GULF COAST DIGS OUT FROM HURRICANE KATRINA WITH HELP FROM THEIR WIRELESS COMMUNICATIONS

TETRA/VIDA NETWORK SOON TO BE AVAILABLE TO INTERNATIONAL MARKETS

NEW YORK STATE CHOOSES VIDA NETWORK FOR ONE OF THE LARGEST PUBLIC SAFETY WIRELESS COMMUNICATIONS SYSTEMS IN U.S.

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It’s all about saving lives

For those in public safety, critical communications are about saving lives, whether in response to local incidents or wide-spread regional emergencies. Hurricane Katrina cut a swath over two hundred miles wide as it moved inland, knocking out power to hundreds of thousands across three states. Fortunately, search and rescue and other emergency efforts are now able to draw on nationwide – if not worldwide – resources. The 304th Rescue Squadron shown above illustrates the point. Based in Portland, Oregon, the 304th is part of an Air Force Reserve team credited with saving 1,040 lives in the aftermath of Katrina.

Access to such diverse and far-flung resources is a tremendous help to those in need. But it nonetheless places an additional burden on critical infrastructure that must have the capacity and capability to support the communications these additional responders require. As told in our Katrina story (page 7), M/A-COM communications systems in the region proved equal to the task.

Our cover story (next page) shows how the State of New York is taking the next step in critical communications with its new SWN (Statewide Wireless Network). SWN is a local/state partnership that leverages the capabilities of M/A-COM’s VIDA network technology for a wide-area wireless communications network able to link together every public safety agency, regardless of size or budget. SWN marks the beginning of a new era in critical communications and further supports those whose job is to save lives. ■
New York State launches bold new era in statewide public safety wireless communications

IP-BASED VIDA NETWORK SELECTED FOR FLEXIBILITY, LOWEST COST/PERFORMANCE RATIO AND ENVIRONMENTAL SENSITIVITY IN NEW STATEWIDE PUBLIC SAFETY WIRELESS NETWORK

In September 2005, then New York State Chief Information Officer James T. Dillon announced that the design and construction of the state’s new public safety radio network, designated SWN (Statewide Wireless Network), was set to begin.

The New York SWN will be based on M/A-COM’s VIDA network platform and represents one of the largest statewide public safety communications projects in U.S. history. Valued at approximately $2 billion, the 20-year contract calls for the design, deployment, operation and maintenance of the network in partnership with the New York State Office for Technology (OFT).

In a statement released on Sept. 22, 2005, the New York State CIO’s office said that “SWN will be the first comprehensive upgrade to many of the state’s emergency radio systems in more than 30 years.” The objective is for the network to be used as a public safety radio system that will provide essential connectivity to enable on-demand and real-time coordination of police, fire, emergency medical, volunteer and other necessary response services on a day-to-day as well as emergency basis.

An escalating need, aging infrastructure
As detailed in an OFT report, the idea for a statewide network grew from an initiative
that began in 1996 within the State Police, which was anxious to upgrade its aging analog land mobile radio system. Replacement parts were no longer available and interoperability, especially in crisis situations, was non-existent.

By the late 1990s, the OFT had determined that “given the aging condition of all State agency communications systems, it would be more appropriate and cost effective to develop a modern, digital radio system to serve all State agencies.”

Following this determination, the Statewide Wireless Network Project was established in 2000 by Governor George Pataki to meet a number of key objectives. These objectives included the implementation of a common communications platform for public safety and public service agencies statewide; enhanced interoperability between state and local agencies, especially during emergencies; the encouragement, through partnerships with local agencies, of enhanced communications functionality and economics of scale in the construction of the network; and the ability to accommodate both voice and data where required.

With extensive input from the state’s first responders, including state, local and federal agencies, the OFT developed a set of functional specifications, issued a Request for Proposal, and began the careful process of evaluating the responses.

In announcing the resultant contract in September, 2005, CIO Dillon said, “The awarding of the Statewide Wireless Network contract to M/A-COM and its team of partners is the culmination of a multi-year effort to ensure our State’s public safety officials have access to the most reliable and effective communications necessary to protect themselves and our citizens.”

New York State Police Superintendent Wayne E. Bennett added a sense of urgency to the announcement. “In the aftermath of numerous natural disasters, emergencies and September 11th, as well as the need to plan for future emergencies, the need for a modern emergency radio communications system has become even more acute. From the standpoint of the State Police, it cannot happen soon enough,” Bennett said.

Technical flexibility and choice indispensable to success
Also stated in the CIO’s report was the fact that M/A-COM was judged to have the most technically and financially superior plan. Given the state’s size, geographic diversity and the number of users operating legacy systems on different frequency bands over a variety of wireless technologies, achieving both technical and financial superiority is no mean feat.

New York’s IP-based Statewide Wireless Network provides access to multiple airlink technologies and frequencies. This allows the most cost-effective and performance-enhancing technologies to be used wherever required within the network. In addition to multiple radio technologies, seamless access is also provided to IP network-based peripherals and software applications.
within a single network is no mean feat.

“That it can be done at all is testament to the flexibility of M/A-COM’s VIDA network architecture,” said Skip Funk, director, strategic programs for M/A-COM.

There are a number of factors that contribute to New York’s need for great flexibility, Funk said. One is adequate coverage. “The state encompasses more than 49,000 square miles with a varied terrain ranging from the Atlantic Coastal Plain of New York City and Long Island to the high peaks of the Adirondacks, Catskills and Taconic Mountains.”

