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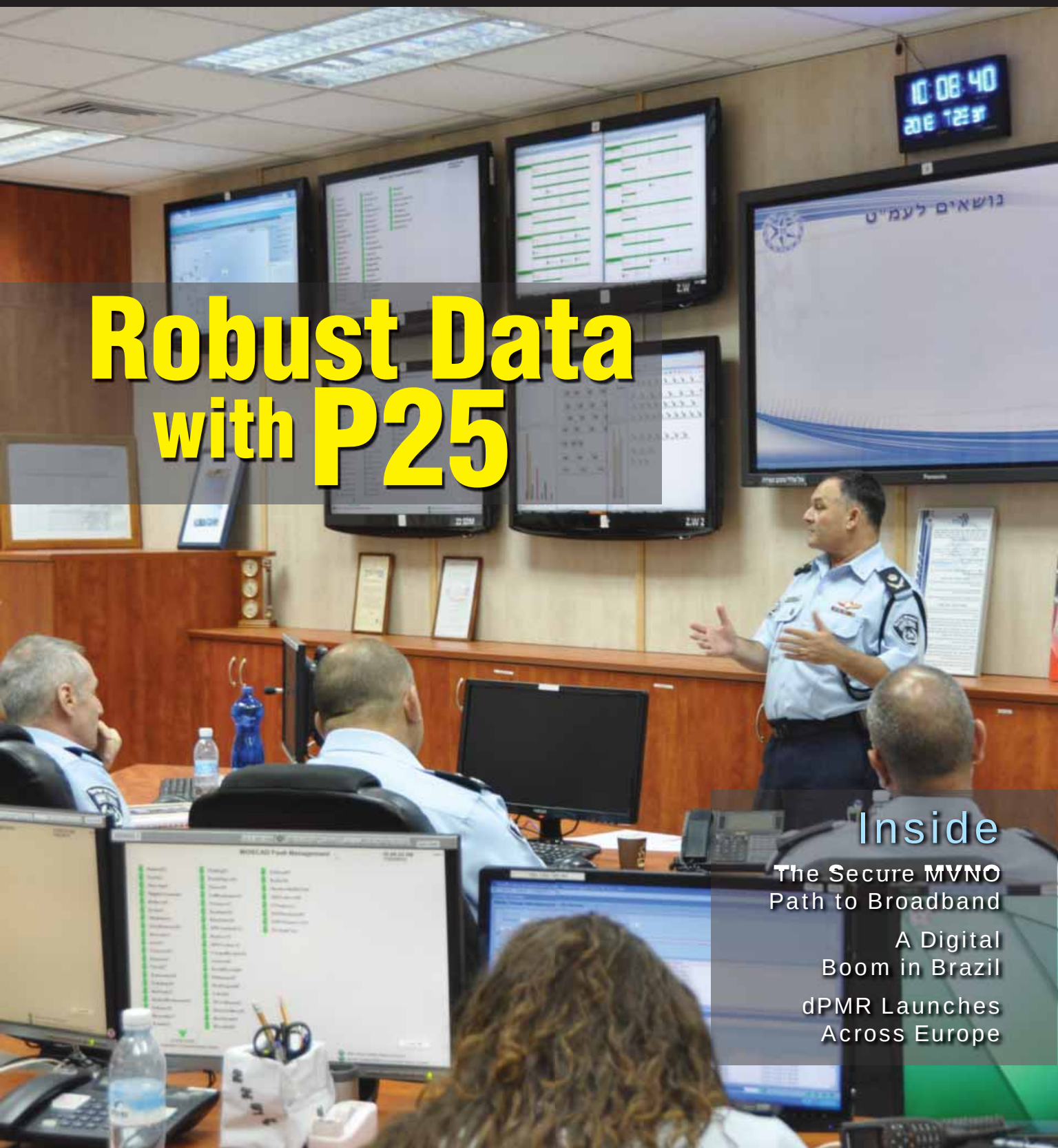

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Inside

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Digital Radio

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Cover photo courtesy Israeli National Police

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Creative Broadband Options

Mission-critical communications suppliers are tentatively moving into the broadband arena, while waiting for details to emerge from telecom regulators, customers and pilots. Some vendors are conducting trials, some are partnering with other suppliers to combine expertise and others are rolling out transitional products.

2014 will be a pivotal year for many countries in terms of public-safety broadband networks and decisions. Some regulators could allocate spectrum for public protection and disaster relief (PPDR) broadband applications. Other countries, including those in Europe, will likely wait until 2015 or later to make regional private broadband spectrum decisions and allocations.

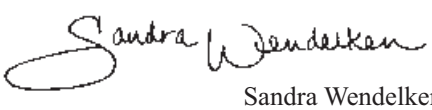
But even without spectrum clarity, public-safety agencies are tentatively considering their options. This issue highlights several mission-critical users and their broadband plans.

In Europe, some TETRA operators are considering a mobile virtual network operator (MVNO) model that uses a commercial operator's network but adds features, security and coverage necessary for public safety. The cover story describes a public/private plan by the Israeli National Police to deploy a private broadband network enhanced through a commercial network to obtain necessary coverage and price points. A "World News" item on Page 14 describes several mission-critical communications trials using professional mobile radio (PMR) spectrum at 400 and 800 MHz to offer Long Term Evolution (LTE) services through TETRA and Tetrapol networks.

The next International Telecommunication Union (ITU) radio conference will likely shed some light on where PPDR spectrum allocations will be in most countries. Until then, the industry is offering up creative ways to move forward.

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

The next generation of mission-critical communications will likely not be in place for years to come, but the evolution is underway. We'll keep you updated on the latest developments, and we would appreciate hearing how your agency or company is planning for the transition.



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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EUROPE

EENA Offers NG 1-1-2 Resource, EU Launches NG 1-1-2 Work Program

The European Emergency Number Association (EENA) released a document that overviews how to transition from an existing 1-1-2 emergency architecture to next-generation 1-1-2 (NG 1-1-2) using a number of different steps.

The document is intended to assist implementers in planning the migration of specific 1-1-2 deployments to NG 1-1-2. Different transition models allow a solution to be selected based on specific implementation factors including transition time, budget and required functionality.

Separately, the European Commission launched a work program for the next two years that includes a specific topic titled "Communication Technologies and Interoperability: Next Generation Emergency Services," EENA said.

The European Commission's Horizon 2020 Work Program for 2014 – 2015 includes development of a testing regime for NG 1-1-2 products, using existing standards and protocols. EENA has led discussions regarding NG 1-1-2 services and launched its plan for NG 1-1-2 in 2011.

EENA plans to create a consortium responding to this call in the coming months and will propose an innovative solution for the European Commission, a statement said.

"I believe that this topic will be the catalyst for change in the way NG 1-1-2 communications will develop in Europe in the coming years, and EENA intends to be at the forefront with its members in shaping its future," said Gary Machado, EENA's executive director.

The total Horizon 2020 project includes more than €15 billion (US$20.5 billion) total during the first two years. The funding is intended to help boost Europe's knowledge-driven economy and tackle issues to better people's lives.

RIGA, Latvia — The Information Centre of the Latvian Ministry of the Interior (MoI) selected **Motorola Solutions** to deploy a nationwide, digital Project 25 (P25) Phase 2 network. The US$18 million network is scheduled to be completed by the end of 2014.

Motorola Solutions was chosen to evolve the current ASTRO system following a closed tender negotiation. The new system will be ASTRO25 Release 7.14. Motorola Solutions will merge the existing analog and digital ASTRO systems, ASTRO25 Release 7.0 and ASTRO SmartZone Release 4.1, to form a single, nationwide, digital infrastructure.

The infrastructure will connect 10,000 public-safety professionals from the police force, ambulance service and fire brigade through 64 radio sites. The company will provide the equipment, engineering design and implementation services.

The European Regional Development Fund (ERDF) is funding the project framework, "modernization of radio communications system of the MoI." The total budget for the project is €16.2 million (US$22 million).

Motorola Solutions will upgrade 55 radio base stations and one master switching site throughout Latvia. The implementation also includes the installation of nine new radio base stations and the delivery of 6,242 portable and 2,500 mobile radios.

The Latvian MoI will have P25 Phase 1 FDMA and Phase 2 TDMA modulation capabilities following the migration. This will give the Latvian authorities expanded data capabilities including enhanced data transmission, Motorola executives said.

The project allows Latvian public-safety professionals to take advantage of vehicle and personnel location, over-the-air rekeying, over-the-air programming, radio user authentication and advanced encryption system (AES). The upgraded system will allow interoperability among all radio users throughout Latvia.

"The analog system in place was outdated, and with this new implementation, we will modernize and merge two separate networks to one nationwide digital LMR network," said Janis Ritins, head of information center, Republic of Latvia MoI. "Our front-line users will be able to benefit from a network of the highest standards of security, stability and quality."

ASIA/PACIFIC

QUEENSLAND, Australia — Work on the first stage of Ergon Energy's radio communications upgrade in Queensland, Australia, is now complete.

The project, which includes **Zetron**'s Project 25 (P25) Console Subsystem Interface (CSSI) connected to multiple Zetron Advanced Communications (Acom) P25 console systems, demonstrates how a P25 encrypted

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Project Targets European Next-Generation Public-Safety Networks

A European project is underway to design, implement and evaluate a next-generation communications network concept for public protection and disaster recovery (PPDR) agencies, supported by network operators and industry. The SALUS project will provide security, privacy, seamless mobility, quality of service (QoS) and reliability support for mission-critical professional mobile radio (PMR) voice and broadband data services, the project's website said.

The project's consortium includes Alcatel-Lucent, Airwave and Airbus Defence and Space; four small and medium enterprises (SMEs), including One-Source, Rohill, UbiTEL and TI-WMC; research institutions Fraunhofer-IOSB and Instituto de Telecomunicações; and five universities including the University Belgrade-School of EE, Kingston University London, University Ljubljana, University Patras and University Twente; as well as PPDR end user groups Emergency Services College (ECS) and Public Safety Communications Europe (PSCE).

The 36-month targeted research project is funded by the European Union, Framework Program 7 and was put in place to design, develop and validate the next-generation PPDR network. The project has a total budget of €4.8 million (US$6.5 million), with European Union funding of €3.5 million (US$4.7 million). The project began 1 September and ends 31 August, 2016.

"Using our public-safety knowledge and expertise, Airwave will be able to influence the direction of public-safety communications of the future whilst at the same time work with other industry leaders and academic experts in this vital area of communications," said Euros Evans, Airwave chief technical officer (CTO).

The project will use three reference scenarios: city security, disaster recovery and temporary protection. The project will see dependable and secure mobile broadband services developed for video streaming, large document transfers and database access. PMR voice and data services will be made interoperable between legacy PMR and new mobile broadband networks, the website said. Interoperability with satellite IP connections is also part of the project, along with transportable systems with mobile broadband and integrated PMR voice and data capabilities.

radio network can optimize advanced monitoring, control, tracking and communications across widespread delivery infrastructures.

Ergon Energy's field crews are required to move within the state to respond to emergencies and system faults and to support and bolster local area resources, particularly during natural disasters. To support Ergon's field crews and the power network, the communications network is using software-defined radio (SDR) architecture.

