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MISSION-CRITICAL COMMUNICATION SYSTEMS

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Zetron and Kenwood Deliver Reliability and Support for Narrowbanding

Top: The Tattnall County Judicial Annex in Reidsville, GA.
Above: New display screens at Tattnall County 9-1-1.

Tattnall County Georgia's recently installed Zetron and Kenwood systems have dramatically improved the coverage, reliability and functionality of their emergency communications. Their new Kenwood NEXEDGE® system also ensures that the agency will be able to meet the 2013 deadline for narrowbanding.

When you ask 9-1-1 center directors what they need most from their emergency communications equipment, their answers are so consistent you could bank on them. The first thing they all mention is reliability. Ease of use, interoperability, and good service follow closely behind, not necessarily in that order.

There are good reasons why these criteria are so critical to those who respond to emergencies on a routine basis. When someone dials 9-1-1, it takes reliable, user-friendly equipment to ensure that the call is handled efficiently and help is dispatched quickly to the scene. If an event involves multiple agencies, the equipment must be interoperable so the agencies can talk to and coordinate with each other. And because lives are often at stake, a 9-1-1 center has little tolerance for downtime; equipment problems must be resolved immediately.

This helps explain why Monica Douglas, director of the 9-1-1 center in Tattnall County, Georgia, is so satisfied with the Zetron and Kenwood systems her agency recently installed. According to her, it meets every one of the criteria cited above and has improved her agency's ability to respond to and manage emergencies.

Previous equipment

Prior to the recent project, Tattnall County's emergency communications were severely limited by minimal, aging equipment and a lack of support.

"Their VHF repeaters were old and in disrepair, so their radio coverage couldn't reach the northern and southern ends of the county," says Kurt Henningsen, the Kenwood technician who oversaw the project. "In addition, their existing hybrid dispatch/call-taking system had been purchased over a decade ago. The equipment's poor performance was only getting worse with time, and the support they were getting was atrocious. They'd call with a problem and wouldn't get a call-back for days."

The decision to upgrade

In an effort to solve these problems, Tattnall County decided to upgrade their communications infrastructure and equipment. Kenwood U.S.A. won the project with a proposal based on Kenwood's NEXEDGE® trunked radio system and Zetron's Series 4000 dispatch console system. Once the project had been secured, local Kenwood two-way radio dealer and Zetron reseller, Monroe Communications, was called in to help with the installation and provide ongoing service and maintenance after the initial work had been completed.

Zetron dispatch consoles

The first phase of the project involved installing Zetron's Series 4000 dispatch system, its Model 4020 Common Controller, and three Integrator RD console positions. It was a routine and uncomplicated installation that was completed without any disruption of the 9-1-1 center's operations. And because the system design is so intuitive, the dispatchers were able to learn and transition to it with a minimum of training.

Adding Zetron call-taking

Tattnall County was pleased with their new dispatch equipment — they liked its reliability, ease of use, and the speed with which their dispatchers were able to master it. So when the performance of their ailing 9-1-1 system declined even further, they decided to replace it with Zetron's Series 3300 VoIP Call-Taking system.

"We liked how the Zetron dispatch equipment was performing," Douglas explains. "And having Zetron equipment for both dispatch and call-taking would allow for greater integration and give us one vendor for both systems."

Another problem-free transition

The installation of the Zetron phone system was just as problem-free as the move to their new dispatch system had been. And because the system is so user friendly, the dispatchers were able to learn it easily.

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"They have great coverage with their simulcast-paging and NEXEDGE systems. And they're getting excellent functionality and reliability from their Zetron dispatch and 9-1-1 systems."

Kurt Henningsen, Project Technician, Kenwood U.S.A

PSAP Improves Interoperability with Integrated Zetron-Kenwood Solution

An operator at the Christian County-Hopkinsville ECC works her position.

> ***"The ECC is now a state-of-the-art communication center…We've made a 180-degree turn from where we were before."***
>
> *Randy Graham, Director, Christian County ECC*

The Christian County-Hopkinsville Emergency Communications Center's new integrated Kenwood NEXEDGE® and Zetron radio dispath solution has improved the center's interoperability, radio capacity and ability to respond to emergencies.

Until recently, poor interoperability was a major problem for Christian County, Kentucky. Its public-safety agencies were communicating over a radio infrastructure that one radio technician described as "a hodgepodge of old VHF and UHF conventional repeaters" that didn't allow agencies to communicate directly with each other. And the dispatch consoles in the Christian County-Hopkinsville Emergency Communications Center (ECC) were several decades old, inefficient, unsupported, and cumbersome to use.

These problems were remedied when the center was remodelled and equipped with Zetron's Series 4000 radio dispatch system, and the aging repeaters were replaced with Kenwood's NEXEDGE® digital trunking system.

