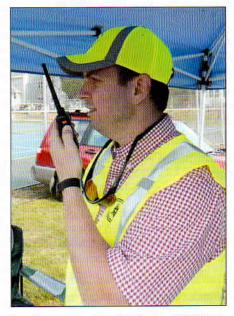# Planning and Operating
Special Event Communications

Prep tips, techniques, and protocols for operators.

Providing radio communications at special events such as running races, bike-a-thons, walks for special causes, and competitions requires Amateur Radio operators to be efficient and effective at all stages, from planning and preparedness right up through providing communications services. In addition to upholding the standard of safety and security for all, radio amateurs are also cogs in the behind-the-scenes machine, with a responsibility for ensuring that officials and workers are able to communicate with one another as needed. Our reputations are also at stake, as an effective communications plan carried out flawlessly results in us being asked to return the following year, and also asked to serve in sometimes even more demanding situations, such as disaster responses. It's said that "practice makes perfect," and that applies to public service as well. Here's an example of how one ARES® group's participation in a state-wide exercise prepared them for providing effective service at an event the very next week.

Case Study in Excellence

I was recently impressed by the fine effort of the ARES operators of the Clallam County Amateur Radio Emergency Service (CCARES), on the Olympic Peninsula of Washington state, who participated in the Washington State Emergency Department's statewide "Fifth Saturday Exercise." Held on August 30, the exercise served as an opportunity for the group to assess the area, which features unique terrain over logging roads and other challenging conditions, as a dry run for an inaugural trail marathon that would be conducted the following week in the same area — an event for which this same ARES group would be providing communications. Marathon officials had provided the group with an outline of the event, concerns about lack of cell phone coverage, and the need for reliable safety and security communications.

Practice and planning will help your ARES team efficiently and successfully provide communications at public service events. Here, Joe Hamm, KC1BAQ, serves as net control at a marathon in Wallingford, Connecticut.

The exercise (a wildfire scenario) began with operators contacting the Resources net for check-in. They proceeded to a staging area where they received their instructions and safety briefing for deployment. Assignments and maps were issued to the two-person teams and, at that point, Operations took control of the exercise from Resources. The teams were then dispatched to their assigned locations.

Upon reporting arrival at their locations, teams awaited net roll calls on repeater and simplex channels. When Operations found that they could not maintain contact with all of the deployed elements from the Incident Command Post, control was passed to the only station that could. The teams assessed road conditions, and reported locations and signal strengths to the net. All of the teams

then returned to the staging area for the hot-wash and were released to the Resources net control for final check-out.

The group's after-action reports — which went to government officials as well as planners of the inaugural Great Olympic Adventure Trail Marathon — included information concerning road conditions, hazards, and radio communications coverage at critical field way points. Necessary changes were made to the communications plan for the marathon, as a result of CCARES's findings in the wildfire exercise.

During the marathon, after contacting Resources, CCARES personnel deployed directly to the locations they had manned during the exercise. The Operations net received check-ins as members arrived on location. CCARES members manned the Start locations, the Finish Line, and all critical points along the trail where cell phone communications were impossible because of terrain. Aside from minor glitches, radio communications ran smoothly the entire day. CCARES members were readily identifiable, thanks to their communications vests and radios.

"Our demonstrated professionalism was not lost on event organizers, and ARES was able to practice and become familiar with our unique geography for incidents and events in the future," said a coordinator, Bruce Reiter, KD7WBM.

Analysis of a
Winning Team Effort

There are many things that CCARES did right, starting with an assessment of the terrain and its related challenges to be met, in a government emergency response exercise no less, and especially communications coverage and gaps. They coordinated and planned with exercise and event officials, as well as their own leadership. An initial net took check-ins and roll call, a staging area

provided the forum for instructions and safety briefing, and two-person teams (wisely providing a back-up operator) were deployed to assigned positions, checked in to another net upon arrival. Operators were already aware of the terrain and hazards, as well as gaps in communications coverage, thanks to their participation in the previous week's exercise. The result was a professionally run, efficient, and successful communications service.

Modes and Other Matters

As far as radio modes go, some of the most interesting and innovative ones for special event communications I've seen these past few years include the use of the mesh networking model deployed in a remote area of the southwest for event participants, organizers, and a grandstand of spectators removed geographically from the finish line. The system uses modified wireless routers with custom firmware on the amateur 13 centimeter band (hence small antennas can be used), and runs all day on a car battery. The broadband capability allows for high-speed data and amateur television. The system, while used for safety communications for event organizers and participants, was also used to send television imaging of the runners crossing the finish line to TV screens at the grandstand so that family and friends could see them finish![1] You can get more information about this technology at **www.broadband-hamnet.org**.