Commissioned in June 2012, stage one of the new network built by BAI Group, **Airwave Solutions Australia** already covers 177,000 kilometers in the southern Queensland region including Toowoomba, Warwick and Darling Downs. The next section of the network, between Townsville and Cairns, will see additional high-availability P25 Radio Frequency Subsystem (RFSS) cores installed at Ergon's data centers in Cairns, Townsville, Mackay, Rockhampton and Maryborough.

The additional RFSS cores would make Ergon's network one of the most resilient professional mobile radio (PMR) networks in the non-military world, Airwave CEO Malcolm Keys said.

"Our primary role is to bring together the different components of the solution into a single, unified network," said Keys. "We are working in partnership with Ergon Energy, **Auria Wireless**, **Tait Communications** and Zetron, also technology partners within the P25 Solution Center. Together, we are emphasizing the benefits of a common industry approach within the P25 standards to achieve optimum interoperability efficiency."

As a result of the RFSS deployment, Ergon Energy's systemwide resilience will be reinforced by having each of the existing console systems connect directly to each of the P25 RFSS cores via a IP WAN, said Zetron Australasia Vice President and General Manager Ranjan Bhagat. "In this configuration, which is the first of its kind in the world, in the event of a radio systems failure, no intervention is needed on the CSSI-connected P25 console system," said Bhagat. "The net outcome is that statewide Ergon operations can continue seamlessly, even in the unlikely event of a system failure."

MELBOURNE, Australia — Simoco will supply more than 800 portable radios, as well as system infrastructure and accessories to support this year's Australian Grand Prix, to be held in Melbourne 13 – 16 March.

Simoco Digital Mobile Radio (DMR) radios will help the Australian Grand Prix and contractors involved in staging the high-profile event to reliable communications. The infrastructure and radio equipment will be supplied on a rental basis to numerous organizations involved in construction, operation and managing safety. The Australian Grand Prix attracts an estimated 300,000 attendees during the weekend.

"It's critical that organizers and contractors are able to communicate with team members, race marshals, security staff and other workers to ensure that the event runs safely and successfully," said Craig Moca,

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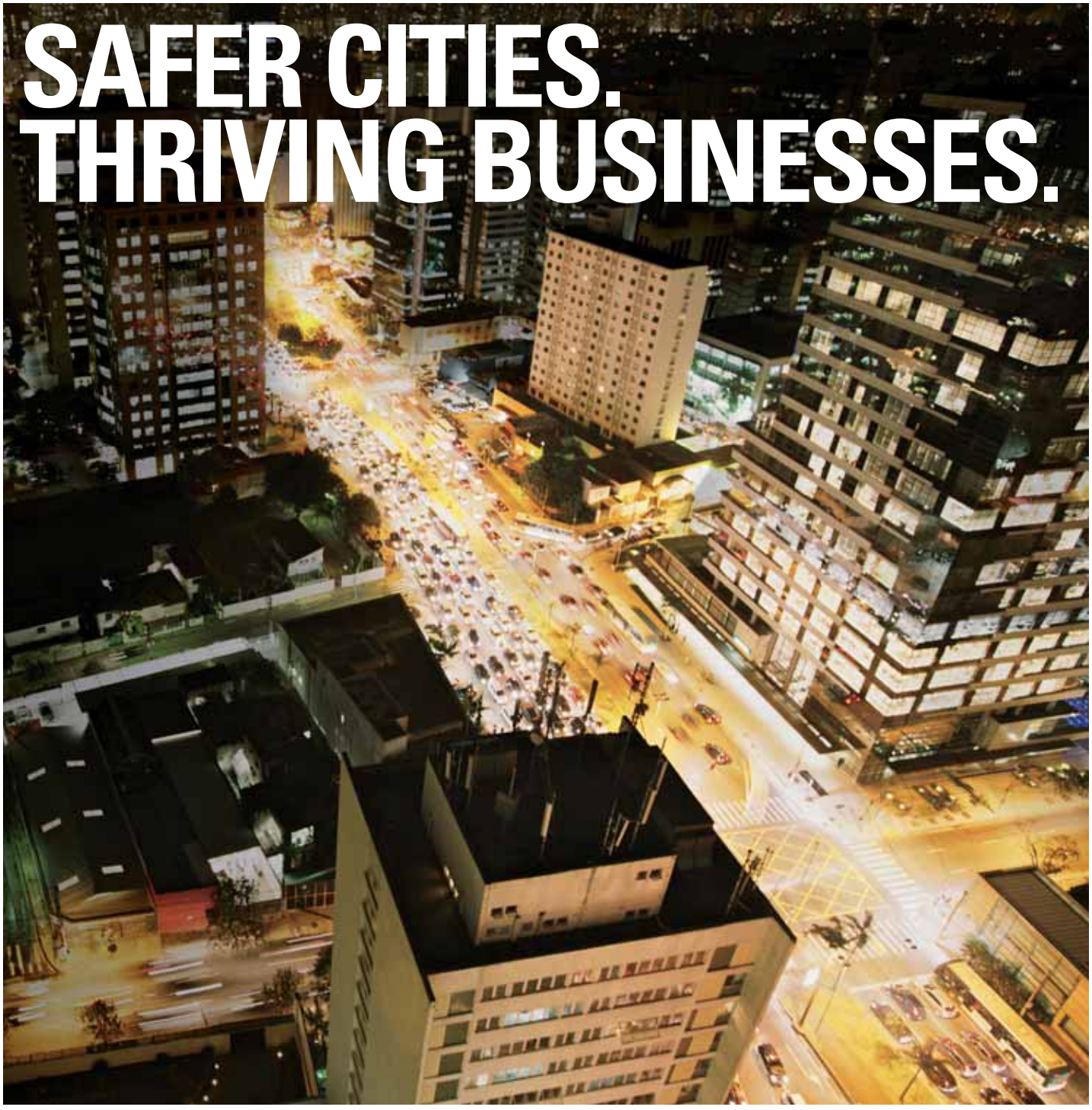

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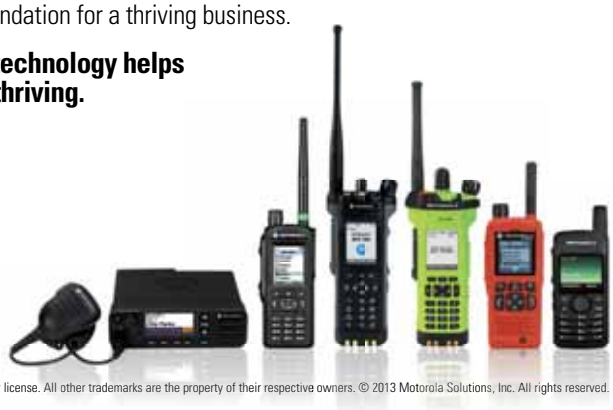

MOTOROLA SOLUTIONS

engineering manager at the Australian Grand Prix. "The fact that Simoco provides a reliable rental radio solution means that companies involved with the event can access high-quality communications equipment on a short-term basis."

Simoco has been working at the site since late January when the Australian Grand Prix began to implement the first phase of operations to support the event build teams. Simoco has seen an increase in the demand for its rental services during the past year with deployments at major sporting and entertainment venues, as well as across other sectors including construction, security, production and mining.

HANOI, Vietnam — The Vietnam Ministry of Public Security, tasked with protecting the entire region of Vietnam, selected a **Tait Communications** Digital Mobile Radio (DMR) Tier 3 trunked digital radio network for its traffic police pilot project.

Tait, together with a local partner, will provide a single-site UHF DMR Tier 3 network with packet data, scheduled to be operational by August.

The traffic police operate on an existing analog conventional network, however, they wanted greater coverage and clearer voice communications. The agency has its own AVL, and Tait will provide an interface to it. Tait will also provide system and network design services.

The pilot will proceed a potential five- or six-site trunked network. The phased migration will allow the agency to schedule the upgrade when it best suits its requirements and budget.

AFRICA

QUNU, South Africa — Airbus Defence and Space (formerly Cassidian) and its local partners Saab Grintek and Integcomm were commissioned by the South African Police Services (SAPS) to extend the SAPS Eastern Cape TETRA network to ensure the safety of the participants at Nelson Mandela's funeral in the former South African president's hometown Qunu.

South African Police Services provide security for Mandela's funeral.

The Eastern Cape TETRA network from Airbus was also used to cover the memorial service at Port Elizabeth Stadium and airport security in Port Elizabeth and East London.

About 3,300 TETRA handheld terminals were reprogrammed and distributed to all South African public-safety responders. Additional radio dispatchers were stationed at the SAPS command-and-control centers. Temporary transmission lines and microwave enhanced radio coverage in the Qunu area. They were set up within a couple of days to extend coverage to the small rural village in South Africa's Eastern Cape.

At the 15 December funeral, around 4,500 people gathered in a tent set up at the family compound before making their way to the gravesite together with several thousand others gathered in the small village. The system helped ensure that everything ran smoothly and guaranteed the safety of all participants, including foreign envoys such as Britain's Prince Charles, Monaco's Prince Albert II and businessman Richard Branson.

The SAPS network, monitored in real-time tests, proved 100 percent availability, allowing individual and group calls at any time and any location in the defined region.

LATIN AMERICA/CARIBBEAN

BARUERI, Brazil — Azul Linhas Aéreas Brasileiras adopted a Digital Mobile Radio (DMR) system from **Hytera**. The system increased the radio communications coverage in the airports of Campinas, Confines Pampulha, Porto Alegre and Azulville, as well as the company's headquarters in Barueri.

The airlines have used Hytera repeaters and digital portable radios since 2012, and now all the operational and maintenance staff uses the equipment to ensure seamless communication in all areas.

The digital radios, given the requirements of Brazil's telecom regulator Anatel, have noise filters, accessories integrated with personal protective equipment (PPE) and audio that works in adverse conditions.

ORANJESTAD, Aruba — Rohill announced a pilot of its Long Term Evolution (LTE)/TETRA solution with network operator SETAR in Aruba. The pilots will be based on public LTE integrated with TETRA networks and serve the mutual needs of mission critical and broadband of the local blue light user groups.

Rohill integrated TETRA with LTE from **Huawei** and **Alcatel-Lucent** and is open to integrate with further LTE platform suppliers, company officials said. Besides public LTE, Rohill is also working on private LTE solutions subject to spectrum availability.

The system enables mission-critical users to access the same data features available on public LTE networks. The LTEtraNode solution and future developments will not only target the public-safety market but also transportation, utilities, and oil and gas firms.

INTERNATIONAL

TOKYO — JVCKenwood announced an acquisition around Project 25 (P25) and plans with **Icom** to offer products that support both trunking protocols in the NXDN technical standard.

JVCKenwood agreed to acquire **EF Johnson Technologies** from current owner, Francisco Partners. The transaction value was not disclosed.

Continued on Page 15

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tait communications

Airbus (Cassidian) Pushes 400/800 MHz LTE Markets with Trials

During recent months, Airbus Defence and Space (formerly Cassidian), together with its partner Alcatel-Lucent, conducted extensive Long Term Evolution (LTE) trials with pilot networks in France, Spain, Mexico and the Middle East. The tests were with public-safety and military customers to determine the feasibility of adding mobile broadband capabilities to existing Tetrapol and TETRA networks.

The objective of the 4G LTE pilots was to validate how leveraging existing sites and frequency bands for the new technology affects coverage and capacity and to define future operational needs for applications. All tests showed the benefits of LTE to improve public services while using existing infrastructure in a non-disruptive and cost-effective way, said Philippe Devos, head of market and technology, secure communications solutions at Airbus Defence and Space.

