- End-to-end testing of a network system.
- Total system response to a given situation.

New concepts or skills that are large or complex should be introduced in stages. The basic skills should first be taught in a classroom or on-air session, and only then “exercised” in a drill.

Four SETs in Santa Clara County, California progressively tested the use of a new packet radio Emergency Bulletin Board System (EBBS) that links each city's Emergency Operations Center (EOC) to the County EOC and local Red Cross chapters.

The goal for the first drill was simply to expose EOC radio operators to this unfamiliar system in an operating environment. The next drill tested operator skill with EBBS use and the new countywide net plan. In the third drill, the Operational Area Damage Assessment form was introduced. City EOCs sent local data via the EBBS so that a countywide damage assessment could be compiled at the Operational Area EOC.

The final drill added the dimension of field damage reporting by voice radio to city EOCs with transmission of summary data by packet to the Operational Area EOC on the EBBS. This exercise closely simulated a primary role for ARES/RACES in Santa Clara County – the gathering and transmission of damage assessment information to the State Office of Emergency Services. This information is used to request the gubernatorial Declaration of Emergency required to obtain state aid for stricken areas.

### **Choosing the Type of Exercise**

There are three types of exercises commonly used by emcomm groups: *tabletop*, *functional*, and *full-scale*. Which one you choose depends on your goals. Tabletop and functional exercises are both excellent ways to introduce new procedures and systems. Full-scale exercises can test multiple systems working together, and help simulate the stresses that occur to network operations during a disaster.

Your first few exercises should *never* be full-scale. Begin with smaller exercises that focus on individual elements of the larger goal. Once each element has been tested, put it all together in a full-scale exercise.

**Tabletop** – Tabletop exercises are especially valuable for testing new procedures or techniques in a classroom setting. Their primary limitation is that fewer participants can be involved.

Tabletop exercises are essentially role-playing meetings. After a separate classroom training session in which the skill is taught, it can be “tested” in a tabletop drill session. With one person serving as facilitator, participants representing various locations or functions review their roles or respond to questions from other participants. No timeline is required although the discussion should follow a typical sequence of events. Tabletops allow the participants the luxury of interrupting the exercise to discuss any aspect of the drill. They are the best way to introduce new procedures because the feedback is immediate and heard by all present.

**Functional** – Functional exercises may utilize the same facilities as full-scale drills, including EOCs and live radio nets, but are more limited in scope. Most participants perform their typical roles, while a smaller group serves as “simulators,” feeding scenarios, data, and messages into the system. Functional exercises can also be run with all participants communicating from their homes, simply adopting the roles they would have in a full-scale drill.

One station can facilitate a functional exercise, much as in the tabletop exercise. Functional exercises held on the air can be scaled to allow as many or as few participants as the exercise designers choose. Emcomm leaders can monitor the exercise for its training value, and provide an immediate post-exercise critique.

Consider tabletop or functional exercises as multiple mid-term events to be held before an annual full-scale SET. They provide low-stress training opportunities which can be adjusted as they progress, something which is nearly impossible during full-scale exercises.

**Full-Scale** – Annual SETs are often full-scale disaster communication simulations with operators responding to EOCs and field locations. They are fun, challenging, complex, and prone to significant failure, especially if a new or unfamiliar procedure or system is included. While identifying areas that need improvement is a valuable part of any exercise, it is equally important that volunteer participants have a generally positive experience. The goal of a full-scale exercise should be to evaluate how well all the individual components of a system work together. Consider a full-scale exercise only when individual systems or tasks have been adequately tested on a smaller scale.

### **Design Elements**

The success of any exercise is directly related to the amount and quality of planning that goes into it. Keeping in mind the goals of the exercise, a number of exercise design elements will need to be considered.

1. **Scenario evolution** – Each simulation needs a starting point, one or more tests or challenges in succession, and an ending point. Think through your simulated situation in detail while keeping in mind the goal of your exercise.

