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# TALKING TECH FOR DISASTER COMMUNICATIONS

## Backup systems are key to ECC continuity in case of disaster and disruption.

**By Robbie McCormick**

We are all familiar with emergency communication center (ECC) disaster preparedness as it relates to evacuations, bug-out (leave in a hurry) to the back-up centers, go bags and physical plans for continuity of services. But what about the technology that drives our services in public safety communications? What does it take for a center to be truly redundant and resilient in the face of disasters that threaten to interrupt the technologies that run public safety communications?

Having our technology up-to-date and backed-up is not a luxury, it is imperative; so much so that the industry is replete with standards that speak to it. These standards and performance indicators involve technology in the communications center and how it is expected to stand up in the face of storms, fires and earthquakes. The standards guide ECC managers when selecting, building-out and implementing technological fail-safes, back-ups, redundancies and contingencies. But it doesn't end there. Standards also address technician competencies and training.

APCO's **Core Competencies and Minimum Training Requirements for Public Safety Technician** states in section 2.1.1.5, that the agency has a responsibility to … "provide training and performance expectations to the technician detailing responses to catastrophic, technological, or structural failure within the work area (including the communications center), emergency evacuation plans, and recovery processes to ensure the continuity of operations."[1]

APCO's **Public Safety Communications Center Key Performance Indicators** is replete with information on the topic of disaster operations and continuity of services as it relates to technology. Section 2.5 Technical Systems Functionality states, "… mission-critical key performance indicators focus on technical systems health, including location information accuracy, system availability, reliability, redundancy, call delivery, and continuity of operations." Among the factors listed, all of which should be tested and have some form of redundancy and disaster planning are generators, (load testing & start/runs), UPS (checking for dead cells), phone, radio CAD and alerting systems.[2]

APCO's **Public Safety Grade Site Hardening Requirements** states in its executive summary regarding hardened, public safety grade facilities that "These sites need to withstand the onslaught of natural or man-made conditions and consider the distinct requirements for different geographic locations of the United States, including their likelihood to be subject to severe storms, earthquakes, tornadoes, and other disasters."[3] This standard also speaks specifically to coaxial cable, antennas, clean power and several NFPA standards, such as 70[4] & 1221[5] and for circuit breakers, fixed generators and the ability to run for 72 hours at 99.99% availability before refueling is necessary.

APCO's **Project 43 Broadband Implications for the PSAP** (ECC) document addresses NG9-1-1, IP, ESInets, hosted solutions and seamless interoperability options to further mitigate and improve operational continuity in the areas of customer premises equipment (CPE), land mobile radio (LMR), computer aided dispatch (CAD), records management systems (RMS) and geographic information systems (GIS). Project 43 states that, "In the case of a major disaster, an IP environment offers even greater advantages in terms of redundancy and resiliency."[6]

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Public safety communications managers must decide how to implement these standards in the real world. They must design systems that can withstand "severe storms, earthquakes, tornadoes and other disasters" with redundant systems and trained staff who can maintain communications.

Stephen Martini, director for the Metro Nashville (Tennessee) Department of Emergency Communications (MNDEC), noted two prevalent perspectives among his peers:

1) ECCs cannot plan for every scenario, so do your best with what you have and beg forgiveness when the ECC is overwhelmed and experiences a disaster.
2) Consider every disaster a local emergency and be responsible to plan at the local level to continue to respond no matter the severity or extent the impact of the disaster.

"I subscribe to the second, and we will spend the necessary money and engage with more resources to best be prepared to lead when called to do so in the way our citizens expect," Martini said.

The military uses a communications method it calls PACE[7] that is designed to make sure the communications can get through by building in several backup modes into the operation. The modes are known as primary, alternate, contingent, emergency. MNDEC takes the PACE approach when preparing for disaster response communications. For example, mapping and GIS uses CAD (primary), cloud-based map / location services (alternate), Google Maps (contingent), and printed map books designed for ECCs (emergency).