Using a deployable box system and additional antennas, the tests were conducted at 400 MHz and 800 MHz. Some of the tests were on existing sites to examine possible effects on mission-critical communications. For an actual rollout, Airbus Defence and Space and Alcatel-Lucent have a combined hardware and software approach to integrate broadband technology into narrowband networks. A new dual-mode base station developed by the companies was used to support either Tetrapol or TETRA and LTE services in the trials.

Customers have concerns about the cost of broadband, which is why it makes sense to leverage existing infrastructure. The beginning of the LTE migration involves upgrading the backhaul network to IP. “It’s a migration strategy, and part of the discussion is how to maintain the existing system,” Devos said. “We are trying to make it as low cost as possible.”

Several applications were tested during the pilots. Situational awareness augmented by video capabilities was displayed on tablets in the field and in control rooms. Sensors equipped with cameras captured video, transferred to tablets in vehicles to allow officers to see themselves and colleagues on a map and share video before arriving on scene. The pilots also tested sending large files of medical data.

LTE pilots were conducted in France, Spain, Mexico and the Middle East.

“One important thing was to validate coverage of the video service; the purpose of the trial was to demonstrate we could leverage a professional mobile radio (PMR) site to provide the same coverage,” Devos said. “Uplink especially is very important for public safety. Here it’s important that the control room can quickly assess the situation and have remote control of cameras from the control room.”

Devos said the feedback from the trials is important for validation for public-safety operations. “We need to translate the technology usability in a real-world use and to show the benefits and value of the solution,” he said.

Many users were surprised that it’s possible to provide LTE services at 400 MHz with existing sites from their voice systems. “It’s a different way to look at your infrastructure,” Devos said.

Capacity is another concern, and Devos admits the 400 MHz equipment cannot accommodate all broadband traffic. “If you limit yourself to mission-critical data needs, you have enough, but you need to use that network for incident management only,” he said. “Offloading non-critical data to a commercial network is necessary in Europe. You have to secure that commercial service, but it can be complementary to a 400, 700 or 800 MHz nationwide network with mission-critical data capability and super coverage …”

The trial used 1.4- to 10-megahertz channels. “This was part of the trial — to show that it’s very possible to use 1.4-megahertz channels for video capability,” he said. “How much capacity do you really need?”

Europe has yet to allocate spectrum for public protection and disaster response (PPDR) broadband applications. 2015 is the earliest any allocation is likely to be awarded. The PPDR community is considering two spectrum options, 700 MHz and 400 MHz or a combination of both.

“1.4-megahertz channels are a good way to start, but 5 megahertz would be the right target,” he said. “But you need to refarm the 400 MHz band, and you have to grow as well. It’s possible to start with 1.4-megahertz channels, then move to 3 megahertz and then 5 megahertz as you add needs.”

Airbus Defence and Space and Alcatel-Lucent plan to continue trials this year and begin to add customers for 400 MHz LTE next year. On 1 January, the defense and space businesses of the EADS Group, including Cassidian, were consolidated into one new division, Airbus Defence and Space.

Continued from Page 12

The acquisition gives JVCKenwood a P25 infrastructure line and is integral to JVCKenwood's overall strategic initiative to increase its focus on the U.S. public-safety market.

Separately, JVCKenwood and Icom plan new NXDN product introductions in March. The NXDN suite of standards includes two trunking protocols. Type C, offered by Kenwood under the NEXEDGE brand, is a control channel-based trunking architecture. Type D is Icom's IDAS brand and is a distributed logic-based architecture.

The NXDN Forum released the Type D trunking protocol about 18 months ago. Both Icom and Kenwood plan to offer Type C and Type D trunking systems under their respective brands and system nomenclatures.

"The steering committee wanted to fulfill the entire standards and make products available that encompassed all components within the standard," said Mark Jasin, NXDN Forum chair. "There is a market for both types of protocols."

Several third-party certification agencies are members of the forum, and trunking interoperability tests are expected to begin within the next two quarters, Jasin said.

The NXDN digital air protocol is an open technical standard free to the wireless industry. The standard includes a conventional mode as well. The NXDN Forum provides governance and advancement of the technology and is comprised of 34 member companies including designers, developers and manufacturers that provide products and services in compliance with the NXDN technical standard.

Forum members and their channel partners have sold more than 1.5 million NXDN products since the technology's introduction in 2006.

PARIS — Airbus Defence and Space (formerly Cassidian) and **JVCKenwood** allied to jointly evaluate common developments in public-safety wireless broadband technology for North America and Europe.

To promote North American as well as European business development, the companies will jointly examine professional broadband technologies applicable to Project 25 (P25), a public-safety digital radio standard for North America, and TETRA, its European equivalent. In addition, the companies will explore further opportunities to jointly develop technologies and solutions for the evolution of professional mobile radio (PMR) markets.

"We intend to address the market of police, fire brigades and emergency response teams with a full-scale public-safety wireless broadband system with video and sensor solutions," said Haruo Kawahara, CEO of

JVCKenwood. "We have a good dealership in the United States, for example, and are excited to be able to support customers with all-in-one P25 next-generation system solutions. Doing this together with Airbus Defence and Space is a perfect match."

NEWBURY, Berkshire, United Kingdom — The Open Mobile Alliance (OMA), which supports interoperable end-to-end commercial mobile services, expects to address public-safety requirements in 2014.

OMA's push-to-talk over cellular (PoC) enabler should serve as a baseline for further enhancement to meet public-safety user needs, the group said in its 2013 annual report. Public-safety requirements work is underway in Release 12 of Third Generation Partnership Project (3GPP) Long Term Evolution (LTE) standards that will enhance LTE to meet public-safety application requirements.

During a 2013 meeting, OMA companies discussed how and which technical work would be needed to enhance the OMA PoC and location enablers to support public-safety applications. The over-the-top (OTT) community must be involved in the work and provide support, said Telecom Italia's Francesco Vadalà, OMA Technical Plenary chair.

A new work item, Push-to-Communicate for Public Safety, was assigned to the Communications Working Group. The Location Working Group is discussing a potential work item to support public-safety location services.

SHENZHEN, China — Hytera Communications shipped more than 1 million professional mobile radio (PMR) terminals in 2013 with 60 percent sold to international markets.

Founded in 1993 in Shenzhen, China, Hytera has a customer base in more than 80 countries and regions across the world. The Hytera research and development (R&D) department has more than 1,000 engineers, and more than 10 percent of its revenue goes into R&D for developing new products and technologies.

Hytera manufactures TETRA, Digital Mobile Radio (DMR) and Professional Digital Trunking (PDT) products.

"Hytera has gained certain achievement in the past years and will continue its focus on the professional communications network industry, while actively promote the technology transaction of professional network," said Chen Qingzhou, president and CEO of Hytera. "It's Hytera's mission to bring unlimited communications experiences to customers worldwide."

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Digital Boom in Brazil

With a robust economy, recent regulatory changes and upcoming global events, Brazil's communications market is ripe for a digital transition.

By Kazimierz J. Malachowski and Rubens Pedrosa Boucault

Brazil is the fifth-largest country in the world by geography and population, with more than 8.5 million square kilometers and 190 million inhabitants. Gross domestic product (GDP) is $1.9 trillion, making the country the seventh-largest consumer market in the world. Brazil is the largest economy in Latin America and the world's sixth-largest economy, according to the new methodology of the World Bank. The country is second in the ranking of foreign nations with the largest number of companies with shares and securities on the New York Stock Exchange (NYSE).

Brazil moved up five seats and is in 56th place in the ranking of the Global Report on Information Technology 2010 – 2011, released by the World Economic Forum. Brazil has one of the highest numbers of Internet users in the world and is the third-largest buyer of mobile phones.

To meet the demands of the Brazilian two-way radio market in various operational sectors of critical infrastructure such as public safety, transport and energy, the Brazilian telecommunications regulatory agency — Anatel — recently published new regulatory resolutions changing spectrum bands and creating new services. Anatel also required old analog systems to be replaced by digital systems. This created new demand for equipment in the professional mobile radio (PMR) market, bringing new opportunities for manufacturers worldwide.

Investments in Infrastructure

With the upcoming FIFA World Cup in 2014 and the Rio Olympics in 2016, world attention is focused on Brazil. These events brought investments, with a large portion invested in basic infrastructure, a major deficiency of Brazil. Infrastructure means urban mobility and transport focusing on airport modernization and expansion.

In addition to the 12 stadiums where the games will be held, transportation services must be enhanced, primarily in airports, trains and urban subways, highways and traffic control of the host cities. Modernization of public safety includes new radio communications systems for military, civil police and municipal guards, as well as integrated communications centers for various agencies, including federal police, border police, national guard, traffic police, highway patrol and first responder services including fire, ambulance, hospitals and more.

There is also an increased demand for more advanced communications systems for the utilities sector such as energy, water and oil companies, because of the expected increase in energy consumption.

Digital Technologies

Anatel didn't regulate which narrowband digital technologies should be used in the digital technology mandate. All available technologies are being implemented in various market segments. Communications protocols including Project 25 (P25) Phase 1 and 2, TETRA, Tetrapol, NXDN, digital Private Mobile Radio (dPMR) and Digital Mobile Radio (DMR) are

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dPMR Mode 3 Launches in Europe

By Ian Lockyer

The latest version of Icom's FDMA digital radio protocol, digital Private Mobile Radio (dPMR) Mode 3, was recently launched across the globe. Two of Icom's leading European agents, Icom UK and Icom France, offer the new product range. Icom UK, based in Herne Bay in southeast England, is celebrating its 40th anniversary in business.

The digital crossover can be confusing for customers. There is a broad choice with multiple standards, such as dPMR, Digital Mobile Radio (DMR), Project 25 (P25), and multiple brands as well. All the manufacturers are conducting sophisticated campaigns to attract customers from core markets such as education, transport, facilities management and construction. Customers are getting used to the differences between analog and digital, and digital products have reached the first stage of market maturity.

There are many variables to consider when a customer or dealer makes a two-way radio choice. Those include product characteristics, price, availability, dependability of supply, reputation, corporate culture, trading history and importantly, level of service and support. Every technology will have advantages and disadvantages. For example, TETRA systems tend to be designed for large-scale systems and may not be the most cost-effective solution for smaller organizations.

dPMR offers flexibility with a scalable solution from license-free to multisite/trunked systems. If the number of radio users increases in the future or the system requires expanded communications coverage, the dPMR conventional system can be upgraded to a multisite system, or grow into a Mode 3 trunking system while using the same subscribers. One sector where dPMR Mode 3 can be successful is in replacing MPT 1327 trunked networks coming to the end of their natural lives. The cost of maintaining an MPT 1327 system can start to build in time with replacement handsets, spare parts, new accessories and site maintenance.

Photo courtesy Icom

Business and industry users are investigating digital options.

It may be more cost effective to upgrade from MPT 1327 to dPMR Mode 3. Benefits include 6.25-kilohertz efficient channel spacing, outstanding audio and superb noise-cancelling properties. The initial Mode 3 capability is a trunked and networked radio system ranging in size from a single site up to 16-site multisite trunking operation, although further enhancements are planned.

