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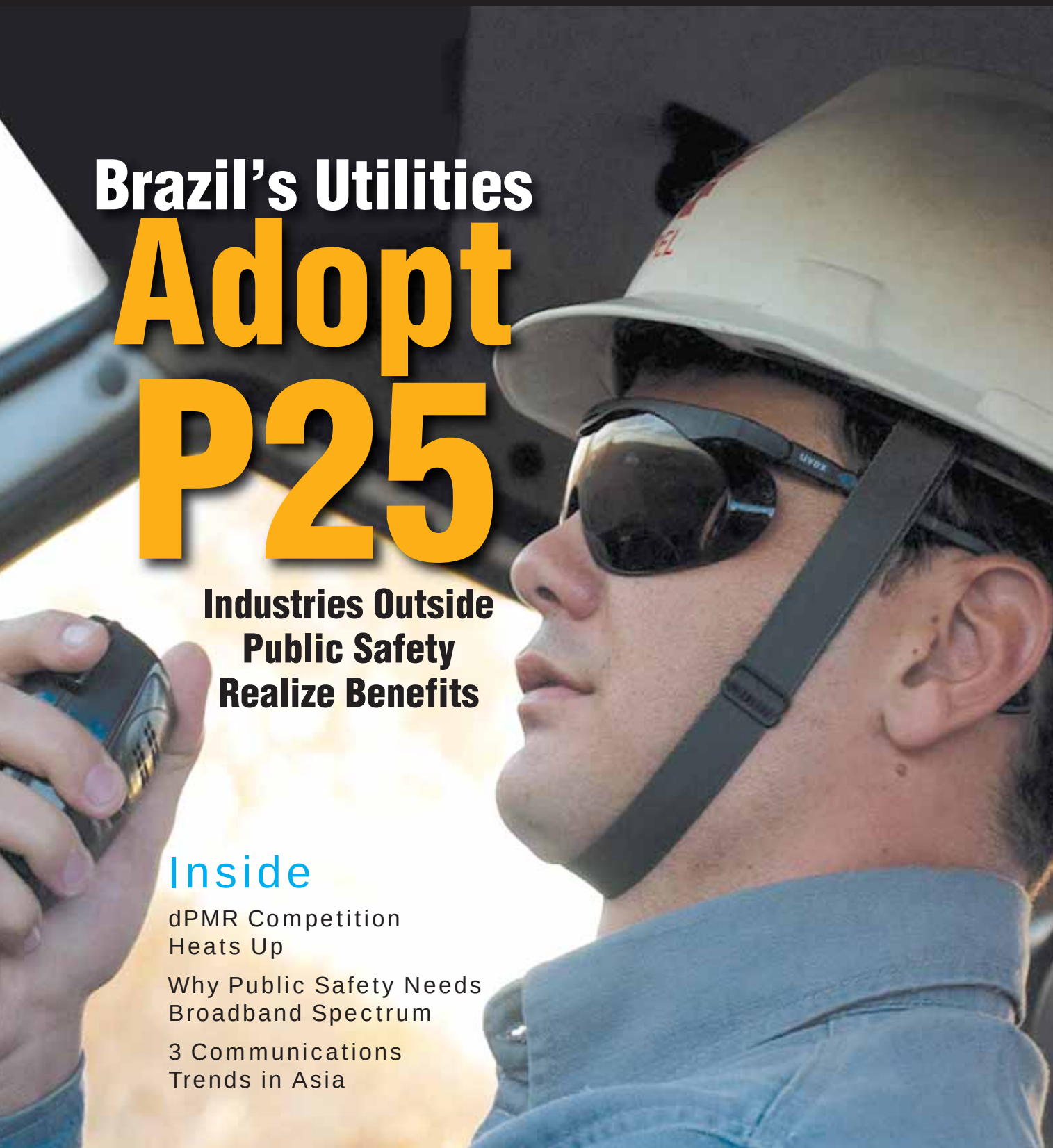

Brazil's Utilities Adopt P25

Industries Outside Public Safety Realize Benefits

Inside

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Australia's Spectrum

The Australian government dedicates spectrum for public safety.

Separate Data Devices

Users may soon have two devices, one for voice and one for broadband.

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READER SERVICES

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Broadband Challenges Around the World

Varying developments in public-safety broadband communications have evolved in Europe, Asia and the United States during recent weeks. The long-term implications for different strategies in geographic regions remain to be seen. A unified effort would likely lower costs and increase competition in the market.

In Europe, one nationwide TETRA operator is establishing a 3G mobile virtual network operator (MVNO) service to allow its users to access data services before spectrum issues are resolved among the European Union member states. Belgium's ASTRID plans to award a tender in February and provide data services through the country's three 3G operators but with features tailored to public-safety requirements. See Page 8 for more details on ASTRID's plan.

The European Commission recently added 120 megahertz to the spectrum portfolio for 4G technologies, such as Long Term Evolution (LTE), around the 2 GHz band but only for consumer mobile broadband applications. Spectrum for public-safety broadband communications in Europe is still up in the air and likely won't be resolved for several years.

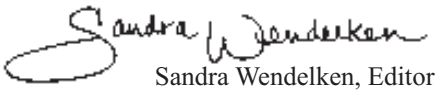
In Australia, the telecom regulator in October made available 10 megahertz of 800 MHz spectrum for a dedicated nationwide interoperability network for public safety. The plan also includes 50 megahertz of spectrum at 4.9 GHz.

Australia's plan aligns somewhat with the U.S. plan to build a nationwide public-safety broadband network, except that the United States has allocated 20 megahertz of spectrum in the 700 MHz band. How the different frequencies will affect worldwide volumes of LTE equipment for public safety remains to be seen.

In fact, public-safety-specific LTE standards are still not defined, and that will affect the global market as well. Thailand's Maj. Gen. Suchart Kangwarnjit makes the case for a unified Asian organization to address public-safety broadband needs in the article that begins on Page 26.

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

Perhaps a worldwide organization of public-safety professionals to address harmonized spectrum, standards and requirements could bring more cost-effective, efficient communications to first responders and other mission-critical communications users globally. It's hard to find agreement within a specific country or region, so a global alliance would not be an easy task. But the long-term benefits could very well be worth it.



Sandra Wendelken, Editor
swendelken@RRMediaGroup.com

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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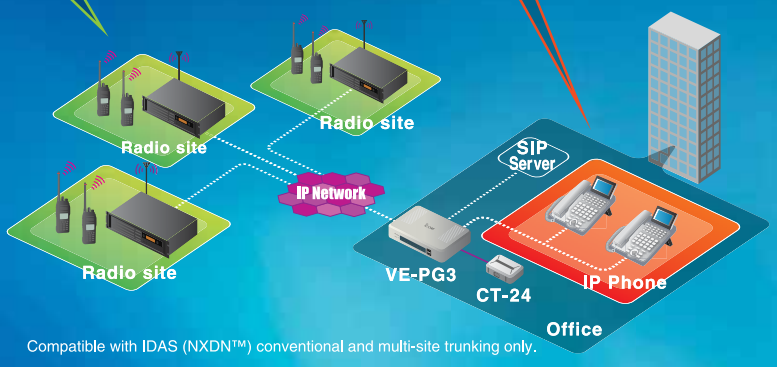

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EUROPE

ASTRID Plans MVNO for Public-Safety Mobile Data

ASTRID, the Belgian nationwide TETRA operator, is moving forward with mobile data plans for its users through a commercial mobile virtual network operator (MVNO) service rather than waiting for spectrum and technology details to be hammered out through the European Union (EU) and various public-safety association working groups.

ASTRID is analyzing offers to a public tender for a data MVNO model under which the three Belgian GSM network services would be used initially. The service would incorporate a subscriber identity module (SIM) card configured with public-safety features such as nationwide roaming and end-to-end encryption.

"In Europe no spectrum is free from regulators to deploy a dedicated data network for public safety," said Christian Mouraux, ASTRID product management and market intelligence manager. "People are working on it, but we are not there yet. In the meantime, we don't want our users to go to the public GSM operator. We want to offer them an MVNO service, put in place and managed by ASTRID, so they can get a higher service level from GSM operators."

The Belgian TETRA operator plans to award a data contract in 2013.

The tender has three parts. First, ASTRID is seeking a third-party roaming hub partner to ensure international and nationwide roaming, something not currently available in Belgium. Another part of the tender includes a dual SIM card, with a mobile termination (MT) that would be activated by the roaming partner and a second MT that is silent and could be activated by ASTRID once it launches its own dedicated network. The third piece of the tender is for the management platform including the servers, virtual private network (VPN) and control units for the public-safety service.

ASTRID received applications in April and selected a short list of the best candidates in May. The full specification was provided in July. ASTRID received the candidates' first offers and is starting negotiations. "Our objective is to award the contract to the best bidder by the beginning of February and then start with the implementation," Mouraux said.

BRUSSELS, Belgium — The European Commission added 120 megahertz to the spectrum portfolio for 4G technologies, such as Long Term Evolution (LTE), around the 2 GHz band. The decision makes it mandatory for member states to open the relevant spectrum by 30 June, 2014, and lays down harmonized technical conditions to allow coexistence between different technologies.

The band currently is solely used for UMTS wireless communications, known as 3G networks. With the decision, the member states will have up to twice the amount of spectrum for mobile broadband as in the U.S., around 1,000 megahertz. Europe's Digital Agenda has a broadband target of universal European Union (EU) broadband coverage of at least 30 Megabits per second (Mbps) by 2020.

BUCHAREST, Romania — TETRA technology from **Zetron** is enabling communications in the remote Exxon Neftegas Chayvo oil field on Sakhalin Island, just off the east coast of Russia.

The oil field's production platform, onshore processing facility and oil terminal are each equipped with Zetron digital consoles linked by E1 circuits. Console operators have control over all marine-band UHF, air-band VHF and **Motorola Solutions** TETRA radios, as well as landline telephony. In addition, Zetron remote desktop controllers are deployed on the oil field's production platform.

SØNDERBORG, Denmark — ATEL Telekomünikasyon provided **DAMM**'s TETRA infrastructure and dispatcher applications to Ana gold mining at Çöpler Gold Mine in Turkey. Alacer Gold Canada/Australia owns the mine. Çöpler Gold Mine is an open pit mine located 120 kilometers southwest of Erzincan, Turkey.