Availability of frequencies and signal propagation is another element demanding flexibility. VHF does a better job in meeting coverage requirements in areas of rugged, thickly forested terrain. Yet 700 and 800 MHz are desirable in the more densely populated areas. “Ideally, the state would have the option of using any bands available to meet specific needs,” said Funk.

Still another factor is the need to provide immediate interoperability with legacy systems of differing types and frequencies. This includes Federal and state agencies as well as local governments. “Clearly, an IP-based interoperability solution such as NetworkFirst— which has been designated as a qualified anti-terrorism technology under the Department of Homeland Security’s SAFETY Act—is ideal for this role,” Funk said.

Local/state partnerships become cornerstone

Perhaps the most flexible requirement of all lies in the nature of the partnership between the state and local governments. “While SWN was initiated to replace aging state agency systems alone, fostering voluntary partnerships with local governments to address their communications needs has become a cornerstone of the SWN Project,” said the state in a recent CIO news release.

“The state is actively encouraging local government participation, which is voluntary and subject to each jurisdiction’s own needs,” said Funk. According to the OFT, the SWN Advisory Council and other “outreach activities” are used to identify and address local government needs. To this end, the OFT says that partnering opportunities include, but are not limited to:

• Full system integration—Adoption of SWN as the partners’ operational radio communications network. Components may include sites, frequencies, training and maintenance.

• Interfaces/gateways—Operation of an interface or gateway between the partner and SWN. This includes design, development and operations of technical system interfaces to achieve interoperability.

• Infrastructure—Collaboration and cooperation in the development of the partner’s independent communications network, with no integration of the actual radio networks or systems.

The OFT says that the basic plan is for the state to make the state infrastructure available at no charge. Local jurisdictions can then set up the level of partnership they want and can afford. “This allows great freedom of choice for each agency, and makes it far easier for the local governments to plan for their current as well as future needs,” says M/A-COM’s Funk.

Freedom to mix and match technologies makes SWN possible

In the past, the ability to offer a range of partnerships based on disparate technology to such a diverse group would have been extremely difficult, if not impossible. John Vaughan, M/A-COM vice president and general manager, explained why.

“Until the development of M/A-COM’s VIDA network, users generally had little choice but to select a single technology and frequency band for their critical wireless communications. That choice required many compromises on coverage, features and cost,” said Vaughan.

While all radio system designs must contain a certain degree of compromise based on specific priorities, the larger the system, the more difficult the situation tends to become. “As we move to IP-based, network-centric communications, it becomes much easier to scale a network to encompass a state, a region, or even the nation. But that only works if the infrastructure is based on an open architecture that accepts multiple applications and technologies,” Vaughan said.

For New York’s SWN and even larger networks, such as the proposed Federal network, the freedom to mix and match technologies and accommodate them all on a single network is essential.

“Doing things the old way, with proprietary technologies and without cross-band interoperability, many of New York’s local agencies would have been locked out of the
network until they could scrap and replace their existing radios and system. Obviously that would be an expensive, and ultimately unworkable, process,” Vaughan said.

**SWN technology choices**
The technology choices available for the Statewide Wireless Network include:

- 700/800 MHz integrated voice and data and four times the capacity per frequency pair through the use of TDMA (OpenSky).
- Increased in-building penetration and coverage extension through the use of mobile systems (OpenSky V-TAC).
- Improved coverage in difficult terrain using VHF overlays and voice/data interoperability with Federal systems (P25IP).
- Immediate voice interoperability through the use of NetworkFirst.
- Connectivity to IP-based peripherals and applications.
- A clear migration path to future IP-based technologies.

**Cost and environmental sensitivity**
In addition to meeting the needs of a disparate group of public safety agencies across a wide geographic area, New York’s SWN must, in the OFT’s words, “provide a network that is affordable for taxpayers.” At the same time it must minimize the proliferation of towers.

“New York’s SWN will achieve both these goals through a combination of careful planning and technology options,” said Funk. The planning aspect involves the establishment of a site hierarchy that would minimize the number of towers required by providing an alternative to the use of many uncoordinated, separate radio systems.

“We’ll use collocation on existing sites as much as possible, and when that is not feasible we can use low-impact ‘cell sites.’ These compact sites are housed in small, weather resistant equipment shelters mounted on poles with whip antennas and greatly increase coverage in sensitive areas,” Funk said.

In addition to leaving a much reduced environmental “footprint,” cell sites don’t require large access roads designed for heavy equipment during installation and maintenance. This reduces costs dramatically and causes less disruption to the environment.

Ultimately, said Funk, the biggest cost-savings for taxpayers will likely be due to two factors: the sharing of towers, land, and equipment for the statewide infrastructure; and the savings to local governments through the protection of their investments in existing radios and systems.

“With a VIDA network, every agency, big or small, can plan its migration to the statewide network at a rate commensurate with its needs and budget,” said Funk.

“In addition,” he added, “state and local agencies can be assured that their investment in infrastructure will be protected over the long term through our commitment to open architecture design and the use of industry standards.”

Current plans are for the total project to be deployed on a regional basis over approximately 58 months. The network will be scaled to serve up to 65,000 users and 250,000 pieces of equipment.

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**SWN MISSION STATEMENT**
From the New York Statewide Wireless Network Home Page

“The mission of the Statewide Wireless Network (SWN) is to develop and implement an integrated statewide wireless radio network to provide a common communications platform for State public safety and public service agencies, and enhance interoperability.