The Icom/Fylde Microsystems solution will offer an immediate migration path from MPT 1327 to dPMR without the requirement of MPT 1327 operation in the IDAS terminals. The Fylde Multi-Lingo controller can encode/decode analog MPT 1327 signals to and from digital dPMR signals and vice versa. This provides the advantage of not requiring a parallel infrastructure set up to allow an MPT and the dPMR digital system to work together. As such dPMR Mode 3 provides scalable, true trunking features with migration possibilities from analog systems.

Icom France also launched Mode 3 to the French two-way business radio market. Founded in 1976, Icom France is heavily involved in system manufacture, sales, installation, training and consultation in the business radio market.

"It is still early to get feedback from different customers because the system is still under deployment, but the presentations made by Icom France received positive feedback," says Lionel Lewin, director of Icom France. "There has been a lot of interest in dPMR Mode 3. Our customers find it reassuring that dPMR Mode 3 is a European Telecommunication Standards Institute (ETSI) standard that offers a multivendor environment. They also like the fact that dPMR Mode 3 provides a dedicated calling channel that permits many levels of priority calls and queuing functions. The data capacity and the private call functionality in digital make dPMR Mode 3 trunking a necessity."

Both DMR and dPMR were developed to gain spectrum efficiency. But dPMR is a real 6.25-kilohertz channel where DMR is 6.25-kilohertz equivalent. Therefore, users implementing 6.25-kilohertz dPMR will not need to reinvest in a new system if 6.25 kilohertz becomes mandatory. ■

Ian Lockyer is the Icom UK marketing manager. Email feedback to editor@RRMediaGroup.com.

starting to share the market to meet the demand.

Each technology has its specific technical characteristics, and although they are treated as open protocols, users are finding that they are not fully compatible among the various vendors. For years P25 and TETRA were perceived as "high tier" narrowband digital technologies and appropriate to be implemented in public safety, however, DMR and dPMR are now taking increasingly higher shares of the high-end market, mostly because of competitive pricing and clever marketing. With the latest update of Anatel rules and the increasing sophistication of PMR digital technology, many Brazilians are seeking more than simple voice communications in the traditional VHF band (160 MHz), the newly opened 360 – 400 MHz or 800 MHz band using conventional, simulcast or trunked systems.

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Integrating Voice and Data

Driven by a stable economy, interest in accessing the Internet through digital mobility offered by devices and resources seen in digital and high-definition TV and 3D technologies and mostly through smartphones and tablets has brought this expectation to professional PMR equipment. Police agencies, utilities and large transport companies are looking for ways to bring data and images to mobile terminal users. Integration between smartphones and two-way half-duplex radio is being implemented in several systems. Software-activated push to talk (PTT) and interoperability devices that can connect different PMR systems and interconnect them to wideband networks are also in demand.

Recently Anatel regulated the 700 MHz band, and it will join the 2.5 GHz and 450 MHz bands to spread further access to 4G telephony. The difference for 700 MHz from the other 4G bands is that public safety, defense and critical infrastructure (utilities and transport) can ask for 5+5 megahertz for PMR use inside determined areas covered by 4G operators. This will open a specific market for segments that were restricted to narrowband communications or used wideband commercial service providers. The regulation will also open markets for suppliers that offer P25 and TETRA Long Term Evolution (LTE) overlay technology.

The transition to digital systems will also open narrowband data communications for users who cannot afford or do not need wideband data. Digital systems are more efficient than analog and can transfer more data in the narrower channels than the 1.2 kilobits per second (kbps) typically available in 12.5-kilohertz analog channels.

The need for data communications is increasing and brings a range of applications that include job requests, biodata acquisition and transfer, alarm detection, failure report, status reports, geolocation services, surveillance and monitoring. All these applications were seen in 2013 as an immediate need by corporations that were not satisfied spending money on a wide-area narrowband digital system for only voice or limited GPS location acquisition and transmission.

2013 wasn't bad for radio communications. Utilities and transport segments opened new opportunities. We expect that 2014, being the year of the FIFA World Cup and an election year for the president and state governors, will bring new and exciting opportunities in Brazil for all digital radio systems vendors. ■

Kazimierz J. Malachowski is commercial director at SGM Telecom in São Paulo, Brazil, a value-added reseller and integrator of mobile systems. Rubens Pedrosa Boucault is manager of system engineering at SGM Telecom. Email comments to editor@RRMediaGroup.com.

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Graphics courtesy Israeli National Police

Robust Data with P25 Phase 2

The Israeli National Police's Project 25 (P25) network is evolving to meet data and broadband needs.

By Yacov Lazar, Eldad Barzilay, Eli Weissbart and Alberto Schliserman

The Israeli National Police (INP) Project 25 (P25) Nitzan Project has been proving itself and exceeding operational expectations since it was built in 2010. The project has three system master sites, two active master sites with dual-site redundancy (DSR) and automatic backup activation. The third master site serves as an additional redundant site. The radio system comprises about 90 radio sites with a total of about 800 radio repeaters operating in 12.5 kilohertz (Phase 1) or equivalent to 6.25 kilohertz (Phase 2).

In addition to the fixed repeater sites, there are four mobile radio sites that can be deployed if needed and operate as an integral part of the trunking network connected via WiMAX, satellite or landline links. The mobile sites can also operate in a standalone site-trunking mode. The transport network is mainly synchronous digital hierarchy (SDH) microwave with four rings based on Ceragon Networks' IP10 systems. SDH rings provide the 1+1 resiliency, critical to ensure network availability. P25 Inter Subsystem Interface (ISSI) links provide connectivity to other P25 systems.

In total the system includes about 20,000 subscriber units with more than 3,000 talk groups. The system serves about 50 dispatch stations. The system is managed and monitored through a distributed management system by the regional communications officers using Genesis Group software. A centralized recording system serves the whole system.

The Center for Operational and Techno-Logistic Control operates 24x7 and offers technical monitoring and control and performs changes based on ad-hoc operational requirements as they arise. Tasks include site off-load during events by disabling talk groups at the sites or channel partitioning of

To reach the necessary level of data integration, INP used both off-the-shelf systems and dedicated development within the police force.

selected talk groups, active system monitoring and failure tracking, ongoing system management and trouble ticketing, and periodic testing and system trials to activate failure modes and check system reactions to failures, including activation of redundancy capabilities.

System Background

In preparation to meet the new challenges of Israeli public protection and disaster relief (PPDR) forces in the 21st century, the INP decided to replace its aging radio communications system, which was nearing its end of operational life because of the unavailability of spare parts, a slow management system and spectral inefficiency. In 2009 the INP chose P25 technology for the replacement system. Motorola Solutions won the contract for the supply, buildout and integration of the system.

The vision for P25 technology was the establishment of a system based on a new and evolving set of standards that would serve as the national communications system for all PPDR forces in Israel. The new P25 system had to meet the following operational requirements:

- Larger number of sites (90 instead of 60) to improve system coverage within the large cities, as well as most of Israel's less-populated regions — Galilee, Carmel Mountains and the Negev region.
- Improvement in grade of service (GoS) to system users to no more than 3 percent waiting for service more than 3 seconds.
- Ability to support at least 3,000 talk groups.
- Support new services such as GPS positioning, emergency alert, connectivity to public-switched telephone network (PSTN) for specific users and rugged subscriber units that meet hazardous materials environments.
- Capability to encrypt narrowband services.

Nitzan Goes National

During the system buildout, Israel suffered a large fire in the woods of the Carmel Mountains. In the event, 45 policemen and firefighters lost their lives. Inquiries into the high number of fatalities and the overall operation of

Nitzan system center for operational and techno-logistic control

the PPDR forces identified that the existing inter-forces bridges (radio over IP) were inadequate for large emergency events. A government decision led to the Nitzan Project becoming the national radio system not only for the police but also other PPDR forces, including the fire brigades. Interconnectivity with the Home Front Command forces and Rescue Forces allows definition of common communications talk groups that are critical for harmonizing operations of all PPDR forces during emergencies.

As the Nitzan system started serving additional PPDR forces, it became the natural choice for other government units that needed similar services. The Prisons Authority, the National Authority for Nature Preservation and Hazardous Materials Control Authority joined the system.

A parallel network enlargement and expansion was needed to support the additional forces and units. To support the new demand for additional call GoS, the network was expanded by more than 100 repeaters, changing from FDMA (12.5 kilohertz) to TDMA (6.25 kilohertz equivalent), without requesting additional frequency channels. The subscriber units were upgraded to support 3,000 talk groups. Because each radio unit may have many talk groups programmed, an automatic search was added in the unit that allows immediate access to the talk group needed. Some talk groups can be saved as hot keys.

In December, another emergency event occurred, with the Alexa storm covering the whole Middle East with snow and huge amounts of rain. The last similar storm was recorded in 1952. As a result of the storm, electricity lines were cut, highways and in-city roads were blocked and closed, and many travelers were stuck in freezing cold along the roads.

During the storm, the Nitzan system served as a transparent communications system for police, support and rescue forces, demonstrating its capability to survive the harshest climate without affecting the forces in the field.

The current phase of the Nitzan project is concentrating on enabling the encryption and data services capabilities of the system and integrating them into the INP operational support systems.

Data Integration

The operational requirements of INP from the P25 Nitzan system are exhaustive and beyond the P25 data capabilities as a standalone system. The INP requires integration of the Nitzan data services into a whole set of information systems that serve INP's daily operations so that the police command and control (C&C) systems can receive Nitzan data on one integrated operational display.

Therefore, the main effort was the integration of Nitzan data into the INP data system that contains subsystems such as INP C&C system, emergency calls and dispatch center, INP operations management system and INP enterprise resources planning (ERP) system.

A typical scenario that demonstrates the level of integration among the INP C&C systems and Nitzan data services is the handling of a distress signal from a policeman.

Once a police officer has pressed the distress button on his radio unit, the signal is received at the dispatch center with the location coordinates of the officer. The signal is also relayed to the INP resources management system that already contains all officers and their radio units' data. Once the distress signal is received, the officer is identified (with all his personal data), and the local command can make immediate decisions on how to react. The location signal is also relayed to the INP geographic information system (GIS), which presents the officer in distress on a multilayered map. On the same map, other police forces are shown so the commander can order forces to assist the officer immediately. To reach this level of integration, INP used both off-the-shelf systems and dedicated development within the INP.

The subsystems participating in the integrated data solution include the following:

Motorola Universal Processing Server (MUPS): The MUPS serves as a gateway between the P25 subscriber units, other INP C&C and operational systems. The MUPS system is a Motorola off-the-shelf product.

Text Messaging Service System (TMS System): The TMS system is the off-the-shelf short messaging application service of Motorola's P25 ASTRO 25 system.

ASTRO to Israel National Police (ASTRO2INP): ASTRO2INP is an intelligent mediator between the MUPS gateway and the INP

In view of the critical services the current system provides, service continuity between the P25 system and any future broadband network is mandatory.

operational data network. The bidirectional flow of data is performed asynchronously, using IBM's Websphere Mq application. A group within INP and Motorola developed ASTRO2INP. It holds the location information of all subscriber units with a location interface. Once a radio registers into the Nitzan system, the ASTRO2INP service feeds it with the location policy that controls the location reports' timing from the radio unit.

Messages Router: The messages router serves to relay Nitzan location information to other PPDR forces that use the Nitzan system. In these additional forces, the location information received is processed by their existing C&C systems to serve their special operational needs.