The TETRA network will provide private and secure voice and data access through all mining fields and operation. The network also provides worker safety with man down and emergency call features. Supervisory control and data acquisition (SCADA) and telemetering applications will also be available.

ASIA

BEIJING — Cassidian, an EADS company, won the contract to expand the metro coverage of Beijing Government Shared Radio Network. The expansion will improve coverage and provide communications for the Beijing metro police.

Cassidian will provide 24 base stations to expand the coverage of the new Beijing metro lines. The delivery and implementation will be in 2013 and 2014. After the network is finalized, all the running 17 metro lines will be equipped with Cassidian's TETRA system.

Beijing Government Shared Radio Network is the largest digital trunked network in Asia and the biggest city-wide TETRA network in the world, covering the Beijing city area, venues, metro lines, counties, main highways and important buildings.

In addition, Cassidian won a bid to

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deliver a TETRA system for the first tram network in Shenyang, the provincial capital of Liaoning, in China. The project will build inner-city and intercity trams in coming years.

DHAKA, **Bangladesh** — Dhaka Police of Bangladesh completed the initial phase of upgrading the analog communications system to a Digital Mobile Radio (DMR) network from **Hytera**. The Bangladesh police are working to bring all the police stations across the country onto the network.

In the first phase, all the superintendents of police and inspectors under the districts were provided DMR handsets. On-duty police officers of each police station were also equipped with the handsets to replace the analog radios. More than 2,300 Hytera DMR units, including portables, mobiles and repeaters, were delivered for the system in 15 districts of the Dhaka range.

Hytera Mobilfunk Buys Fjord-E-Design

Hytera Mobilfunk acquired fjord-e-design (FED), a Flensburg, Germany, company specializing in wireless protocols. FED has experience in the development of TETRA and TETRA Enhanced Data Service (TEDS) protocol stacks, as well as TETRA measurement technology. The value of the deal was not disclosed.

In addition to the Hytera center of competence for TETRA in Bad Münder, Flensburg is the second development location of Hytera Mobilfunk in Germany. The existing FED customers and sales will continue to be managed from Flensburg.

"The acquisition of FED is an important step for Hytera Mobilfunk to accelerate the further development of the TETRA portfolio toward TETRA-2/TEDS as well as Long Term Evolution (LTE)," said Dr. Georg Haubs, managing director of Hytera Mobilfunk. "In the future, we will be able to react to the demands of the market even faster, and together we will offer the best and most innovative products, both with regard to infrastructure and radio terminals."

Hauke Holm, managing director of FED, said the company's experience with TETRA and TEDS fits Hytera's competences in the field of system infrastructure technology and radio terminals.

Chinese firm Hytera Communications purchased Rohde & Schwarz Professional Mobile Radio (PMR) last year.

KUALA LUMPUR, Malaysia — 3T Communications and **Sepura** were awarded a contract to supply a TETRA system covering four Malaysian international airports — Kuala Lumpur, Penang, Kuching and Kota Kinabalu. The project with Malaysian Airports Holdings Berhad (MAHB) includes one 3T TETRA system for each location and more than

Continued on Page 14

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- Dual microphone for noise cancellation

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- Hearing protection, noise cancellation
- Ears-Free for situational awareness

H-400 Submersible speaker microphone
- IP68 rated
- Rubber-sealed, slip proof
- Emergency button (option)
- Volume control (option)

HS02 Medium duty headset
- Boom rotates, suitable for either ear
- Adjustable boom mic
- Stable and Comfortable

H-300 Rubber-sealed speaker microphone
- Rubber-sealed, slip-proof
- RJ-45 replaceable cable

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Hong Kong Police Begin ICT Strategy Review

The government of the Hong Kong Special Administrative Region, acting through the Hong Kong Police Force (HKPF), engaged U.K. consulting firm Analysys Mason to conduct an information and communications technology (ICT) systems strategy review.

Analysys Mason will formulate an ICT development plan to enhance traditional policing, expand community police work and strengthen intelligence-led policing. The multimillion-Hong-Kong-dollar consultancy program, which will take place during the next year, will include an in-depth review of the current business environment of the force. The company will review the existing ICT policies, strategies and network infrastructure, as well as identify and anticipate the needs of front-line police operations and the systems and infrastructure required to support them.

Jolly Wong

Duncan Swan

This is the first ICT strategy review that the HKPF has commissioned. Changes in the business environment and the advent of new technology prompted the force to combine the planning for information systems and its communications systems — integrating its approach to IT and telecoms, said Jolly Wong, HKPF chief police telecommunications engineer. The new strategy will ensure that ICT is best used to improve policing and to underpin the HKPF strategic direction and the commissioner's operational priorities.

"It is a privilege to have been awarded this prestigious contract," said Duncan Swan, partner at Analysys Mason. "Bringing together a team not only of technical consultants, but also experts in the field of operational policing, will allow Analysys Mason to provide deep insights into how the Hong Kong Police can use ICT to its best operational advantage. Traditionally, the force has been recognized as a global leader in many of its initiatives, and this strategy will help maintain that profile."

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Continued from Page 10

1,000 Sepura radio terminals with built-in GPS technology.

PERTH, Australia — C4i established an office in Perth, Western Australia, with plans to further expand its presence within the resources sector.

LATIN AMERICA

SAN JOSÉ, Costa Rica — Costa Rica's largest electric utility, Instituto Costarricense de Electricidad (ICE), selected **Tait Communications** to provide Project 25 (P25)-compliant digital radios. More than 1,800 Tait radios will be used by ICE's telecommunications department and power and generation staff.

BELO HORIZONTE, Brazil — Icom America established Icom Brazil, a subsidiary with headquarters in Belo Horizonte, the capital city of Minas Gerais state.

INTERNATIONAL

TETRA Technology Permanently Allowed in United States

The U.S. telecom regulator Federal Communications Commission (FCC) allowed TETRA equipment certification and use in two bands, 450 – 470 MHz and business/industrial/land transportation (B/ILT) 800 MHz. The technology is not allowed in U.S. public-safety spectrum.

The commission said the order "will give private land mobile radio (PLMR) licensees additional equipment alternatives without increasing the potential for interference or other adverse effects on other licensees."

One of the concerns with TETRA noted in comments filed was the potential for interference. Motorola Solutions provided technical analysis showing interference potential, and the TETRA Association provided technical analysis showing no potential for interference.

"We agree with the methodology utilized by the TETRA Association and do not believe it was necessary to perform this analysis at frequency offsets less than 18.75 kilohertz," said the FCC order. "We thus conclude that the TETRA Association's technical analysis accurately represents TETRA systems' interference potential. … We find that TETRA offers adjacent channel protection that is often better than other narrowband systems currently operating in the LMR bands."

The FCC agreed with commenters who argued against allowing TETRA technology in public-safety spectrum.

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GENERAL DYNAMICS

Brazil's Utilities Adopt P25

Utilities and other industries in Brazil are realizing the benefits of Project 25 (P25) technology including its data features.

By Kazimierz J. Malachowski and Rubens P. Boucault

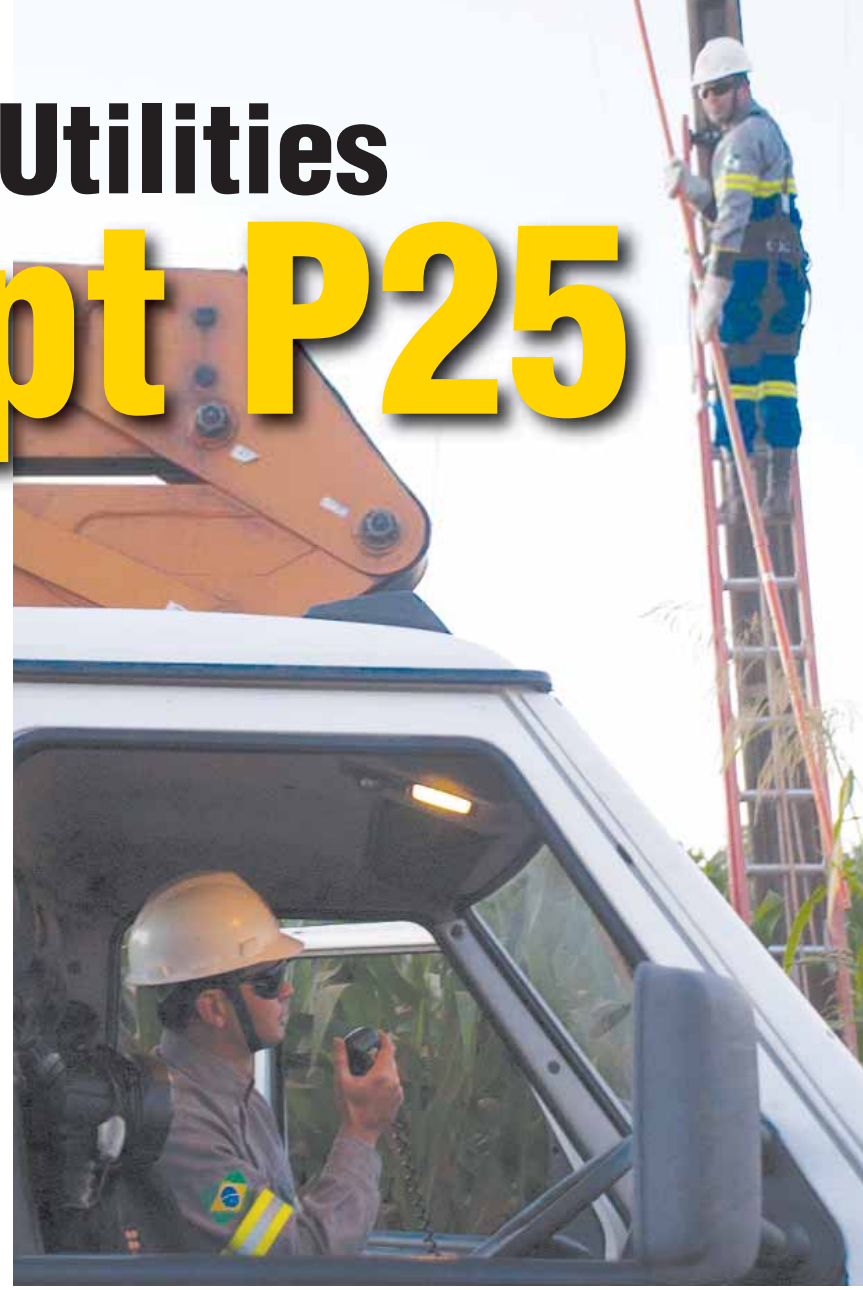

Photo courtesy COPEL

Brazil is one of the largest countries in the world with the seventh-largest economy — a developing nation with strong manufacturing, agriculture and mining industries, as well as booming cities, leading to an increasing need for energy. Brazil is also blessed with enormous water-based resources where dozens of large hydroelectrical power plants are being built by private consortia. Examples include the Belo Monte project, a network of power plants to be completed in 10 years, and Itaipu, a giant complex supplying energy to Brazil and Paraguay.