- The network will include local governments at their option.
- The SWN will encourage partnerships with local governments to enhance communications and achieve economies in network build out.”

In addition to the Mission Statement, the OFT web site (www.oft.state.ny.us) contains general information, project information, scheduling, and Frequently Asked Questions. The site is operated and maintained by the New York State Office for Technology. More information may be obtained from the website or the Statewide Wireless Office at 518-474-9112.
When Hurricane Katrina struck the Gulf Coast on the morning of August 29, 2005 the destruction extended far beyond the city of New Orleans. Over 200 miles of Gulf shoreline experienced severe winds and storm surge not seen since Hurricane Camille in 1969. And Katrina was much worse.

According to the National Oceanographic and Atmospheric Agency (NOAA), “almost total destruction was observed along the immediate coast in Hancock and Harrison Counties [Mississippi], with storm damage extending north along bays and bayous to Interstate 10.”

In fact, the storm’s track to the east of New Orleans placed the most destructive northeast quadrant squarely over the Gulf region between Waveland and Ocean Springs, Mississippi where the highest storm tide was recorded at 13.26 feet above the low water reference point. And that wasn’t even peak high water – NOAA’s sensors at Ocean Springs, Biloxi and Waveland all ceased transmission during the storm and did not record the maximum storm surge, estimated by FEMA to be between 20-30 feet.

While residents and public safety officials across the area braced for the assault, those responsible for critical communications in the area went through their checklists. As Telecommunications Specialist for the Harrison County Emergency Communications Commission (911 Commission) Gil Bailey put it, “When the situation is at its worst, we have to be at our best.”

“WHEN THE SITUATION IS AT ITS WORST, WE HAVE TO BE AT OUR BEST”
Gil Bailey, Telecommunications Specialist, Harrison County, Mississippi

“WITHIN NEW ORLEANS, THE ONLY PUBLIC SAFETY RADIO SYSTEM OPERABLE IN KATRINA’S IMMEDIATE AFTERMATH WAS THE CITY’S 800 MHZ [EDACS] NETWORK.”
Nick Tusa

More than 20 systems across tri-state region receive full attention
With more than 20 M/A-COM communications networks ranging from private industry, Federal government and numerous state and local public safety agencies (see chart) in use across the region, Katrina had the company’s full attention.

“We maintained an emergency hurricane call-center with a dedicated customer hotline that was staffed 24 hours per day, 7 days per week since the day before the storm hit and for two weeks after. The call center was then reestablished for Hurricane Rita, which thankfully for all concerned was less destructive,” said Rob Nosenzo, director of
field services for M/A-COM. Ultimately the response center was to field in excess of 2,000 calls and ship out more than 10,000 pieces of equipment in support of emergency communications in the region.

In addition to the response center, local support personnel had been dispatched throughout the area. “We didn’t have to send people from our Lynchburg, Virginia offices,” said Nosenzo. “Between our

### M/A-COM SYSTEMS IN THE GULF

The overwhelming majority of systems spread across the Gulf Coast experienced little or no damage and provided support for search and recovery efforts.

<table>
<thead>
<tr>
<th>CUSTOMER</th>
<th>USERS</th>
<th>STORM DAMAGE</th>
<th>REPAIR STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALABAMA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile County</td>
<td>Sheriff’s dept.</td>
<td>Operational with minor damage (one misaligned microwave dish)</td>
<td>Dish realigned, fully operational within 72 hrs.</td>
</tr>
<tr>
<td>City of Montgomery</td>
<td>Police, Fire, EMS</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Morgan County</td>
<td>Police, Fire, EMS</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td><strong>MISSISSIPPI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harrison County</td>
<td>Police, Fire, EMS</td>
<td>Operational with minor damage (misaligned dish; damaged tower; damaged generator)</td>
<td>All damage repaired, fully operational within 48 hrs.</td>
</tr>
<tr>
<td>Jackson (City)</td>
<td>Police, Fire, EMS</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Jackson (Airport)</td>
<td>Security &amp; ground operations</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Dept. of Corrections (3 prisons)</td>
<td>Security</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Green County</td>
<td>DOC prison security</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Noxubee County</td>
<td>Sheriff’s office</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Mississippi State University</td>
<td>Security &amp; operations</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td><strong>LOUISIANA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Orleans</td>
<td>Police, Fire, EMS</td>
<td>Operational during storm, sustained late damage to primary site generator due to debris, reducing performance to 10%. Two secondary sites lost power due to flooding</td>
<td>Repair crews available but denied access for 72 hrs. Once access granted, primary site restored to operation within 12 hrs; remaining two sites restored by 9/12</td>
</tr>
<tr>
<td>New Orleans Airport</td>
<td>Security &amp; ground operations</td>
<td>No damage but operated in failsoft mode due to loss of N.O. Police Dispatch Center control point.</td>
<td>Full operation restored by 9/12.</td>
</tr>
<tr>
<td>BASF (commercial)</td>
<td>Security &amp; operations</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>NASA (St. Michoud)</td>
<td>Security &amp; operations</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Point Coupe</td>
<td>Police, Fire, EMS</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>St. Tammany Parish</td>
<td>Police, Fire, EMS, public works</td>
<td>Operational with minor damage from flooding (T1 connection)</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Avoyelles Parish</td>
<td>Police, Fire, EMS</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Ft. Polk</td>
<td>Base security/operations</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Iberville Parish</td>
<td>Police, Fire</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
<tr>
<td>Louisiana State University</td>
<td>Security &amp; operations</td>
<td>No Damage</td>
<td>Fully Operational</td>
</tr>
</tbody>
</table>
maintenance centers and dealers we already had a contingent of local technicians and engineers who were familiar with the systems and experienced in this kind of threat.