D-STAR (Digital Smart Technologies for Amateur Radio) is also a relatively new player on the special event communications front, and certainly a viable one with its digital voice (DV) capability, slow data messaging, position reporting (with GPS coordinates), and other information reporting added as a sub-layer to the top-layer voice transmission. The main criticism of the system I've heard is its dependence on the Internet for routing messages among D-STAR repeaters, but it is totally independent of the Internet when a repeater serves just the local area, or when its simplex mode is executed: point-to-point communications are easily accomplished without the Internet, especially in the relatively small footprint of a local or even regional area special event theater of operation.

[1] L. Jelinski, AG4IU, "A Broadband Ham Network Crosses the Finish Line," QST, Jul 2013, pp 68 – 69.

But more traditional and conservative modes and methods are perfectly applicable and tested by time. The Automatic Packet Reporting System (**www.aprs.org**) is a good example: it's been in use for a long time, allowing special event coordinators to view a map and spot locations of operators, vehicles such as SAG wagons and ambulances, in real time. Log files of GPS coordinates can be imported into mapping software to show movement along routes during hotwashes and after-action reports that result in enhanced efficiencies for the next event.

And, of course, there are the workhorse bands, modes, and radios that remain the bedrock for special event communications: analog FM simplex and repeaters, the 2 meter and 70 centimeter bands, and the ubiquitous mobile and hand-held radios that are used on them. Repeater hardware and software systems can be hardened for demanding conditions, but they should never be relied on as the sole networking source. Backup repeaters must be incorporated in the communications plan, as well as a robust simplex network for getting messages around the horn without repeaters. The simplex network and indeed, the repeater network, must be tested and exercised for 100% coverage of the operating theater. Consider HF, also — the use of NVIS antenna configurations, for example, can add local and regional coverage.

The goal is no gaps! Murphy's Law dictates that an incident requiring immediate attention on a special event course will occur at the location of a communications failure point, guaranteed!

Work-arounds must be considered case-by-case, based on the unique operating environment of each field waypoint where operators are to be deployed. Ideally, they are discovered and planned for in advance, but can be done on the fly if necessary. A good example was the work-around engineered by the Clallam County ARES group, when they shifted net control efficiently to another operator who could hear all stations on the net. Another example is the use of the cross-band repeater function of many radios nowadays, including on my Icom ID-5100, where I can push a button, set the frequencies, and then transmit into it on one frequency in the 2 meter band, and have the signal simultaneously retransmitted on a frequency in the 70 centimeter

band. An application example in the field would be if an operator was in the woods or ravine away from his vehicle and mobile transceiver, searching for a lost runner, he/she could use a hand-held to send his signal to his vehicle's transceiver at a higher elevation and having it retransmitted on another frequency monitored by the rest of the net.

More Tips, Techniques, and Protocols

Use plain language. It's readily understood by all entities supporting a special event, and thus promotes interoperability. If, however, a special event turned into a terrorist incident, such as what occurred at the Boston Marathon in 2013, tactical language is occasionally warranted.

Don't show up on time on event day — show up much earlier! Allow plenty of time to negotiate traffic, barriers, detours, and bad weather. Get to your first obligation early. Showing up late is bad form at best and, at worst, ratchets up the stress levels of your team leaders and fellow operators unnecessarily, and undermines the possibility of a good, efficient start to a long day of operating in the field. Your leader and teammates are counting on you.

Observe net protocols. Transmit only when directed to do so by net control. Keep transmissions brief for efficiency, and conservation of battery capacity. Listen carefully to net control; respond quickly to roll calls. Have at least two operators at each field location, as the Clallam group did. Switch operators for frequent relief breaks and to avoid physical and mental fatigue, which can reduce operation efficiency and effectiveness. You don't want to miss an important piece of information from net control, or worse, provide an erroneous report.

For event Amateur Radio communications planners and leaders, don't promise event organizers services you can't supply: The key is to under-promise and over-deliver. Have extra operators on standby as fill-ins when the inevitable occurs — there will be no-shows. Establish contact with other entities' leadership immediately upon arrival at the staging area for a smooth start to management of the event.

And lastly, have fun! There is no thrill in Amateur Radio like being in the field as part of a fast, efficient, and effective net of experienced operators passing messages, being led by an inspiring net control!