Brazilian electric utilities are public concessions, controlled by a governmental agency called Aneel. A few utilities are still in the government's hands, but most were offered to private companies for a fixed period of time. Indices of efficiency and reliability have to be met by all utilities, privately held or belonging to the government, and are monitored monthly by Aneel.

Digital Forces

There are three main reasons why electric utilities have to invest heavily in communications, even if it is only a tool and not its core business. In some states, the investment level is so high that the utility creates two separate companies; one for the core utility business and another to take care of telecommunications issues.

The first reason is to comply with Aneel requirements indices, impossible without a reliable and highly integrated communications system. All utilities originally operated mission-critical VHF or UHF analog systems of some kind. Distribution and transmission utilities depend entirely on their radio systems to fulfill Aneel indices, which take into account the duration of electricity outage; the speed of arrival to check a power failure; and how the utility controls and monitors the whole power system of the country, perhaps the most important considering there are many companies in each state and all are interconnected. What happens to one may affect the other.

In addition, the frequencies allocated to each company are expiring; all will expire in a few years. The added complication is the decision of Anatel — the frequency governing body — to reband the VHF and UHF bands, moving the channels from 20-kilohertz slots in VHF and 25-kilohertz slots in

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Photo courtesy Marcelo Pereira, CTEEP

Advances in data features for dispatch and smart grid systems are contributing to Brazil's digital growth.

UHF into 12.5-kilohertz spacing. In addition to the rebanding came the ban on further type approval of analog equipment with a consequent obligation to move the systems from analog to digital platforms.

A third reason for communications investments include the advances from voice-only dispatch to the use of data for dispatch, team localization and automation of the grid, as well as smart grid systems. The meaning of smart grid varies from vendor to vendor and from utility to utility, but all involve radio communications and high investment in resources that may include anything from the power plant through transmission system and distribution network to the consumer facilities.

For these reasons there was an increase in the purchase of new digital systems in Brazil during the past two years. In Brazil international and local vendors offer all existing digital system standards. TETRA, Digital Mobile Radio (DMR) Tiers II and III, digital Private Mobile Radio (dPMR) conventional and trunking, and Project 25 (P25) conventional and trunking have been sold with varying degrees of success.

Why P25?

In spite of being developed for public-safety applications, the P25 protocol has some key characteristics that make it a good choice for power utilities applications. Those key characteristics include, but are not limited to:

- Mission-critical toughness
- The same footprint coverage as the previous analog systems
- Availability in all frequency bands
- Almost no limits on size
- Interoperability with legacy analog systems on the same frequencies
- Availability of conventional, trunking, simulcast and mixed modes
- Better audio quality within a coverage area
- Multiple vendors for terminals and systems

TETRA has the advantage of many vendors and an established platform but has had slow growth in Brazil because of the limited frequency band availability and its restricted coverage area. Its native 380 – 410 MHz band was not available until recently, and it cannot operate in VHF spectrum. DMR and dPMR were also slow to enter the market, and although offered in most bands, there are issues with their use by "mission-critical" systems, besides the limits in the size of the system and availability of vendors.

SGM Telecom, a distributor and systems integrator in São Paulo, offers Tait Communications P25 systems and terminals, while Motorola Solutions and Harris actively market their products as well. Some Brazilian systems use P25 infrastructure from one manufacturer and terminals from another. This is appealing to users that do not want to be tied to only one vendor, which is the norm in Brazil.

System Components

In addition to deciding what digital radios will be used, one must also consider the dispatch centers, data transmission capabilities and supervision of the network elements.

Dispatch Centers. If you check any central dispatch center you can see an array of monitors and keyboards in front of the operators. The dispatch center has to be as practical and user friendly as possible. The equipment must reduce the clutter on the operator's desk. Besides these features, modern dispatch centers have to be digital or at least offer digital interfaces to the external world. IP connectivity has been a must, replacing long-used two- or four-wire interfaces with DC or tone signaling. The console should also natively speak the P25 language, so the P25 Console Subsystem Interface (CSSI) is becoming a must.

These considerations have to be added to an attractive man-machine interface. A utilitarian, practical and well-distributed screen is important, but if you add "sexy" attributes that also make it esthetically clean and pleasant to look at, it can be a strong selling factor.

Based on those aspects, SGM chose two console vendors that implemented the CSSI interface for conventional and trunked P25 and were tested with Tait P25 systems: the Avtec Scout and Zetron Acom platforms. Both systems can deploy hundreds of consoles and link hundreds of sites and repeaters, as well as integrate other resources such as private automated branch exchanges (PABX), cellular networks and public-switched telephone network (PSTN).

Data Transmission. Electric utilities dispatch is increasingly trending from voice-oriented into data-oriented communications. An ideal solution for a distribution utility would be the transfer of a call center ticket electronically to an available repair team nearest to the incident location. To do so, the amount of data over the air can be reduced to a minimum that can be handled conveniently by the restricted data handling capability of a narrowband radio. A suitable handheld device with prepared forms helps the repair crew receive job orders quickly without error and record the operations for accountability. SGM worked with NASTEC, a Brazilian company, to

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In addition to the rebanding came the ban on further type approval of analog equipment with a consequent obligation to move the systems from analog to digital platforms.

adapt its job-order software to transmission over the P25 system.

Other data needs can be transmitted over the narrowband P25 system, such as AVL to localize the teams in the field and help the teams find the incident location; and radio-activated reclosers, which use commercial carrier GPRS technology whenever available and use portable narrowband radios in areas where a cellular network is not reliable, does not exist or is too expensive. With good wide-area coverage provided by narrowband P25 at a small cost, a range of services can be imagined and implemented.

Supervision. P25 repeaters and console centers, as well as other network elements, offer a comprehensive array of system and equipment diagnosis and remote maintenance tools. Every P25 Tait repeater deployed by SGM has IP connectivity and presents a complete diagnosis of its health and operational status anywhere on the network. The same occurs with switches, routers and consoles. System administrators have the tools available on their office desks. System technicians can have those tools on the move, as long as they are tied to the corporate network.

SGM Deployments

Being a traditional supplier of systems to electric utilities, SGM did not want to be left behind and decided to enter the market following successful implementations of digital P25 systems in the public-safety and transport segments. Given its previous successes, SGM was able to secure contracts with the following utilities in São Paulo, Espírito Santo and Paraná states:

■ COPEL (Companhia Paranaense de Energia Elétrica) — Nine VHF P25 conventional repeaters, 200 mobiles, 45 portables and 10 dispatch consoles with analog-to-digital gateways.

■ EDP Bandeirante — 37 VHF P25 conventional repeaters, 250 mobiles, five portables, 66 fixed stations and 15 video dispatch digital consoles.

■ EDP Escelsa — 28 VHF P25 conventional repeaters, 170 mobiles, 35 fixed stations and 34 portables.

■ CTEEP (Companhia de Transmissão de Energia Elétrica Paulista) — 68 UHF P25 conventional repeaters, 160 mobiles, 330 portables, 108 fixed stations and 10 video dispatch digital consoles.

COPEL and both EDP companies replaced or will replace analog systems. CTEEP had to build a new system, including new sites, towers and microwave backbone, from scratch. CTEEP already had some UHF equipment, so it will use the newly rebanded UHF channels in 12.5-kilohertz spacing. The other companies replaced VHF analog systems, which will all use the rebanded VHF channels.

Replacing old systems or implementing a new one presents obstacles. The new system's coverage must be at least as good or better than the replaced system. A man in the field, already accustomed to certain bad coverage areas, will not want the addition of new "dead" coverage areas. The expectation is to always have a better tool than the previous one.

The terminals should be easy to use. The old terminals were hardware oriented and had few features besides push to talk (PTT). The new terminals, software based, feature large screens, multiple lines, icons and alarms. Good training is a must.