Initial reports from customers and field personnel were encouraging. “We were all relieved when early indications were that our systems were continuing to operate as designed across the region. But we knew that with a storm of that size, sooner or later there were bound to be problems and we had to be ready for them,” he said.

When trouble did come it was generally minor, with just a few incidents (3) of microwave antennas being blown out of alignment due to the high winds. The single exception to the good news for M/A-COM customers was the City of New Orleans – and even that had begun well, according to independent radio engineering consultant Nick Tusa, of Tusa Consulting Services, headquartered in Metairie, Louisiana.

New Orleans communications withstand initial impact

“Within the New Orleans vicinity, the only public safety radio system operable in Katrina’s immediate aftermath was the city’s 800 MHz trunked radio network,” said Tusa, who had been the design consultant for the New Orleans system back in 1991. He had also designed many of the other EDACS networks in use throughout the Gulf region.

Tusa knew the system was still operating because he called the New Orleans Fire Communications Dispatch Center at approximately 10 a.m., near the height of the storm. Tusa, who had evacuated his family to Jackson and later to Nashville, Tennessee, had called because he was concerned about his clients.

“I was surprised to have my call to the affected area answered on just the second ring,” he said. The communications supervisor there told him that all was well, the city’s 800 MHz radio network was fully functional, and that radio calls were being placed to units throughout the city.

Unknown to either man at the time was that a backup generator located on the top of a 42-story downtown office building had sustained damage to its radiator from wind-blown debris. The radiator soon lost its coolant. “Unfortunately,” said Tusa, “it later automatically shut down and communications within the area immediately ceased.”

Tusa also learned later that day that two Members of the Mississippi Army National Guard, 890th Engineering Battalion, help clear roads in hard-hit Pass Christian, Miss. on Sept. 8, 2005.

“WE HAD SEAMLESS INTEROPERABILITY WITH EVERY GROUP OR AGENCY THAT CAME DOWN TO HELP, INCLUDING STATE, LOCAL AND FEDERAL AGENCIES.”

Gil Bailey

“WE MAINTAINED AN EMERGENCY HURRICANE CALL CENTER THAT WAS STAFFED 24/7 SINCE THE DAY BEFORE THE STORM.”

Rob Nosenzo

Rob Nosenzo
nearby, non-M/A-COM systems had also suffered damage. One, in neighboring Jefferson Parish, had sustained a critical self-supporting tower collapse, and the State Police site in nearby Bridge City had flooded. As a result, both of these systems were off the air, further compromising communications efforts within the immediate area.

For those in New Orleans, conditions were to get much worse as breached levees flooded the city and made rescue and recovery operations a nightmare. “The City’s August 28th mandatory evacuation order applied to all area residents and visitors, including M/A-COM’s radio service engineers and field-service technicians,” said Tusa. The consequence of this evacuation order, though understandable and necessary, was to have a major impact on the restoration of the city’s critical radio communications in the hours and days ahead.

Meanwhile, St. Tammany and Harrison Co. maintain critical communications

In stark contrast to the deteriorating conditions faced by New Orleans in the storm’s aftermath, the St. Tammany Parish and Harrison County (Miss.) communication networks were battered and bruised, but not out.

In St. Tammany Parish, Louisiana, which lies just north of New Orleans across Lake Ponchartrain, the Sheriff’s Office has operated a 5-site, 8-channel simulcast network since 2001. In addition to the Sheriff’s Office, the EDACS network serves a mix of city police departments, fire, public works, emergency management and one state agency.

As Katrina swept through on the morning of August 29th, the St. Tammany Parish Sheriff’s Office system operated at nearly full capacity throughout the crisis, providing uninterrupted radio communications to more than 1,600 users across the parish.

“We lost one site that had been connected via a leased T1 line due to flooding. However, because of the site’s location, it did not cause much of a problem,” said Mike Boyet, manager, Radio Maintenance Division, St. Tammany Parish Sheriff’s office. It was the only public link used in the system and has since been replaced with a microwave link that was, ironically, scheduled to be installed just about the time Katrina came through.

In addition to their regular users, the system served as a backup for the City of Slidell, which had also suffered damage. “We lost one site that had been connected via a leased T1 line due to flooding. However, because of the site’s location, it did not cause much of a problem,” said Mike Boyet, manager, Radio Maintenance Division, St. Tammany Parish Sheriff’s office. It was the only public link used in the system and has since been replaced with a microwave link that was, ironically, scheduled to be installed just about the time Katrina came through.

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Harrison County anchors recovery with uninterrupted communications

“While this emergency has been truly catastrophic for our community, we believe that the situation would have been even more dangerous had our first responders and other public safety officials not had access to consistent, uninterrupted radio communications capabilities throughout the initial ordeal and continuing today,” said Telecommunications Specialist Bailey.

The Harrison Co. simulcast EDACS network consists of three 20-channel and two 10-channel sites stretching along the coast from Biloxi west through Gulfport and Long Beach to Pass Christian. The network, which grew from a two-site system originally installed for the City of Gulfport in 2001 and expanded countywide in 2003, serves a mix of law enforcement, fire, emergency medical, emergency management and public utility services.

