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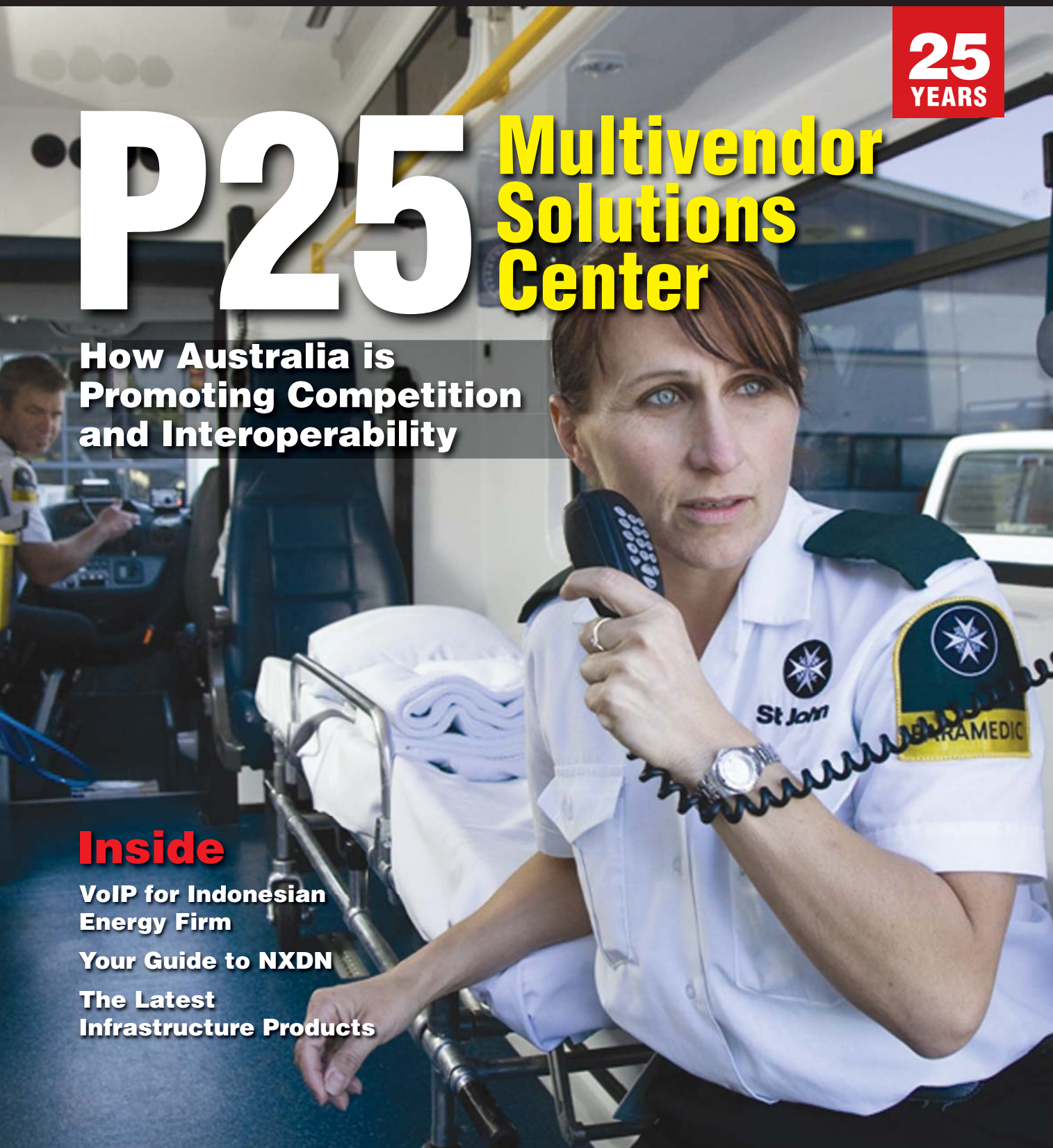

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GENERAL DYNAMICS

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The Rise of Standards

The main reason for technology standards is to ensure that products from one vendor work with products from another vendor. Not that long ago, a mission-critical communications user had to buy an entire system from one company to ensure everything would work together seamlessly. Times have changed, and standards for mobile radio technology have given users more options when buying systems.

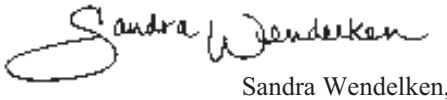
However, even within each standard, problems with one product from vendor A working with another product from vendor B arise. This is true across all standards — TETRA, Project 25 (P25), NXDN, Digital Mobile Radio (DMR) and others — and I hear the case-by-case stories from our readers. Several recent initiatives are helping resolve some of those issues, and manufacturers are doing a better job of working with their counterparts to ensure true interoperability among products.

Our cover story discusses a new center dedicated to the P25 standard and ensuring that products are compatible. The center also allows users and potential customers to test drive systems and features before they buy. Considering the cost of mission-critical communications networks, this is a positive step for buyers. In the United States, the federal government set up the Compliance Assessment Program (CAP) to ensure interoperability among the various P25 vendors. Users can track online which vendors have complied with the detailed testing required under the program, and manufacturers post documents outlining their specific product verification.

DMR vendors have been verifying interoperability between different DMR products from various vendors for several years. In fact, the DMR Association awarded the world's first DMR Tier 3 interoperability certificate following formal standardized tests of DMR Tier 3 infrastructure as we went to press. TETRA and other standards groups undergo similar interoperability testing.

We value your opinions! Please email your feedback to me at swendelken@RRMediaGroup.com.

Of course, a byproduct of guaranteeing that products from different vendors work together is better price competition. Prices come down with a level playing field, and that's good for buyers as well. The industry is on a strong path for standardization and product interoperability, and this bodes well for the long-term viability of the industry as well as offers numerous benefits for mission-critical communications users.



Sandra Wendelken, Editor
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RadioResource INTERNATIONAL

RadioResource International delivers wireless voice and data information for mobile and remote mission-critical operations for professionals who reside or do business outside the United States and Canada. The magazine covers private and trunked mobile radio, wireless data, location technologies, public safety communications, microwave radio, satellite, paging/messaging, remote monitoring, and other wireless applications. Editorial content is international in scope and encompasses emerging technologies, industry reports and trends, innovative applications, product information and comparisons, news, standards, and troubleshooting tips.

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RadioResource International (ISSN 1080-3025) is published five times a year in the United States. It is circulated free, by name and title, to personnel responsible for purchasing, recommending, specifying or managing equipment and services for radio communications systems outside the United States and Canada. Canadian Post Publications Mail Agreement No. # 40065056. Canadian Return Address: DP Global Mail, 4960-2 Walker Road, Windsor, ON N9A 6J3.

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APCO Partners with TETRA Group on Broadband

The Global Alliance of the Association for Public-Safety Communications Officials (APCO) and the TETRA + Critical Communications Association (TCCA) announced they will work together to support the U.S. Public Safety Communications Research (PSCR) laboratories.

The Third Generation Partnership Project (3GPP) is the body developing the Long Term Evolution (LTE) standard. The primary purpose of the affiliation is to make certain that the 3GPP and other standards bodies are informed about the needs of the world's public-safety agencies for LTE standards.

Earlier this year, PSCR staff asked for TCCA help to add public-safety LTE requirements through the 3GPP standards process. PSCR representatives were having a difficult time convincing the 3GPP standards groups that LTE would be a standard for public-safety communications outside the United States. Phil Godfrey, chairman of TCCA, wrote a letter from TCCA to 3GPP officials, supporting the U.S.-based request for public-safety standards for LTE.

"PSCR representatives are aware of the fact that 3GPP is not interested in one-off special requirements for just one country, even if it's as big as the U.S.," Godfrey said. "They asked if there was any chance that we could support the request. I was quite happy to write that letter, and it's an important piece of functionality for the standard. The TCCA support made a big difference in how 3GPP supported the request. It was a demonstration that to get changes to the LTE standard, we must demonstrate a worldwide requirement."

"The Global Alliance and the TCCA believe that the research being undertaken by the PSCR on public-safety communications is critical to identifying the needs of the public-safety community for LTE and therefore fully supports the efforts of the PSCR to have these needs recognized by standards bodies," said APCO President Gregg Riddle.

"The Global Alliance and the TCCA believe that the formation of new affiliations, such as theirs, will produce the combined expertise and influence necessary to increase the awareness for the world's public-safety agencies to have access to LTE, through a level of collaboration, cooperation and coordination between agencies, their bureaucracies and governments — in conjunction with the private sector — on a scale not seen before."

SEOUL, South Korea — Cassidian, an EADS company, and the Korean equipment manufacturer **Asia Pacific Satellite communications Inc.** (APSI) started pre-interoperability (IOP) tests between TETRA networks from Cassidian and TETRA Enhanced Data Services (TEDS) modems from APSI. The cooperation aims to develop TETRA- and TEDS-enabled modem products that address the critical data transfer needs of a range of industries.

The companies also expanded their existing partnership in developing TETRA terminals to include TEDS technology and data-oriented products for stationary applications, such as smart grids, supervisory control and data acquisition (SCADA) systems and sensor networks.

"The expanded collaboration between Cassidian and APSI underlines Cassidian's commitment to creating an effective and diverse TEDS ecosystem," said Jean-Marc Nasr, head of secure communications solutions at Cassidian.

"Our cooperation will foster the growth and development of the TEDS market both in Korea and on a global scale," said Ryoo Jang-soo, CEO of APSI.

SONDERBORG, Denmark — Siemens Communications, Media and Technology (CMT) and **Damm Cellular Systems** agreed to cooperate on integrated TETRA solutions. The partnership will support the growth of Siemens CMT's worldwide activities with access to the Damm TETRA platform.

Through the partnership, Siemens CMT obtains access to the TetraFlex product program for the seamless integration with its own solutions, including command-and-control applications and professional communications networks within global industries, such as oil and gas, energy, rail and air transportation.

"Our initial research placed TetraFlex at the very top of the list," said Mohammad Vizaei, head of secured networks and applications, Siemens CMT. "Intensive testing in close cooperation with Damm confirmed our first conclusion."

ZURICH, Switzerland — ABB signed an agreement to acquire **Tropos Networks**. The value of the deal was not disclosed.

Tropos will become part of ABB's global Utility Communications product group, which centers on fixed-wire and radio solutions. The combined business will provide customers and partners with a solution for flexible, private distribution area communications networks supported by ABB's global network of customer services. ABB's customer base, which includes the energy, transportation and mining sectors, will offer new geographic and vertical market opportunities for Tropos products.

Tropos will continue to operate and develop new products from its U.S. location. As part of ABB, Tropos will

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add additional engineering, sales and support resources over time. The current leadership team will remain in place, said Tropos officials.

ROME — Selex Elsag completed the first phase of corporate reorganization, under which Elsag Datamat and Selex Communications merged to form a single company. The corporate integration process is still in progress and will result in a unified Selex.

