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THE GLOBAL INFORMATION RESOURCE FOR MISSION-CRITICAL COMMUNICATIONS

25 YEARS

London's Olympic Network

A TETRA System for the Summer Games

Inside

A New Digital Trunked Technology in China

Brazilian World Cup City Builds TETRA Network

4 P25 Security Myths

Digital Technologies Compete in Asia

KENWOOD

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Inbox

Following are reader comments about news articles from WORLD NEWS, our monthly e-newsletter. For a free email subscription to WORLD NEWS, visit RRImag.com.

NYC Transit Completes TETRA Trial

Editor:

TETRA radios (a European standard) in general need more base stations (less coverage) than Project 25 (P25) radios (a U.S. standard). Therefore this aspect is important to analyze too for each particular system, because it could strongly impact the system cost and maintenance.

Mario Fournier
Systems Engineer
Readix Technologies

China Launches Satellite Positioning System

Editor:

Why doesn't China want to use the GPS or GLONASS systems? Is the Chinese system more efficient for money and efforts? Perhaps they can help improve the technology.

Jose Luis Hernandez Castro
Direccion De Capacitacion

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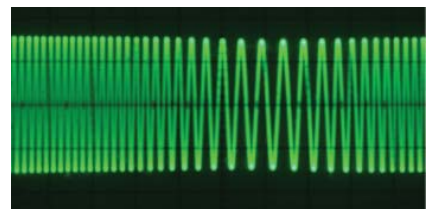
China and Europe Progress with Satellite Positioning Systems

China launches a trial version of its homegrown system that is intended to both rival and complement existing satellite navigation systems. And the European Space Agency (ESA) begins work on the in-orbit validation of its Galileo system.

DMR Market Heats Up

New manufacturers join the Digital Mobile Radio (DMR) Association, and new product suites are announced.

Spectrum Management



Examine the importance of end user involvement in regional and global spectrum management.

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Dubai Popular for 2012 Conferences

In May, two professional mobile radio (PMR) conferences and exhibitions will take place in Dubai, United Arab Emirates (UAE). The Middle Eastern city is appealing to the mission-critical communications industry for a number of reasons.

The Middle East is becoming the next battleground for digital technologies, such as Digital Mobile Radio (DMR), digital Private Mobile Radio (dPMR), TETRA and Project 25 (P25), all making their claim within the region and all vying for market share.

Of the digital technologies, TETRA is forecast to have the highest number of active users before the end of 2015. Perhaps this is why the TETRA World Congress (TWC) is scheduled for Dubai 14 – 17 May. On the event website, Dubai is described as a "vibrant and cosmopolitan city" and "one of the most renowned places to do business in the Middle East."

In addition, the Association of Public-Safety Communications Officials (APCO) International will hold its second annual APCO Global Congress in Dubai 1 – 3 May. Dubai also hosted last year's inaugural APCO Global Congress.

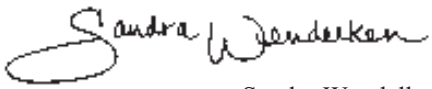
P25 systems are deployed in UAE, along with Saudi Arabia, Bahrain and Kuwait. P25 shipments are forecast to increase year on year, and APCO is the association that began the U.S.-based P25 public-safety digital radio standard. However, the APCO Global Congress is technology neutral, officials said.

"This event does not advocate one technology over another; this is not a P25 conference," said the conference website. "The congress seeks to showcase all types of technology and education available to public-safety professionals in the global arena."

Duncan Swan, a partner at Analysys Mason, provides a thorough overview of the Middle East appeal for digital technology in "Global Forum" on Page 70.

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

New mobile radio products are rolling out in strong force so far this year, and the Dubai events will be excellent opportunities to showcase equipment for the region's mission-critical communications professionals. Michelle Zilis, managing editor of the magazine, will be at TWC so please stop by our stand and say hello.



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

U.K. Transit Firms Announce Contracts

Two transportation agencies in the United Kingdom announced updated communications networks. Nottingham City Transport (NCT) launched a new voice and data communications system from Tait Communications.