“The system performed extremely well during and after the storm,” said Bailey, though two problems had been encountered. “One of our microwave links became misaligned due to the high winds” [recorded by NOAA at a steady 140 mph with gusts to 185 mph]. Fortunately, the towers themselves had been constructed to withstand 150 mph (with ice) winds, and all five remained undamaged during the storm.

The other problem occurred at the county’s western dispatch center in Pass Christian. “They were the hardest hit,” said Bailey. “The site was totally destroyed, and we lost the 911 dispatch, our radios and consoles. All personnel had been evacuated prior to the storm and the impact was minimal, however, and communications continued over mutual aid channels.

Because of the county’s planning and foresight, both problems were quickly resolved.

“Second, it was properly installed. The build-out was up to specifications and all the little details were done right. And finally, the system has been well maintained with upgrades to hardware and software on a continuing basis. We don’t let things deteriorate and we constantly test and re-test,” Boyet said.

800 additional radios aid response and recovery

Anticipating the need for communications with many first responders from outside the region, Bailey and his team had preprogrammed 1,000 LIDs [Logical IDs] into their network for emergency use when the system was originally set up.
“We have just over 3,000 radios in daily use,” said Bailey. “Because we had set aside these emergency LIDs, it was relatively simple to immediately expand the number of users we could accommodate. Following the storm we added a total of about 800 radios. M/A-COM and Patterson Communications and Electronics, our local dealer and maintenance contractor, helped us program the radios with the LIDs we had set aside.”

The extra radios were handed out at the county’s unified command post as volunteers from “Canada to Florida” came to assist in recovery operations. While these extra EDACS radios were a tremendous help in maintaining communications among outside responders, Bailey is adamant about the importance of interoperability regardless of the frequency, make or technology of the radios used by these groups.

“Certainly it is easier if your neighbors have the same kind of radios and use the same frequency as you do. The Florida Department of Law Enforcement is a case in point. But we also had seamless interoperability with every group or agency that came down to help, including state, local and Federal agencies,” he said.

Like the St. Tammany Parish Sheriff’s Office, Harrison Co. recorded a tremendous increase in push-to-talks (PTTs) as volunteers joined first responders in the days and weeks following the storm.

“Our network generally records about a million PTTs per month. But in the first two weeks after the storm we logged 2 million PTTs, with minimal queuing time,” said Bailey. That rate continued for the entire month of September.

Bailey attributes the success of the Harrison County system in dealing with the extreme conditions of Hurricane Katrina to the same basic elements defined by Boyet in St. Tammany: original design; implementation; and first-class maintenance.

Factory and local support invaluable

In addition to design, implementation and maintenance, all of the critical communications systems throughout the Gulf Coast region had the support of M/A-COM and the company’s network of trained local dealers and representatives.

“Not only has our M/A-COM EDACS system held up to the extreme conditions brought about from Katrina, but the technical support and rapid response of the M/A-COM team has been tremendous,” said Bailey. “With their assistance, we were able to easily reprogram other EDACS radios to expand the reach of our network and to communicate with the various agencies that came to our aid. We are grateful to M/A-COM and its dealers in the local area for helping us with a vital aspect of our emergency response.”

A young boy is lifted to safety from the child’s flooded home in New Orleans.

The pararescue team is from the 38th rescue Squadron based at Moody Air Force Base, Ga.
Cost effective migration to newer technologies is major issue for utilities

WITH A MAJORITY OF PRIVATE WIRELESS NETWORKS APPROACHING THE END OF THEIR USEFUL LIFESPAN, UTILITIES TODAY ARE SEEKING REPLACEMENTS THAT WILL DELIVER THE PERFORMANCE THEY NEED AT A REASONABLE COST. M/A-COM’S TOM HOYNE, DIRECTOR, UTILITY MARKET, EXPLAINS THE ISSUES.

Editor: Interoperability, control, standardization and spectrum efficiency are major issues currently influencing critical wireless communications decisions for Federal agencies and public safety. Are these same issues having a similar impact on the utility industry?

Hoyne: Yes, but to different degrees. The need for spectral efficiency is common to all, because spectrum is a limited resource. Interoperability is important to utilities because, even though they may not always be among the first tier of responders in an emergency, they are usually involved immediately following any disaster. As we saw on the Gulf Coast in 2005 and in Florida in 2004, the hours and days following an emergency are critical. The restoration of power and other utility services becomes a top priority and requires coordination and communications with local law enforcement, Federal agencies and the National Guard. These natural disasters as well as the 2003 power-blackout in the Northeast underscored the importance of private critical communications networks that don’t become overloaded with traffic or go off the air just when they’re needed most. It’s difficult to go about the job of restoring power to your customers when your crews can’t talk to each other. The ability to control access, network configurations and peripherals like back-up power and network connectivity can only be ensured by a private network.

Standardization may be of less direct concern to most utilities, but they are certainly interested in multiple sources of procurement and other associated benefits that contribute to a lower total cost of ownership.

Editor: Are there additional issues specific to the utilities?

Hoyne: Definitely. The old circuit-switched private wireless network technologies are now 15 or more years old. Support from the manufacturers is waning. A major issue for many utilities today is the need to cost effectively migrate their existing 800 and 900 MHz systems to newer technology, and IP/packet-switched networks are quickly becoming the preferred platforms. The key phrase here is cost effectively, because the industry is facing rising costs almost across the board and its communications solutions must be considered in the long as well as short term.

Editor: What are the essential elements of a cost effective migration?