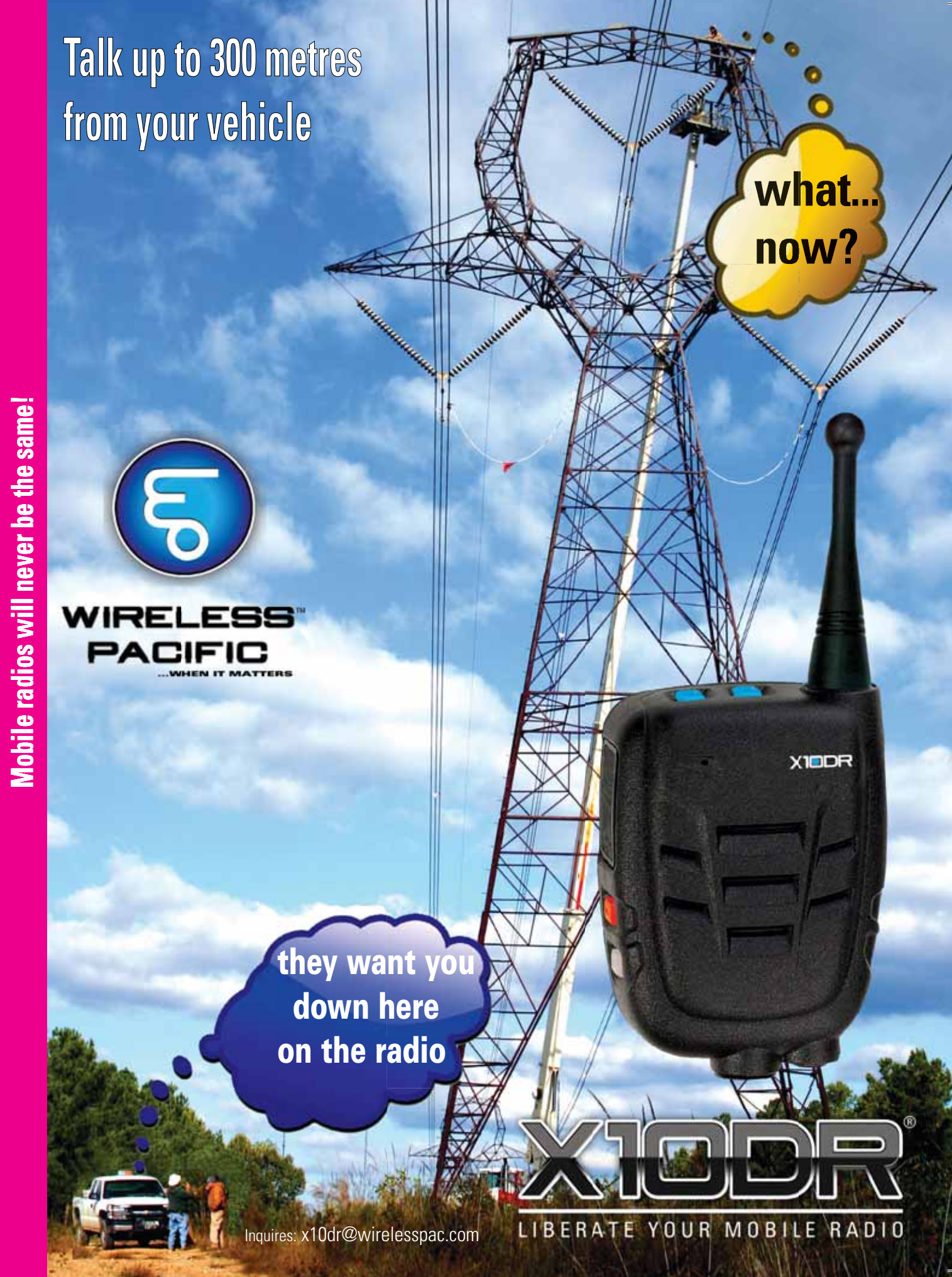
Implementation Challenges

The implementation must take into account that the communications system is being installed on a live electric utility, which means installation and commissioning teams have to mind the client's internal rules, and the job cannot impact daily operations. Although not as difficult as implementing a new radio system on an operational railroad, there are still barriers that will ruin any schedule if project management is not on its toes. For example, in a statewide system it is almost impossible to install all mobiles within a schedule calculated in the office. Urgent problems, electric outages and weather have a way to intrude on orderly plans. And because of complicated labor legislation, technicians and engineers have to comply with tens of regulations, from health certificates to "work on towers certificate" to safety training certificates.

Despite the implementation challenges, the utility market is one of Brazil's market segments that is growing and in need of new digital solutions for mobile communications. The rail industry, in constant expansion fighting against decades of underfunding, is another growing market. The oil and mining industries are other segments where digital mission-critical equipment can offer definite advantages. ■

Kazimierz J. Malachowski is an electronic engineer and is commercial director at SGM Telecom in Brazil. The radio communications division falls under his responsibility, which includes marketing, sales, implementation and after-sale support to radio communications systems in three main market segments: public safety, utilities and transportation. Malachowski previously worked for Philips Telecommunications Division in a variety of positions.

Rubens P. Boucault works for SGM Telecom as system engineer department manager. Under his responsibility is marketing, design and sale of radio communications systems with emphasis on utilities and rail transportation. His expertise includes implementation and after-sales support. He also trained clients' engineers in operation and maintenance of console systems. Email comments to editor@RRMediaGroup.com.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dPMR Competition ESCALATES

As more vendors release digital Private Mobile Radio (dPMR) products, customers around the globe enjoy phased migrations from analog to digital.

By Pete Hizzey

A crucial measure of the likely success of any new technology standard is the uptake by the manufacturing industry. The target in every case is that of a multivendor environment whereby the users are assured of competition-based pricing and longevity of supply. At the recent digital Professional Mobile Radio (dPMR) Association meeting in WuXi, China, members were pleasantly surprised by the arrival of six new Chinese manufacturers, all with TS102 490 and TS102 658 standard radios for interoperability testing. A full range of interoperability tests was undertaken, and pass rates were virtually 100 percent. The six new Chinese manufacturers are:

- Tianjin 712 Communication & Broadcasting
- Quanzhou Feijie Electronics
- Xiamen Puxing Electronics Science & Technology
- Fujian Nanan Quansheng Electronics
- Quanzhou Xinwei Electronics
- Fujian Wanhua Electronic Technology

A major catalyst that facilitated the entry of many new manufacturers and products is the availability of dedicated chipsets for the dPMR protocol. Two distinct offerings, the SCT3252 digital baseband processor from Sicomm and the CML Microcircuits CMX7141 digital PMR/LMR platform processor, are available. These two silicon products provide the core channel coding of the dPMR protocol, leaving designers with the simplified task of interfacing the codec, control processor and RF circuitry — clearly a faster route to market than undertaking a full protocol development from scratch.

Manufacturers are starting to address migration by the design of dual-standard terminals and networks that support multiple protocols. Fylde Micro Systems and Icom released dPMR Mode 3 trunked professional systems components. Fylde's MultiLingo trunking controller supports dPMR and other trunking protocols such as MPT 1327. Using the multiprotocol controller, migration and support may be mixed on a radio terminal basis or by radio channel, radio site or region. Icom introduced the IC-F3262D and IC-F4262D series of radios that are also dual mode (dPMR/analog). These multiple standard, multiple role products are facilitating cost-effective refarming of analog radio systems. Development systems that implement cross calling between dPMR and MPT 1327 radios within the same network are up and running.

Mode 3 trunked radio networks can be coordinated by a regional server, providing 1,024 radio sites. Given that each site could support 60 voice channels and that the network could host up to 500,000 subscribers, dPMR offers the potential to supply nationwide coverage.

In conjunction with the silicon products available, Etherstack offers dPMR mobile and base station protocol stacks. Aeroflex is a well-known manufacturer of digital radio test equipment that allows a manufacturer to accurately measure and confirm whether its product is compliant with the dPMR Common Air Interface (CAI), as well as RF specifications for

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Representatives from the newly certified dPMR manufacturers during an October 2012 interoperability testing session.

type approval purposes. From an applications perspective, Wireless Pacific will soon provide a portable repeater product based on the dPMR protocol.

Based on the wide range of components that can now be used by manufacturers, the realization of obtaining a dPMR product has become a higher possibility, without having to develop a product from scratch. This is a real advantage for small radio and infrastructure manufacturers looking to enter the world of digital two-way radio.

Customer Deployments

One dPMR system serves principally the Liverpool, U.K., city bus company. "Our customers now enjoy clearer audio communications (compared with the previous analog) over a wider geographical area than before," said Paul Benson, technical director of Northwest Radio, a U.K. operator that replaced its community base repeater system with an Icom IDAS system. The excellent audio quality of digital improves communication, and as a result, users can exchange information more effectively, reliably and faster than before. Furthermore, IDAS also enabled effective communications in black spots, where the former analog system could not cover.

"We had a standalone three-channel UHF CBS system, which was reaching the limits of its performing capability," Benson said. "We looked at MPT 1327 trunked systems from various manufacturers. We wanted something modern that was future proof."

Security guard operations in various industries where the guards' radios operate in conjunction with fixed beacons that define the surveillance area are covered by a system called i-LOC. For example, Cargiant, the world's largest car dealership, adopted the technology to cover its 23-acre site in London.

The i-LOC security management system can be installed on a standard desktop Windows-compatible computer. The system manages all voice communications and text messaging between the portable radios and logs and stores all radio traffic on a central database. This makes it an ideal management tool for control and resource planning and helps with personnel coordination.

"The system has enhanced Cargiant's health and safety remit by offering all radio users the ability to send emergency alerts (including man down and lone worker) in conjunction with the location of the radio user," said Danny O'Sullivan, director of EARS, a U.K. distributor that sold the system to Cargiant. "The server then sends a text message to all other radios informing them of the name and location of the radio that is in the emergency mode."

Michel Drevet, information communications technology (ICT) officer for French Red Cross, said dPMR has become the standard used by the organization.

The French Red Cross invested a lot of money in its analog network and it was important to continue to use those radios as much as possible with dPMR. The agency manages hundreds of counties, and the needs are different from one to another. The capacity to deploy a simple network up to very complicated systems with many features was an important point. Many of its operations take place on the spot and are completely unscheduled. With analog radio it is simple to set up a new network.

"We found that same advantage with dPMR because it is an FDMA technology," Drevet said.

Not all the features, including GPS positioning, data transmission and improvement of audio, will be used but depending on the county and the needs, the agency has the capacity to pick the features needed. Each county can decide one by one, to go to digital. This migration will be done step by step. Some counties have already migrated to dPMR, and others have started to change their radios to prepare for this evolution.

Icom France installed a new mixed analog/digital radio network in Djuba, South Sudan, for the United National Refugee Agency, UNHCR, at the end of 2011. Fifteen sites were equipped with an Icom dPMR repeater and IP gateway.

From Djuba, it is now possible to call any two-way radio within the coverage of one of the repeaters, in either analog or digital mode. The capacity to establish repeater links through IP, not only for digital dPMR radio but for analog legacy radio as well, gives UNHCR the capacity to move slowly from analog to digital.

A shopping mall in London also installed a dPMR system for the Senator Security company that secures the site. The earlier analog system was known for coverage problems. When a young child became seriously ill in an area of the complex that was previously a radio dead spot, a guard administered first aid and called for help.

"The amazing thing about this incident was that a new digital IDAS radio system was installed just one day before the incident," said Sam Cohen, managing director at Wall to Wall Radio Communications, a U.K. mobile radio distributor. "The improved radio coverage from the new digital radio system may have assisted in saving this little boy's life."