The results are impressive: Christian County now has a state-of-the art communication center that features a highly integrated, easy-to-use dispatch console system. And its new NEXEDGE system is providing the capacity they need and interoperability that spans three counties.

Christian County, Kentucky

Located in southwestern Kentucky, Christian County covers about 725 square miles and has a population of roughly 80,000. A top producer of wheat, corn, soybeans and tobacco, Christian County is one of the leading agricultural regions in Kentucky.

The Christian County-Hopkinsville ECC

The Christian County-Hopkinsville ECC is the public safety answering point (PSAP) for all of Christian County. It also provides dispatching for the county's fire and law-enforcement departments, emergency medical services (EMS) and rescue squad, as well as most municipal public-safety and law-enforcement agencies in the county.

'Interoperability was a real concern'

Emergency management director, Randy Graham, describes the state of Christian County's emergency communications before the new equipment was installed.

"Each agency had its own repeater frequency," he says. "Some were on UHF, and some were on VHF, so interoperability was real concern. The only way these agencies could communicate with each other was to funnel messages through our dispatch center."

"For example," Graham continues, "an officer at the scene of an accident might need to communicate with EMS. The officer would have to provide information about the accident to the dispatcher, who would then convey it to EMS. The dispatcher might get more information from EMS and then have to relay it back to the officer…and so on. This left a lot of room for critical information to be lost or altered, and it affected the timeliness and effectiveness of our response. It was also a real nightmare for our dispatchers."

Another issue was that their conventional radio system was being used to capacity. "This created serious problems when many officers or fire fighters were trying to use a single channel at the same time," says Graham.

A 20-year-old dispatch system

The communication center's dispatch system was also way out of date. According to Kenwood technician Kurt Henningsen, who managed the project for Christian County (and the project for Tattnall County, which is also featured in this issue) the dispatch equipment was about 20 years old – ancient by public-safety standards. "The manufacturer stopped supporting it years ago," he says.

A total overhaul

When funds became available, Christian County decided to update and overhaul their communications center and radio infrastructure. They approached Kenwood U.S.A. to see what solutions they could offer.

Kenwood responded with a quote that initially included their analog MPT trunked radio system. This plan was altered when a better option became available.

"When Kenwood came out with NEXEDGE," says Henningsen, "we went back to the county and told them we have a new digital product that's secure and better than any analog trunking format that's out there. So they chose to go with it."

In addition to the NEXEDGE system, the solution for Christian County would include:

- Zetron's Series 4000 dispatch system with Model 4048 Common Controller
- Four Zetron Integrator RD consoles
- 16 Zetron Intelligent Radio Interface Modules (iRIMs)
- 30 Kenwood NX-800 digital mobile radios.

The iRIMs and Kenwood radios would connect the dispatch consoles to the NEXEDGE system.

Linked by microwave

The project implementation began with the NEXEDGE system.

"We installed a prime NEXEDGE site on top of hospital in Hopkinsville and installed two outlying sites on water tanks at the southern and northern ends of the county," says Henningsen. "We chose water tanks as sites because they're built to withstand the most severe weather, including tornados. The three sites are linked by microwave."

At the same time, the center remodel was also underway.

"We gutted the center and moved operations to a temporary location in a trailer at the back of their building," says Henningsen. "Then I put the Series 4000 together. Once it was commissioned and ready, I set up the workstations in the mobile location and brought the dispatchers in for training. They all took to it like ducks to water. We completed the training, went on the air, and turned off the old system. Later, when the remodelled room was finally ready, it was just a matter of moving one console at a time into their new location."

A 180-degree turn

The combined Kenwood-Zetron solution is providing the capabilities Christian County was seeking and more. The new equipment not only supports interoperability within the county, but across two adjacent counties as well. In addition, the trunked system has improved their radio capacity because its talkgroups allow many users to communicate over assigned channels simultaneously.

"The ECC is now a state-of-the-art communication center," says Graham. "Everything is integrated onto the console, which is much better for our dispatchers; they love the system's ease of use. With our improved interoperability, agencies can talk directly to each other instead of relaying information through the dispatchers. And we are no longer exceeding the system's capacity. We've made a 180-degree turn from where we were before."■

Series 4000

Communications Control System

The Series 4000 is designed for medium-sized communications centers. In addition to exceptional reliability, it offers easy programming and economical upgrades.

The Series 4000 includes:

- Support for multiple trunked radio formats/protocols.
- Integrated instant-recall recorder that captures radio traffic on each channel.
- P25 compatibility and interoperability.

Featuring three styles of operating positions and two common controller sizes, the Series 4000 can be scaled to accommodate from 2 to 48 channels and from 1 to 16 operator positions.