Hoyne: In general, you would want to ensure that you can maintain control over your own wireless network while:

• Retaining and getting more out of your existing frequencies - more voice and/or data capacity
• Retaining the use of existing radio sites with minimal requirement for new sites
• Migrating as the budget allows with little or no sacrifice in coverage or function during the process
• Assuring that the chosen technology path leverages the benefits of the rapidly advancing IT industry
• Ensuring that an upgrade in the private wireless system doesn’t force a costly upgrade somewhere else at the utility, such as with new data applications, etc.

Editor: How has M/A-COM addressed these requirements?

Hoyne: By providing an easy migration path from existing trunked networks to our packet-switched, 2- or 4-slot TDMA network, OpenSky. OpenSky uses the same channelization as a utility’s existing 800 or 900 MHz channels. It employs stations and radios in the same power class to minimize the need for additional sites. The EDACS IP Gateway allows existing EDACS customers to migrate to OpenSky as their budget allows, while the “hybrid” nature of the network during the process is transparent to users. Migration can occur on a site-by-site or even channel-by-channel basis. OpenSky is an extremely flexible solution, and in fact, utilities currently using other manufacturers’ radio systems can also transition to OpenSky in pretty much the same way.

Editor: So it’s a migration solution for any utility with an older trunked system, not just those with EDACS?
Hoyne: That’s right. In fact, we’ve just signed a contract with a utility to migrate them from another manufacturer’s older trunked system to OpenSky.

Editor: If a user elects to migrate an EDACS network on a channel-by-channel basis, won’t he need two radios for the duration of the transition?

Hoyne: No. We’ll soon be introducing multi-mode radios for the transition between EDACS and OpenSky. Since the radios are software controlled, you can purchase the features and modes you need to accomplish your migration now, delete what you don’t need later and/or add new features. This will allow users to transparently roam between systems with the same radio and will obviously lower ownership costs because you won’t need a transitional radio. There’s no waste with a software controlled multi-mode radio.

Editor: Isn’t there another private TDMA technology available in the market today?

Hoyne: Yes. There is a carrier-based TDMA product that’s been around for about 12 years. The carrier who is its primary user has just been purchased, and, as a result, the longevity of the platform is in question. The economic imperatives of today’s utilities dictate that a private system have a useful lifespan of 15 years or more, and the likelihood of the other TDMA technology being supported by its manufacturer for 27 years is remote.

Editor: How does migration to OpenSky affect a system’s coverage area?

Hoyne: In general, the digital “footprint” of a standard 75W OpenSky repeater station on an existing tower site will be slightly smaller than that of an analog system it might replace. But three distinct features of OpenSky work together to mitigate the issue. First, OpenSky operates in either 2-slot or 4-slot TDMA on 800 MHz and in 2-slot TDMA on 900 MHz. So any working channel will provide either a 2:1 or 4:1 gain in capacity, thus freeing up channels that are now not needed at the site. Second, there is no dedicated control channel on OpenSky. Control is accomplished with an embedded “microslot” on EACH channel. That means you have now freed up yet another channel at the site. Finally, the OpenSky product line includes the unique OpenSky Cell Site, a single-channel, 25W, low-profile site that is weather-tight and mounts on any utility pole. Cell Sites can be easily placed to fill in any coverage holes that develop as a result of migration, and they can use the extra channels that have become available through TDMA. As a result, one should be able to avoid having to acquire new high-profile tower sites to maintain his prior coverage.

By comparison, the other private TDMA technology uses tower repeaters that only run about 40W. And ALL of their radios have an output of only 0.6W instead of the 3W portables and 15W mobiles on an OpenSky network. The result is that OpenSky has a significant coverage advantage over the other TDMA format.

Another way to economically extend or fill-in coverage is with our V-TAC (Vehicular Tactical Repeater), a specialized full duplex vehicular solution that extends portable coverage to mobile coverage without user intervention.

Editor: What other advantages are there to an OpenSky migration?

Hoyne: Certainly one of the biggest advantages is the functionality afforded by an end-to-end IP network and all that goes with it:

1 Lower backhaul bandwidth over a utility’s existing packet-switched IP infrastructure. A single-channel site (equivalent to a 5-ch trunked 800 MHz EDACS site) requires only a couple of DSOs [Digital Switching Oscillators] for connectivity to the network.

2 Every powered device on the network is addressable through its distinct IP address, whether a repeater station, radio, tower-top amplifier, console or whatever. That means virtually anything can be programmed remotely with password-protected access. Very powerful.

3 The OpenSky VIP Console – a “console-on-CD” that turns any reasonably equipped PC with access to the utility’s Ethernet into a dispatch console or virtual control station (without the antenna and RF capacity required by a traditional control station).

4 A choice of full-featured IP consoles by various manufacturers that can be implemented anywhere access to the IP network is available.

5 On-demand scalability. There is virtually no limit to the number of IP addresses that can be added.

6 The use of IT industry-standard servers and routers which handle OpenSky’s switching needs. This helps keep hardware costs down and ensures that the network will stay current over the years.

7 Interoperability Gateway cards – each with its own IP address (naturally!) – provide the interface to legacy trunked talkgroups and/or conventional channels on other LMR systems. Once all your communications are on the IP network, you have direct access to any IP-based peripheral devices or applications, no matter where they may be on the network.