Tait provided the radio communications component of NCT's intelligent transportation system (ITS) supplied by INIT, including AVL, an on-board integrated information system, and voice and data communications between 340 buses and the NCT control room.

"A large benefit for the public is the vast amount of real-time passenger information (RTPI) available on routes and on buses," said David Astill, NCT commercial manager. "RTPI is provided at more than 800 bus stops, via Web and mobile information for cell phones, and over 'next stop' signage aboard buses."

With the AVL data, NCT control-room staff can receive current information and anticipate potential delays, allowing staff to inform specific drivers and alter services as required. The citywide dedicated radio voice channel assures drivers can communicate directly with control-room staff at any time. In addition, historical data is collected by the onboard information system to identify trends in delays and provide insight into scheduling, further improving reliability and punctuality.

The backbone TaitNet MPT 1327 trunked radio network provides radio coverage throughout the city of Nottingham. Tait mobile radios are installed on each of NCT's 340 buses to allow the onboard TaitNet data system to be integrated into the radio network. The radios are linked via the MAP27 interface, enabling drivers to control the radio and parts of the AVL system from one unit.

London Buses and Nottingham City Transport selected MPT 1327 technology for their communications contracts.

Tait also implemented and tested a new radio communications system for London Buses. As part of the US$19 million contract, Tait replaced London Buses' existing obsolete radio network with an MPT 1327 trunked solution.

More than 6 million passenger journeys are made on the buses every day within an area of about 659 square miles. The contract is one of the largest contracts of its kind for the global company.

The radio system replacement represents a major component of an upgrade contracted by Siemens VDO, later Trapeze ITS, with work undertaken at locations across greater London, including 90 garages and 208 dispatch workstations operated by London Buses. The TaitNet system was customized to integrate with the Trapeze ITS dispatch equipment, ensuring optimal voice communications between dispatchers and bus drivers.

"London Buses will play a key role in transporting thousands of visitors around the city during the 2012 Olympics, so it was critical they had a highly reliable communications system combined with ongoing managed services and support," said Frank Owen, Tait managing director.

Other facilities such as emergency (code red) calls are also supported by the Tait system and integrate directly with emergency services dispatchers. The code-red call was specifically customized for maximum speed and to deliver the location of a vehicle simultaneously. The system is also complemented by Tait mobile and portable radios.

SOPHIA-ANTIPOLIS CEDEX, France — The European Telecommunications Standards Institute (ETSI) Technical Committee (TC) TETRA released a new version of the TETRA standard that incorporates the next development step in the TETRA Enhanced Data Service (TEDS). This development is known as Direct Access and is specified in ETSI TS 100 392 2.

Direct Access allows a TETRA terminal to use TEDS data cells independently of TETRA voice and data cells, creating more efficient data terminals. The standard also allows high-speed data networks that are independent of networks carrying speech to be designed.

"It therefore broadens the scope for the use of TETRA and TEDS in building secure and resilient mission-critical professional mobile-data networks," an ETSI statement said.

OSLO, Norway — Motorola Solutions and **Nokia Siemens Networks (NSN)** finalized the transaction to transfer responsibility for the Norwegian nationwide TETRA Nødnett project, including the transfer of 25 employees from NSN locally in Norway to Motorola Solutions. The agreement to take over the project as the prime contractor from NSN was announced

Continued on Page 14

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Headquartered in Shenzhen, China, we have established a global sales and marketing network: three R&D centers in Shenzhen (China), Harbin (China) and Bad Münder (Germany), three subsidiaries in the USA, UK and Germany, more than 20 offices and 95 after-sale service offices. With products distributed in more than 80 countries and regions, our market shares have reached 2nd in LMR Terminal category, 4th in TETRA System category*. Nowadays, we are dedicated to taking a significant position in the worldwide analog-to-digital migration in professional communications field.

In May, 2011, Hytera went public on the Shenzhen Stock Exchange of China (Stock Code: 002583), and in August Hytera acquired Rohde & Schwarz PMR to expand the TETRA portfolio, which strengthened our capability to better serve customers' demands.

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*Source: IMS Research 2011

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Continued from Page 10
earlier this year.