Enterprise Resource Planning (ERP) System: The ERP system at INP serves to manage all Nitzan system inventory, including radios with all accompanying data — type and model (hardware and software configuration and licenses), organizational status and ID number. A batch process updates ERP data regularly.

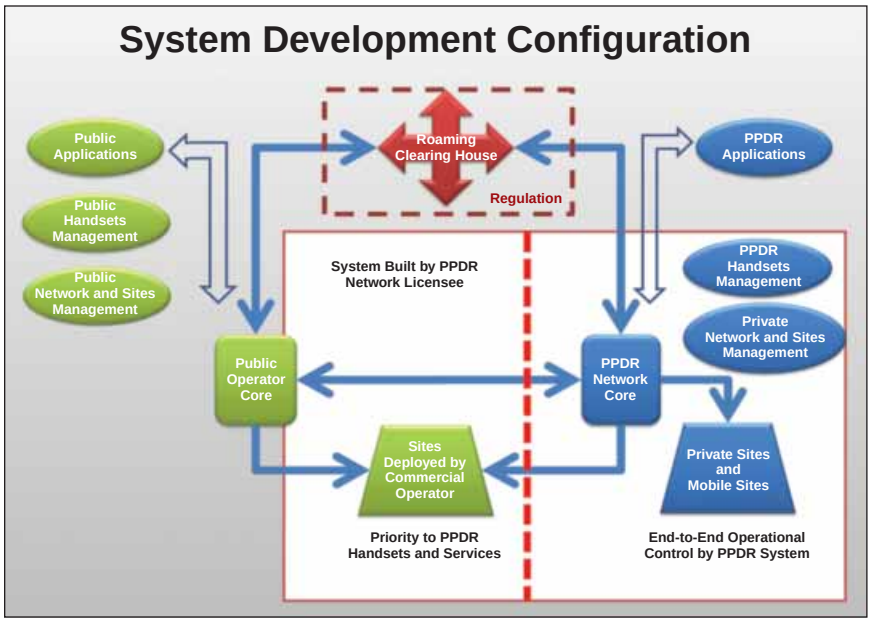
INP Operations Management System: The operations management system manages the radios in real time. It can allocate and modify the location transmission policy of a unit, including start, stop, report period and more. The application is at the commander's desk to be used in real time.

Radio Assignment System: The system serves a real-time database that correlates between police officers and their actual radios. This database can be queried to identify a specific police officer based on data from his radio.

The INP data system was trialed in a large-scale pilot prior to becoming operational. The pilot included all systems participating in the service, real Nitzan system repeater sites and about 30 radios. Results of the pilots were used to set all Nitzan data system parameters. The Nitzan data system now is operational so police commanders at all levels can access the data as presented on INP C&C systems.

Evolution to Broadband

INP is already planning for the next-generation communications system with the target to enable broadband services. INP adopted a combined



private/public approach. The INP private broadband network will be integrated with a larger commercial network built and operated by a separate licensee, because of the prohibitive costs of building a private system for PPDR forces only. In view of the critical services the current system provides, service continuity between the P25 system and any future broadband network is mandatory. The P25 system will likely operate in parallel with the new broadband network for a long time.

The spectrum allocation for broadband PPDR services is a critical resource needed for the network. Israel, with INP representatives, is participating in frequency allocation for broadband PPDR networks discussions, now taking place in the International Telecommunications Union Radiocommunicaitons Sector (ITU-R).

The private/public broadband network will be based on these rules:

- A private broadband network will be built for the PPDR forces.
- The private network will make use of existing sites with additional government sites to achieve coverage in areas of interest to PPDR forces.
- The public network will complement the private network coverage to achieve full countrywide coverage.
- Subscriber units will be able to roam freely between the two networks while receiving priority over regular subscribers in the public network.

■ Subscriber units will be managed by the private network control center.

■ Information assurance and cyber protection will be achieved by end-to-end encryption of traffic regardless of the network used for communications.

■ The private/public network model should be supported by adequate regulation to cover aspects that do not exist in public cellular networks.

The P25 Nitzan system has been proven as a force multiplier in the daily work of INP and during emergency periods. The integration of Nitzan data services into the INP C&C system was a major development and integration effort; but it was all justified by having one integrated C&C system at the disposal of INP commanders. INP is planning for the next-generation communications system with the target to enable broadband services.

Nitzan mobile site on its way to be deployed during the Alexa snow storm in 2013

Yacov Lazar is head of the Electronics and Communications Division of Israel National Police (INP). Eldad Barzilay is senior consultant and head of engineering of the Nitzan Project's P25 system. Eli Weissbart is a consultant in the engineering team of the Nitzan Project. Alberto Schliserman is a consultant in the engineering team of the Nitzan Project. Email comments to editor@RRMediaGroup.com.

Editor's Note: The INP P25 system and its launch were described in "Coverage Challenges" from the Quarter 1 2011 issue of *RadioResource International.*

Photos courtesy Cassidian

The Secure MVNO Path to Broadband

Some TETRA operators are considering a mobile virtual network operator (MVNO) model for public-safety broadband.

By Ole Arrhenius

Public-safety organizations including the police, fire brigades and emergency response teams will need to expand their secured communications from narrowband voice communications to 3G or 4G broadband to transfer large data files, including images and video. Thus, European TETRA operators are planning to provide mobile broadband data services to serve government and public-safety customers.

For some, the new bandwidth-hungry mobile applications are based on a secure mobile virtual network operator (MVNO) model. The model allows mobile data services to be provided by using commercial mobile networks, while offering the secure information access that public-safety organizations need.

New mobile data applications are intended to achieve more with less — better operational results at lower cost. Societies are also looking for better protection of people and property, as well as improved safety for front-line officers. Police officers need timely and accurate local information to be more visible in the community. All of these needs must be met with less money, making operations more efficient. By allowing officers to spend more time in the field and less in the police station, which can be achieved with new mobile data applications, the police vehicle can be converted into a mobile office.

Broadband Challenges

The mobile data applications need high bandwidth to transfer large amounts of data. The challenge is that although dedicated professional mobile radio (PMR) networks can deliver secure, reliable and available data services, they do not have the capacity needed to support the new breed of bandwidth-hungry apps.

Many things may prevent the rapid deployment of new dedicated broadband networks for public safety, including no available radio spectrum. Europe has yet to allocate spectrum for public protection and disaster response (PPDR) broadband applications, and 2015 is the earliest any allocation is likely to be awarded. The PPDR community is considering two spectrum options, 700 MHz and 400 MHz, or a combination of both.

Other challenges include governmental limits on investments or the qualifier that the network will only be justifiable when it provides the same functionalities and performance as TETRA, Tetrapol and Project 25 (P25) networks. To solve the bandwidth challenge, a few public-safety organizations are looking to commercial services. However, the services of mobile operators are targeted for consumers and do not provide the security and reliability needed by public-safety organizations.

Virtual Network Operators

How can public-safety organizations get the security and other mission-critical characteristics while also enjoying operational efficiency and the versatile features provided by broadband solutions? One option is a secure MVNO platform.

A secure MVNO model can meet the challenges, complementing existing public-safety networks by using commercial mobile networks for data. The model can

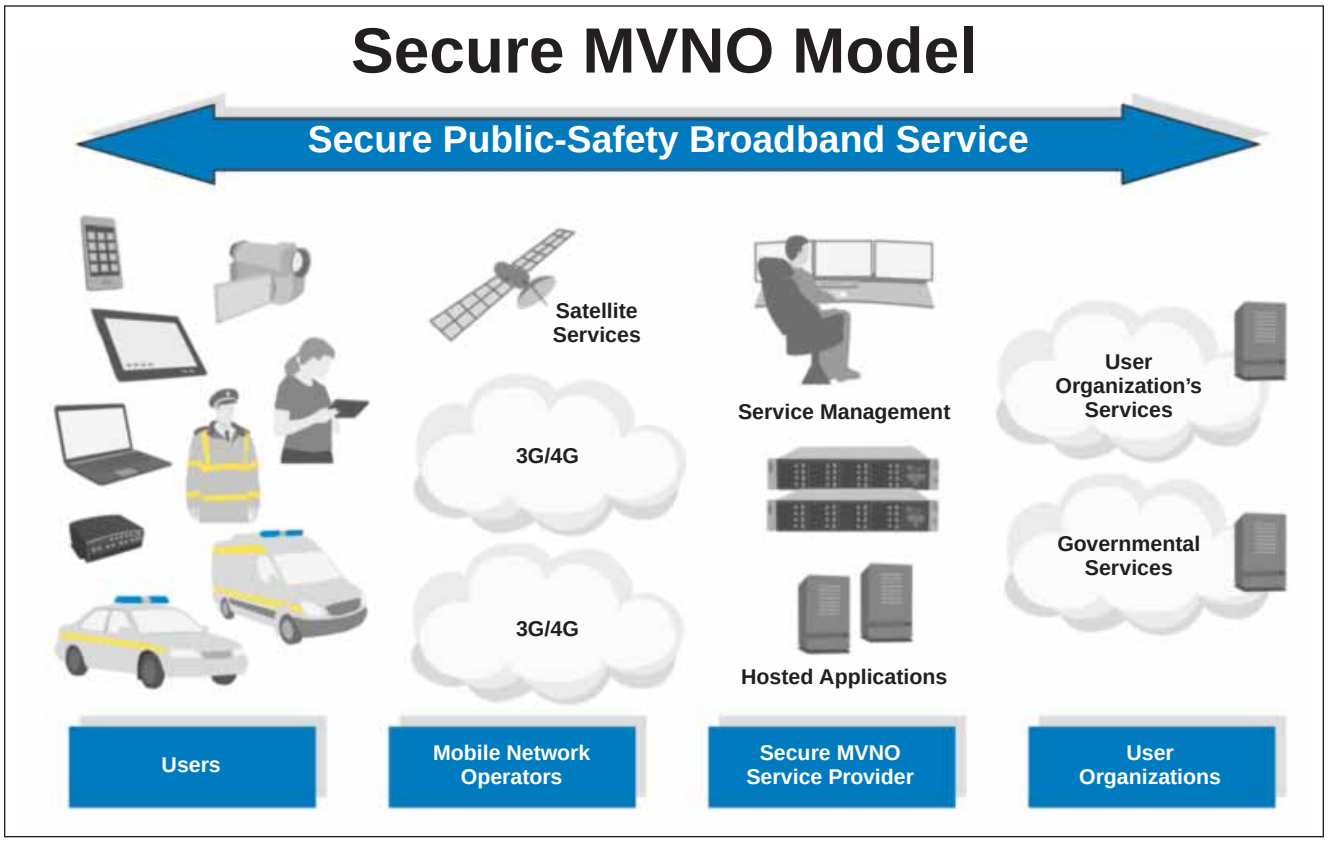
Sweden's Rakel is conducting a pilot of a secure MVNO service that will run through May.

offer the best of both worlds, providing commercial network characteristics while meeting public-safety needs for secure communications.

Instead of each public-safety organization making a separate agreement with a mobile operator, the public-safety network operator adds the secure MVNO model by organizing a global deal with commercial operators to offer broadband capacity to its subscribers. Following the existing TETRA service model, this entails one operator providing mission-critical communications services to all public-safety organizations in the country. The network and other resources are shared by end user groups, and users gain uncompromised security, integrity and high reliability. Users in the field enjoy turnkey access to a secure application cloud, with convenient and timely support when problems occur.