PACE is an on-going evaluation and mitigation practice. For example, in 2020, this method of evaluation and identifying better solutions served MNDEC well following the 2020 Christmas Day bomb explosion in downtown Nashville. The bombing rendered the AT&T Central Offices in downtown Nashville unable to receive and process phone calls.

"We actually lost admin lines due to a lack of redundancy," Martini said. "The solution we created involving neighboring counties was in response to that impact. Our team used Verizon flip-phones to process non-emergency calls for those three days." MNDEC was able to create even further diverse delivery paths from disparate offices and wireless call delivery to continue processing 9-1-1 and administrative calls for citizens during any future events or disasters that would affect central offices. The radio system has a cloud component for redundancy, supporting multiple agencies in two counties. This regional private network can be used to share other critical functions such as the internet (it could be expanded to share software solutions like CAD, CPE and others). "We built one network to share phone system capacity across fiber lines between three comm centers in two counties, and we continue to do the same with seven other comm centers in three other neighboring counties," Martini said.

MNDEC's radio system has also been planned out using PACE radio consoles as the primary mode, followed by laptop-based radio consoles as the alternate for mobility and remote work. The contingency are mobile radios on the desks and portable radios in charging banks in an emergency. The agency also has a partnership with local ham radio operators to leverage amateur radio should

the entire network go down. American Radio Emergency Service (ARES) is part of the National Association for Amateur Radio[8]. Licensed ham radio operators who volunteer can provide emergency radio communications.

Kevin Gardner, deputy director of technical services for Cobb County Georgia Department of Emergency Communications, said Cobb County uses most of the same disaster planning methods. He said the PACE model is also used for mapping, and Cobb County also includes ArcGis, a cloud-based mapping solution accessed from the county's dashboard.

Gardner explains that there are multiple plans regarding CAD — specifically the creation of CAD calls for service, assigning appropriate response, updates and closing the record with a disposition. The primary CAD is, of course, at the console. The alternate is the disaster recovery (DR) environment. The DR mirrors everything happening in the primary site so if physical relocation to the DR site is necessary, it can be seamless to continue receiving and processing calls in the CAD. Cobb County has redundant CAD servers, split between onsite and offsite, which allow continued CAD functions if one goes down. The contingency and emergency plan are the statewide WebEOC, an internet-based crisis management system that provides a central location for situation awareness during an incident.

For 9-1-1 and administrative call-processing, Cobb County uses Viper from CISCO (primary), and POTS — plain old telephone system or copper lines — to bypass Cisco during a failure (alternate). If POTS was not a viable option, the plan is for softphones application using a cloud-based solution (contingent). There are also 100 FirstNet phones (emergency). DEC can use these in sequence as needed, or all at once or in any combination required to continue receiving phone calls — both 9-1-1 and administrative. But, said Gardener, "we were an early adopter of Viper 7 and are multi-node, meaning that we have simultaneous systems that are geo-diverse and use redundant communication methods between both sides (primary site and DR site)." As a large center, DEC has a mobile command vehicle, a service often unavailable to smaller agencies. The unit can house six public safety telecommunicators, and all services can be routed to that mobile command center for full function.

Systems Administrator Vaughan Nasse, APCO's 2023 Technologist of the Year, says the last resort is to go 100% analog — paper calls, radio logs, and unit tracking. "In that event, there are 'crash packs' at Cobb which contain everything each position would need to operate on pen and paper," Nasse said. Gardner added that "our greatest technology plan is a well-trained staff." He explained that every stage of contingency requires that the people working these systems understand, at least fundamentally, what is happening and what they need to do in those circumstances.

> **The myriad of systems and programs to consider for any department is contingent on size, location, capabilities expectations of the community and its citizens, as well as those of the responders and their governing bodies.**

On January 4, DEC's UPS and generator didn't play well together during a storm with multiple, consecutive lightning strikes. DEC does load test on its generator quarterly and conducts weekly start/runs. Both UPS and generator were working as they should. Nevertheless, the UPS spiked with each of those lightning strikes. In so doing, the UPS detected dirty power and switched to battery. But the automatic transfer switch (ATS), thinking it had power, did not alert the generator to kick on. This led to UPS battery depletion over several hours. When the final strike on the UPS occurred, battery power was gone. There was a total power loss of eight seconds during the generator startup, and once the generator started, it ran clean power back to the center without loss of services to the community. While the system itself did not work *as usual*, the backup plan for power did — and that is the whole idea.