All regulatory approvals were obtained, and Motorola Solutions assumed responsibility for the continued rollout, implementation and operation of the nationwide Nødnett network for Norway's public-safety agencies. Motorola formerly was a subsupplier of the technology for the core TETRA digital radio communications infrastructure and now is the prime contractor, including all managed services for the rollout and implementation of the system.

The revenues for Motorola Solutions as the prime contractor through 2026 are anticipated to be about $750 million. The project represents one of Motorola Solutions' largest nationwide public-safety contracts.

Nødnett is the multiagency digital radio communications system owned by a separate administration body, which leads the development of the communications network for emergency and public-safety services in Norway and is subordinated to the Ministry of Justice. The Norwegian Nødnett public-safety network was not part of the NSN acquisition of certain wireless network infrastructure assets from Motorola Solutions last year.

MUNICH — The Parchim International Airport in Mecklenburg-Vorpommern, Germany, will receive an air traffic control (ATC) communications system from **Rohde & Schwarz Systems**. Baltic Airport Mecklenburg, the airport operating company, placed the order for a new turnkey ATC system. The airport is undergoing expansion with a focus on international airfreight development.

In the first phase, Rohde & Schwarz will install the main radio system, two controller working positions and a third working position for the tower backup system. The overall system will include 20 VoIP-capable radios that are linked to the controller working positions via the fully IP-based voice communications system.

WOENSDRECHT, The Netherlands — Raytheon was selected by the Netherlands Ministry of Defence to upgrade the air traffic control radar system at the Royal Netherlands Air Force (RNLAF) base in the town of Woensdrecht with technology to mitigate the adverse effects on radar performance caused by wind turbines.

Raytheon will implement the modification by the end of 2012. It will be the first operational implementation of technology to safely distinguish actual aircraft from false readings.

Wind turbines' rotating blades generate large, moving, false targets that can deluge radars, rendering it difficult for controllers to discriminate between false and genuine aircraft targets. The upgrade comes via a combination of hardware and software changes to the primary surveillance radar system.

The changes nullify the presence of wind turbines and improve the probability of detection of aircraft targets, both above and beyond wind farms. The application of this technology at Woensdrecht will facilitate the extension of a nearby wind farm without any impact on flying operations at the base.

The movement to cleaner energy sources has resulted in worldwide deployment of a large number of wind turbine farms. Raytheon has developed solutions that allow wind turbines to be safely located near radar facilities.

MURTEN, Switzerland — The Federal State Police of Lower Saxony in Germany selected 1,500 radio headsets from **Phonak Communications**. The radio headsets include body-worn push-to-talk (PTT) switches and customized in-ear shells.

The technology allows officers to communicate comfortably via portable radio, without any in-ear instability, wind noise or sound quality issues.

ZARAGOZA, Spain — Private equity firm N+1 reached an agreement with **Teltronic**'s current shareholder IBV to buy 100 percent of the shares of Teltronic and other companies of the group. The deal is part of a divesting process initiated by IBV some years ago.

IBV has been the sole shareholder of Teltronic for 15 years during which the company's turnover multiplied by four, according to a letter from Teltronic CEO Juan R. Ferro.

"This acquisition has been made with no impact against Teltronic's financial solvency so that the company is more capable than ever to implement its technological and commercial plans with its own resources," said Ferro. "In addition, the transaction guarantees the continuity of Teltronic's management team to preserve and strengthen our business model, management style and strategic position in the market. Teltronic is committed to continue with the development of its own technology-based portfolio, to

increase consistently its international market share and to keep its strong customer-oriented policy."

ROME — Selex Elsag, a Finmeccanica company, signed a 4 million euro (US$5.3 million) contract to supply a TETRA radio communications system along the Sakhalin-Khabarovsk-Vladivostok pipeline, used by Gazprom to provide natural gas to China and Russia's Far East regions.

The overall length of the pipeline exceeds 1,800 kilometers. As the 14 compressor stations are completed, the pipeline will be able to convey 30 billion cubic meters of natural gas per year.

The first stage of the project involves the implementation of 1,350 kilometers of the new pipeline, with a capacity of more than 5 billion cubic meters per year. The capacity will guarantee suitable energy resources for the APEC 2012 Summit, which will take place in Vladivostok.