EUROPE

NEWCASTLE UPON TYNE, United Kingdom — TETRA + Critical Communications Association (TCCA) formed the Critical Communications Broadband Group (CCBG) to drive the development and adoption of common global mobile broadband standards for users who operate in a mission-critical or business critical environment.

The CCBG will also work with the TCCA's Spectrum Group and Public Safety Communications (PSC) Europe to lobby for appropriate harmonized spectrum in which to deploy critical broadband services and applications.

Sepura Diversifies with 3T Communications Acquisition

Sepura acquired 3T Communications, an Austrian supplier of TETRA infrastructure. The acquisition gives the U.K.-based TETRA handset manufacturer a play in the TETRA infrastructure market. 3T Communications designs and implements small- to mid-size TETRA systems predominantly for customers in the commercial sector. This business segment is increasing as the worldwide TETRA market develops beyond its public-safety origins, Sepura officials said.

3T Communications' customer base is primarily European focused, and Sepura expects to generate synergies through a combination of engineering design improvements and strong supply chain management.

"In acquiring 3T Communications we have underlined our ambitions to grow and diversify the business," said Gordon Watling, Sepura CEO. "We are very familiar with 3T Communications' product portfolio and management team through our existing partnership and see this acquisition as an exciting opportunity to provide our customers with the end-to-end communications solutions they need. Our two organizations target the same markets, have the same technical skill set, and most importantly, are an excellent cultural fit as we are both very quality oriented with a complementary customer base."

Sepura will continue to support existing partners and respect current supply relationships, company officials said.

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The first elected chair of the CCBG is independent consultant Tony Gray of P3 communications. Elected vice chair of the CCBG is Emmanuelle Villebrun from the French Ministry of Interior.

"By bringing together all interested parties, irrespective of their current chosen technology, the CCBG is taking the lead in gathering the requirements for future critical communications broadband services," said Gray. "We will look to build and strengthen relationships with influential organizations around the world, such as the North Atlantic Treaty Organization (NATO), International Union of Railways (UIC), European Utilities Telecom Council (EUTC) and the National Public Safety Telecommunications Council (NPSTC) …"

The new working group's goal is to enable all mission-critical and business-critical users to access their information systems, intranet and Internet at broadband speeds using professional mobile devices wherever they are and whenever they have the need. The broadband capability should meet the specific needs of the user in the same way that critical voice and narrowband data services are delivered by technologies such as TETRA, Tetrapol, Project 25 (P25) and others, group officials said.

"In Europe there is a law that says if you run a train that crosses international borders, it must have GSM-R technology, but GSM won't be around a great deal longer, so it's sensible for UIC to be looking to replace GSM-R," said Phil Godfrey, chairman of TCCA. "EUTC is also looking at broadband technology and attended."

Attendees at the first CCBG meeting included representatives from industry standards and regulatory bodies, manufacturers, user organizations and governments. All are members of the TCCA. Representatives from the U.S. National Institute of Standards and Technology (NIST) and the Third Generation Partnership Project (3GPP) systems Architecture Group attended as guests.

BAD MUNDER, Germany — Hytera Mobilfunk in Europe broadened its product range with Digital Mobile Radio (DMR) systems as well as digital and analog terminals. In addition, the company's location in Bad Munder is being expanded to become the European subsidiary of Hytera.

Hytera purchased the Rohde & Schwarz professional mobile radio (PMR) business last year.

In addition to the Rohde & Schwarz TETRA radio system, the company is now offering conventional DMR Tier II systems and trunked DMR Tier III

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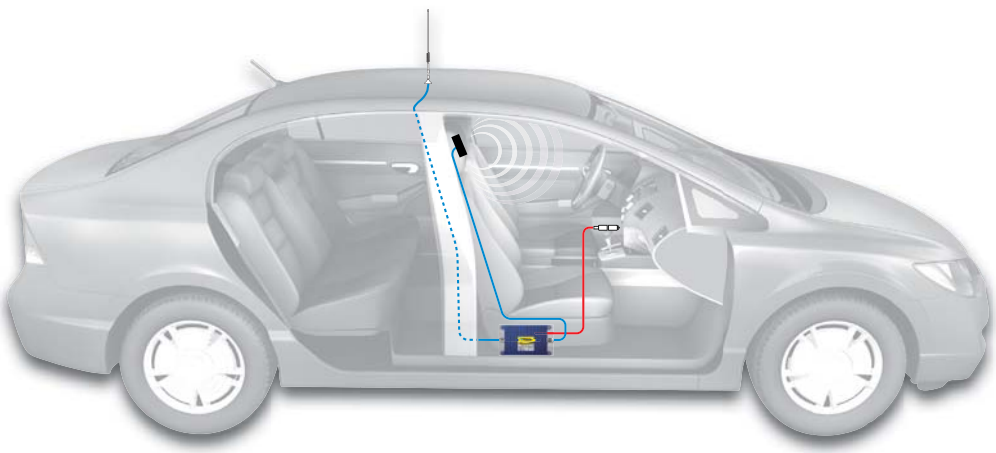

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solutions. Furthermore, the product portfolio was supplemented by digital and analog handheld and mobile radios manufactured by Hytera.

Hytera Mobilfunk will develop its established TETRA radio system further at the Bad Munder location. It will be a competence center for future TETRA and Long Term Evolution (LTE)-based broadband solutions. In Europe, Hytera Mobilfunk will be responsible for sales and marketing, as well as for the maintenance and repair of the entire product range of Hytera.

MILAN, Italy — Damm Cellular Systems was selected to supply the TETRA communications infrastructure covering the entire province of Lombardy, Italy. The network, supplied during the coming four months, is specified for the use of the public-safety services in the region including Milan, the regional capital.

The network is contracted to include more than 100 base stations and a total of more than 60 command-and-control centers. The region is one of the most densely populated areas in Italy with a population of more than 1.3 million in the city of Milan.

IDSTEIN, Germany — Energy utility company RheinEnergie selected **Motorola Solutions** to upgrade and expand its Motorola TETRA digital radio system in Cologne. Motorola will upgrade the network to its latest platform and enhance system resilience with additional redundant elements.

RheinEnergie's TETRA digital two-way radio network has 21 available frequencies and a public trunking license. This enables the utility to expand the network to external subscribers and its cooperative partners. The Municipal Public Order Office of the city of Cologne, the municipal water treatment works of Cologne and the Ford car plants use the network.

HANOVER, Germany — Sepura's German partner Selectric Nachrichten Systeme was awarded a contract for 7,200 Sepura TETRA radios by the Federal State of Lower Saxony. Fifteen out of 16 German states and federal authorities have awarded contracts for procurement of radios for BOS-net, the nationwide German TETRA network.

MIDDLE EAST

RIYADH, Saudi Arabia — Harris received an order valued at more than $8 million to provide the Ministry of Health of Saudi Arabia with a public-safety communications system to support EMS across the western region of the country. The order was received from Saudi Ericsson.

Harris will deliver a Harris Project 25 (P25) system, as well as mobile and portable radios. The new P25 system complies with both the current P25 Phase 1 standard and the emerging P25 Phase 2 industry standards.

AMMAN, Jordan — The Jordanian government awarded **Thales** the extension contract of the nationwide TETRA communications network. In 2006, the group was selected to supply the nationwide TETRA network.

The Jordanian national network aims to provide Jordan Armed Forces, public safety, police security agencies and the civil defense with a reliable, secure and easy-to-use communications system. With more than 160 base stations and 30,000 users, the fully distributed TETRA network will be in operation by the end of 2012.

The multiagency network will integrate the air-ground-air (AGA) communications feature, making Jordan one of the first nations in the Middle East region with the capabilities. Communications between aircraft and ground users will increase the services provided to citizens. Equipped with a distributed architecture and an IP routing capability, the network functionality enables users across different organizations to operate on the same network.

DUBAI, United Arab Emirates (UAE) — Cassidian signed its first contracts for the delivery of the new TH1n pocket-fit TETRA radio. Atlas Telecom from UAE, VIRVE Products and Services from Finland, and the Swedish Civil Contingencies Agency (MSB) confirmed orders for the radio. Cassidian will start deliveries at the end of 2012.

"Such a product will make our nationwide Rakel network interesting to new segments such as administrative officers of governmental organizations, who will clearly benefit from a shared public-safety network and have been looking for a small and lightweight product," said Stefan Kvarnerås, director of Rakel/TETRA business at the Swedish Civil Contingencies Agency.

PEOPLE

CAMBRIDGE, United Kingdom — Sepura appointed


Steve Chamberlain

Steve Chamberlain as chief financial officer (CFO). He has more than 15 years' experience in the technology sector, including time in practice at BDO Stoy Hayward, Arthur Andersen and Deloitte.

LONDON — David Townsend joined **Analysys Mason** as partner. Townsend will be responsible for shaping and developing the U.K. team at Mason, a division of Analysys Mason specializing in information communications technology (ICT) for the public and enterprise sectors. He previously worked for Mott MacDonald and brings more than 20 years of experience.

A Global Call for Data

Photos courtesy IIR Telecoms

By Michelle Zilis

Long Term Evolution (LTE) seems to be the technology of choice to deliver data for mission-critical users, but limitations in spectrum are prohibiting immediate deployment. TETRA technology offers some data with the TETRA Enhanced Data Service (TEDS), but for many, as one user put it, "TEDS are too little, too late."

Repeatedly users spoke at the 2012 TETRA World Congress about the need to incorporate broadband services into their communications systems. The challenges inherent with delivering broadband, mainly spectrum, were also repeatedly addressed during the three-day conference in Dubai, United Arab Emirates (UAE) in May.

Everyone agreed that the TETRA market for mission-critical voice is strong and will remain so well into the 2020s. "TETRA will remain the technology of choice for mission-critical voice," said TETRA + Critical Communications Association (TCCA) Board Member Jeppe Jepsen.

The TETRA Association recognized the data evolution when it changed the association's name to TCCA, and the World Congress is following suit. Next year the event will expand and be renamed the Critical Communications World.

Capt. Mohammed Alkhanbashi, Abu Dhabi Police, said his agency needs more data, faster transitions and a more robust wireless network that TETRA can't support. The agency's TETRA system supports more than 16,000 voice users. The original network's transition plans included TEDS and then migrating to an LTE system. But TEDS is likely not sufficient to meet its needs, he said. "LTE is moving from a 'might have' to a 'must have,' " he said.

"We are very happy with TETRA for voice, but it doesn't meet our requirements for data," said Brigadier Eng. Ali Salem Al Henzab, director of the Telecoms Department, Qatar Ministry of Interior (MOI). Qatar is working with Portalify to develop a mobile data platform to bring LTE and Qatar's nationwide TETRA network together.