For more information about migration solutions for utilities, contact Tom Hoyne at 434-455-9288; boyneto@tycoelectronics.com

“The economic imperatives of today’s utilities dictate that a private system have a useful lifespan of 15 years or more.”
TETRA/VIDA Network adds advanced IP functionality and open architecture to international standards offerings

Regardless of the existing legacy system, a clear, step-by-step migration path to a TETRA/VIDA IP network allows professional mobile radio (PMR) system users to mix and match technologies for maximum flexibility, performance and lowest total cost of ownership.

As announced at the TETRA World Congress in Frankfurt on November 28, 2005, M/A-COM will be supplying TETRA network solutions to the worldwide critical wireless communications market.

“With the addition of TETRA to our VIDA Network suite of supported air interface protocols, international customers now have a clear and easily executed migration path to digital TDMA, open-architecture-based IP networks and the next generation of PMR technologies,” said Dennis Martinez, vice president, technology for M/A-COM.

TETRA (TErrestrial Trunked RAdio), an ongoing TDMA-based trunking standard under development by the European Telecommunications Standards Institute (ETSI) for more than a decade, is one of several radio standards available to PMR users in Europe and Asia.

Among other advantages, TETRA (as well as a new digital narrowband standard used in the US and gaining interest in

Migration to TETRA and advanced IP technologies via a VIDA Network

A TETRA/VIDA network is secure, transparent to the user, easily scalable and allows access to multiple frequencies and air link protocols such as TETRA, digital narrowband, and other existing (and future) technologies. Add hybrid data and IP-based applications when and as required.

Legend:

- Tower
- Console/Dispatcher
- Users (mobiles & portables)
- Voice/Data Switch
- IP Console
- Hybrid Data
- IP-based Applications
Europe) provides improved interworking by specifying the interfaces between critical components and peripheral devices, such as the air interface used between radios and systems.

“Wireless standards are important for users, especially those in public safety, and M/A-COM fully supports the worldwide standards effort,” Martinez said. However, as users worldwide contemplate the migration from older, often proprietary radio systems to new, standards-based systems, there are many decisions to be made.

**Immediate, cost-effective transition with future in mind**

“Worldwide, those responsible for public safety and service need to be able to communicate, at all levels, with neighboring agencies and jurisdictions operating on separate radio systems,” said Robert Jastram, business development, international markets for M/A-COM. “But it will take many years before every user, from local to regional to nationwide, can realistically be expected to replace their legacy radio system with a new one. So the question is, how do you provide voice interworking immediately, and at a cost that can be borne by even the smallest agencies, while simultaneously planning a migration to TETRA or a digital narrowband standard?”

The answer, says Martinez, is a hybrid network using IP technology in addition to traditional radio technology. “It’s only natural for radio people to think in terms of radio solutions to whatever problems they may have. But there is a hybrid solution. By converting voice calls from legacy radio systems into IP packets and sending them through a secure, public-safety-grade IP network, we can connect voice calls from any radio system and provide interworking between different radio technologies. It’s a proven technology that exists today. You don’t need a whole new radio system to get seamless voice interworking.”

The IP-based voice network can be established at a reasonable cost with the addition of a single voice/data switch, a voice gateway for each radio system within a region and an IP-based console that allows digital dispatching.

Just as important, with a VIDA Network the investment in the IP network infrastructure for voice interworking becomes the framework for migration to a full TETRA system. “Nothing is lost,” said Jastram. “The VIDA Network provides a clear migration path to all the existing - and future - features of TETRA, while simultaneously providing a more complete access to other types of radio systems, regardless of frequency or air interface. In addition, it allows the seamless use of IP-based peripheral devices and applications while providing a migration path to future technologies now under development.”

**Radio technology becomes an application on the network**

The overwhelming majority of public safety organizations in the world today have an IP-based enterprise network connecting all of their fixed resources. VIDA is M/A-COM’s architecture for a wireless network that leverages that infrastructure by integrating the radio system with the organization’s existing local or wide-area network.

“The radio system then becomes another IP-based application running on the network,” explains Martinez. “With the result being that whatever resources are available to those in the organization’s fixed environment are also available to the mobile environment. And vice versa.”

Another key advantage of a VIDA Network is the unprecedented flexibility it allows in the choice of technologies used in the wireless network. The State of New York, which recently announced a US $2 billion contract for a statewide wireless communications network that will ultimately connect 65,000 users, will employ VIDA architecture in its Statewide Wireless Network.

“One reason for the state’s selection of the
VIDA network was its ability to allow the use of multiple frequencies – 700 MHz, 800 MHz and VHF – where required for coverage and availability, " said Martinez. "This allows New York State to mix and match frequencies – and air interfaces if required for interoperability with legacy systems – to specific regions. By selecting the most cost-effective technology for each region, the state can greatly reduce their costs over time."

The same ability to mix and match technologies and frequencies, all while providing an easy migration path to future developments, makes the marriage between a TETRA system and a VIDA Network practical and extremely cost effective, notes Jastram. "In a region such as Europe, which is comprised of many political jurisdictions and levels of government, flexibility and security are paramount. Interworking between these various groups and jurisdictions needs to be under supervision and control in order to prevent chaos. While direct radio-to-radio communications is important, only a network-based communications system can provide the necessary control over who is talking to who, and when," Jastram said.

**IP and open architecture address critical issues**

As many in public safety and service are aware, there are several IP-based TETRA offerings currently available. "But," Martinez cautions, "not all IP-based TETRA solutions are the same. M/A-COM's is the only end-to-end, open-architecture IP solution, and by that I mean that our IP network design is based on public, not proprietary, protocols. It's a true client-server environment, identical to that used in enterprise networks."