ZURICH, Switzerland — The service department of the Zurich City Police Department, Zurich Protection & Rescue, completed the first milestone in consolidating its two command-and-control centers — ELZ Zurich and ELZ Airport — into one joint prime center.

The new control center at Zurich Airport will contain 17 dispatcher workstations, supplemented in emergency situations by 14 call-taker emergency workstations. The other existing ELZ Zurich control center, already equipped with **Intergraph** software, will operate as a redundant alternate control center when the new command-and-control center is complete.

Intergraph is leading the project, partnering with **Frequentis** for the radio system and **AVS** for the imaging system. The new command-and-control center is scheduled to be fully operational in November 2012 and will perform all the functions previously performed at the two separate centers.

WARSAW, Poland — The Newag-Siemens Transportation consortium was awarded a contract for the supply of rolling stock for the new Warsaw Metro line. In turn, Newag, the local partner in the consortium, selected **Teltronic** for the supply of specialized onboard equipment for an initial 35 trains. The contract followed a period of collaboration and testing with Warsaw Metro by Teltronic. Warsaw Metro implemented a new suburban Line 2 project in the Polish capital.

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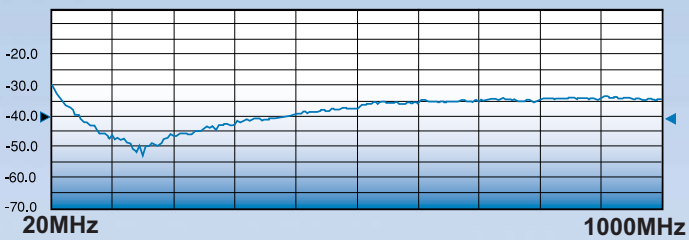

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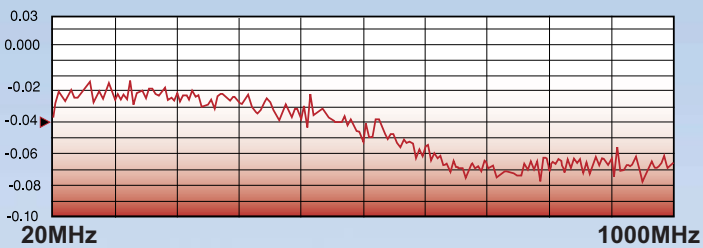

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HAILLEN, France — French manufacturer Snecma Propulsion Solide adopted **Sepura** hand-portable TETRA radios with man-down functionality.

Snecma Propulsion Solide, part of the SAFRAN group, is a designer and manufacturer of solid rocket motors for missiles and space launchers. Some 1,200 employees work at its plant in Haillen, France, offering a number of barriers to seamless communications in certain areas of the site.

Sepura TETRA radios have been integrated with **Sysoco**'s DIGI-Protect system to allow real-time management and tracking of Snecma's TETRA radio fleet, through an indoor localization system consisting of radio autonomous beacons and outdoor localization deployed via the radios' GPS receiver.

DIGIProtect allocates priority

ASIA/PACIFIC

TETRA Contract Extension for Beijing Network

Cassidian signed a new contract with Beijing Just Top Network Communications covering the support and maintenance of the Beijing government shared TETRA network. This three-year contract includes services such as software maintenance, hardware repair, a help desk, on-site and emergency support, and third-party equipment support.

The network, called Beijing Just Top TETRA Network, is the largest digital trunked network in the Asia/Pacific region and the biggest citywide TETRA network in the world, serving 76,000 subscribers. The system was put in place by Cassidian in 2003 and has been extended four times.

A Beijing Just Top user

Besides the 60th National Day celebrations in 2009, it was successfully used at the Beijing Olympic Games in 2008. On the day of the opening ceremony for the Games, the TETRA network successfully handled 1.6 million calls, a world record at the time.

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transmission to man-down calls, and the radio beacons in the system are strategically placed to optimize indoor localization in an alert scenario, when the radio would send its identity to the closest beacon. The software at the control center enables the visualization of all sites on a dispatch screen, instantly flagging the identity of the individual concerned and the precise sector covered by the relevant beacon.