This is an example of a complex full-scale hurricane scenario.

1. Declaration of a hurricane warning (starting point)
2. Pre-landfall preparation (planning and deployment test)
3. Evacuation monitoring and reports (network test)
4. Initial damage reports (network test)
5. Shelter overload and supply shortages (network test)
6. Communication failure at local hospital (challenge)
7. Eye of storm passes over (coffee-break!)
8. Further damage reports (network test)
9. Health and Welfare traffic increases (network test)
10. More shelters are opened for homeless (network test, asset challenge)
11. National Guard moves in, requests communication support (asset challenge)
12. And so it goes until demobilization occurs...
13. The exercise is evaluated and feedback given to participants.

For each of these elements you will have to create in advance some background information, and a number of messages and specific events to simulate a realistic situation. Since this is usually a “compressed time” exercise, you will not need to generate as many messages or events as might really occur. Depending on your goals, you might choose to “throw a monkey wrench into the works,” such as a repeater failure, an EOC flooding out, power failures, and so on, to test back up systems and team flexibility. If you do this,

however, be sure to warn participants ahead of time to expect some challenges, without giving away the actual problems. Surprises add stress, and this might not be desirable in a situation where they are not as mentally ready as they would be during an actual disaster.

A smaller table-top exercise might only have a few elements. This Section-level exercise is designed to test the EC's decision-making process when certain routes become unavailable. One goal of the exercise is to see if cooperation will occur between ECs to reroute messages around failed circuits.

1. The event is described to the group – a storm has knocked out power and telephone service to several counties. The group is asked to establish communication between municipal EOCs and the State Emergency Management EOC at the capitol.
  2. Each EC is asked to choose his primary route for messages to the capitol. Routes are illustrated on a whiteboard map.
  3. The “event simulator” introduces various problems – key repeaters or nodes out of service.
  4. ECs are asked to choose alternative routes.
  5. ECs are evaluated on their solutions during the exercise.
  6. The entire group discusses the results at the end of the session.
2. **Network design** – Consider the communication networks you wish to test. Will it be only one or two, or every network in your emergency response plan? For instance, if you are testing a communication failure between a triage center and a hospital, you might have both a discreet (digital mode) and tactical (voice mode) net. Be sure you have considered all possible communication paths that might be needed for the scenario to work as intended.
  3. **Asset assignment** – Among your assets are your team members and available equipment, as well as operating locations and facilities. Design the exercise with both in mind. If facilities are to be used, such as EOCs, be sure you make plans for access with appropriate authorities well in advance.

Unless you are planning the full-scale simulation of a complete disaster response, make sure everyone knows where they are supposed to be and when, and what equipment they will need. Not every exercise needs to be a full simulation of emergency conditions – remember your exercise's specific goals.

It is OK to design an exercise that overwhelms your assets, but only if it is one of the exercise's key goals, and everyone knows of this in advance. If it happens unintentionally, it can prevent the exercise from meeting its primary goals, and unnecessarily frustrate the participants.

**4. Pre-exercise communication** – For your exercise to happen as you plan it, the participants and others who will be affected must be notified well in advance. How much you tell each participant in advance will depend on the goals of your exercise.

- Develop a written “in-house” plan with full details of the event for use only by planners and simulators. Create an outline listing the date and time, goals, scenario, responder locations, message types, net structure, scoring, and exercise evaluation criteria.

- Develop a complete exercise package for use by the simulators that includes a complete scenario. It should include:
  - Detailed description of the simulated incident.
  - List of conditions affecting field responders, such as whether their response will be impeded by simulated events.
  - Timeline with start and stop times, timing of messages to be sent or generated.
  - Radio plan with the function of each net, primary and alternate net frequencies and CTCSS tones.
  - Instructions for field responders.
  - Supply of appropriate forms.
- From the full outline, write an announcement of the exercise with the “who, what, when, where, and why” questions answered. You may need to list specific equipment participants will require. Be sure to indicate the level of challenge and stress to be encountered so that participants can be mentally prepared. Send this to all participants or to local ECs to be forwarded to their local members.