Each of these illustrations provides a small picture of the scope and variety of dPMR systems currently in operation. Systems vary from small local systems to large-area networks, but the key issue is migration to digital. Many large regional and national trunked radio networks are in commercial operation. A dilemma for network operators is the migration from their existing analog technology to new narrowband digital technology. Network operators face extreme risks that a switchover may result in a catastrophic loss of service to the users from which the business may never recover. Clearly, the migration strategy is as important as the choice of the technology.

During the next 12 months, dPMR is poised for acceleration in the number of manufacturers with interoperable products, the capability to allow new entrants into the digital realm and the emergence of applications and services to complement the hardware available or soon to come. ■

dPMR Manufacturers

Radios

ETSI Standard TS102 490 (License Free)

- EIL
- Wintec
- Icom

ETSI Standard TS 102 658 (Modes 1 and 2)

- Icom
- Tianjin 712 Communication & Broadcasting
- Quanzhou Feijie Electronics
- Xiamen Puxing Electronics Science & Technology
- Fujian Nanan Quansheng Electronics
- Quanzhou Xinwei Electronics
- Fujian Wanhua Electronic Technology

ETSI Standard TS 102 658 (Mode 3 Trunked)

- Icom

Repeater/Network Controllers

- Icom (Mode 2)
- Fylde Micro Systems (Mode 3)

Silicon Chipsets

- Sicomm
- CML Microcircuits

Protocol Stack Software

- Etherstack

Test Equipment

- Aeroflex

For all dPMR Association members, visit dpmr-mou.org

Pete Hizzey is one of the co-authors of the European dPMR standards, TS102 490 and TS102 658, as well as chairman of the dPMR Memorandum of Understanding (MoU) group since it was formed in 2007. Hizzey is also research manager for Icom and responsible for all technical, regulatory and legislative issues for Europe. He has been involved in European standardization since 1988 and is responsible for many radio standards. Email comments to editor@RRMediaGroup.com.

Why Public Safety Needs Broadband Spectrum

Public protection and disaster relief (PPDR) officials rely on mobile broadband spectrum to perform their critical jobs more effectively.

By Maj. Gen. Suchart Kangwarnjit

The Royal Thai Police's mission is the prevention of, and the protection against, man-made or natural events that can endanger the public from significant injury, danger, harm or damage. The police organization is one of three primary public-safety organizations that respond to emergency events in Thailand, in addition to the fire service and ambulance or emergency medical service (EMS). Primarily the organization's responsibility is to respond to daily emergencies and to aid in the recovery efforts once the disaster has been contained or passed. There are a variety of other organizations that may exist in your country that help during times of disasters, such as water and electric utilities, local hospitals, airports and traffic enforcement departments.

Most public-safety organizations are similar in operations and face common constraints and challenges. Because of small budgets, many public-safety organizations must use old and limited technologies. Agencies often have large geographical areas to cover, sometimes even an entire country. Officers' jobs are hazardous and at times life threatening, yet the public expects this.

Natural disasters are reaching higher levels of destruction than ever before. Public safety must respond faster and be more effective than before to save lives. This requires agencies to work together, often across borders. An earthquake or typhoon does not distinguish between countries and does not know borders. To save lives and minimize damage, cost-effective technologies that are interoperable across borders are helpful.

Spectrum's Importance

Without any or enough spectrum, there is no effective public protection

and disaster relief (PPDR) response. PPDR organizations depend on spectrum as a critical tool and resource. When a police officer or fireman is in danger, radios are the only way to call for immediate help. Two-way radios are the preferred technology because of generally good coverage inside buildings, speed of call setup and performance of group calling to many officers at one time.

The 700 MHz digital dividend spectrum gives public-safety organizations a tool for emergency response and disaster management. The 700 MHz band enables public safety to access mobile broadband for full-motion video from the field. Many public-safety organizations around the world are looking at the Long Term Evolution (LTE) standard as the next technology for communications.

Public-safety organizations will require dedicated broadband spectrum to guarantee uninterrupted video from the disaster site, requiring a minimum of 10 x 10 megahertz and ideally 20 x 20 megahertz. The U.S. and European public-safety organizations have researched broadband spectrum needs and determined that a 10 x 10 megahertz block of dedicated spectrum is barely adequate. Studies by a German consultant concluded that a 15-megahertz uplink and a 10-megahertz downlink are required for public safety.

Regulator Suggestions

Regulators should take PPDR spectrum requirements into consideration as they plan for the 700 MHz digital dividend. In addition, authorities should protect licensed spectrum from interference. Enforcement of the non-interference rules ensures that frequencies are clear for emergency communications. When PPDR licensed frequencies are interfered with, PPDR organizations have to request clean and unused frequencies, which only compounds the lack of spectrum. When public-safety communications is interrupted or experiences interference, lives can be lost.

Public systems cannot guarantee adequate bandwidth and/or coverage and provide guaranteed emergency and priority access for PPDR subscribers. The commercial carrier business model is based on profit, which drives companies to size their capacity in a certain manner. Public systems are good for providing affordable communications to the public. But asking public operators to provide specialized communications to PPDR standards and technical requirements would increase the cost of communications significantly. The PPDR organization's business model is based on quality of emergency service, and we build our systems based on worst-case situations.

Regulators should also consider updating or eliminating some rules and regulations to reflect the latest technologies. Authorities should strive for better interoperability among various

Mobile broadband can be used to search for trapped survivors after an earthquake by viewing camera feeds from robots in destruction areas.

emergency responders. For example, there are times when PPDR must work with the water, electricity, or oil and gas industries. We must have fast and secure communications that will enable us to work together quickly. Interoperability can be solved in many ways. New rules and regulations are not necessary. PPDR needs regulators' support in achieving effective communications and operations during times of crisis with all of the various responding industries.

Telecom regulators should not mandate technology standards to the PPDR industry. There are many technology standards, each with strengths and weaknesses. PPDR organizations can best determine which is the correct technology standard based on budgets and operational requirements. If regulators mandate a technology standard that PPDR organizations cannot afford or use, public safety suffers.

PPDR needs harmonization of frequency bands not just within the Asia/Pacific region but also with the United States and Europe. This will allow PPDR organizations to buy from companies with larger economic trading areas that offer the lowest prices. Most countries use VHF, 380 MHz, UHF and 800 MHz for narrowband two-way radio. These bands are globally deployed, and there is a large market supply of radios in all of these bands, making them affordable. There is a concern that the 700 MHz digital dividend will not be as harmonized as narrowband two-way radio, especially with the potential for different band plans that will not provide interoperability between neighboring countries. When each country has its own unique band plan, it limits options to more expensive choices because there are fewer suppliers in those unique bands. Worse yet, it discourages and may prevent interoperability because of spectrum incompatibilities. Unlike a commercial business, PPDR organizations depend critically on interoperability to get aid and resources into disaster areas for relief.

The Federal Communications Commission (FCC), the U.S. telecom regulator, has a Public Safety and Homeland Security Bureau (PSHSB) that closely tracks public-safety spectrum needs and requirements. A "critical industries" or a "public safety" department should be created within each country's administrations. This department can represent the various industries that are critical to the economic welfare and the safety and security of the citizens of our respective countries, such as public safety, electricity, water, oil and gas, manufacturing and others that are strategically important to governments.

PPDR Suggestions

Spectrum is becoming scarce because there are many more wireless devices in use. As an industry, we must use spectrum efficiently, yet still have enough to meet our capacity needs when a disaster strikes. We should explore partnerships with other critical industries that also have a need for private, dedicated spectrum. We need to plan for future technologies that use spectrum more efficiently and include them in budget plans for procurement. As we phase out old communications technologies, we should also return spectrum that is no longer used.

Regulators should be kept up to date on technology and PPDR needs as crime rates evolve. If crime starts to rise, more public-safety activities will be needed, creating a larger demand for communications. We should invite regulators to learn what we do, how we communicate and how spectrum is needed for us to do our jobs effectively. We also need to share how we use various communications technologies in disaster scenarios so that regulators understand that certain technologies work best under certain situations.

The Asia/Pacific region should consider forming a professional association where public-safety organizations can share best practices and address common communications issues. The United States, Australasia, Canada and the United Kingdom all have Association of Public Safety Communications Officials (APCO) International chapters. APCO's mission is to educate public-safety organizations on communications and technology. The TETRA and Critical Communications Association (TCCA) promotes one technology across many industries. While APCO may have started and supported the development of the Project 25 (P25) standard, APCO does not care which technology is used for public-safety communications. Indeed, the British APCO is technology neutral; the U.K. uses a nationwide TETRA system for PPDR. In 2005, there was an attempt to start an APCO chapter in the Asia/Pacific region. We need to organize a regional chapter for the benefit of our profession, industry and region.

Finally, public safety and critical infrastructure industries understand the

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PPDR Broadband Applications

There are numerous immediate public protection and disaster relief (PPDR) applications and more are expected. Mobile video can be used for the following applications for command decision-making:

- During a high-speed car pursuit to determine whether to call off the pursuit because of associated dangers, such as the number of innocent bystanders in the chase area.
- To view multiple camera angles on hostage situations or during a bank robbery.
- To monitor the health of firemen when they enter a burning building or while they fight a bush fire.
- To see what the SWAT officers see as they start a rescue operation.
- To view the video camera feeds from robots in destruction areas to search for trapped survivors after an earthquake.

need for dedicated, private spectrum. It is a constant challenge for government agencies to battle against public carriers willing to pay a lot of money for spectrum. For many cash-poor countries, this is a tempting offer. We need to keep educating our regulators, government officials and policy-makers about the need for dedicated spectrum for public safety and for critical industries by defining the amount of PPDR spectrum that we require during the next 10 to 20 years.

Both the U.S. and Europe conducted extensive research into their spectrum needs. For Europe, this resulted in the successful allocation of spectrum from National Atlantic Treaty Organization (NATO) and harmonized a band in Europe for TETRA technology. For the U.S., this resulted in new PPDR broadband and narrowband spectrum in 700 MHz digital dividend. In the Asia/Pacific region, with natural disasters increasing in severity and man-made disasters and emergencies happening more frequently, we must plan spectrum requirements for the future because the process takes a long time.