BELLEVUE, Washington, USA — Icom America acquired the Japan-based **Kyodo Communications & Electronics** Project 25 (P25) division and plans to expand its P25 product line. Icom will introduce a new P25 repeater in 2013 that is based on an existing platform.

Icom will use the newly acquired engineering and design capability to continue strengthening its product development program. Paired with Icom's P25 portable and mobile radios, the new repeater will complete the necessary infrastructure for a P25-compliant system.

"Our expanded P25 division allows Icom to continually provide customizable end-to-end solutions for the P25 community," said Icom America Vice President Chris Lougee. "We are excited about beginning the development of a new repeater and look forward to designing more interoperable, user friendly and affordable solutions to our customers."

VICTORIA, Australia — C4i received a further order to add to its existing nationwide communications system for the Royal Thai Air Force. C4i delivered another installation of its IP communications system for this project in the first quarter.

C4i delivered the existing system for the air force in 2008. The technology consists of more than 20 operational sites scattered across the country, linked via an IP network to provide a system-of-systems solution. This allows every site to work together similar to a single, large system, providing flexibility for resource allocation across the country while retaining complete standalone autonomy should the network be removed.

"The system delivered to the Thai Air Force is the largest end-to-end IP-based communications system we are aware of in use by any air force in the world today," said Peter Harrison C4i's managing director. "It provides the operators with transparent access to communications assets located all across the country as if they were all in the same room."

MELBOURNE, Florida, USA — Harris was awarded two contracts to modernize the air traffic control (ATC) systems at two regional airports in Indonesia.

Harris will supply its technology to the Ngurah Rai International Airport in Bali and the Sepinggan International Airport in Balikpapan. The platform delivers a reliable, scalable communications solution for ATC towers, airline and area control dispatch, flight service stations and mobile shelters, Harris executives said.

The airport systems will be equipped with touch-screen operator positions, radio interfaces, telephone interfaces, and a maintenance, administration and reconfiguration terminal. Harris also will install and provide operation and maintenance training for Indonesian air traffic controllers and technical staff.

KUALA LUMPUR, Malaysia — Malaysian firm SAPURA Secured Technologies awarded **Teltronic** a contract to supply a wide-area TETRA network, which will provide coverage to the Kuala Lumpur region and other territories across Malaysia.

The initial network design includes 112 site base stations and two redundant switching control nodes. In addition, Teltronic will supply three intersystem nodes for seamless communications with the existing nationwide TETRA network managed by SAPURA. The project, which incorporates the strictest mission-critical requirements and the highest possible service availability, is expected to be completed by the end of 2012.

The two companies also will collaborate on specialized mission-critical Long Term Evolution (LTE) solutions via a long-term joint development program.

A joint initiative will set up a local TETRA center of competence in Malaysia for existing and future users of Teltronic equipment across the Asia-Pacific region. In turn, a commercial cooperation framework will result in a closer integration of the two firms' core technologies to address a wide range of user requirements.

Teltronic also appointed Chang Hyun Kim as sales director for Asia/Pacific and Gabriel Solana as vice president of sales support for the region. Oscar Fernandez, vice president international sales in charge of Asia/Pacific, assumed new responsibilities in Latin America, another key hot spot in the mobile radio business.

LATIN AMERICA

SÃO PAULO, Brazil — Tait Communications announced two Project 25 (P25) technology contracts in Brazil. The Civil Police of the state of São Paulo, Brazil, will upgrade to a P25 trunked digital radio network to provide greater security and digital communications to more public-safety officials within the state.

The Polícia Civil do Estado de São Paulo selected Tait, in partnership with **Alcatel-Lucent** and **SGM Telecom**, Brazil, to upgrade

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INTERNATIONAL

WRC-12 Addresses Global Frequency Issues

The World Radiocommunication Conference 2012 (WRC-12) concluded in February and revised the Radio Regulations, the international treaty governing the use of RF spectrum and satellite orbits. WRC-12 addressed some 30 agenda items related to frequency allocation and frequency sharing for the efficient use of spectrum and orbital resources, thus ensuring high-quality radio communications services for mobile and satellite communications, maritime and aeronautical transport as well as for scientific purposes related to the environment, meteorology and climatology, disaster prediction, mitigation and relief.