One challenge for vendors is how to meet the coverage and requirement needs of a mission-critical system over an LTE network. "LTE today is a commercial technology; our challenge is to make it a mission-critical technology," said Eric Davalo, chief technology officer (CTO), Cassidian.

But the largest challenge is securing harmonized spectrum to support broadband applications. Countries and regions are in varying stages in terms of spectrum allocations.

During the World Radiocommunications Conference 2012 (WRC-12) a request from the Middle East/Africa subregion resulted in the allocation of the frequency band 694 – 790 MHz in Region 1 to mobile services and to identify it for international mobile telecommunications (IMT).

"This gives the opportunity for personal protection and disaster recovery (PPDR) to make use of this band and for it to be harmonized with the U.S.," said TCCA Chairman Phil Godfrey. "I understand that public-safety agencies in parts of the Middle East and Africa are already looking to use this for PPDR. We hope that we can encourage the European regulators to follow suit."

In Europe, PPDR spectrum will be discussed in 2015 and is considered a "policy objective." Realistically, mission-critical data won't be available until after 2020, said Hans Borgonjen, senior coordinator, Vts Politie Nederlands.

A spectrum conference in Asia saw difficulties for harmonized spectrum. Regulators are more inclined to promote economic growth using the spectrum, said Jolly Wong, chief technical engineer, Hong Kong Police.

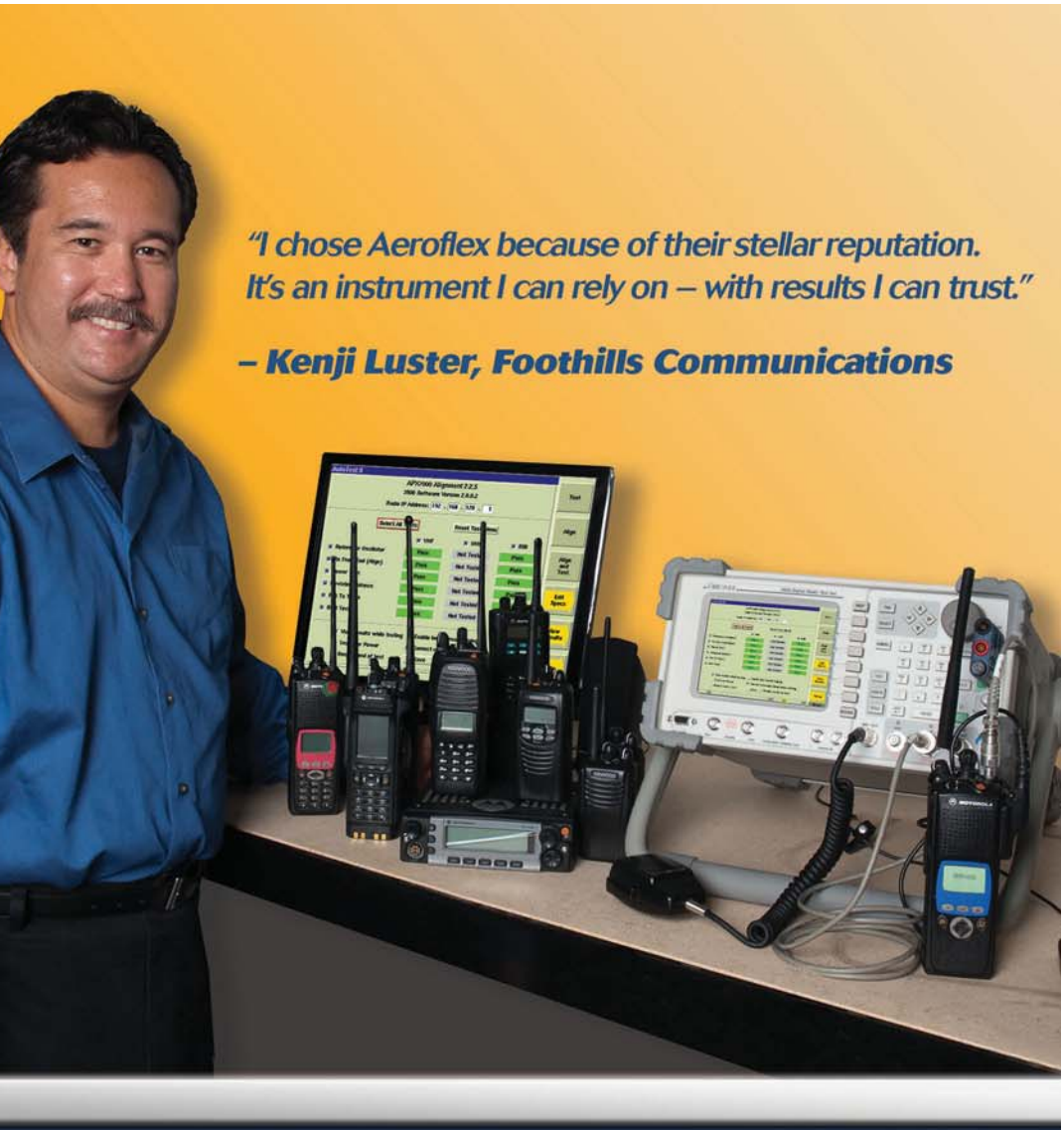
Although the Qatar government and Abu Dhabi Police don't believe TEDS can support their needs, other users are happy with the technology. Croatia's national police network is starting to incorporate data using short data service (SDS), said Marijo Novosel, head of the TETRA network management, Croatian Ministry of Interior. "The users are happy with the data at the moment," he said.

In Norway, a nationwide TETRA network will begin TEDS implementation next year, said Tor Helge Lyngstøl, director, the Directorate for Emergency Communication (DNK), Norway. "TEDS will be the way to go if the data is mission critical," he said. "If it's not mission critical, we can use commercial networks."

About 80 percent of agencies around the world use commercial networks for data needs, said Thomas Lynch, IMS Research mobile radio analyst. ■

Michelle Zilis is managing editor of *RadioResource International*. Email comments to mzilis@RRMediaGroup.com.

The Aeroflex 3920 - The one to trust



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brought it into the cab of fire engines and it does a fantastic job. It's an instrument I can rely on – with results I can trust. It's worth every penny I spent.

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NXDN: A Digital Trunking Option

Photos courtesy TGS

Users around the world, including a Turkish airport ground services firm and a U.S. public-safety agency, are deploying digital technology for mission-critical communications. **By Jens Toobe**

Much has been written about the migration to digital trunked radio systems from an established analog environment. However, the focus should be which technology can and should be used to provide the best system performance and resilience for a given application and how that goal is achieved. Of course, there is no simple answer to this question.

Radio industry experts are unanimous in agreeing to a, "It depends" viewpoint. The list of contributing factors is long, including the application, user requirements, deployed environment, user preferences, associated costs and more. The list of digital technologies is also extensive, and includes Project 25 (P25), TETRA, Digital Mobile Radio (DMR), digital Private Mobile Radio (dPMR) and NXDN. Differentiators such as FDMA- or TDMA-based system access and respective spectral efficiency properties further divide the group.

Digital Standards

TETRA has been operating since 1990, and about 30 companies manufacture TETRA core products and radios. More companies are involved in providing applications, solutions, accessories and services. TETRA is an open standard.

DMR and its early predecessor can be traced back to the mid-2000s. The DMR standard was ratified in 2005, and currently there are about a dozen active core and equipment manufacturers. DMR is also an open standard.

By the end of the second quarter, NXDN standards and technical documentation will be opened to the public domain as announced by the NXDN Forum in February. The NXDN Forum will continue to operate and accept new members after opening the technical specifications and will maintain the specification and related interoperability testing. Currently, 19 international radio and test equipment manufacturers support the technology with some members designing and manufacturing radio equipment since 2007. Support for the different operating modes such as digital conventional and digital trunking is high, with the number of supporting manufacturers steadily increasing.

Trunking Fundamentals

A trunked radio system is fundamentally different from a conventional two-way radio system in that it pools all available channels and allocates capacity as required. A conventional radio system employs a dedicated or fixed channel for each individual group of users, and when channel capacity is reached, the user will have to wait until it is freed. Put simply, a conventional system is limited by the number of users calling on its capacity at the same time, while a trunked system allows virtually unlimited user groups and provides the most efficient use of the radio frequencies and channels allocated to a system.

When a user places a call on a trunked system, a channel is allocated to all participants, and once the call is completed, the channel is returned to the pool for other users. This sharing of the channel capacity increases the availability of the system to all radio users, maximizing availability, especially important at times of peak use.

A trunked radio system is configured on the basis that with any given

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NXDN trunking was developed based on the experience gained from working with MPT 1327 systems.

number of users, not all will require channel access at the same time. Fewer individual radio channels are required, providing a number of benefits including savings in the cost of channel licenses, the ability to accommodate more users and user groups, the flexibility to configure access between user groups, increased security against eavesdropping and increased availability of the system at all times.

The control channel is a vital instrument in the management of a trunked radio system, ensuring seamless operation in all situations. It can be used to transmit small data messages between radios even if all other channels are occupied, and it provides pre-emptive call handling to ensure radio access in case of emergencies.

NXDN Basics

While other technologies may not need RF combining systems in small channel number deployments, the technologies are vulnerable to a critical component, endangering the whole system in case of a failure. A failure of one repeater could leave the complete radio population without means of wide-area communications. NXDN trunking has followed a different route.

The philosophy behind NXDN can be traced to the MPT 1327 standard. MPT 1327, established by various companies in Europe and adopted throughout the world, was a dominant radio system concept and standard for more than 20 years in mission-critical installations ranging from airports, utilities, public-safety agencies, public transport, and business and industry applications. The standard was first published in 1988 by the British Radio Communication Agency, now called OFCOM. MPT 1327 wasn't a European Telecommunications Standards Institute (ETSI) standard.

An MPT 1327 system uses a control channel to manage radio access, a major contributor to its widespread adoption. A control channel-based system offers the ability to control radio call requests based on system infrastructure capability and programmed parameters. It does not overly rely on any intelligence in the radio itself to find the next rest channel, because it can still deliver messages to radios, even if all voice channels are occupied and provide resilience. Emergency calls can be treated with maximum efficiency and

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The Turkish Ground Services (TGS) uses NXDN technology in six airports in Turkey.

importance by allowing the clear-down of calls in progress to make voice channel resources available for emergency call-handling purposes. TETRA and GSM systems also use the control channel (or slot) concept.

NXDN trunking was developed based on the experience gained from working with MPT 1327 systems. The standard combines a proven infrastructure concept with digital signal processing (DSP), RF and vocoder technology, creating a high-performance digital, 6.25-kilohertz-capable, spectrally efficient, secure and reliable digital radio system.

NXDN supports true mixed-mode operation. While a user can select, via appropriate radio programming, the preferential mode, the radio terminals and repeaters are inherently capable of working in analog or digital mode without user intervention. For example, if an analog radio population needs to be replaced, a soft migration strategy may be advantageous. This means that new digital radios must be able to fit into the existing radio infrastructure and emulate analog signaling systems without the need to add extra option boards to each radio, which would increase the overall costs and delay deployment.