In the end, we need to start coming together as a PPDR industry to speak with one voice on spectrum requirements. We also need to work closely and better with our regulators to help them understand our responsibility to society. More effective use of spectrum can be achieved when the end user, regulator and manufacturers all talk to understand options, constraints and the impact of the choices we make. If we don't work together, we will all lose the battle for spectrum. ■

Maj. Gen. Suchart Kangwarnjit works for the Royal Thai Police, communications division, in Bangkok, Thailand. Email comments to editor@RRMediaGroup.com.

Editor's Note: This article covers presentations the author made at the Asia-Pacific Telecommunity (APT) meeting in Chiang Mai, Thailand, and the third annual Asia-Pacific Radio Spectrum Conference in Hong Kong during 2012.

Product Expo: Antennas and Accessories

ANTENNAS

Carlson Wireless Technologies

Carlson's high-gain omnidirectional base station antenna is designed to meet the demands of TV white space, which is unused spectrum located between 470 – 698 MHz. The antenna optimizes the performance of Carlson's RuralConnect broadband radio. The design provides strong, consistent gain across the entire UHF band and is not limited to specific channels or geographic areas, and it can withstand extreme weather conditions.

www.carlsonwireless.com

Codan

The 3046 is a low-profile, 125-watt high frequency (HF) antenna-tuning unit designed to deliver high performance and reliability in harsh environments. The device provides high speed and efficient tuning of short and long whip antennas across the full operational HF band. With a 125-watt RF power handling capability, the antenna can be used for voice (including frequency hopping) and data operation across the full 2 – 30 MHz frequency band. The tuner offers an unlimited tune from memory capacity, and when using a tuning algorithm, new frequencies are tuned in typically less than one second.

www.codanradio.com

Linx Technologies

The µSplatch antenna uses a grounded-line technique to achieve outstanding performance from a tiny surface-mount element. The antenna is designed for hand or reflow-mount directly to a product's circuit board. The low cost makes it ideal for volume applications, Linx executives said. The compact antenna exhibits good proximity performance, making it appropriate for handheld applications such as remote controls, pagers and alert devices. The µSplatch is available in the following frequencies: 403, 418, 433, 868 and 926 MHz and 2.4 GHz.

www.linxtechnologies.com

Mobile Mark

Mobile Mark's LTM series antenna combines five separate antennas in one compact housing that measures 5.7 centimeters tall and 12.7 centimeters in diameter. New multiple input multiple output (MIMO) radios offer high data speed and capacity, but to ensure optimum performance, users need MIMO antennas on both the transmission and receive ends. The

LTM series mounts to vehicles or fixed locations and contains two Long Term Evolution (LTE) 700 antennas (694 MHz to 2.17 GHz), two Wi-Fi antennas (2.4 – 2.57 and 4.9 – 6 GHz) as well as one GPS antenna. Gain ranges from 3 – 5 dB, depending on frequency.
www.mobilemark.com

Panorama Antennas

Featuring Long Term Evolution (LTE) 700 MHz, GPS and Wi-Fi 2.4 GHz, Panorama released its latest configuration in the Sharkee range of mobile antennas. The single-hole, roof-mount, OEM shark fin antenna can now be used with any consumer or public-safety 4G and Wi-Fi equipment. The antennas offer additional mounting for an optional external single, dual or tri-band whip.
www.panorama-antennas.com

Procom

Procom released a quarter wavelength mobile antenna for the 160 – 174 MHz VHF band. The MH 1-MG/GPS/160-174 antenna is housed in a heavy-duty magnetic mount base with a toggle joint. An external antenna whip is mounted on the magnetic base, which includes a GPS antenna and a high-gain low-noise amplifier. Provided with two 5-meter cables attached: RG58 cable with UHF-male connector for VHF and RG174 cable with SMA-male connector for GPS. The antenna features a temperature range from -35 to +75 degrees Celsius and a total height of about 6.4 centimeters (cm), with a 13 cm diameter.
www.procom.dk

Radio Frequency Systems

Radio Frequency Systems' latest addition to the CompactLine series of antennas features a robust design and superior mechanical and electrical performance. The Category A compliant SB6-W60B is wind tunnel tested and well suited for tight urban locations and rugged outposts. The antenna covers the full 6 GHz frequency band (5.925 – 7.125 GHz) and is available in a basic 200 kilometers per hour (kph) configuration and high-speed 250-kph configuration. Offered with single or dual polarization, the antenna is optimized for direct mount applications with radios from microwave radio manufacturers.

www.rfsworld.com

SkyMasts Antennas

The Ultra Broadband UHF ceiling mount antenna is an 802.00.05.00 antenna carefully designed to offer a compact, stylish and ultra

efficient indoor ceiling mount antenna for UHF, TETRA and PMR distributed antenna systems (DAS). The radiator design allows for broadband operation, making the antenna suitable for use within either UHF or TETRA frequency bands. The main housing is manufactured in ABS fire retardant material. The antenna features less than 2:1 VSWR across the entire 380 – 470 MHz band, excellent passive intermodulation (PIM) performance at 100 dBm, 1 dBi gain and vertical polarization.

www.skymasts.com

Telewave

The ANT2045Y12-WR and ANT2400Y12-WR yagi antennas cover 1.92 – 2.17 and 2.4 – 2.5 GHz respectively. At only 46 – 61 centimeters in length, the lightweight antennas are ideal for handheld use with portable analyzers or as a wireless donor link. Each antenna provides 12 dBd gain with a typical 30 dB front-to-back ratio and is completely coated for full environmental protection. An N-female or 7-16 DIN connector is permanently mounted in the end of the boom. Several types of optional mounting hardware are available, including a rotatable universal mount for precise positioning on a variety of supports.

www.telewave.com

ACCESSORIES

Addvantech

The ES-M11SP2 is a heavy-duty speaker microphone with IP55 waterproof rating that features three programmable buttons for volume control, clear call and additional functions; replaceable antenna; emergency button options; and 3.5-millimeter earphone jack. The mic has undergone mechanical and environmental testing to ensure optimum performance in extreme conditions, company officials said. The mic is fully compatible with Sepura STP8000 and STP9000 series radios.

www.avt-communications.com

Astra Radio Communications (ARC)

S21 is a rugged and high-performance remote speaker microphone. The IP68 waterproof-rated mic offers reliable two-way communications in complicated environments. The mic conforms to military standard 810. The design contains a high-impact resistant polycarbonate shell, Kevlar-reinforced cables and enhanced internal airtight design. The latest model Knowles microphone component comes standard with the S21. The Knowles Audio

technology improves the S21 audio quality, ARC executives said.
www.arcmics.com

BatteryJack

BatteryJack manufactures the Hytera BL2006 replacement battery for the Hytera PD780/782 series Digital Mobile Radio (DMR) radios. The battery also fits the Harris HDP100 and HDP150 radios. The battery manufacturer will produce the Li-ion battery with a 2-ampere hour (AH) Japanese cell. The BL2006Li battery is a direct replacement for the OEM part number BL2006 and will work with all OEM equipment. The battery comes with an 18-month warranty.

www.batteryjackdealer.com

Bee Electronics

The newly designed swivel chest harness offers a slim and lightweight option to carry a radio diagonally across the chest or comfortably adjusted to the side. The harness fits all shapes and sizes and is compatible with any existing Bee D-Swivel case, Bee executives said. The harness can be ordered separately or in combination with a Bee leather or nylon swivel case, making it interchangeable with the swivel belt loop.

www.beecase.com

CaseGuys, by A.W. Enterprises

Two-way radio users gain the freedom to move with the case-less carry attachments SwivClip and SwivLoop. The attachments enhance mobility, comfort and convenience to perform activities without restriction. Users can rotate the radio position as desired. The radio clicks into the AWedge swivel receptacle from any direction in one motion. The device consists of a two-piece kit, the patented AWedge stainless steel swivel receptacle plus a screw-in or slide-on D button bracket, which mounts on the radio.

www.caseguys.com

Entel UK

Whether it's a simple covert two-wire kit, a submersible remote speaker microphone, ear defenders or a high-end ATEX certified bone-conductive product, Entel covers a range of compact HX and submersible HT portables. For wireless communications, Bluetooth earpiece accessories are available. Entel manufactures almost all of the

products at its facilities, ensuring that the radios' high specifications are matched by the quality of the accessories that go with them and are always available from stock, Entel officials said.
www.entel.co.uk

FreeLinc

The FreeMic speaker microphone, FreeMotion single-ear headset

and Dual Muff all communicate without wires or cords via the patented Near Field Magnetic Induction (NFMI) technology. NFMI is more secure, reliable and power efficient than standard RF wireless devices, FreeLinc officials said.
www.freelinc.com

Guardian Safety Systems

The Guardian Comms Swiftwater Kit is an ideal way to protect and

carry portable radios in hazardous situations. The kit includes a tough, clear flexible enclosure that houses most portables, an attachment harness to secure it to the user's body and a waterproof speaker microphone that is external to the enclosure that can be located close to the user's head with the heavy-duty clip. A waterproof bone conduction accessory that fits to some lightweight rescue helmets is also available to further improve communications and for ease of use in hazardous and noisy situations.
www.guardian.com.au

Harris PSPC

The Harris VC4000 Car Charger for the Unity portable radio is a rapid battery charger that is compatible with Li-poly and Li-ion battery

packs. The unit includes a variety of features such as microprocessor-controlled operation, which replenishes battery power without overcharging; an automatic restart option, which constantly monitors the battery while in the charger; and ignition sense, which prevents vehicle battery drain. The charger's design provides the flexibility to charge the battery in or outside the radio and can accommodate a radio with the speaker microphone and/or belt clip still attached.
www.pspc.harris.com

Imtradex

The Aurelis Nexus Push to Talk (PTT) is a handheld microphone that features an extra-large PTT of aluminum, making use with gloves possible. The mic includes an emergency button, a three-level volume control and a two-color LED. The splash-proof hand mic

features a Nexus socket for connection with other accessories. The product is compatible with analog and digital radios.

www.imtradex.com

JCK Jean Couk Enterprise

The H-500N ergonomic shape speaker microphone features a 7.3-millimeter jack for Nexus U-174/U connectors on the top.