More than 3,000 participants, representing 165 out of the International Telecommunication Union (ITU) 193 member states, attended the four-week conference.

ITU Secretary-General Hamadoun Touré highlighted the achievements of WRC-12 in allocating spectrum resources for mobile broadband and for addressing the digital dividend issue, which "now provides for a great deal of global harmonization of the use of the 700 MHz band for all regions by the services that most need it." He also commended the delegates on the attention given to Earth observation radio communication applications, crucial for monitoring and combating climate change and disaster prediction.

Photo courtesy ITU/P.M. Virot

The World Radiocommunication Conference 2012 opening ceremony

Among other issues, the conference considered further spectrum allocations to the mobile service, including international mobile telecommunications (IMT) to facilitate the development of terrestrial mobile broadband applications in the 694 – 790 MHz band, in addition to the use of the 790 – 862 MHz in Regions 1 and 3. This issue has been placed on the WRC-15 agenda together with the need to consider additional spectrum allocations for the mobile service.

WRC-12 addressed the application of new technologies, such as IMT and intelligent transport systems (ITS) to support or supplement advanced public protection and disaster relief applications. WRC-12 instructed ITU-R to continue studying aspects of radio communications and ICT relevant to early warning, disaster mitigation and relief operations and encouraged administrations to consider using identified frequency bands when undertaking their national planning for the purposes of achieving regionally harmonized frequency bands or ranges for advanced public protection and disaster relief solutions.

The conference also considered the use of new technologies in the maritime service needed to the "table of transmitting frequencies in the VHF maritime mobile band," which defines the channel numbering for maritime VHF communications based on 25-kilohertz channel spacing as well as where digital technologies could be deployed.

the agency's existing Tait P25 conventional network to a P25 trunked network. The US$4 million upgrade will provide coverage to the municipality of São José do Rio Preto, and for the first time, digital radio communications to neighboring Nova Granada. The agency also upgraded to a P25 Console SubSystem Interface (CSSI) trunked digital radio network with **Zetron** command-and-control consoles.

The police's upgrade to a Tait P25 trunked digital network is part of a 10-year crime-prevention plan for the state of São Paulo. In 2008, the state's police forces installed six P25 conventional networks, with the ultimate goal of interconnecting all of the networks using the P25 Inter RF Subsystem Interface (ISSI).

"With personnel numbers growing in the Civil Police force, trunking offers better channel resource use, improved communications flexibility and greater security for police," said Steve Cragg, president, Tait Radio Communications, Americas. "The Civil Police will move to trunking operation across five of São Paulo's TaitNet P25 conventional networks."

The Military Police of the state of Paraná, Brazil, also selected P25 digital radios from Tait to help officers combat organized crime in a state populated by more than 10 million people.

The military police, responsible for policing and public order across Paraná's territory, will use highly secure encrypted Tait mobile radios in their vehicles for policing operations, mainly in the capital of Curitiba. Tait partner SGM Telecom will

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SÃO PAULO, Brazil — The Military Police of São Paulo State and Alcatel-Lucent demonstrated 4G Long Term Evolution (LTE) trials as a support for public-safety networks of the state.

Two police operations centers have been trialing fully operational LTE networks to carry out daily activities since May 2011. The technology allows live transmission of data, video and images with high speed and quality. The network supports intense traffic of different types of data through the different types of devices used by the police.

The convergence of media will be key for the police, which plans to rely on a 4G network in 2012. "The LTE trials with Alcatel-Lucent have allowed us to use several applications to understand how this network can improve our efficiency and reduce our operational costs, besides generating return for the state and São Paulo population," said Colonel Alfredo Deak, who is responsible for the technology sector with São Paulo Military Police.

Alcatel-Lucent offered all infrastructure for the trials, including the network core, radio base stations, microwave links, terminals and applications server. Last year, the U.S. city of Charlotte, North Carolina, contracted Alcatel-Lucent to deploy an LTE public-safety network in the U.S. dedicated public-safety 700 MHz broadband spectrum.