Resilient satellite connections and management access to commercial networks further complement the data services, ensuring maximum coverage by using several choices of commercial networks, not just one. And because the approach does not rely on a single network, it also optimizes availability. The result is uncompromised security and multinetwork availability for mobile data applications. The model also supports extended coverage or additional capacity, often required in the case of major accidents, for example.

The PPDR operator can also integrate the MVNO services with other wireless services to improve operations. One example is to use wireless LAN between vehicle routers, providing the broadband service, and tablets and smartphones outside the vehicle. The public-safety operator also takes care that the security and availability



are on an agreed level and organizes the connections between the user organization's command and control, applications and user equipment in the mobile end. The control can be with the operator or outsourced through clear service level agreements and security clearance.

European Market

The secure MVNO arrangement helps organizations using narrowband secure networks take advantage of broadband and adjust the services to their particular needs of data speed, control and security. Operators with established TETRA networks in Europe are actively looking for these types of solutions and some operators are about to have their first experiences.

In Belgium the TETRA operator ASTRID offers a service called Blue Light Mobile. The service includes ASTRID subscriber identity module (SIM) cards enabling roaming between different commercial networks. Security and 24/7 support are included in the service. Through a tender last year, ASTRID selected three specialist partners, Astrium, Belgacom and Halys, to help with service and equipment for the service.

"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, in a 2012 interview. "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."

In Sweden, Swedish Civil Contingencies Agency (MSB), through the Rakel public-safety TETRA network, will pilot a similar data service with public-safety authorities. The Swedish project will run until the end of May. Interest is increasing in other countries as well.

The concept is a step toward dedicated broadband capacity. It enables new kinds of applications, giving field users the chance to enjoy new functionalities. As dedicated broadband is introduced, new capacity or improved coverage can be offered. However, in many instances, users can continue using the same applications without modifications. Investments can also continue to be exploited as facilities develop.

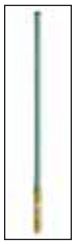
Adding broadband capacity as a new service for public-safety users allows the secure MVNO operator to provide attractive new services, while bringing in more revenue. It also safeguards the operator's future in another way — without broadband the secure network operator is at risk of becoming a voice-only services provider and losing its momentum to invest in services. ■

Ole Arrhenius is senior system marketing manager at Airbus Defence and Space (formerly Cassidian). He is an electronics engineer with experience importing, selling and marketing communications systems. He has more than a decade of experience with professional mobile radio (PMR) and TETRA networks. Email comments to editor@RRMediaGroup.com.

ANTENNAS

Bird Technologies

Bird Technologies' high-performance base station antennas are designed to complement the company's wide bandwidth multicoupling systems covering the 380 – 512, 746 – 896 and 896 – 941 MHz frequency range. Through a true corporate-feed design, equal in-phase power is distributed to each radiating element to ensure excellent vertical pattern control and shaping, low loss and beam tilt that does not vary over the operating bandwidth of the antenna, company officials said.



www.birdrf.com

Cobham Antenna Systems

The SA-11-90-0.6VH/2113 dual-polar UHF white space sector antenna features vertical and horizontal polarizations and can be used in conjunction with radios that have two-port diversity to provide non-line-of-sight (NLOS) connectivity and reliable communications in challenging environments. The antenna is wideband, covering the frequency range 470 – 700 MHz, allowing it to be used in situations where a number of channels are wide apart. Fewer antennas may be needed to fulfill requirements, reducing inventory and installation costs for operators and installers, company officials said.

www.european-antennas.co.uk

Codan Radio Communications

The 3040 automatic whip antenna is a low-profile, high-performance mobile antenna for all of Codan's high frequency (HF) radios. The combination of fast tuning, compact form factor and rugged construction provide a state-of-the-art mobile antenna tuner, company officials said. The antenna is built to withstand severe conditions often experienced in mobile HF radio deployments. The internal electronics are protected by a lightweight composite shroud and vibration-absorbing mount to provide an antenna that is fully waterproof and compliant to Mil-Std-810F for temperature, immersion, vibration and dust ingress.

www.codanradio.com

dbSpectra

The DB02409-XWBD antenna is designed for use in carrier-neutral distributed antenna system (DAS) applications, with coverage for bands from 698 – 960 MHz and 1.71 – 2.7 GHz, including Long Term Evolution (LTE), Advanced Wireless Services (AWS), Personal Communications Services (PCS) and 700/800 cellular bands. Each antenna port is internally diplexed, minimizing cabling and installation time. With dimensions of 61 by 33 by 18 centimeters, defined beamwidth of 30 degrees, and

nominal 8 dBd gain, the antenna is ideal for use in locations requiring defined coverage areas as part of DAS implementations.
www.dbspectra.com

IK-Telecom

IK-Telecom offers collinear antennas with

excellent directional diagram and good matching in the industrial, scientific, and medical (ISM) 433 MHz band. Traditional radials are replaced with a current balun, which increases reliability. A gain of 7 dBi increases a radio covering of any telemetry system. The feed line is protected from bad weather. All antennas are checked on compliance of standing wave ratio (SWR) parameters.
www.duplexers.eu

MicroMagic

The UHF unit gain fiberglass antenna with a mast mount features a frequency range of 400 – 470 MHz and a gain factor of 5 dB.

The antenna offers a bandwidth of 5 megahertz, omni radiation pattern, vertical polarization and series-fed mounting array. The antenna can operate in a temperature range from -40 to +80 degrees Celsius and comes with an N-female connector.
www.micromagic2way.com

MiMOMax Wireless

The low-profile 450 MHz panel antenna is a high-gain, rugged, compact antenna suitable for radio sites that encounter ice, snow and

strong wind loading. The antenna provides independent horizontal and vertical polarizations, making it suitable for a wide range of radio applications including multiple input multiple output (MIMO). The pattern-type diversity unit provides increased signal quality and path resilience in challenging environments. The antenna comes with a fully enclosed radome, a typical gain of 9 dBi and a maximum input power of 200 watts.
www.mimomax.com

Mobile Mark

The LTM502 series multiple input multiple output (MIMO) antennas are designed for wireless fleet management systems that combine a Long Term Evolution (LTE) MIMO modem with a Wi-Fi MIMO modem and a GPS receiver. The combination

requires five separate antenna elements: two for LTE, two for Wi-Fi and one for GPS. The antennas are for applications that require real-time video/data uplinks and downlink from vehicles. The cellular/LTE elements cover all LTE frequencies worldwide from 700 MHz to 3.7 GHz. Mag-mount versions are available.
www.mobilemark.com

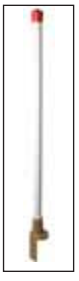
Panorama Antennas

Featuring Long Term Evolution (LTE) 700 MHz, GPS and Wi-Fi 2.4 GHz, Panorama Antennas released its latest configuration in the Sharkee range of mobile antennas.

The single-hole, roof-mount, OEM shark fin antenna can be used with consumer or public-safety professional 4G broadband and Wi-Fi equipment. The antennas include additional mounting for an optional external single, dual or tri-band whip.
www.panorama-antennas.com

Procom

The CXL 380-470C antenna is a sturdy, 0 dBd, vertically polarized, omnidirectional base station antenna that covers the 380 –



470 MHz frequency range. The antenna is tested for a wind survival rating of 200 kilometers per hour, with a maximum power of 150 watts. The antenna is provided with Procom's "C" mast bracket, a universal, epoxy-coated mounting bracket made of non-corrosive aluminum. The antenna's total height is 1.2 meters, and the unit can operate in a temperature range of -30 to +70 degrees Celsius. The broad-banded antenna element is enclosed in a glass fiber shroud, which ensures the performance is undisturbed by corrosive environments.
www.procom.dk

Radio Frequency Systems (RFS)

The SC3/SCX3 series CompactLine easy microwave antennas are ideal for mission-critical communications and engineered to provide high performance in an easy-to-

deploy package. The antennas are available in single-polarized configurations (SC3 series) and dual-polarized configurations (SCX3 series) for 6 GHz to 25 GHz frequencies and include three wideband models. The antennas are built to survive wind speeds up to 250 kilometers per hour without a side strut. The antennas were tunnel tested to ensure they can remain operational in extreme conditions.
www.rfsworld.com

RF Industries (RFI)

The Meander collinear antenna is for 793 – 824 MHz receive systems. The antenna is

optimized to produce better results in a smaller package with distinct size, weight and cost advantages, company officials said. Because it is tuned to the receive band, the antenna is half the diameter, 25 percent of the weight, and 20 percent shorter than other collinears with the same gain (9 dBd), RFI executives said. The COL811-824 is passive intermodulation (PIM) rated.
www.rfiwireless.com.au

Royal Communications International

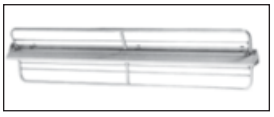
The CWA-125 is a Near Vertical Incident

Skywave (NVIS) antenna that eliminates the "skip zone" and provides excellent results for long-range communications. The antenna is easy to assemble with a total installed

height of less than 3.65 meters. Universal mounting hardware is included for use with the Micom F2265 antenna tuner or other similar models.
www.royal-communications.com

Sinclair Technologies

The SM700 series antennas are compact, low profile and cover the 694 MHz to 6 GHz range without the need for a ground plane.



The SE41X series of broadband antennas cover the 746 – 960 MHz range and are available in a pattern-adjustable version.
www.sinctech.com

ACCESSORIES

CML Microcircuits

The CMX7011 is a low-cost, self-contained voice encryption chip with an embedded low bit rate vocoder and a microcontroller used to provide secure encrypted voice communications on analog radio systems.

The device manages the voice conversion to digital, real-time voice encryption and wireless data modem. The unit provides an over-air protocol that can be easily implemented in analog radio communications headsets.
www.cmlmicro.com

David Clark

David Clark noise-attenuating Series 6200 and Series 6700 intrinsically safe Radio Direct Headsets connect directly to

portable and mobile radios without the need for a separate adapter and provide maximum comfort, dependable performance and rugged reliability. Series 6200 headsets connect to narrowband and legacy portable radios. Series 6700 headsets are intrinsically safe and carry FM Approval for potentially explosive or hazardous environments. The headsets are also available in modular configurations to provide added flexibility by using interchangeable communications cords for connection to a wide variety of radios.
www.davidclark.com

Entel UK

Entel released the CXE19 headset, which uses bone conduction for speech and listening to ensure that the user's ears are not covered, allowing them to hear and be

aware of their surroundings while wearing the headset. Lightweight and waterproof, the headset is suitable for a variety of applications, such as defense, security, fire and rescue. The device is

usable with most helmets and provides whisper speech capabilities under stealth conditions. Entel's bone conductive range also includes a throat mic, skull mic and earpiece/mic.
www.entel.co.uk

Impact Radio Accessories

The IP67 waterproof, heavy-duty PRSM-HD3-WP was re-engineered to exceed the quality and reliability of high-priced brands,

company officials said. The microphone features high-grade Knowles components; fully anchored, Kevlar-reinforced heavy-gauge cabling; and a tough polycarbonate casing for reliability in demanding environments. The product is optimized for use with digital radios and is available for most portable radios on the market. The unit features a three-year warranty.
www.impactcomms.com