This is important because even though other solutions use IP in elements of their design, they are nonetheless limited in their ability to connect with other IP-based products and applications. "On a TETRA/VIDA Network, virtually any IP-based hardware, application, or peripheral device can be connected," said Martinez.

In such a network, physical location no longer matters to accessibility. If a resource is on the network, it is available to whoever has a need and permission.

"But to be seamless," added Martinez, "the information from many, often third-party, applications needs to pass freely across the network. That requires open architecture throughout the network design."

Again, cost is also a factor. Non-proprietary, open protocols allow the use of industry-standard components, routers and servers throughout the network. Often called COTS (Commercial Off-The-Shelf) equipment, these components are typically low in cost and high in performance because of their worldwide acceptance on a vast scale. Furthermore, COTS equipment is continually being upgraded due to a continuing investment in research and development.

In the end, the user can only gain from the hybridization of their radio system and a secure, public-safety-grade IP network.

"M/A-COM pioneered the use of IP-based wireless radio systems in 1995, and our record has shown that we are committed to providing clear, easy migration to future technologies and features. The TETRA/VIDA network solutions we offer today continue that tradition by offering increased design flexibility, enhanced security and protection of our customer's investment in infrastructure over time," said Martinez.

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The TETRA/VIDA Network solution provides a clear migration path to all the existing – and future – features of TETRA.”

Robert Jastram

For more information, contact Robert Jastram at jastramr@tycoelectronics.com.
NetworkFirst designated as Qualified Anti-Terrorism Technology

In August, 2005, M/A-COM announced that its NetworkFirst Land Mobile Radio (LMR) interoperability solution became the first and only LMR technology to be officially designated as a Qualified Anti-Terrorism Technology under the Department of Homeland Security’s SAFETY Act. The SAFETY (Support Anti-terrorism by Fostering Effective Technologies) Act of 2002 provides liability limitations for “claims arising out of, relating to, or resulting from an act of terrorism” where qualified anti-terrorism technologies have been deployed. This designation provides significant protection to M/A-COM’s customers, vendors, partners, suppliers, subcontractors – and M/A-COM itself – in the event of a lawsuit as a result of a terrorist attack or event. The designation is retroactive to July 4, 2002, ensuring that existing NetworkFirst systems are covered under the SAFETY Act.

California utility selects OpenSky

The Sacramento Municipal Utility District (SMUD), a California publicly-owned electric utility, recently announced the selection of OpenSky to provide voice and data communications for its mobile work force. The digital 900 MHz OpenSky TDMA network will supply integrated wireless voice and data communications throughout SMUD’s service territory. SMUD is the nation’s sixth largest community-owned electric utility. The company generates, transmits and distributes electric power to a 900 square-mile service area that includes more than 550,000 customers throughout the City of Sacramento, Sacramento County and portions of Placer County.

U.S. Navy chooses P25IP and NetworkFirst

M/A-COM has been awarded a follow-on contract by the US Army’s APM LMR office to provide a fully interoperable radio network for the United States Navy. The NetworkFirst and P25IP network will provide full interoperability for one of the first joint tri-service (Army, Navy & Air Force) Land Mobile Radio (LMR) Systems in the United States. The Phase II contract will link the critical communications systems of approximately 3,000 Army base personnel in 11 separate Army installations in the Joint National Capital Region (J-NCR). The J-NCR is part of the Navy’s ELMR (Enterprise Land Mobile Radio) program. When completed, Phases I (also P25IP and NetworkFirst) and II will link nearly 30 Department of Defense installations (17 Navy installations, 11 Army bases and Bolling Air Force Base), interoperating with more than 100 entities across the region. The system will provide base radio communications for many thousands of DoD users while facilitating interoperable communications with civilian public safety agencies located in Maryland, Virginia, New York and Pennsylvania.

First OpenSky network for public safety goes online

Officials in Cumberland County, Pennsylvania recently announced the transition of its police, fire and EMS agencies to a new public safety radio system based on M/A-COM’s OpenSky technology. OpenSky is based on Internet Protocol (IP) technologies that will seamlessly connect the County’s first responder and other public safety agencies while providing flexibility and scalability for all applications, including voice, data messaging and file transfers. The new network also provides a path towards interoperability with the Pennsylvania Statewide OpenSky Radio System network which is currently in deployment. In addition, the new network enables the County’s public safety agencies to communicate in one talk group at an incident scene to further ensure the safety of both officials and citizens in both small- and large-scale emergency situations. The County’s municipal police departments switched to the new system in early December, while fire and EMS departments are expected to transition to the system soon.

New Hampshire Fire Department increases coverage, reliability

The Salem, New Hampshire Fire Department has successfully implemented a customized, two-site simulcast M/A-COM radio communications network. The new system consists of a conventional two-site simulcast system, which includes two MASTR III Base Stations. The new network will increase safety and efficiency of firefighters by giving them dependable communications through their portable radios. A spokesman for the Salem Fire Dept. said the goal was to increase radio coverage and communication reliability and to ensure that all Salem firefighters are able to communicate with the dispatch center and the other firefighters on the scene.

New Training Center Catalog and Schedule now available online

The 2006 Training Center Catalog and schedule for classroom and online training is now available online. Some of the highlights include Web-based training to provide initial or refreshers training on the functions, features and operation of radios and dispatch consoles. Also added to the training schedule are a series of both administrative and maintenance courses for P25 trunked and conventional customers.

More information is available at www.macom-wireless.com/training, or through the Training Center Manager at 1-434-455-9469.
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