DERBY, United Kingdom — Simoco Group appointed Jonathan Bunce as group marketing director and Vicki Guttridge as marketing executive as part of the company's global growth strategy. The employees will support the company's plans for further expansion in key markets across Europe, the Americas, the Far East and Australasia.

Previously commercial director for Airborne Networks, Bunce oversaw the introduction of new patented mesh technologies. He also held global marketing roles for Motorola Solutions.

SCHAUMBURG, Illinois, USA — Motorola Solutions took full ownership of the Vertex Standard LMR business. Motorola Solutions previously owned 80 percent of the company.

"There is no change for Motorola Solutions customers and partners," said Tama McWhinney, corporate communications, Motorola Solutions. "Vertex Standard LMR products will continue to be available through the normal Vertex Standard channels."

Jun Hasegawa, president and CEO of Vertex Standard, announced the ownership change. "After four years of joint venture with Motorola, we have decided to transfer the Vertex Standard LMR business to Motorola and focus on amateur, marine and air-band business," he said in a letter to customers.

Vertex Standard will once again be Yaesu Musen; a name business partners have been familiar with for over 50 years, Hasegawa said.

WELLINGBOROUGH, United Kingdom — IMS Research said the TETRA covert market represents significant growth opportunities for the TETRA community.

About 2 percent of all TETRA users are now using covert devices, the research firm said. This is significant for TETRA vendors because covert devices offer specialized features that add new customers, in surveillance and undercover operations, to the existing TETRA installed base.

The major players in the TETRA covert market include Motorola Solutions, Sepura and Thales. However, IMS Research forecasted more devices to be announced during the coming months. Covert devices are not just limited to TETRA, but are available for Digital Mobile Radio (DMR) and Project 25 (P25) systems as well.

"The covert market presents a unique opportunity for vendor manufacturers to gain increased margins by providing solutions in features and hardware that allow specialists operators the confidence to carry out their operations successfully," said Thomas Lynch, mobile radio market analyst at IMS Research.

VISTA, California, USA — Datron World Communications completed interoperability testing for its Guardian 2 VHF, UHF and tri-band handheld Project 25 (P25) radios. The testing was performed on P25 trunking systems at **EF Johnson**, **Harris** and **Motorola Solutions**.

MAIDSTONE, United Kingdom — Peter Clemons launched **Quixoticity** to "shake up critical communications and defend the industry's interests in the upcoming battle for harmonized frequencies and global technology standards."

Clemons said global decision makers must address the dangerous imbalance of resources as soon as possible to guarantee the safe and secure environment that will underpin future economic growth and prosperity. "The cash-starved critical communications sector, including government and private public safety, emergency and critical national infrastructure players, are struggling to acquire additional spectrum and agree on harmonized standards that will protect societies and economies from a multitude of known and unknown threats for decades to come," he said.

Clemons, formerly the director of communications for Teltronic, is director and board member of the TETRA + Critical Communications Association.

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Digital Decisions in Asia

New digital mobile radio technologies compete for strongholds in many Asian business and industry markets.

By Aaron Camp

Photos courtesy Icom

Digital two-way radio is permeating its way into the market. In the case of Project 25 (P25) and TETRA, this transition has been occurring in the public-safety sector for more than 10 years. However, the cost of full-featured digital systems for many in the business and industry (B&I) portion of the market without governmental funds is often out of reach.

The professional two-way radio market can be broken down into several vertical markets. The high-tier public-safety market serves police, fire, military and other mission-critical entities. The mid-tier professional/business and industry market serves transport, utilities, local government and large industry. The low-tier light commercial market serves the hospitality industry, construction, retail and rental entities.

Narrowband digital technologies such as NXDN, digital Private Mobile Radio (dPMR) and Digital Mobile Radio (DMR) are finding their places in many market segments. Transport is one area where the uptake is seen as robust and growing.

The three established B&I narrowband digital technologies are vying for all market segments in the migration from analog to digital. One success story for NXDN technology is that the Class 1 U.S. railroad companies are specifying NXDN as their next-generation communications platform. But this success has yet to be replicated in the Asia/Pacific region on a similar scale.