Some industry insiders have suggested that NXDN trunking has not been deployed in important installations. However, several companies have successfully implemented a large number of mission-critical NXDN installations worldwide, including at the G8 and G20 Summits in Toronto, a public-safety system at Christian County, Kentucky, USA, and for the German state of Hessen's highway and road traffic management. NXDN is the recognized standard for the railroad industry in North America.

To further illustrate the case for FDMA 6.25-kilohertz control channel trunking, the first case study is indicative of the type of mission-critical applications suited to NXDN trunking and mission-critical deployments in which a trunked two-way radio system is the preferred option.

Turkish Ground Services

Turkey, situated between Europe and Asia, has a population of around 75 million and is about the size of the U.S. state of Texas. Turkey is a leading tourist destination, attracting close to 31 million visitors in 2011. The bulk of tourists arrive by air, so there is a heavy reliance on the smooth and effective operation of its major airports to provide seamless and secure operations for airlines, staff, airport employees and tourists in transit.

Operating in six of the busiest airports in Turkey — Atatürk and Sabiha Gokcen (both in Istanbul), Ankara, Izmir, Antalya and Adana — Turkish Ground Services (TGS) deploys more than 3,000 pieces of equipment and 6,000 staff to deliver ground services operations.

When TGS was awarded the airports contract it was evident that the legacy analog infrastructure needed to be replaced with a high-performance, efficient and reliable radio system. The main problems identified with the existing 50-year-old infrastructure were:

- Analog functionality only
- Lack of advanced functions
- Insufficient number of channels
- Poor coverage
- Poor voice quality
- No built-in redundancy

A number of technology alternatives, including TETRA and DMR, were considered. TETRA requires a minimum of one carrier, which includes one control channel slot and three traffic channel slots. DMR requires one carrier as a minimum, providing two voice channels. But in both cases there is no further system redundancy built in, should the single carrier base stations fail. NXDN trunking uses one base station per carrier with redundancy built into the multicarrier trunked radio system installations.

Competitor companies were established in the ground services segment in Turkey mainly because of the past investment in the radio communications infrastructure. Airport and airline companies typically rented their radio equipment to operate on the existing infrastructure.

After a comprehensive study established the core needs of TGS and the operational requirements at the airports and an extensive review of the existing system and infrastructure, an NXDN 6.25-kilohertz digital trunked radio system was selected. Contributing factors for the project award included the radio coverage that would be provided relative to the site required to provide such coverage, and extended capabilities, scalability and resilience. NXDN trunked radio systems are now deployed in all six airports and demand for more equipment is likely to increase to more than 3,000 radios and 80 channels by 2013.

Christian County, Kentucky

In Christian County, Kentucky, various county departments used their own radio systems, which brought about issues of interoperability between the departments. Some

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A number of companies have successfully implemented mission-critical NXDN installations worldwide, including at the G8 and G20 Summits in Toronto and the German state of Hessen's highway and road traffic management.

cross-department calls had to be routed through various dispatchers to reach their intended destination, resulting in wasted time and sometimes loss of crucial information.

The need for a homogenous and efficient communications system was one of the driving forces for the Christian County officials to start looking at a new radio system. Officials from Christian County and the city of Hopkinsville formed a committee consisting of the city fire chief, the sheriff, emergency management, dispatchers and other officials to investigate purchasing a new radio system.

An independent and external consultant was engaged to help with the selection process, designed to find the most appropriate radio communications solution following the three main criteria set by the committee: interoperability, radio coverage and network capacity. A three-month selection process resulted in an NXDN trunked system chosen as the new mission-critical digital radio system. The system offers talk groups, direct communications with individuals if required, system access priority in case of emergencies, and a clear and structured communications platform across all departments.

NXDN deployments have grown steadily, and the technology is recognized as a contender for mission-critical applications in scenarios throughout the globe. Large, multisite deployments have proven NXDN trunking can deliver an optimum blend of system performance, resilience, security and economy. ■

Jens Toobe started his wireless communications career in 1993 in Germany. Toobe has been with Kenwood/Zetron for 15 years. Some of his current duties include new business development in Europe Middle East Asia (EMEA) and government/regulator liaison. Toobe is an active Kenwood representative in local and international industry forums. Email feedback to editor@RRMediaGroup.com.

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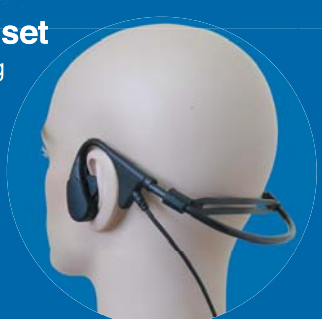

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Indonesian Energy Firm Selects VoIP

A liquid natural gas plant in Indonesia deployed a new communications network to enhance operations, customer service and safety.

By Andy Grimmett

Photos courtesy Simoco

Operating in Balikpapan, Total E&P Indonesie is the affiliate of one of the world's largest oil and gas companies. Balikpapan is a seaport city on the eastern coast of the island of Borneo, Indonesia, in the East Kalimantan province.

Parent company Total is the second-largest international oil and gas operator in the liquid natural gas industry. Total holds interests in 16 liquefaction complexes currently in operation, under construction or under study in every major producing region of the world. The company has been increasing its liquid natural gas investments since 2000.

Within the oil and gas industry, safety is always a priority. To avoid life-threatening disasters, emergency communications is extremely important, with radio coverage essential to enable critical communications across Total E&P Indonesie's nine transmission sites. Two sites are in Oman and in Qatar each, along with sites in Yemen, the United Arab Emirates (UAE), Norway, Nigeria and Indonesia.

A fundamental part of energy firms' networks is the ability to safely extend communications into potentially hazardous areas. One major requirement from Total E&P Indonesie was to provide intrinsically safe (IS) portables to prevent sources of ignition, ensuring the safety of all employees and enabling critical communications throughout the area at all times. The company also required a strong radio signal to enable full functionality between the base station and the mobile and hand portables.

About 300 mobiles and 1,250 ATEX intrinsically safe (IS) trunked portables operate on the new network.

Total E&P Indonesie wanted to replace its existing analog trunked system with a secure and reliable multichannel network across the transmission sites. The energy firm and Simoco officials met to determine what was required for the project. This consultative approach ensured all parties initially agreed on the footprint of the project, providing a clear brief on the level of coverage required and the budget available prior to developing the full technical specification. The network needed to offer full coverage in the migration period and ensure

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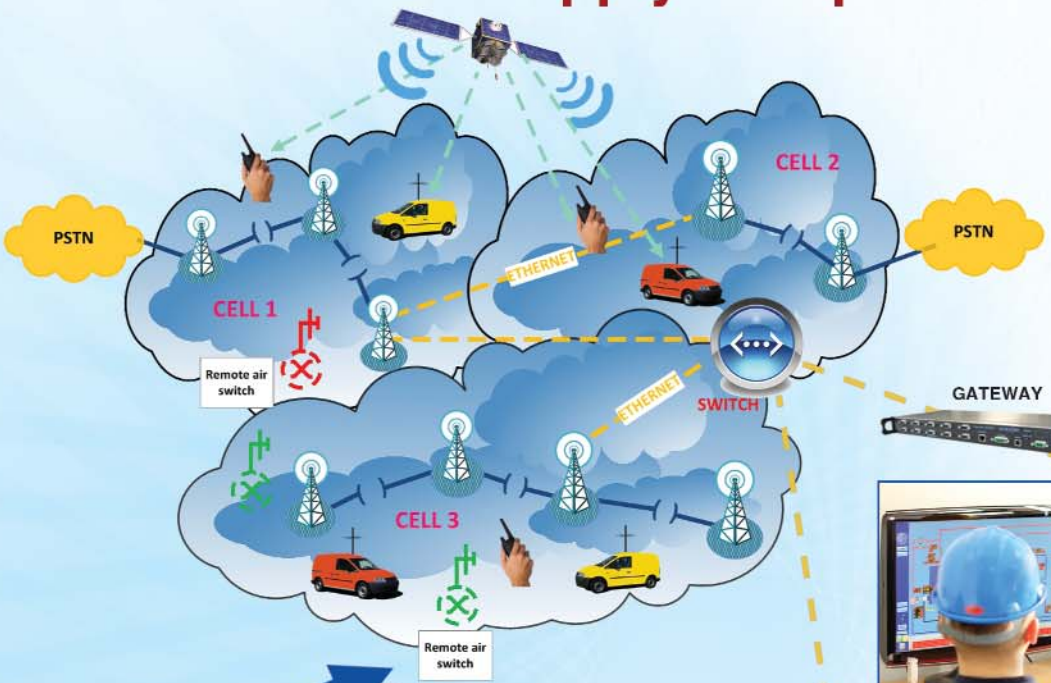

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communications was not interrupted at any point, meeting the company's safety requirements.

Working with local systems integrator PT Alssa, Simoco's Xfin technology replaced the existing Total E&P Indonesie analog trunked system. Xfin technology converges MPT 1327 trunked radios with next-generation hardware and VoIP technology. A trunked site consists of a number of Xfin units that are connected to form a wide-area coverage network using a standard IP connection between sites. The complete system works across nine transmission sites using the existing IP connection to deliver radio communications across the IT backbone of the company, removing the need to install new cabling and minimizing the disruption to the daily activities of the company, an essential requirement.

PT Alssa installed the new system in January 2011. Supporting easy network expansion, the IP base station enables networking connectivity over the Web-based IP connection ensuring there is no single point of failure. Simoco provided 300 mobiles and 1,250 ATEX IS trunked portables, with the Xfin network supporting calls between the radios, used by the company's operational staff across the region.

The Migration

Simoco employees provided extensive training on the system. A strict migration strategy was developed through extensive planning, allowing both the existing system and new technology to run parallel during the management of the switchover, ensuring a smooth transition.

Following the installation of the system, PT Alssa undertook rigorous testing to ensure the network provided the coverage, flexibility and control required by the

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A strict migration strategy was developed through extensive planning, allowing both the existing system and new technology to run parallel during the management of the switchover, ensuring a smooth transition.

company before the system handover in March 2011. Throughout the project Simoco and PT Alssa provided support, from initial system design to implementation. With a clear understanding of what needed to be achieved and how to reach the solution, the companies provided guidance and training to the end users on the functionality of the hand portables and mobile devices to ensure a seamless transition to the new system for all involved.

The project's consultative approach ensured that an effective, robust radio communications solution was provided to Total E&P Indonesie, meeting the company's requirements in terms of service and performance, without impacting business continuity. ■

Andy Grimmett is chief technologist at Simoco Group. Grimmett has more than 18 years of experience in radio communications research, development and project delivery. Email comments to editor@RRMediaGroup.com.