The mic also features one side push to talk (PTT) and one front tactical speaker PTT. The mic is an ideal solution for heavy-duty applications because users can activate PTT even when wearing heavy gloves, JCK officials said. Other features include a dual microphone for noise cancellation and rubber-sealed housing design for impact against skid proof.

www.jeancouk.com

Jing Deng Industrial (JDI)

JDI microphones include lightweight headsets and surveillance, desktop and shoulder

products. There is a wide range of microphone types to choose from, and the research and development department is always available to help meet users' needs.

www.jdi-co.com

Midian Electronics

The GPS speaker microphones work with Midian's CAD-800 controller and a Google Earth interface to display unit ID and loca-

tion information. The company offers multiple varieties of GPS speaker microphones, including an automatic number identification/emergency number identification (ANI/ENI) version (TS-120-SM1G), a voice alarm encoder version (VAE-1-SM1G) and versions with voice scrambling (VS-1200-SM1G and VS-1050-SM1G). All of the GPS speaker mics include man-down and lone worker features, as well as muting of the signaling packets and a system ID for system security.

www.midians.com

Mobility Sound Technology

The BT-Dongle is a low-power, high-performance Bluetooth dongle available for Motorola Solutions, Kenwood and Icom radios, and they are compatible with Plantronic, Peltro and Sony. The dongle features a small form factor intended for a

broad range of OEM products, where fast and easy system integration and minimal development risk are required. The device's high quality and sensitivity allows continuous operation in nearly all Bluetooth application environments. The device is suitable for a wide range of OEM configurations including most radio models.

www.mobilitysound.com.tw

National 2 Way

N2W Snaplock System is a solution for work environments that have a large number of users, with a limited number of radios. The key ingredient is the interchangeable earpiece. The connected cable with push to talk

(PTT) stays with the radio, while the earpiece is swapped out at shift change, providing a hygienic solution to employee usage. Users can pick from earbud, earhook, swivel, adjustable d-ring or acoustic tube options.

www.national2way.com

OTTO

The Pro Series 200 speaker microphone delivers audio clarity. The microphone's cable disconnect RJ45 connector allows users to switch easily between radio plat-

forms. It is fitted with a 360-degree rotating, spring-loaded clip and 3.5-millimeter (mm) accessory jack. The microphone's durable design is water resistant to Mil-Std-810 standards and offers an optional emergency button.

www.ottoexcellence.com

Plantronics

The CA12CD is a cordless headset adapter that provides wireless communications and push-to-talk (PTT) functionality for applications within E9-1-1 dispatch and air traffic control. The adapter uses digital, 64-bit encryption and operates within the UPCS band (1.92 – 1.93 GHz). It features built-in battery chargers and two batteries that provide 8 hours of talk time each. The base has a 3-meter coil cord terminated with a PJ7

connector. The remote features a quick disconnect that provides compatibility with all Plantronics H-tops. Corded and USB versions of the PTT interface are also available.

www.plantronics.com

Pryme Radio Products

Pryme builds professional-grade, ruggedized radio accessories for public-safety users of two-way radios. The heavy-duty Storm

Trooper SPM-4200 speaker microphone features extra durability. The mic is waterproof, dustproof, features stainless steel anti-corrosion hardware, Kevlar-reinforced coil-cable, tough Polycarbonate housing and IP67 standards certification.

www.pryme.com

Savox Communications

The SRVA voice amplifier combines the functionality of a push-to-talk (PTT) radio accessory and the CSVA voice amplifier to provide PTT and voice amplification all in one unit. Ideal for hazmat; mass decontamination; chemical, biological, radiological/nuclear and explosive (CBRNE); and drug

lab operations, the radio accessory can be worn on the outside of a Level A, B or C suit. It is waterproof and dust tight, rugged and reliable, easy to operate and interoperable with most radios. The device features a large, easy-to-activate PTT button, operates with any personal protection equipment (PPE) suit and can be decontaminated.

www.savox.com

Setcom

The Liberator wireless headset features a range of up to 365 meters, up to 30 hours of continuous talk time, and a heavy duty and

durable design. The "Instant On" is an advanced motion sensor technology integrated into the headset to ensure there is no need to turn the headset on and off. The

headset can be used with most Bluetooth-enabled cell phones. The headset can be integrated with a portable radio to allow simultaneous communications over two channels. It is available in TwinTalk, single person and integrated intercom models.
www.setcomcorp.com

TecNet International

The TecNet TBM series of Bluetooth mobile dongles serves as an affordable vehicular repeater for TecNet, Maxon and Kenwood mobile radios. With a range of up to 91 meters, users can transmit and receive outside of their vehicles while using their mobiles. The Class 1 Bluetooth speaker

microphone offers adjustable volume, simple pairing with auto repairing, more than five hours of talk time, and 48 hours or longer in standby. The package comes with Bluetooth dongle, Bluetooth speaker/mic, connection cables, external antenna and mounting hardware.
www.tecnetusa.com

Titan Communication Systems

The Titan Responder is a remote speaker microphone for first responders, law enforcement and military personnel. The mic features front and side push to talk (PTT), 3.5 millimeters and Nexus adapter

for a multitude of audio accessories and volume control. The IP55-rated mic is programmable and is emergency button capable for equipped radios. The speaker mic is ideal for users wearing heavy clothing, large gloves or helmets while working. All Titan products undergo rigorous mechanical and environmental testing to ensure optimum performance.
www.titancomsys.com

Wireless Pacific

The XSFB provides a variety of enhanced functions, including selectable digital delay and enhanced remote ambience listening capability for the X10DR secure wireless microphone. The X10DR (pronounced

extender) puts radio system access into the user's hand when away from the vehicle. The device allows wireless communications with a fixed or vehicle radio up to 300 meters. The mic is durable, lightweight, affordable and highly intuitive, company officials said.
www.wirelesscorpltd.com

New Products

TETRA Radios

Motorola Solutions introduced the MTM 5200 and MTM 5500 mobile radios and the MTP 6550 portable radio, which all support

TETRA Enhanced Data Service (TEDS). Features of the MTP 6550 include push services to allow dispatchers to deliver messages directly to radio screens, radio call out requiring a mandatory acknowledgement of message delivery and built-in Bluetooth for wireless audio and connectivity to collaborative data devices. The MTM 5200 and MTM 5500 complement existing MTM 5400 mobile radios and give users a choice of form factors and capabilities. The MTM 5500 includes integrated direct mode operations (DMO) gateway and repeater capabilities. All three radios include large quarter video graphics array (QVGA) color displays.

Motorola also introduced the DP4000 Ex series of ATEX- and IECEx-certified portables designed for environments that contain potentially explosive gas and dust. A highly visible blue and black housing ensures workers know they are bringing only ATEX-/IECEx-approved radios into hazardous environments. The radios include Intelligent Audio that adjusts volume based on environmental noise and noise suppression technology that negates background sounds. The Ex series devices meet Mil-Std-810 and IP67 specifications.

www.motorolasolutions.com

Rugged Tablet

The Algiz 10X is a rugged tablet PC from **Handheld Group** that can withstand challenging weather and harsh handling. The tablet includes a 257-millimeter (mm) touchscreen with MaxView technology,

weighs 1.3 kilograms and is 32 mm thick. The device is IP65 rated and meets Mil-Std-810G standards for dust, water, vibration, drops, temperature and altitude. That tablet includes a u-blox GPS receiver, Bluetooth 4.0, WLAN 802.11 b/g/n and is WWAN Gobi 3000 ready with integrated modem and antennas for wireless connectivity. A 5-megapixel camera with light-emitting diode (LED) flash is included. Connectivity options include waterproof USB 2.0, video graphics array (VGA) and RS232 ports. The device operates on an Intel Atom N2800 dual-core processor with 4 gigabytes (GB) of DDR3 memory.

www.handheldgroup.com

Satellite Data Terminal

Vislink International announced the lightweight Mantis MSAT satellite data terminal. Weighing 12.5 kilograms, the MSAT is designed for one-man operation in challenging environments. The rugged terminal is deployed from a lightweight backpack and can be unpacked and operating within five minutes, company officials said. The

unit provides up to 5 Megabits per second (Mbps) of upstream data throughput and can deliver high-definition video intelligence as well as standard voice and data. The unit meets military specifications for shock, vibration, sand and rain, and comes in a package incorporating an antenna, modem and all electronics. The terminal is available for X, Ka and Ku bands.

www.vislink.com

Ethernet Adapter Panel

Telex Radio Dispatch launched its IP-224 Ethernet adapter panel, providing interfacing of multiple radios, satellite and cellular devices, intercoms, mass notification systems and existing dispatch consoles and security equipment. An optional C-Soft software platform enables customized cross-

platform radio over IP (RoIP)/VoIP communications connectivity and control from a single position via Ethernet. The compact design allows the product to be rack mounted or placed on a desktop. The unit includes an LCD display and volume unit (VU) meters. Features include a Linux-based operating system, push to talk (PTT), monitor and F1 and F2 relays, nine selectable PTT frequencies, eight outputs for channel selection and continuous tone coded squelch system (CTCSS) generation.

www.telex.com

SCADA Radio

MiMOMax Wireless announced the Tornado series remote radio for mission-critical supervisory control and data acquisition (SCADA) and telemetry applications. The narrowband point-to-multipoint radio provides full duplex, multiple input multiple out-

put (MIMO) functionality with low latency, low power consumption, scalable data rates, remote network management, simple network management protocol (SNMP) and distributed network protocol 3 (DNP3) support and efficient random access protocol. The radio operates in the 330 – 520 and 806 – 960 MHz frequency ranges in 12.5- and 25-kilohertz narrowband channels in 6.25- and 5-kilohertz steps. The radio comes with a dual 10/100 Base-T Ethernet switch that supports auto negotiation while standby power consumption of less than 5 watts supports longer standby times. The radio includes digital and analog interfaces and allows for a variety of mounting options.

www.mimomax.com

Vehicle Mount Display

The VMD 2000 vehicle mount display from **Nexcom** is designed for use with in-vehicle computers and offers increased functionality and improved visual assistance. The

product features a 20.32-centimeter (cm) touchscreen LCD panel with super video graphics array (SVGA) resolution, auto brightness adjustment to 1,000 nit, and screen brightness is automatically adjusted based on ambient light. Other features

include an optional front camera, speaker, USB port and secure digital/ multimedia card (SD/MMC) memory card slot. Optimized for vehicle environments, the display passed shock and vibration testing based on the Mil-Std-810F standard, and the front panel complies with IP54 ratings for water resistance and dust ingress. The power input ranges from 9 – 36 volts.