Is P25 Secure Enough for Public Safety?

A group of experts recently addressed questions that have arisen concerning whether P25 is secure enough for public safety. Their conclusions should be reassuring to P25 users.

A white paper published in August 2011 by the University of Pennsylvania created a stir in the public-safety community—especially among those who have an interest in Project 25 (P25) standards and the systems that employ them. An exploration of the controversy and an important discussion it stimulated between an author of the white paper and public-safety professionals revealed that the paper left out several critical details pertinent to P25. Comparing the intentions of the white paper to the goals and intentions of P25 produced a conclusion that should be reassuring to the public safety community, especially those using or considering a move to a P25 system. However, the white paper did reveal an issue unrelated to P25 that deserves the attention of P25 users.

The white paper

The controversy began with the publication of a white paper entitled "Why (Special Agent) Johnny (Still) Can't Encrypt: A Security Analysis of the APCO Project 25 Two-Way Radio System." The paper, which was critical of the security features in P25 radio systems, was widely publicized by the public-safety communications media. Its criticisms of P25 caused many in the field of public safety to become concerned about whether P25 systems are secure enough to be used by the nation's public safety agencies.

Why these questions matter

The questions the paper raised are significant to public safety for a number of reasons. Project 25 open standards were developed in response to interoperability problems with proprietary radio systems. As a result, there has been a major effort underway in recent years to encourage public-safety agencies to adopt equipment that supports P25 and the interoperability it offers. Many public-safety agencies are at some stage of moving to P25 or plan to do so in the near future. Clearly, it was important to determine whether there was any validity to the white paper's criticisms of P25 security and to do so quickly.

Addressing the issues

The issues presented in the white paper were taken up in mid-October 2011 at the quarterly meeting of the Telecommunications Industry Association (TIA) Land Mobile Radio (LMR) Engineering Committee TR8—the committee responsible for publishing the standards used by P25. One of the authors of the white paper, Professor Matt Blaze, was invited to present his findings to the committee.

The lively discussions that accompanied Professor Blaze's presentation clarified the intent of the white paper and brought to light some of its misconceptions. The discussion also illuminated how and why some of the paper's conclusions are not applicable to most P25 users.

Participants noted that, for one thing, the white paper was written for the highly scientific and technical international cryptographic community and delivered to the 20th USENIX (the Advanced Computer Systems Association) Security Symposium. It was neither intended nor written for those in the field of public safety. According to Professor Blaze, the role of the symposium proceedings was to find faults in security protocols that fall short of the most rigorous cryptographic best practices. Thus, the white paper's findings were based on the highest levels of security, such as those used by the National Security Agency/Central Security Service (NSA/CSS), an agency that is responsible our nation's most secure communications.

The goals of P25

Another issue was that the white paper made little if any mention of the goals of P25 that prohibit its design from meeting the requirements that pertain to top-secret communications systems. Several TR8 members pointed this out and explained the difference between the interoperability goals of P25 and the security requirements of highly sensitive communications. Their discussion included the following:

- The primary goal of Project 25 is operability within an agency and interoperability between agencies. This stresses the importance of getting a message across rather than preventing it from being intercepted by eavesdroppers. As a result, P25 includes provisions that allow radios to receive both encrypted and non-encrypted traffic so users without encryption keys and those whose encryption keys have expired can still communicate. Defeating encryption might allow a criminal to avoid arrest. But applying defense-grade security to public-safety communications would make it more difficult to communicate and thus more dangerous for responders.
- The FCC Part 90 rules dictate licensed narrowband communications for public-safety land mobile radio (LMR). This prevents P25 from using more-easily encrypted schemes such as spread spectrum.
- The mission-critical nature of public-safety communications means that the traffic must be subject to minimum delay. It also means that users must be able to enter a conversation quickly when they switch to a channel. These requirements prevent the implementation of some cryptographic best practices.

Is P25 secure enough? Yes!

The discussion went on to consider all of the points the paper raised, including whether P25's intentional design mean that it's not secure enough for public safety.

The conclusion was (as it has always been) that the security of P25 is indeed sufficient and appropriate to its goals, mission and intended application— local public-safety agencies. However, everyone agreed that paper did reveal one valuable piece of information that public-safety agencies should attend to. Too often, P25 users unintentionally transmit secure traffic over non-secure—or clear—channels. This is due to factors such as improper radio programming, improper key management, a lack of user training, and radio user interfaces that are not user friendly or intuitive.