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Users Test Drive Multivendor P25 Systems

Photo courtesy Zetron

A multivendor center in Australia allows customers to verify real-world Project 25 equipment and networks.

By Paul Isaacs

Airwave Solutions Australia unveiled the P25 Solution Center 1 April, 2011, to demonstrate to the Australian and New Zealand markets the performance and maturity of the Project 25 (P25) open standard with equipment supplied by multiple vendors. The center is an industry initiative among Airwave and seven P25 equipment suppliers.

With past professional mobile radio (PMR) systems, users secured a license from a governmental department, purchased a repeater box from a vendor to sit on a hill or building and bought handsets from a vendor. As long as the repeater and handsets could operate on the same frequency, the system worked with coverage where the user wanted it if a good engineer was involved. Today the problems with this approach are that the system is inefficient, the equipment is now old and expensive — if you can even get it anymore — and others can easily listen to what is said.

Modern digital systems operate to international standards, are spectrally efficient and offer high levels of encryption. They are almost mandatory for any public-safety agency and highly desirable for other users. They also offer a host of facilities such as prevention of over-talking (only one person at a time is permitted to speak), channel pre-emption, messaging systems, and emergency call indication and alerts. There is an enormous variety of equipment available, something to suit everyone's needs, usually from multiple manufacturers.

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The center is an "open home" for P25 radio products, where they can be demonstrated and tested by customers in a situation that is as real to life as can possibly be created.

on the network chosen, if the network manufacturer and equipment manufacturer are not the same company? Who will take the risk? With these questions in mind, Airwave partnered with P25 industry equipment manufacturers and suppliers to bring the P25 Solution Center to market.

The Center's Goals

The standards bodies have attempted to ensure that all equipment is compatible by putting testing certification in place. In theory, as long as a handset has a test certificate verifying that it has been tested against manufacturer X, a customer should be able to buy with confidence. But would you like to see it working first — to actually make calls between different terminals working on the network you have chosen?

The P25 Solution Center provides an environment that allows visitors to test and verify the equipment and applications from multiple vendors, and to confirm the value of these features to their business. Customer agencies can define the parameters and participate in the live demonstrations of equipment working together within an integrated environment. Radio terminals can be used on the infrastructure of alternative manufacturers as defined by the end-user requirements, in an as true-to-life environment as is possible to produce. Potential buyers can discover any inherent limitation of the proposed configuration and compatibility of the standards implementations by each vendor before committing to large-scale procurements.

It is generally normal to buy a network from a single manufacturer. That means switches, servers and base station controllers all have a common badge. That is fine when the network is first purchased, but there are two conditions where it might be necessary to work with a second manufacturer. The first is when the network needs to be expanded, and a different manufacturer can offer a better price for the job. The second condition would be beneficial to connect to a nearby network, either in a nearby city or perhaps between two networks in the same city or state. The P25 standards committees specified the Inter RF Subsystem Interface (ISSI) to connect two different networks and to pass calls and messages between them. Several manufacturers can provide ISSI interfaces working to the standards, but until now, there was nowhere to see the interface in action.

From discussions with customers and users, Airwave executives recognized that a hurdle prevented customers

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The center will soon demonstrate interoperability with encryption, with plans to install data services before the end of the year.

from gaining access to a range of competitive products. For a long time it had been the norm to buy from one vendor because everything from one vendor worked together. That prevented true competition and caused governmental agencies and others to overpay for equipment. Airwave staff believes that real competition will result in better product features and lower prices for customers as is seen in other retail sectors. To lower the hurdle, it would be necessary to eliminate the perceived risk of buying from different vendors. What was needed was an "open home" for P25 radio products, where they can be demonstrated and tested by customers in a situation that is as real to life as can be created.

Vendor Collaboration

Airwave approached all of the main equipment vendors of terminals, networks and consoles to see if they were willing to participate in a center that would demonstrate all of the P25 interfaces working in a real environment. The center would be a demonstration facility, not a laboratory, where potential users or customers could put their hands on the equipment and use it in a configuration much like their own environments. The aims of the P25 Solution Center are threefold:

- Allow customers and senior officials to see a potential purchase in action over real radio channels, in a prepared situation close to their own environments. The goal is to demonstrate true-to-life working scenarios and to provide the customer with the confidence that a system design will work.
- Provide an area where a group of manufacturers can demonstrate to customers that their equipment will interoperate with other equipment, outside of their own test facilities. This could also include the connection of legacy equipment to the potential new digital network, or integration of new applications from other parties such as GPS/AVL or data applications and devices in a secure environment that does not compromise an operational network.
- Offer a test facility for a manufacturer to test products against other products, again in a real-world scenario.

Most of the major manufacturers agreed to take part in the center. The

following vendors provided the following equipment types:

- Network equipment: Harris RF Communications, Tait Communications, Auria Wireless, ComGroup Australia, RFI Antennas and Icom
- Terminal equipment: Harris RF Communications, Tait Communications, ComGroup Australia, RFI Antennas and Icom
- Console equipment: Zetron

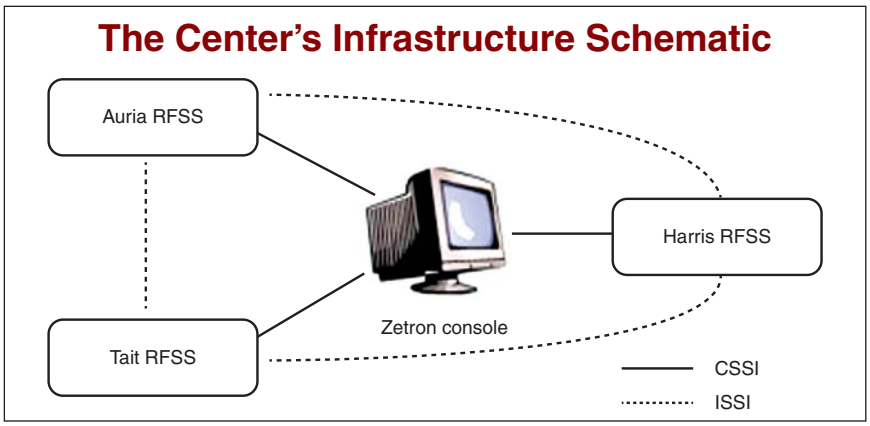
Photo courtesy Tait Communications

The center provides an environment to test and verify equipment and applications.

Airwave hosts the facility at its head office in Sydney, Australia. The transmitting equipment is located at the Broadcast Australia radio tower at Gore Hill, North Sydney. The network equipment is installed at the Airwave office in Chatswood, some 15 kilometers away. Airwave has licensed six radio channels in the 500 MHz band in order for real radio interfaces to be demonstrated, with the antennas installed on one of the tower legs at Gore Hill.

Three network vendors, Auria, Harris and Tait, have each supplied a small-scale demonstration network consisting of core network equipment and a P25 base station system. The ISSI is used to connect the three vendors' equipment into a single network, and the P25 Console Subsystem Interface (CSSI) connects the Zetron console into each radio sub-system. The terminals in the center are configured to work on any one of the three networks so that they can roam across the ISSI.

At the launch of the center last year, Airwave successfully demonstrated interoperability between terminals and networks, roaming between networks and the ISSI carrying calls in a common group. Airwave executives considered one demonstration to be a world first and a tribute to the vendors' work to support the concept. The demonstration consisted of Icom terminals on a Tait network and Harris terminals on an Auria Wireless network, all talking on a common group over



the ISSI, and to a Zetron console connected to the Auria Wireless network over the CSSI. The demonstration illustrated what can be achieved when companies work together with a common interest.

What's Next?

Airwave is continually updating and expanding the center, and the vendors are installing their latest software. The center will soon demonstrate interoperability with encryption, with plans to install data services before the end of the year. The data will include GPS positioning systems and over-the-air applications. Having data services available will open the center to more vendors that deliver mobile-data applications.

During its short life, the P25 Solution Center has successfully demonstrated interoperability between networks, and between networks and terminals, proving what a robust standard P25 has developed into. By working with the P25 Solution Center, anyone considering buying or extending a P25 radio network — either trunked or conventional — can experience what their final system will look like, and can solicit opinions from their users before spending large sums of money on configuration and installation. Airwave Solutions will work with customers and vendors to ensure that the experience is as close to real life as possible within the constraints of the system. ■

Paul Isaacs is the engineering manager for Airwave Solutions Australia and New Zealand. He joined the Airwave Australia/New Zealand team in 2009 after six and a half years with U.K. parent company, Airwave Solutions. He previously led a team of more than 50 engineers that delivered the U.K.'s TETRA trunked radio network. Email feedback to info@airwavesolutions.com.au.

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2000mAh standard Li-ion , 2600mAh Li-ion is optional
Compliant with DMR ETSI Tier 2 standard

Integrated Application

GPS Position
Text message service
Telemetry application
IP data
Real Time Clock
Vibration reminds when receiving text messages and voice call
Enhanced encryption function , support sofrware and hardware encryption

Versatile features

Support both Analog and digital mode

Dual priority channel scan operates in both analog and digital mode

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DIGITAL MOBILE RADIO ASSOCIATION

Manufactured by KIRISUN Communications Incorporation(Inc.)
Http：//en.kirisun.com
Contacts： Tel：+86-755 86095979
Fax：+86-755 86096018
E-mail：marketing.os@szkirisun.com

Product Expo: Base Stations and Repeaters

Bird Technologies Group

Bird Technologies offers a broad range of RF signal booster products including solutions for enterprise, mission critical, operations critical and channelized applications. The Signal Booster I series provides a balance of performance and value for extended coverage of radio communications networks, Bird executives said.