Lower priority systems not directly connected to citizen and responder safety still need some means of functionality, such as timekeeping and scheduling. As Martini says, Those systems "still impact our employees, and their getting paid is still essential." Gardner says the scheduling software for DEC is cloud based. While the county's timekeeping software is local, in the event of an outage, it is stored and forwarded to the county's servers.

The myriad of systems and programs to consider for any department is contingent on size, location, capabilities expectations of the community and its citizens, as well as those of the responders and their governing bodies. But one thing is certain for all ECCs, disaster is possible and should be planned for. The people, the place and the process (which is largely technology driven) needs serious consideration and pre-planning to ensure systems are viable and working during those events. ●

***Robbie McCormick, MSE, RPL, CPE**, is the Deputy Director of Cobb County Department of Emergency Communications.*

Contributors: *Kevin Gardner, Vaughan Nasse, Sean Craig, Chris Hayes, Andrea Pritchett (Cobb County DEC) and Stephen Martini (Metro Nashville DEC)*

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# CDE EXAM #65184

1. What does the PACE stand for?
   a. Power, alternator, computer, engineered
   b. Plan, accommodate, consider, engage
   c. Primary, alternate, contingency, emergency
   d. PSPA, ASAP, community, employee

2. What is an example of a system that may not be part of emergency response but still essential?
   a. Logging recorders
   b. Timekeeping
   c. Interfaces
   d. Vending machines

3. Project 43 Broadband Implications for the PSAP includes options to increase interoperability for all these systems except _____?
   a. CPE, LMR, CAD,
   b. LMR, CAD, RMS
   c. CAD, RMS, GIS
   d. ECC, PSAP, CAC

4. Which standard defines KPIs for technical systems functionality?
   a. Public Safety Communications Center Key Performance Indicators
   b. APCO KPI Occupational Analysis
   c. Public Safety Communications Key Performance Indicators for Personnel
   d. Core Competencies and Minimum Training Standards for Public Safety Technicians

5. Which standard provides the expected role and responsibility of the agency in preparing and equipping the technician and the center for technology maintenance and disaster planning?
   a. Public Safety Communications Center Key Performance Indicators
   b. APCO KPI Occupational Analysis
   c. Public Safety Communications Key Performance Indicators for Personnel
   d. Core Competencies and Minimum Training Standards for Public Safety Technician

6. What is the DR Environment and what is its function?
   a. Designated response environment — place where the designated response takes place during disaster
   b. Disaster recovery environment — allows data to replicate in a mirrored system
   c. Delayed response environment — location that allows response personnel who are on standby to work in a simulated environment
   d. Disaster reciprocation environment — allows date to reciprocate from a blinded system.

7. What is the most common backup capability larger centers may have that small and medium centers may not?
   a. Cloud based systems
   b. Backup Scheduling Software
   c. Mobile Command Units
   d. DR Sites

8. What is the purpose of "crash packs," and who should have them available?
   a. EMTs — when responding to motor vehicles accidents
   b. Law enforcement officers — when responding to motor vehicle accidents
   c. Public safety telecommunicators — when working without technology and using all paper logs
   d. IT Personnel — when the ECC operations are updating systems

9. What is the name of the amateur radio operating system that can be used should the ECC's entire radio network go down?
   a. Citizens band radio (CB)
   b. Community Broadcasting System (CBS)
   c. Ham radio — Volunteer ham radio operators that are part of ARES
   d. Amateur Radio Club for Government or Independent Services (ArcGis)

10. What were the four listed elements for mapping and GIS using the PACE model of disaster preparedness?
    a. Handheld portables, radio consoles, Google Maps, cloud-based map/location services
    b. CAD, cloud-based map/location services, Google Maps, and map books
    c. CAD, Rapid SOS, RF consolettes, pull-down maps
    d. Cloud-based map/location services, Google Maps, map books, county GIS

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