Imtradex

OnGuard Clear+ is a covert communications solution that features a small, interference-free, modern in-ear-receiver,

and can be used for the security segment. The device can operate with analog and digital radios, and in addition to the in-ear receiver, the unit includes a highly sensitive miniature microphone for discreet fastening on a shirt collar. The technical configuration can reliably suppress electromagnetic noise interference.
www.imtradex.com

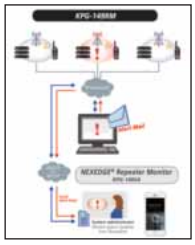
JCK Jean Couk Enterprise

The JCK noise-canceling solution uses advanced digital signal processor (DSP) technology to offer clear communications. The H-580N speaker microphone and HS32N earmuff headset are ideal for peo-

ple working in high-noise environments, such as construction, manufacturing and aviation. Other functions, including a volume control, emergency button and wireless version, are optional.
www.jeancouk.com

Kenwood

The KPG-149RM NEXEDGE repeater monitor PC software enables around-the-clock remote IP monitoring of all base repeaters on an NXDN single- or multi-site trunked network and on NXDN conventional IP networks. Designed for use with the KPG-



149RM PC software, the KPG-149SA app for the Apple iPhone/iPad is capable of monitoring system conditions on the go and notifying staff of remote repeater incidents. Even when the iPhone or iPad is in sleep mode or when the app is in the background, the PC-based software can take over to notify the device user via email at any time.
www.kenwood.com

Klein Electronics

The Valor professional speaker/microphone is for two-way radios and smartphones. The

speaker mic is rubber overmolded and features side and front push to talk (PTT) and two audio ports (top and bottom) with locking cameras. The mic comes in black or safety orange, with a three-year warranty, and is designed, engineered and assembled in the United States.
www.headsetusa.com

Midian Electronics

The GPS speaker microphones work with Midian's CAD-800 controller and a Google

Earth interface to display unit identification (ID) and location information. The company offers multiple varieties of GPS speaker mics, 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 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 Mobility GPS Microphone GM22 series is a low-priced speaker mic with built-in

GPS module that works with Kenwood/Icom two-way radios. With a built-in, highly sensitive GPS chip, the mic not only works as a standard speaker mic, but also tracks the position of the radio and displays it at the dispatch center where the base station unit is located with a computer running a map software application. The mic is compatible with FleetSync and IDAS systems, and is suitable for police, firefighter, dispatch applications and mountain rescue.
www.mobilitysound.com

National2Way

Designed to work with MOTOTRBO radios, National2Way's wireless earpiece and wire-

less push to talk (PTT) are paired to the wireless audio gateway (WAG) out of the box, ensuring a quick setup process by pairing the WAG to radio. The included wireless earpiece can also pair to any mobile phone. Users have several PTT options, including the PTT on the WAG unit or the included wireless PTT.
www.national2way.com

Oy Stop Noise Finland

Multi Handset is a handheld audio-data-image radio accessory. The product offers

uncompromised performance with limited user resources. The device renews the processes for

collecting data from the field by boosting efficiency, improving yield, offering automatic statistics and eliminating human errors, company officials said. Benefits include excellent ergonomics and ease of use, one push of a button per scan, several checks made in one session, and light and portable size. Often the required terminals, network, and databases already exist. It comes in a familiar speaker microphone device.
www.stopnoise.fi

ParMarLow Electronics

The RS-1400 one-wire two-way radio shroud was updated to include the inline audio speaker and tube headset. The single-wire configuration is optimum for repetitive, short response use. The unit is an alternative to the shoulder microphone/earphone setup and is now available for Harris radios.

www.twitco.com

Plantronics

The CA12CD is a cordless headset adapter that provides wireless communications and push-to-talk (PTT) functionality for applications within dispatch and air traffic control. The headset uses digital, 64-bit encryption and operates within 1.92 – 1.93 GHz. The product 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 has a Quick Disconnect that is compatible with all Plantronics H-tops. Corded and USB versions of the PTT interface are also available.

www.plantronics.com

Pryme Radio Products

The HBB-EM series professional-grade dual-muff headset is designed for high-noise environments and earned a noise protection certification rating. Receive audio is heard over loud dual-muff earphones, and the adjustable boom microphone ensures clear audio on transmit. The headset is lightweight, comfortable and easy to adjust, Pryme executives said. The headset comes in over-the-head and hardhat mounting models. Users can push to talk (PTT) via the tactile PTT button mounted on the right earphone.

http://mc.pryme.com

Savox Communications

The Promate Bluetooth push to talk (PTT) provides clear audio in a range of working industrial environments. To increase efficiency, the Bluetooth devices enable smartphones and data collection devices on high-speed networks. In combination with PTT applications running on Long Term Evolution (LTE), 3G and Wi-Fi devices, the BTR-155 Remote Speaker Microphone (RSM) and BTH-101 Bluetooth headset feature full duplex and require no dialing or texting. The headset is designed to sit comfortably and securely on the ear, while the mic offers handheld capability.

www.savox.com

TecNet International

The TecNet TBM series of wireless Bluetooth mobile kits offers a range of up to 91 meters, allowing users to transmit and receive outside their vehicles, while using mobile radios. The Class 1 Bluetooth speaker microphone offers adjustable volume, simple pairing with auto repairing, more than 5 hours of talk time and 48 hours or longer in standby. The package comes with Bluetooth dongle and speaker/mic, connection cables, external antenna and mounting hardware.

www.tecnetusa.com

Wireless Pacific

The XSFB special function box provides a variety of enhanced operational functions, including dual radio, local talkaround, radio and public address, lone worker and enhanced remote ambience listening capability for its X10DR secure wireless microphone. X10DR (pronounced extender) cuts the cord and puts radio system access into the user's hand when away from the vehicle, delivering mobility without system compromise, company officials said. The mic allows wireless communications with a fixed or vehicle radio up to 300 yards.

www.wirelesscorpltd.com

New Products

Rugged Smartphone

Handheld Group is shipping the Nautiz X1, a rugged enterprise smartphone that is waterproof, dustproof and shock resistant. The device has an IP67 ingress protection rating and meets military test standards for

humidity, vibration, shock and extreme temperatures. The phone is slim, weighs less than 179 grams and features a 10.16-centimeter sunlight-readable, capacitive touchscreen and durable Gorilla Glass. Features include a 1 GHz dual-core processor, 1 Gigabyte (GB) of random-access memory (RAM), Bluetooth, Wi-Fi, compass, u-blox GPS and a 5-megapixel camera. Multiple battery options are available.

www.handheld-us.com

Waterproof dPMR Radio

The IC-F3262D from **Icom UK** is a rugged digital Professional Mobile Radio (dPMR) two-way radio that is waterproof and dustproof, and includes a built-in

GPS receiver. IDAS technology provides two distinct channels in each 12.5-kilohertz slot rather than one channel with two time slots. Benefits of the radio include clear audio transmissions, large coverage footprint and encrypted communications. The device features a backlit dot-matrix LCD, 14-pin accessory connector and a rechargeable Li-ion battery. Other features include multiple scan functions, voice scrambling, five-tone signaling, silent standby and radio stun/kill/revive.

www.icomuk.co.uk

FDMA Software-Defined Radio

The DE9944 from **CML Microcircuits** is a compact demonstration platform for narrowband FDMA digital and analog professional mobile radio (PMR). The system allows fast evaluation through production

and can be used to demonstrate a complete RF transceiver and baseband function. The platform incorporates a direct conversion receiver and voltage-controlled oscillator (VCO) two-point modulation transmitter. Features include a built-in keyboard, display microphone and speaker. In digital mode, the board is European Telecommunications Standards Institute (ETSI) dPMR TS 102 658 compliant, and in analog mode, legacy TIA-603-D/EN 300 086 standards are supported.

www.cmlmicro.com

TETRA Pager

Airbus Defence and Space (formerly Cassidian) introduced a TETRA pager for rescue organizations. The device is easy to deploy and combines antenna performance, battery autonomy and robustness in a compact form factor. Secure two-way communications between the control center and operational units is supported. TETRA features such as group calling are available.

www.cassidian.com

TETRA Base Station

The NeTIS-B VHF from **Etelm** is an IP-based TETRA base station that can support all system architectures. The base station is compact and features power-control functions. Efficient outdoor and indoor coverage is provided with the integration of up to six receivers on a single base station. The product supports registration of terminals, full- and half-duplex individual calls, group calls, secondary control channel, short data service, data transmission and security features. The base station operates in the 146 – 170 MHz band for uplink and 151 – 175 MHz band for downlink.

www.etelm.fr

Tactical Repeater

The HiveNet and Vizor are tactical repeaters from **Codan Radio Communications**. HiveNet is a rapid repeater network solution for secure mobile and fixed operations. The network can link several repeaters together to provide fully encrypted Project 25 (P25) communications. A rugged design and low power draw make the network ideal for undercover operations, vehicle convoys or wide-area public-safety incidents. Vizor is a transportable repeater featuring Advanced Encryption Standard (AES) 256 over repeater links, transparent communications, quick swap duplexers for channel agility and a flexible control interface. The product comes in a lightweight, rugged Pelican case.

www.codanradio.com

Configurable Test Set

Aeroflex introduced a configurable automated test set. The 7215 is designed for production- and depot-level testing of military and software-defined radios (SDR). The standard configuration includes a high-resolution touchscreen user interface, RF testing up to 2.6 GHz, 90 megahertz of instantaneous bandwidth for digital signal generation and analysis, and multiple RF and audio instruments. Advanced digital signal analysis tools are optional, including error vector magnitude (EVM) measurements and power drop-out tests on frequency hopped waveforms. Customers who need automation for RF and non-RF radio tests can use the product as a small alternative to large rack-and-stack automated test equipment (ATE) systems.

www.aeroflex.com

TETRA PIM Analyzer

The S1L TETRA MK2 series is a passive intermodulation (PIM) analyzer from **AWT Global**. The analyzer measures TETRA and UHF networks in the 400 MHz frequency range. A variety of test modes are supported, including field measurement mode, analyzer, multiple PIM display, receive (RX) sweep, PIM vs. time, and single carrier mode for insertion loss and coverage measurements. The analyzer features a 3-centimeter touchscreen and includes three USB ports for entry devices, external data storage or wireless devices. Results can be stored in several file types.

www.awt-global.com

Tracking Antenna System

TeleCommunication Systems (TCS) introduced its X/Y Tracking Antenna Systems, designed for low-Earth orbit (LEO) and medium-Earth orbit (MEO) satellites. Applications include Earth observation, remote sensing, telemetry, tracking and control applications. The systems can be operated from anywhere in the world using a control and monitoring capability. The X/Y axis configuration eliminates the keyhole effect that can occur when other tracking antennas cross through the zenith. Antenna reflectors are made of carbon composite, which allows them to maintain their shape in extreme heat and cold. Feed assemblies include both right-hand and left-hand circular polarized configurations from L-band through Ka-band.

www.telecomsys.com

GNSS Antennas

Tallysman Wireless added three antennas to its line of dual-feed antennas. The TW2710 and TW3710 cover China's BeiDou

B1, Europe's Galileo E1, U.S. GPS L1 and Russia's GLONASS G1 frequencies. The TW4821 covers BeiDou B1, Galileo E1 and GPS L1 frequencies. The units all use wideband dual-feed patch antennas and exhibit low axial ratios, high multipath rejection and excellent gain.
www.tallysman.com