The Signal Booster II series is for public-safety-grade communications and reliability in disadvantaged RF locations for first responders, public-safety/governmental agencies and private system users. The Signal Booster III series features an intuitive user interface that allows easy configuration for changing RF environments. The RescueLine Signal Booster fully complies with the International Fire Code (IFC) 2009 and National Fire Protection Association (NFPA) 1 2009 codes.

www.birdrf.com

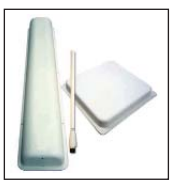
Cellular Specialties Inc. (CSI)

The CSI Modular 250 and 251 series addresses the need for multiple integrated configurations. The modular form factor permits growth from one band up to four bands in a single package that can be wall or rack mounted. The digital repeater series is flexible and features a versatile, lightweight design that offers many options, including multiple frequencies, custom passband filters, output power options and numerous port configurations to provide a user-friendly, easy-to-install repeater. Available frequencies include 700, 800 and 850 MHz as well as 1.9 GHz.

www.cellularspecialties.com

Cobham Microwave Antennas

The Cobham range of base station antennas meets RF and environmental specifications required for WiMAX, Long Term Evolution (LTE), wireless LAN (WLAN) and Wi-Fi. Available polarizations are vertical, horizontal and dual slant ±45 degrees. Null fill and electrical tilt options provide better close-in coverage, essential in high RF density city areas, company officials said. Frequency bands are 2.3 – 2.7, 3.3 – 3.8 and 4.9 – 5.9 GHz.



www.cobham.com/antennasystems

Damm Cellular Systems

Damm TETRA base stations are optimized for maximum user friendliness. Outdoor base stations, BS421, can be installed with up to four carriers at one site. The indoor base stations, BS41x, can be installed with up to 16 carriers. Designed for a fully distributed IP system, scalable from single to large multisite networks, the base stations come integrated with LogServer, dispatcher and network management, and with an internal GPS receiver. The BS421 can be mounted directly in the mast, close to the antennas, providing full dual receive diversity for optimal sensitivity and offering a built-in duplex filter with an output power to the antenna of up to 10 watts.

www.damm.dk

Daniels Electronics

Daniels Electronics offers an Aviation VHF AM – VHF FM cross-band repeater to support air-to-ground communications. The AM repeater has transmitter and receiver modules on the left, with front access panels to select the specific frequency of operation. On the right are the FM transmitter and receiver repeater modules. The radios are modular and can be configured into a variety of different systems in a standard 19-inch subrack. The systems offer robust construction, low current consumption and extreme temperature tolerance (-30 to +60 degrees Celsius). Redundancy switching is available as an option.

www.danelec.com

Detracom

The e-DMR duplex base stations from the RPND series are infrastructure equipment that use three-slot digital TDMA technology designed and manufactured by Detracom. The highly spectrum-efficient duplex base stations can provide two audio and one data communications at the same time in 12.5-kilohertz channel spacing between digital terminals. In networks where analog and digital terminals coexist, the duplex station can also handle communications between analog terminals. The company's mobile terminals also support dual-mode analog/digital operation.

www.detracom.net

Fiplex Communications

Fiplex introduced a way to wirelessly link various bidirectional amplifier (BDA) repeaters with proprietary software known as FOMS. The software, when combined with remote control cards inside each BDA, allows users to manage the repeaters via wireless links. The Windows-based utility allows real-time monitoring and operations of the BDA network for cellular, TETRA and public-safety 700/800 MHz. As an administrative application, FOMS allows for dynamic reconfigurations.

www.fiplex.com

Harris Public Safety and Professional Communications (PSPC)

The Harris microMASTR P25 Cell Site is a flexible, digital system that enhances mission-critical communications capabilities in areas challenged by inadequate system coverage, low population density or difficult terrain. The cell site operates on 700 and 800 MHz, VHF and UHF frequencies in Project 25 (P25) trunked and conventional modes and can act as a

Simplifying advanced communications - for even the harshest working environments

DAMM's fully IP-based TetraFlex® digital radio system is the ideal solution for a wide range of users, from harsh working environments to large-scale mission critical applications.

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Future-proof flexibility and scalability
There is no limit to the size of the network that TetraFlex® can support. The distributed architecture and TETRA over IP technology allows easy and effective network planning and integration. In addition, built-in scalability and modular product flexibility secures your investment for the future.

Compact, versatile and rugged
TetraFlex® base stations are compact enough to ensure quick and easy outdoor installation, even where space is limited or under harsh environmental conditions.

Intelligent software for maximum usability
The intelligent TetraFlex® software enables simple self-configuring site expansion, even while in operation. TetraFlex® also comes with a wide range of valuable integrated software, such as network management, dispatcher solution, voice/data recording and replay facilities, SIP gateway to legacy networks, packet data gateway and open application interface.

DAMM solutions and support are available worldwide through an exclusive network of authorized partners

www.damm.dk

DAMM

stand-alone system or as part of a larger, multisite system. Quick and easy to deploy with minimal impact on the environment, the unit consumes 80 percent less power and is 90 percent smaller than traditional cell sites, Harris executives said.
www.pspc.harris.com

Icom

Icom's IC-FR5000/FR6000 is a 50-watt, 32-channel VHF/UHF repeater/base station that combines analog FM and IDAS digital modes with auto sensing function. The IDAS digital mode uses

6.25-kilohertz narrowband FDMA technology and offers a flexible choice of the NXDN digital protocol or the European Telecommunications Standards Institute (ETSI) digital Private Mobile Radio (dPMR) protocol, with common hardware. The unit features a space-saving design in which either optional RF module or a power amplifier can be installed in a 2U height, 19-inch rack mount chassis. The optional RF module UR-FR5000/FR6000 increases channel capacity, and the optional UR-PA5000/PA6000 power amplifier provides 100-watt output. The optional UC-FR5000/FR6000 network/trunking controller board provides NXDN Type-D trunking capability and IP connectivity.
www.icom.co.jp/world

Innovative Circuit Technology (ICT)

ICT offers a range of solutions for reliable DC power for base station and repeater sites. ICT manufactures high reliability DC power supplies, DC distribution panels, battery chargers, DC-DC converters, and DC-AC inverters for 12, 24 or 48 VDC applications. With power levels from 150 watts to 1.5 kilowatts, battery backup, N+1 redundant systems, transmission control protocol (TCP)/IP capability to remotely monitor and manage DC devices, and site-optimized inverters for running AC loads at off-grid or DC-powered sites, ICT can configure a power solution that meets any user needs, ICT executives said.

www.ict-power.com

Kenwood

Kenwood's system repeater, the NXR-700/800 series, offers advanced digital and analog operating modes with 30-, 25-, 15-, 12.5- and 6.25-kilohertz channel spacing, depending on the model. The unit can be used as a repeater in existing MPT and logic trunked radio (LTR) systems, connected to legacy controllers or used as a NEXEDGE system repeater, because of a built-in logic board. The tunable RF front end guarantees the best RF performance for a specific frequency, company officials said. An Ethernet port for multisite IP connections, a 25-pin standard SUB-D connector, an easily accessible fuse and 1U form factor make the line an ideal choice for a systems integrator, officials said.

http://nexedge.kenwood.com

Midian Electronics

The RIC-2 is a tone remote adapter that allows two repeaters connected by dedicated phone line or microwave to key one another. When repeater A receives a signal from a field radio, the

repeater will give a carrier-operated relay (COR) signal to the RIC-2. The RIC-2 will generate 2175 hertz high-level guard tone, function tone and low-level guard tone to key repeater B and re-transmit the audio coming from repeater A. The RIC-2 is ideal for expanding radio system coverage in mines and buildings.
www.midians.com

Midland Radio

The Base Tech III Project 25 (P25) base stations and repeaters

are designed for government, public safety and business applications and offer a five-year warranty. Built for 100-percent continuous duty, the units are designed to withstand severe working conditions. With the ability to operate in analog mode or full digital mode, the products meet P25 Common Air Interface (CAI) standards for compatibility with other P25 radios, regardless of manufacturer. The products are also backward compatible with conventional wideband FM systems.
www.midlandradio.com

Mobile Mark

With an extensive line of multiple input multiple output (MIMO)

antennas, the DOD5-2400/5500 is ideal for next generation Wi-Fi, including the 2.4 GHz and 5.5 GHz bands. The omnidirectional model features 5 dBi gain and is available in two or three cable versions. The antenna's two or three terminating SMA plugs are staggered to improve installation. The antenna meets military shock and vibration standards of EN 300 019-2-4 and IEC 60068.
www.mobilemark.com

Motorola Solutions

The Motorola Solutions GTR 8000 is a high-performance 100-watt (110-watt UHF) base station platform for mission-critical systems. With VHF, UHF, and 700, 800 and 900 MHz band

coverage, the future-ready station supports everything from analog conventional to Project 25 (P25) TDMA/FDMA with the same hardware. The base station enables easy migration for analog conventional sites to P25 mixed-mode operation. Building on Motorola QUANTAR features, the unit offers enhanced serviceability, no tuning required, hot swappable modules, no single point of failure, integrated battery charger, software upgradeability and front access serviceability.
www.motorolasolutions.com

Pulse Electronics/Larsen Antennas

The Radome Omni series antennas are designed for harsh outdoor environments to provide mechanical stability and UV/IP67 protection to ensure a long, reliable, maintenance-free life, Pulse executives said. The radomes are made of UV-protected pultruded fiberglass and come in a variety of frequencies, including 2.4, 4.9 and 5 GHz and multiband, covering 806 – 960 MHz and 1.71 – 2.17 GHz. Gains range from 4 dBi to 10 dBi. Most models are available with either an N-male or N-female connector. Key applications include wireless LAN (WLAN), mesh networks, access points, public safety, femtocells, repeaters and base stations.

www.pulseelectronics.com

Simoco

The SB2025NT is a Project 25 (P25) conventional repeater for simulcast and multicast radio networks. The repeater is composed of a durable 100-watt base station with IP simulcast and voting technology in a 2 rack unit (RU) chassis. The unit, when deployed with Simoco's GPS synchronized reference and timing modules, forms the core of a low-bandwidth, low-latency radio system that integrates easily into modern telecommunications networks, company officials said. Employing the redundancy feature enhances system resilience. Mixed-mode analog and digital operation combined with the P25 Digital Fixed Station Interface (DFSI) and analog four-wire dispatch console interface provide a straightforward and easily managed migration path, officials said.

www.simocogroup.com

Spectra Engineering

The MX800 repeater/base station now offers extended capabilities with the availability of transmitter power up to 110 watts and frequencies as high as 900 MHz. The RF output power can be further increased up to 300 watts with the addition of the MXPA300, an external stand-alone amplifier. The MXPA300 offers its own power control loop and built-in remote diagnostics. Advanced VSWR protection circuits can shut the amplifier down in several microseconds to prevent potential damage. The receiver can also be optioned for increased sensitivity to -124 dBm (0.15 uV) to provide similar range-extending improvements in the receiver.

www.spectraeng.com.au

Tait Communications

The TB9100 Project 25 (P25) base station/repeater offers reliable continuous duty cycle operation at a range of temperatures and altitudes. A flexible, modular design combined with intuitive programming software makes the unit ideal for conventional, trunked and simulcast mission-critical networks. In addition, the transportable repeater is ideal for use in emergency situations such as accidents

or natural disasters, and for tactical operations everywhere from remote or inaccessible locations to densely built-up urban environments. The product is available in 50- and 100-watt configurations in a range of frequency bands.
www.taitradio.com

TEDAP

TEDAP introduced a line of products for repeaters used in TETRA and Digital Mobile Radio (DMR) networks, company officials said. Highlights include a VHF/UHF high Q cavity duplexer that features six

cavities and minimal frequency separation; VHF/UHF two to eight channels receive multicoupler with or without amplifier; VHF/UHF two to eight channels transmit combiner with hybrid circulator and cavity circulator; and VHF/UHF six cavities high-power duplexer with 2 to 5 megahertz frequency separation.
www.tedap.eu