www.nexcom.eu

Mobile Ad Hoc Testing

Elektrobit (EB) launched a test system for mobile ad hoc networks (MANET) that allows testing in the laboratory under field-

similar conditions with a single device. The EB Propsim F32 radio channel emulator can be used to test VHF and UHF radios and allows different testing environments to be chosen from a drop-down menu. The device can evaluate and verify the functional performance of MANET. A point-and-click setup wizard helps define parameters including number of radios, active frequency band and selection of environment.

www.elektrobit.com

Messaging Application

The Responder Smartphone application from **PageOne Communications** offers closed-user group messaging for BlackBerry, Apple iOS and Android devices. The application provides a separate, secure messaging channel, distinctive pop-up and audible alerts, a separate inbox, and two-way reply options. In addition to supporting GPS location services, the application also incorporates a status update facility that allows users to indicate their current availability. A lone worker feature and an SOS alert button are included, and a periodic welfare-check alert generates an SOS alert with GPS location if not acknowledged by the user.

www.pageone.co.uk

Covert Earpiece

Phonak Communications launched a next-generation covert earpiece, the Profile Nano, featuring a small form factor that makes it invisible to bystanders. The ear-

piece is immune to electromagnetic interference from alarm systems, vehicles and other electronic circuits. The earpiece works with all portable systems including Project 25 (P25) and TETRA. Audio quality has been enhanced compared with other Phonak earpiece models. The earpiece comes in beige or dark brown and includes a variety of wiring kits.

www.phonak-communications.com

MIMO Antenna

Cobham Antenna Systems developed a multibeam hub base station antenna, the MBA6-3.5DS45/2045, enabling multiple input multiple output (MIMO) radio system operators to achieve 1 Gigabit per second per squared kilometer (Gbps/km^2) anywhere within a cell. The antenna provides 90-degree coverage using six individual

narrowbeam patterns each with a half-power beamwidth of 15 degrees. MIMO capability is provided with ±45 degree polarization in each of the six 15-degree sectors. The antenna measures 56.8 centimeters (cm) high by 45.6 cm wide and 7.6 cm deep. The antenna element includes a single cross-dipole assembly operating at a center frequency of 3.5 GHz interlocked in a configuration that provides a slant dual polar beam. Eight sets of these assemblies are fed in phase through a stripline feed to create the single 110-degree sector antenna that forms the basis of the array. There are eight sector antennas in the complete assembly.

www.cobham.com

Downtilt Antennas

Procom added two downtilt antennas and a TETRA base station antenna to its line of antenna products. The antennas are designed to reduce wind load and space load on tower sites. The CXL 70-5C/T-7 is a UHF 7 dBi gain vertically polarized omnidirectional base station antenna with a 7-degree electrical downtilt. The CXL 70-5C/T-12 is a UHF 7 dBi gain vertically polarized omnidirectional base station antenna with a 12-degree electrical downtilt. The CXL TETRA-5SL/ is a UHF 7.5 dBi gain vertically polarized omnidirectional base station antenna. The antennas can withstand wind loads of up to 160 kilometers per hour and temperatures from -35 degrees to 70 degrees Celsius. N-female connectors are standard.

www.procom.co.uk

Lightning Protection

The Times-Protect LP-18-400-N series of direct current (DC) pass RF lightning and surge protection products from **Times Microwave Systems** operate in frequen-

cies from DC to 6 GHz. The bidirectional design with either type N male or type N female connectors can be directly attached to LMR-400 cable via the company's EZ non-solder interface. The products use CST-400 prep tools and either the CT-400/300 crimp tool or a combination of the HX-4 crimp handle and Y1719 crimp dies for installation. The protector handles up to 150 watts of RF power and allows for up to 72 volts of DC voltage to be supplied on the center pin, eliminating two connectors normally needed and reducing insertion loss and return loss. The body is IP67 rated and is housed in white bronze plating to ensure durability.

www.timesmicrowave.com

Network Video Recorder

The MxNVR-IA8-T is an industrial-grade network video recorder (NVR) from **Moxa Americas**. The eight-channel NVR is designed to meet the requirements of energy plants, water treatment centers, oil and gas pipelines, oil drilling platforms, chemical

processing, public transportation and other harsh environments. The recorder supports H.264 MPEG4 and MJPEG codecs and records up to eight Moxa-brand IP cameras or video encoder VPort streams in event-

triggered or scheduled recordings. Two built-in SATAII hard disk drive bays allow for user selection and simple expansion in video storage, and six DIs and two DOs support a variety of connected external devices. The device is hardened against high electro-magnetic interference (EMI) and electrical surges, as well as temperature extremes and humidity. The NVR supports supervisory control and data acquisition (SCADA) systems.

www.moxa.com

Hybrid Energy System

Emerson Network Power introduced the NetSure 701H series of hybrid systems for indoor and outdoor hybrid energy applications. The system expands the company's hybrid energy capabilities for telecom access sites up to 21 kilowatts (kW) by incorporating an integrated design that manages multiple energy sources, requires less than two hours for installation and reduces operational costs. The footprint for the product is less than 1.5 square meters. Hybrid solutions blend power from generators, batteries, solar, grid/mains and other sources. Emerson's hybrid solutions also include active site management to ensure proper battery health, optimal generator maintenance and real-time fuel information. The line includes power systems, rectifiers, solar convertors, battery backup solutions and enclosures.

www.emersonnetworkpower.com

Multiplexer Filter

Creowave developed a dual multiplexer filter, allowing both TETRA and Long Term Evolution (LTE) bands to be connected on the same antenna. The company's subsystem and filter products address spurious emissions, multiband testing and passive intermodulation (PIM) measurements. Standard and custom products are available.

www.creowave.com

SDR Demonstrator

The credit-card-sized DE9941 from **CML Microcircuits** is a demonstration board for complete linear modulation-based software defined radio (SDR) for wireless data. The

product can be used to demonstrate transmit and receive performance with 4/16/64 quadrature amplitude modulation (QAM) linear modulation and constant-envelope modulation schemes such as 2/4-level frequency-shift keying (FSK) and Gaussian minimum shift keying (GMSK). The board includes a 1-watt power amplifier, and RF performance is designed to comply with EN 302 561 and EN 300 113.

www.cmlmicro.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/Senior 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 areas of the world do you do business? (mark all that apply)
❑ 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

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 _____

Q113

By Jolly Wong

3 Communications Trends in Asia

The past year has seen new developments and trends in mission-critical communications in the Asia/Pacific region. Three areas of activity in the region include the following.

1. Mobile Broadband

The most active area of interest is in mobile broadband, and spectrum availability is a hot topic of discussion among the regulatory circle in the region. For commercial operators, there is interest in what 4G spectrum can deliver to consumers — faster downloads and video.

Many public-safety organizations are also interested in mobile broadband because of what it will bring to their agencies. New tools include full-motion video while moving/driving; automatic personnel location system (APLS) for enhanced safety to front-line patrolling officers; and machine-to-machine (M2M) communications to support the safe city concept. As a possible crime fighting and emergency response tool, mobile broadband technology has been the Holy Grail for public safety for many years. With the introduction of Long Term Evolution (LTE), the technology may finally be within reach of the blue light industry.

Asian officials will analyze how the U.S. manages its 700 MHz public-safety LTE rollout, along with deployment and cost lessons before they fully commit to this path. Trial systems and demonstrations have been conducted in the region, and the technology shows great promise.

Asia/Pacific public-safety agencies generally believe that LTE is the more cost-effective way to deploy mobile broadband, leveraging the manufacturing volumes demanded by the global marketplace. There were WiMAX trials, but no operational deployments for public safety.

2. Professional Mobile Radio (PMR)

Many countries in the region still see the need for PMR. Public-safety-specific features embedded in LTE technology will take time to develop through the open standards-setting process, and LTE will not replace LMR for some time. For those organizations that still require two-way radio communications, planning and deployment continue unabated.

The region has seen a large increase in the deployment of two-way radio systems across many different industries, most notably within large infrastructure projects such as power and energy, seaports, airports and metro rail systems because many countries are investing in infrastructure. This brings more opportunities for two-way radio manufacturers in the region to enjoy more business, and for new manufacturers to enter the marketplace. Indeed, several analog radio manufacturers have entered into the low-tier market in recent years.

On the technology front, the trend is digital. Leading that trend are public-safety organizations and many of the large industries that appreciate the value that digital features offer.

Many countries have also started narrowbanding their VHF and UHF channels from 25 kilohertz to 12.5 kilohertz, thereby doubling the spectrum. This is expected to help address the need for more spectrum as economies grow. PMR is expected to have an increasing demand in the region because of the investments and economic growth under way.

3. Spectrum Planning

Because of the 698 – 806 MHz (700 MHz band) digital dividend, much work has been done in the past three years within the Asia Pacific Telecommunity (APT) to agree on the structure of the band. The 700 MHz band will essentially be a 45-megahertz uplink and 45-megahertz downlink with a 10-megahertz duplex gap in the middle for the frequency division duplex (FDD) configuration, or the full 108 MHz band for the time division duplex (TDD) configuration.

The 700 MHz band is widely expected to be allocated to commercial cellular operations, with the possibility of some going to public safety, similar to the U.S. This will enable public safety to enjoy the economies of scale from 700 MHz deployments. Clearing the TV broadcasters from the 700 MHz band varies by country and is expected to be completed around the 2013 – 2015 timeframe.

While the work within the APT is to be commended for finding common agreement among many countries, there is also a need to efficiently use under-used spectrum. Some countries are shutting down older cellular technologies, thereby opening some of the cellular bands.

Australia spectrum regulator ACMA announced an 800 MHz allocation to public safety for mobile broadband. China is looking at 1.4 GHz for the same purpose. Unfortunately, deviations for public-safety mobile broadband allocations will be a detriment to public safety and ultimately to taxpayers who must bear the brunt of higher technology costs. As an unfortunate by-product of the unique bands, interference across bands will also become a challenge. ■

Jolly Wong is chief police telecommunications engineer with the Hong Kong Police Force (HKPF). He is an editorial advisor to *RadioResource International* magazine. Contact Wong at jollywong@police.gov.hk.

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