Integrated Communications Solution

The **Sepura** Integrated Communication Solution (SICS) is a consolidated application portfolio that integrates software from 3T and Portalify with Sepura's existing applications and services. The product addresses resource management, dispatch, productivity, security, radio applications, and application, operations and maintenance (OMC).
www.sepura.com

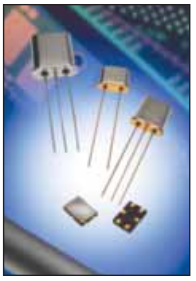
LMR-500 Cable

The EZ-500-NMH-X from **Times Microwave Systems** is a type-N no-solder male straight connector for LMR-500 low-loss coaxial cable. The crimp-style connector does not require soldering of the center conductor into the contact or braid trimming, making it ideal for field installations. The connector is compatible

with the CST-500 cable prep tool and the HX-4 crimp tool. Features include combination hex/knurl coupling nut, tri-metal plating to eliminate tarnishing, chamfered cable entry hole for ease of termination, ridged landing area on the aft end for better grip and sealing of the heat shrink boot, and low voltage standing wave ratio (VSWR).
www.timesmicrowave.com

Monolithic Crystal Filters

Mercury Electronics Europe introduced

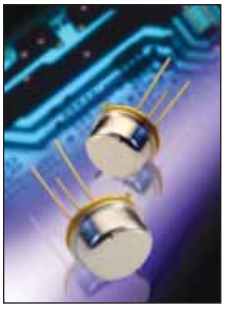


monolithic crystal filters in surface mount and through-hole package styles. The SMD type Q series and through-hole 49T, U1 and U5 series offers compact and lightweight construction as well as shock and vibration resistance. The surface mount devices are suitable for auto pick and place, reflow solder applications and are housed in a 7-by-5-millimeter (mm) package. Available with two and four poles at 21.4, 21.7 and 45 MHz frequencies, the devices offer attenuation from 50 – 80 decibels (dB) at 910 kHz with maximum insertion losses from 1.5 – 3 dB. The 49T through-hole device offers channel spacing of 12.5, 20, 25 and 50 kilohertz with two, four, six and eight poles. Attenuation of 35 – 90 dB over a range of frequencies is guaranteed. Four-, six- and eight-pole

filters are available in a single package or as a tandem set. The U1 and U5 packaged filters are available for 21.4 and 45 MHz with channel spacing of 12.5, 25 and 50 kilohertz. The filters are lead free and restriction of hazardous substances (RoHS) compliant.
www.mecxtal-europe.com

High Shock Oscillators

Euroquartz launched a line of high-temperature, high-shock oscillators that can operate at temperatures up to 200 degrees Celsius. The miniature



SQX02ATHG oscillators are available for frequencies from 32.768 kHz to 50 MHz and offer high shock resistance. The 32.768 kHz version offers low current operation and fast startup times. The oscillators can operate at 2.5, 3.3 and 5 volts.
www.euroquartz.co.uk

Two-Tone Voice Pager

The Minitor VI from **Motorola Solutions** is a two-tone voice pager that records and manages up to 16 minutes of messages. Message functions include replay, skip,

fast forward, rewind, lock, unlock and delete. Call alerts, memo announcements and vibrate types can be customized by call address. An intrinsically safe mode is available for use near flammable gases, aerosols and particulates. The small, lightweight device can withstand heat, smoke, grime and water spray. A rechargeable battery is included and an alkaline battery tray is available. Voice announcements indicate battery levels, and an optional desktop charger with a built-in audio amplifier allows messages to be heard throughout a home or business.
www.motorolasolutions.com

Rugged Handheld

Juniper Systems introduced Archer 2, a

rugged handheld that features a bright IllumiView display and a large, glove-friendly capacitive touchscreen and numeric keypad. The device includes a Li-ion battery that provides more than 20 hours of life on a full charge using Overtime Technology. Other features include enhanced GPS capabilities, improved photo and video capture, a built-in barcode scanner and Bluetooth capabilities. Five models are available.
www.junipersys.com

MarketPlace

Contact Debra at +1 303 792 2390, x 103
Fax: +1 303 792 2391 • dsabin@RRMediaGroup.com

Equipment For Sale

www.RRImag.com

Equipment For Sale

4 March: TETRA in Taiwan, Taipei, Taiwan. TETRA + Critical Communications Association (TCCA): www.tandcca.com

6 March: TETRA in the Philippines, Manila, Philippines. TETRA + Critical Communications Association (TCCA): www.tandcca.com

10 – 12 March: Critical Communications Europe, Amsterdam. TETRA + Critical Communications Association (TCCA) and IIR Telecoms & Technology: http://criticalcommunicationseurope.com

19 – 20 March: Microwave & RF Conference, Paris. Bureau International de Relations Publiques (BIRP): www.microwave-rf.com

24 – 28 March: International Wireless Communications Expo (IWCE), Las Vegas, United States. Penton Media: www.iwceexpo.com

1 – 2 April: British APCO, Manchester, United Kingdom. British Association of Public-Safety Communications Officials (BAPCO): www.bapco.org.uk

2 – 4 April: EENA Conference, Warsaw, Poland. European Emergency Number Association (EENA): www.eena.org

15 – 17 April: PTC World Congress, Orlando, Florida, United States. Global Transport Forum: www.globaltransportforum.com/ptc-world-congress

28 – 30 April: LTE Latin America, Rio de Janeiro. Informa Telecoms & Media: http://latam.lteconference.com

29 April – 1 May: APCO Australasia, Melbourne, Australia. Association of Public-Safety Communications Officials (APCO) Australasia: www.apcoaust.com.au

12 – 13 May: LTE MENA, Dubai. Informa Telecoms & Media: http://mena.lteconference.com

20 – 22 May: Critical Communications World/TETRA World Congress, Singapore. TETRA + Critical Communications Association (TCCA) and IIR Telecoms & Technology: www.criticalcommunicationsworld.com

18 – 19 June: CommsConnect, Sydney. Westwick-Farrow Media: http://comms-connect.com.au

23 – 25 June: LTE World Summit, Amsterdam. Informa Telecoms & Media: http://ws.lteconference.com

3 – 6 August: APCO Conference & Expo, New Orleans, United States. Association of Public-Safety Communications Officials (APCO) International: www.apco2014.org

9 – 11 September: Critical Communications Expo, part of General Police Equipment Exhibition & Conference, Leipzig, Germany. Exhibition & Marketing Wehrstedt: www.ccexpo.de

14 – 16 September: Critical Communications Middle East, Dubai. TETRA + Critical Communications Association (TCCA) and IIR Telecoms & Technology: www.criticalcommunications-me.com

17 – 19 September: VSAT, London. Informa Telecoms & Media: http://vsatevent.com

22 – 24 September: LTE Asia, Suntec, Singapore. Informa Telecoms & Media: http://asia.lteconference.com

24 – 25 September: Emergency Services Show, Birmingham, United Kingdom. Broden Media: www.emergencyuk.com

30 September – 2 October: CommsConnect, Melbourne, Australia. Westwick-Farrow Media: http://comms-connect.com.au

22 – 24 October: EUTC 2014, Monte Carlo. European Utilities Telecom Council (EUTC): www.eutc.org

25 – 27 November: PMR Expo, Cologne, Germany. PMR Expo: www.pmrexpo.de

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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 _____

Q114

By Michelle Zilis

Latin America's Control Room Market Heats Up

Law enforcement command-and-control room investment is experiencing major growth in Latin America, says Jennifer Shortland, market analyst for critical communications with IHS. Shortland shared several key takeaways from an IHS report she authored on the Latin American market.

Investment in fire service and EMS is strong, but law enforcement represents a more significant proportion of the market, she says. One contributing factor for this is that law enforcement is the predominant public-safety agency in many countries.

"In countries with high crime and drug rates, it was law enforcement that was receiving a lot of the investment, the updates to the emergency calling numbers and the more sophisticated technology," she says.

The maturity of countries' emergency number services plays a key role in how each country is investing. Many countries have more than one emergency number, with a separate number for police, fire and EMS. Brazil has three, but is rolling out a single emergency number to consolidate.

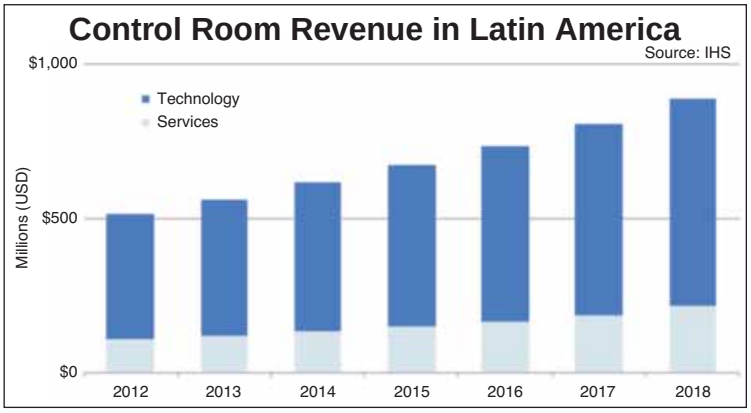
"In some ways, the emergency medical number services were kind of in infancy, while a lot of the technology for law enforcement was much more advanced," she says.

Consolidation is another major trend. "We were seeing a lot of countries with smaller, more rural control rooms showing some kind of indication to consolidate their infrastructure and to improve the technology," Shortland says.

In Ecuador, a national emergency number is rolling out, and the country is consolidating to 15 control rooms to align with the new number service.

However, even with all the new opportunities, the install base for the region appears balanced because there are other countries with limited emergency infrastructure.

"The install base aspect looked stagnant, but when you looked at it country by country, there were many differences," she says.



Brazil represents more than 50 percent of the region's control room revenue for public safety. "Brazil is the predominant one, not only because it makes up a big proportion of Latin America, but also because of the investment due to the World Cup and things like that," she says.

Mexico is the second-largest market, and the country is seeing growth with a variety of technologies, including recording software and closed circuit television (CCTV) integration. IHS predicts about 20 percent growth for both technologies in Mexico.

Across the region, there is an effort to improve evidence management, Shortland says. In fact, CCTV integration is believed to decrease crime rates by 70 percent, she says.

The research also analyzed the transportation and utilities control room market. Brazil and Mexico continue to make up a large proportion of the market, because of the rapid growth in infrastructure investment.

Shortland says there were several transportation system upgrades that included LMR upgrades as well. "The voice dispatch transportation market is growing quite rapidly, and that is due to a large uptake in the transport sector," she says.

Peru and Colombia are recognized as small markets with fairly basic technologies now, but both are expected to accelerate and become major markets in the next five to 10 years, she says.

New power plants and oil and gas pipelines throughout the region are encouraging growth. And the potential for fracking in the next 10 to 15 years in Argentina is also seen as a new opportunity, Shortland says.

Services is another opportunity. "In the European and American market, over half the revenue is from services — things like installation, ongoing support, costs and change management," she says. "In Latin America, comparatively, it makes up barely one-fifth of the market. Obviously it's not going to change quite to that degree, but we did see that service proportion market creeping."

In urban areas, there is a trend for whole system providers, but local resellers and vendors are also having success. And there's been success for external suppliers, typically specializing in one aspect of the control room, such as CAD. These external suppliers are typically selling the features on the one off, rather than an entire solution-based system, she says. ■

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

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