Teltronic

Nebula, Teltronic's TETRA infrastructure, provides coverage, security and reliability in a platform designed for efficient implementation and cost-effective scalability. The system is 100 percent IP, allowing a secure and reliable network with distributed switching, distributed intelligence and complete fault-tolerant redundancy. With 75 watts of RF output power from each repeater and triple receiver diversity, the system is loaded with advanced capabilities such as multislot packet data up to 28.8 kilobits per second (kbps), simultaneous voice and data, FIPS Level 3-oriented E2EE management, real-time statistics of network performance and off-the-shelf solutions optimized for AVL, telemetry and transportation. The hardware is ready for migration to TETRA Enhanced Data Service (TEDS).

www.teltronic.es

Vertex Standard

The VXR-9000 delivers reliability and extended range in a slim-line design. The unit is programmable with up to 32 channels. The product includes priority channel scanning, back DC power supply, flexible

automatic five-step command sequence configuration for custom operations and simplex/duplex capability. Other features include six dual-function programmable keys, compander per channel, CW identification and message, busy channel/busy tone lock out, CTCSS and DCS encode/decode, multitone decode, D-Sub 25-pin accessory connector, voice inversion encryption option, and Electronic Industry Alliance (EIA) rack-mount size.
www.vertexstandard.com/lmr

Webb Industries

Telegärtner's range of Telecommunications Outdoor Connectors (TOC) series is suitable for integration into any electronic SFP+ interface or as a stand-alone interface for IP68 outlets. All connectors are compliant with the specifications of the

IP68 protection class and can be used in a temperature range from -40 to 85 degrees Celsius. The connector comprises both RJ45 Cat.6A and fiber optic (FO) interface and is available in two types. The TOC Fix features plug and bulkhead inserts that have a fixed position in the plug housing. The TOC Flex is for adaptation to different connector alignments between the plug and bulkhead inserts. The cabling is used extensively on base stations.

www.webb.co.za

Westel Wireless Systems

The TRS-25 multirepeater package provides up to three full-duplex Project 25 (P25) or analog repeaters or base stations in a single 19-inch chassis. The three radios can operate independently or be

set to a link-repeater-link configuration for remote areas, highway and pipeline scenarios. VHF/UHF cross-band and analog/P25 digital cross-mode configurations are supported with 12 kilobits per second (kbps) CVSD for legacy users. The device also provides inbuilt P25 vocoding, direct connection to 4-watt lines, and data encryption standard output feedback (DES-OFB) encryption and can be connected to tone-based console systems. The unit supports Westel's existing VoIP and Web-based diagnostics and can be software upgraded to support P25 trunking.

www.westelwireless.com

Wireless Pacific

The RDX Pico is a small, self-contained analog and Project 25 (P25) suitcase repeater designed for instant deployment in most radio environments. A mode selector allows users to pre-define configurations to meet local and interoperability needs. The 8.5 ampere hour (AH) inbuilt battery provides more than 12 hours stand-alone operation at 10 percent duty cycle and can be recharged by any available 8 – 30 VDC power source or alternatively, AC mains power. RF output power is set to 5 watts to maximize battery life, as well as to ensure perfectly balanced talk-in/talk-out to field portable units. The repeater weighs about 9 pounds and delivers exceptional P25 and analog repeater performance, company officials said.

www.wirelesscorpltd.com

New Products

TETRA Portable

Sepura introduced the STP9000 series TETRA hand portables, featuring an IP67 rating, enhanced user interface, built-in radio frequency identification (RFID) tag and GPS capability. The series includes three models. The STP9000 features a full keypad and a large color screen, the STP9100 offers a reduced keypad and a large color screen, and the STP9200 offers a reduced keypad and monochrome screen. The radios offer haptic technology, which produces a physical movement of the radio so users wearing gloves can be sure their key press has been successful. A twist and zoom feature allows users to see full detail of images by zooming a portrait image to full screen size.

www.sepura.com

Slim TETRA Radio

Cassidian Communications introduced TH1n, a slim TETRA radio, the first in a line of pocket-sized TETRA radios. The radio features a metallic finish with rubber-coated sides and includes a large color display. IP65 protection ensures the radio will perform in demanding environments, and 1.8 watts of output power provides extra reach in limited coverage or direct mode operation (DMO). A repeater feature in DMO allows teams to build a voice connection among users who might otherwise be out of reach.

www.cassidiancommunications.com

TETRA Handhelds

Motorola Solutions unveiled the MTP3000 TETRA handheld series, offering increased range, better in-building coverage and an advanced audio system. The series includes three models. The entry-level MTP3100 is ideal for users who need basic functionality but do not require advanced communications and data sharing features or a keypad. The MTP3200 mid-range model includes Bluetooth connectivity and GPS capabilities. The MTP3250 high-end radio offers a full keypad, radio messaging service, call-out function and full telephony capabilities. All models provide 1.8 watts output and include two control knobs for volume and talk groups. An IP55 certified side connector allows for easy connection to and disconnection from accessories.

www.motorolasolutions.com

Portables

Unimo Technology showcased two TETRA portables. The UT-1500 is a dual-mode portable that operates in TETRA mode and GSM or wideband CDMA mode when out of TETRA service coverage. The radio is waterproof and offers Bluetooth capability, a built-in camera, voice recorder and security features. Frequency ranges include 380 – 400, 410 – 430 and 806 – 870

MHz. The PT-1500 portable weighs 245 grams with standard battery and offers 18 hours of battery life. The radio is water and dust resistant and comes pre-programmed with 16 group channels. Frequency ranges include the 370 – 400, 400 – 430 and 806 – 870 MHz bands.

www.unimo.co.kr

VoIP Phone

Elektrobit (EB) updated its Tough VoIP product portfolio with a new field and desktop phone that extends broadband voice and data connectivity to the field, vehicles and command posts. The device can be integrated into existing communications infrastructure. Features include support for GPS positioning, new audio codecs, improved keypad and user interface, wall-mounting capability, new mechanical construction for lower weight and better durability, and connector options. Both desktop and field models are equipped with an integrated speaker and Ethernet connectivity. The field phone also includes single-pair high-speed digital subscriber line (SHDSL) connectivity.

www.elektrobit.com

Transceiver

Royal Communications International introduced the Micom-Pathfinder HF-SSB 1.6 – 30 MHz transceiver that provides reliable, long-range radio communications. Housed in a rugged manpack configuration, the product can withstand severe shock, vibration and extreme weather conditions. The transceiver is U.S. Mil-Std-810 and JITC certified and approved automatic link establishment (ALE) per Mil-Std-188-141B standards.

www.royal-communications.com

TETRA System

Damm Cellular Systems introduced its Rapid Deployable TetraFlex (RDT) system, a self-contained, preconfigured mobile TETRA system. In a suitcase mounted on wheels, the product has an integrated power supply and can use a 24 voltage direct current (VDC) vehicle socket. The system can also be connected to solar-powered devices or to a 230-volt alternating current (VAC) generator. Individual cases can be linked together in a multisite configuration to create a larger coverage area. Software tools include remote network management and voice and data management for recording, storing and replaying all calls and short data service (SDS) messages. The system can be connected to an advanced dispatcher solution with a GPS positioning system.

www.damm.dk

4G LTE Broadband

Cassidian Communications and **Alcatel-Lucent** launched Evercor, a 4G Long Term Evolution (LTE) system that enables real-time video, data and other media. The system integrates Alcatel-Lucent's lightRadio 4G LTE mobile broadband with TETRA-based systems to form the end-to-end integrated LTE 400 professional mobile radio (PMR) system for the 380 – 470 MHz band. Alcatel-Lucent's eNodeB base station engines, wireless packet core and backhaul solutions combine with the LTE 400 remote radio head, terminals and applications. The system can be integrated into existing TETRA and Tetrapol networks.

www.cassidian.com

Enhanced Digital Repeater

Axell Wireless enhanced its CSR438 digital band selective TETRA repeater. Based on software defined radio (SDR) and digital filtering technology, the repeater does not require hardware upgrades and can be reconfigured remotely. The enhancements allow the repeater to be configured via graphical user interface (GUI) to operate in either band or channel selective modes, allowing deployment in a typical 5-megahertz band selective mode with the option to improve selectivity and reduce noise by reconfiguring the unit to operate with a unique set of channels within the band. While operating in channel selective mode, the unit provides filtering for up to eight channels. The repeater operates in the 380 – 470 MHz frequency range in bands of up to 20 megahertz.

www.axellwireless.com

Frequency Shifting Repeater

Creowave introduced a TETRA frequency shifting repeater ideal for large outdoor locations with minimal requirement for isolation

between uplink and downlink antennas. The repeater includes a master unit that converts the TETRA downlink carrier to the selected frequency and a slave unit that converts it back to the original frequency. The shifted frequencies are used only in traffic between the master unit and slave unit. The company's earlier software-definable TETRA channel-selective repeaters can be upgraded to incorporate the frequency-shifting functionality.
www.creowave.com

900 MHz Linking

MiMOMax Wireless introduced linking solutions for the 900 MHz frequency band. Operating in the 806 – 960 MHz range, the unit features 12.6- and 25-kilohertz narrowband channels in 6.25- and 5-kilohertz steps; improved frequency reference with enhanced spectral performance to support greater signal sensitivity and better path performance; a dual 10/100 Base-T Ethernet switch that supports auto negotiation; and lightweight antennas offering a 16 decibel isotropic (dBi) nominal gain. Low-visual-impact antennas come with a fully enclosed radome and an internal band pass duplexer enhances radio performance by mitigating onsite interference. A digital processing system increases performance of the central processing unit (CPU), memory and clock.

www.mimomax.com

Broadcast Antenna

PREMO announced a new series of broadcast antennas designed for field emission low frequency (LF). The KGEA-HB antennas allow remote access to vehicles for users who have identification devices for vehicle passive entry. Sealed with ultrasonic welding, the half-bridge antenna can be inserted in the bumper or trunk of a vehicle. A waterproof housing prevents water and dust from getting inside.

www.grupopremo.com

Hand Microphone

Imtradex expanded its Aurelis handheld microphone line to include the Aurelis Nexus, which integrates a Nexus jack to provide compatibility with all major headsets and in-ear headsets. The company's Aurelis product line includes the Aurelis Bluetooth model, a wireless handheld microphone that includes a transmit button, microphone, speakers, an emergency button, three-level volume control, two-color LED and a connector for external audio equipment.

www.imtradex.com

Voice Storage Module

Midian Electronics introduced the VM-3 series of voice storage modules, offering up

to three minutes of voice storage. Recording is triggered by a carrier-operated relay (COR), continuous tone controlled squelch system (CTCSS) or talk group indication from the radio or from a radio indication that a selective call has occurred. A button on the radio controls playback. The module provides flexible recording blocks, storing only the amount of time needed for each recording.