These factors fall outside of the purview of the P25 standards. But as a result of the white paper, many agencies have reprogrammed their radios and have implemented new procedures to help ensure that sensitive traffic is not transmitted over non-secure channels. ■

Open Standards and Why They Matter

The world of public safety is facing some robust challenges. Budgets are shrinking even as the demand for more and better services is growing. And agencies are under increasing pressure to be able to interoperate and communicate with each other when events span agencies or jurisdictions. Indeed, a lack of interoperability was cited as a main reason for critical communication failures that occurred in the wake of Hurricane Katrina and during 9/11. Interoperability is a now typically required in order for new radio equipment to qualify for state and federal grant monies.

Open standards (such as those developed by APCO P25 primarily for the U.S. and Canada, and Terrestrial Trunked Radio Association [TETRA] and the DMR digital radio standard, which were developed primarily for countries outside of the U.S. and Canada), offer clear and viable solutions to these problems.

What are open standards?

Open standards are a set of agreed-upon industry protocols that manufacturers of public-safety equipment can use in their radio products. Products that utilize open standards protocols can interoperate with each other, even if the products are from different vendors.

The problem with proprietary equipment

Proprietary equipment—that is, equipment that does not use open standards—may not support interoperability. A customer who buys a product based on proprietary protocols may be limited to using the same vendor's offerings for any other equipment that must interoperate with the original product.

So, for example, a public-safety agency that selects a proprietary radio network might also have to buy that same vendor's dispatch system, whether they want to or not. This can prevent the agency from being able to pick the system that's best suited to their needs and budget. By comparison, equipment based on open standards is designed to give customers freedom in their choice of equipment, which in turn, promotes healthy competition, fair pricing, and innovation.

Zetron's support for open standards

For all of the reasons mentioned above, Zetron has been long-time advocate of open standards, and many Zetron dispatch products are designed to support them. The following Zetron systems support open standards:

- MAX Dispatch
- Acom EVO Advanced Communication System
- Series 4000 Communication Control System
- DCS 5020 Digital Console System

For more information about Zetron systems that support open standards, visit www.zetron.com.

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> ***"Tattnall never calls me about anything. When you're a technician who installs complex systems like these, the absolute best thing you can hear from your customers is nothing."***
>
> *Kurt Henningsen, Project Technician, Kenwood U.S.A*

"If you sit a dispatcher down in front of the Zetron call-taking system and explain how to use it, 15 minutes later she'll be operating it like she's been doing it all her life," says Henningsen.. "That's one of the things I like so much about the system — it's just so easy to use."

Moving to NEXEDGE

The Kenwood NEXEDGE trunking system that would replace Tattnall County's old radio infrastructure would be an IP-based, multi-site radio network linked by microwave. In addition to greatly improving Tattnall County's radio coverage and interoperability, it would also support narrowbanding. This would ensure that Tattnall County would be able to meet the 2013 deadline by which all public safety agencies must be using narrowbanding.

Simulcast paging

Henningsen says that a new simulcast paging system was a particularly unique and important aspect of the project. "I installed a four-site simulcast paging system that's wireline-controlled directly off of Zetron's Series 4000 dispatch system," he says. "So in addition to their extended radio coverage, Tattnall County 9-1-1 would have county-wide paging as well."

Above and beyond the call of duty

The upgrade of Tattnall County's communications infrastructure and equipment has been completed, and Douglas and Henningsen are both happy with the results.

"I don't work at a console that often," says Douglas, "but if I'm needed, the equipment is so easy to use that I can jump in and work with it immediately with no problem at all."

Douglas also has high praise for the way the project was handled. "I really appreciate how Kenwood and Kurt Henningsen addressed our needs," she says. "They went above and beyond the call of duty. And the local radio dealer they brought in – Mike Monroe of Monroe Communications – is so helpful. I couldn't ask for better. I'd give him a raise!"

'The best thing you can hear... is nothing'

Henningsen says the Tattnall County 9-1-1 no longer needs him. "They have great coverage with their simulcast-paging and NEXEDGE systems," he says. "And they're getting excellent functionality and reliability from their Zetron dispatch and 9-1-1 systems. Everything is running well and doesn't ever break, so Tattnall County never calls me about anything. When you're a technician who installs complex systems like these," he adds wryly, "the absolute best thing you can hear from your customers is nothing."■

IWCE
February 22 - 23, 2012 | Las Vegas, NV

Western Regional APCO
February 29 - March 2, 2012 | Anchorage, AK

APCO Australasia
March 12 - 14, 2012 | Queensland, Australia

Missouri NENA
March 18 - 21, 2012 | Lake Ozark, MO

ZETRON FACTORY TRAINING

MAX Dispatch (2 days)
March 7-9, 2012

Series 4000 (2.5 days)
March 20-22, 2012 May 15-17, 2012

Series 3200 (2.5 days)
April 16-18, 2012

Series 3300 (2 days)
April 19-20, 2012

Please contact Zetron before scheduling factory training as dates are subject to change.

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