**5. Exercise participants** – Santa Clara County has long followed the practice of naming a simulator in each jurisdiction to receive the entire exercise package. Other participants receive only a brief overview of the exercise since, in a real incident, they would not know the entire sequence of events. In some cities, the EC appoints a simulator. In others with different training needs, the EC takes the simulator role and appoints an Assistant EC to assume command. To facilitate this process, all documents except the general announcement and instructions are sealed in an envelope that is opened only by the simulator at a designated time.

**6. Time compression** – You seldom have the luxury of running an exercise in “real time.” A complete hurricane evolution might take days. The time-line will need to be compressed to fit into your exercise period. For instance, you can limit the number of messages, eliminate travel time, and introduce certain events more quickly than they would normally occur. In reality, the time between a hurricane watch and warning might be days. In your exercise it should be limited to the time necessary to test those plan elements that would normally occur in that time period. Certain actions might only be verbalized to save time. Instead of sending a repair team to “fix” a broken repeater, you might talk about how long it could take and which resources it would tie up.

Participants might already be on site instead of responding from home. When the activation order comes, they would simply list the actions they must take to respond.

**7. Measurement and evaluation** – If you complete an exercise, but you have no way of measuring the performance of your operators and systems, you will have lost much of the value of an exercise. The method of measurement must be developed during the planning phase, not after the exercise is over.

You will need to devise a means to objectively measure your success, and then a means to evaluate the resulting information to identify areas needing improvement. Measurement should use some form of numerical scoring. For instance, you could

score the percentage of messages delivered correctly and without errors, give points for on-time setup, for the percentage of teams participating, and so on, depending on the goal you are evaluating. In addition to formal measurement, informal comments and feedback are invaluable to understanding the numerical results. If a particular score was low, what conditions caused it to be low? Was it due to equipment failure, or a need for additional user training?

Who will do the measuring? One method is “self-scoring.” Provide a measurement and evaluation sheet in a sealed envelope to each team, and ask them to open and fill it out after the exercise is over. You can provide a space on the form for self-evaluation comments. Another method uses an independent “exercise evaluator” who observes the operation and scores the team’s work. This person can also act as the “simulator,” introducing elements of the exercise to the group one at a time.

If you plan to compare results from one exercise to another, it is important to use a “standardized” scoring system that allows you to compare results from two or more exercises in a meaningful way. In other words, you should be measuring the same items in exactly the same way, from year to year.

### **Post-Exercise Feedback to Participants**

Letting exercise participants know how they did is critical to success. Doing it in a timely and positive manner is equally important.

Tabletop exercises provide immediate feedback to all participants by their very nature. On-the-air functional exercises can be immediately followed by critiques. Full-scale exercises, on the other hand, are usually of such a large scope that the demobilization process precludes an immediate critique. ARRL sponsored SETs have reporting requirements that contribute to delays in providing feedback.

In Santa Clara County, the SET scores and a summary of observations are posted on local packet bulletin boards (today we could use email) within twenty-four hours and later printed in local club newsletters. During the subsequent weekly training net, an on-the-air critique of the exercise is made. Finally, exercise review is on the agenda for the next quarterly countywide meeting of all Emergency Coordinator/Radio Officers (EC/RO).

Finally, emcomm leaders should hold their own evaluation taking into account all the feedback from participants and evaluators. Compare the group’s actual performance with the exercise goals. Identify any elements that worked well, and those that did not. Be careful to keep comments as positive as you can. In group or public sessions, discuss actions, not people. If personnel changes need to be made as a result of the exercise, the responsible leader should do it quietly and privately. Determine the cause of specific failures and suggest specific ways to improve. Create an “action list” of specific changes or improvements to be shared with the entire group, and a plan for accomplishing them.