www.midians.com

BNC Connectors

Times Microwave Systems introduced its EZ-400-BM Bayonet Neill-Councelman (BNC) no-solder male straight connector and EX-400-BM-RA BNC no-solder male right angle connector for LMR-400 low loss coaxial cable. The crimp-style connectors do not require soldering of the center conductor, making them ideal for field installations. The connectors are also compatible with the CST-400 cable prep tool and either the CT-400/300 or HX-4 crimp tools.

www.timesmicrowave.com

TETRA Combiner

Procom developed TETRA combiners that connect stations. The two-station model is PRO-MIX-PHY-TETRA-2 N, and the four-station model is PRO-MIX-PHY-TETRA-N 4. The product provides isolation of more than

60 decibels between stations. The four-station model includes a highly selective helical duplex filter for each input that will split the transmitter (TX) and receiver (RX) signal and send the TX channel to an isolator and the RX channel to the passive RX splitter. The TX signal is fed through a low-pass filter into a hybrid where it is then fed into another helical duplex filter and connected to the antenna. The RX signal runs from the antenna through the output duplex filter to a hybrid splitter, divided into two and sent to the input duplex filters.

www.procom.dk

DC/DC Converter

Absopulse Electronics introduced the RWY 252H series dual-output, railway quality direct current (DC/DC) converter. Using high-efficiency power conversion technology, the converter offers a 250 watt power

system in a compact enclosure. The converters meet EN50155 standards for electronic equipment used on railway rolling stock. Two fully independent regulated isolated output stages are included, each providing any single voltage between 5 volts and 110 volts direct current (VDC). Output V1 has 140 watts power capacity, and output V2 has 110 watts power capacity. Nominal input voltages are 24, 36, 72 and 96 V or 110 VDC with EN50155 input ranges. Efficiency is 85 percent at full load.

www.absopulse.com

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2. Which of the following best describes your organization?
❑ A Mobile Communications Dealer/Reseller
❑ B Distributor, Agent, Importer, Exporter, Rep
❑ C Commercial Trunked Radio and Other Wireless Service Providers
❑ D Government/Public Safety/Military
❑ E Business/Industrial/Transportation User
❑ F Communications Manufacturer/OEM/Software Developer
❑ G Engineering and Consulting Firm
❑ Z Other—please specify _____

3. What is your function?
❑ A Corporate Management
❑ B Operations/Administration Management
❑ C Technical/Engineering Management
❑ D Sales/Marketing
❑ Z Others Allied to the Field—please specify _____

4. Do you recommend, specify or purchase mobile communications equipment or services?
❑ A Yes ❑ B No

5. Is there any servicing of mobile communications equipment at your location?
❑ A Yes ❑ B No

6. In what area of the world do you do most of your business? (mark only one)
❑ A Western Europe
❑ B Eastern Europe
❑ C Middle East
❑ D Asia
❑ E Australia/New Zealand
❑ F Africa
❑ G Mexico/Central and South America
❑ H United States/Canada
❑ Z Other _____

7. What wireless technologies does your organization plan to use/buy over the next 2 years? (check all that apply)
❑ A Conventional Two-Way
❑ B Cellular/Personal Communications
❑ C Paging/Messaging
❑ D Mobile Data
❑ E SCADA/Telemetry
❑ F Microwave radio
❑ G Trunking
❑ H Location Technologies
❑ I Tone Signaling (ANI, Encryption, etc.)
❑ J Interconnect
❑ K Satellite
❑ L CAD
❑ M Wireless Broadband
❑ Z Other _____

Q312

By Steve Baroch

Latin America Offers Telecom Opportunities

While Latin America can be categorized as one region geographically, the region does not act in sync culturally or economically. With a population similar in size to the European Union (EU), the region does not have the same level of standardization. The resulting diversity provides some positives, but in the telecom world, a lack of standards can pose many problems.

Many countries in Latin America are experiencing surges in stability, influxes of tourism and vast increases in economic activity. The economies of the region have generally moved on a similar path as the rest of the world, with difficult times in 2008 and 2009 and a recent return to growth.

Chile is an example of political and economic success. The country is in its second decade of democracy with a political and economic system that is held in high esteem for its pro-business, anti-corruption stance. It is rated among the top tier of countries worldwide in terms of its lack of corruption. Another example is Colombia. Within the last decade, Colombia has largely suppressed narcoterrorism and associated crime, and emerged to attractive growth and relative stability.

Brazil, selected to host the 2014 World Cup and the 2016 Summer Olympics, will see significant opportunities for growth. The events will help the country continue toward the top of the gross domestic product (GDP) rankings, where it now sits in sixth place, moving up from 11th place in 2009. Planned additional infrastructure investment to accommodate the two global events is estimated to exceed $100 billion.

GDP for all of South America is predicted to increase 4 percent for 2012. Some countries, such as Argentina and Paraguay, are experiencing between 6 – 8 percent annual growth. And the telecom sector could experience as much as twice that growth rate.

Still, it can't be denied that the difficult state of affairs for Mexico weighs heavily on all of Latin America and the Americas as a whole. While other economies have moved up the GDP ranking scale during the past few years, Mexico has stalled at 14th. If Mexico could reduce its problem with drug trafficking and the ensuing economic damage, one can only imagine what kind of economic engine it could become because of its strategic location as the path between the U.S. and other surging Latin American countries.

A calming political scene has led to increased trade between regional countries. And as politics have stabilized, there has also been a tremendous wave of privatization and deregulation in the telecom sector throughout the region.

Telecom Outlook

Infrastructure and telecommunications are poised for growth, assuming that current conditions hold. Commercial Long Term Evolution (LTE) services, for example, could have more than 14 million subscribers by 2014. The size of the prize is the more than 500 million Latin Americans who will be connected with phones, laptops, two-way radios and other devices.

The market conditions can vary from country to country and category by category. The Mexican cellular market is concentrated under the corporate structure of Carlos Slim's Grupo Carso, which also has large shares of other Latin American markets. Similarly, Spanish-owned Telefonica owns a majority share of many Latin American cellular carriers. Yet, some of the smaller, less economically developed countries have fragmented telecom markets. Some countries' technological markets are sophisticated while others are primitive.

Growth Potential

The wireless and telecommunications arena in Latin America presents the same problems as it does in any other region, with the added dimension of international shipping, financial transfers and regulation. Pricing is an issue, as it is anywhere, and in a developing region it is a larger concern because budgets are even tighter.

Categories identified as having growth potential — in addition to the traditional public-safety sector, which should grow significantly as the expanding middle class demands more stability — include national and homeland security and defense, and natural disaster notification. Mining, energy production, transportation and natural resource development are also sectors that should experience large growth.

The big names in telecommunications will continue to dominate, and Asian manufacturers have targeted the region for development. As recently as June, China Telecom and China Telecommunications Service announced expansion plans for Brazil. But there are still many opportunities for the correctly positioned manufacturer that is looking to export to Latin America. ■

Steve Baroch has worked in electronics and telecom for more than 20 years and is a partner in The NetMark Group, a manufacturers' representative group covering the mountain states in the United States and all Latin America. The NetMark Group specializes in telecommunications and electronics products. Contact Baroch at sbaroch@thenetmarkgroup.com.

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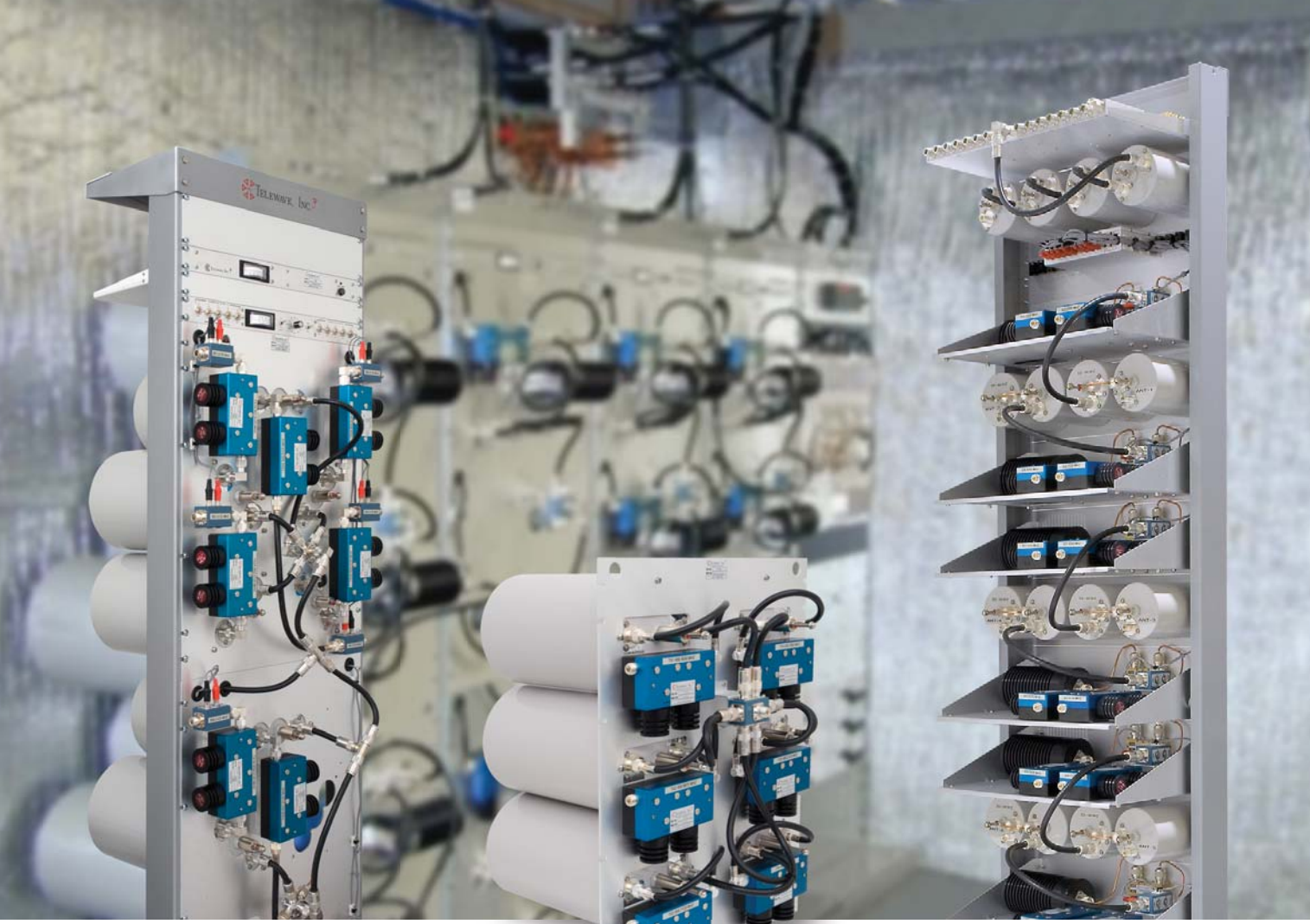

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