At this time, the Asia/Pacific region is still up for grabs. No particular transport market has shown a trend toward one digital technology over another, although TETRA may be the most visible to date for some sectors, such as city transit systems. Asian markets are diverse in their needs and requirements for digital radio systems. Many factors contribute to decisions for new radio systems, irrespective of whether it is digital or analog. Some contributing factors are economic resources, the differences in industry development, infrastructure and regulations in each country.

Concentrating on narrowband FDMA technologies, many radio users have installed either NXDN or dPMR 6.25-kilohertz FDMA technology in the region. System implementations include networks for bus companies, tow truck firms, chauffeur companies, motor racing events, railroads, courier companies, mobile security firms, refuse companies, mines and local councils.

The need for mobile communications among the companies and industries is a common theme. The size and type of systems differ, but most of the systems offer some form of GPS service and AVL application. AVL has been a commonplace application for many years in the analog market. It is

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Asian markets are diverse in their needs and requirements for digital radio systems. Contributing factors are economic resources, the differences in industry development, infrastructure and regulations in each country.

important during the migration that the new digital technologies still offer equivalent applications and services. Other applications, such as status messaging and short data message (SDM), are also being used more often. For wide-area applications, linking sites via IP is also becoming a standard and convenient feature.

If we look at where professional digital radio has progressed in the Asia/Pacific region, it is a mixed bag to say the least. As previously stated, TETRA is present in most markets. P25 is the public-safety technology of choice for Australia and New Zealand with P25 systems also installed in Malaysia. NXDN, dPMR and DMR systems can be found in the majority of Asia/Pacific countries too. Many of these users are in the transport industry in one form or another.

Spectrum Regulation

While Europe has made great efforts in harmonizing regulations in regard to professional digital radio, the regulatory environment in Asia differs almost as much as the countries and cultures themselves. Japan, China and Korea have shown some indications of using regulatory changes in their professional two-way radio industry to facilitate migration to digital technology in the near to mid-term. Similar to the United States, these changes come in the form of licensing conditions, frequency usage or type-approval mandates.

While spectrum resource constraints have provided the impetus to make these changes for some countries, others are taking advantage of the day and age to adopt digital technology now while their market is still developing. This will provide a feed-on effect for other Asian countries that are undecided and will eventually look at developed radio markets and Asian neighbors with similar market conditions as a reference for their administrations going forward. The eventual result will be acceleration in the shift to digital.

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A conductor operates radio communications equipment on a train in Japan.

Japan's Outlook

The Japanese professional radio market, as with most countries, is split into public safety, B&I professional radio and lower end license-free and light commercial markets. However, contrary to most other developed markets, no one digital protocol has been specified for public safety. The police use a proprietary digital protocol; the fire, ambulance and community wireless systems use another protocol that is similar to TETRA. A mandate to unify these entities with one protocol has been decided, but in practice it has not happened. One reason for the delay is a preference to maintain some individuality between the users of the systems.

The specifying of protocols and frequencies also applies to the B&I market. There is a commercial radio category, but this has branched out into one category that requires licensing of the radio and user, referred to as SR radio, and one where only the radio license is required (a pseudo license-free status) referred to as CR radio. The Ministry of Internal Affairs and Communications, in charge of frequency allocation and coordination, is mandating some CR radios go digital. This digital mandate applies to the CR analog radio market where radio traffic for services are hardly used or for services where the merits of going digital are established. Part of the CR radio market's UHF band must shift to digital by 2022. While this date is still 10 years away, users with station licenses that are up for renewal are looking at digital radios as replacements.

Only the UHF band is authorized for use, but the Japanese government is expected to authorize use in the VHF band in the future, creating further growth for 6.25-kilohertz FDMA technology.

In regard to the transport industry, a majority of couriers and large-scale trucking companies, taxis, public and private bus companies, and railroads still use analog. Some of these entities have begun switching to digital, but again there are differences in the protocols or frequencies used.

The Association of Radio Industries and Businesses (ARIB) is tasked with developing standards for professional radio in Japan. The most recent ARIB standards are T-98 (digital CR radio) and T-102 standards (digital SR radio), which are both 6.25-kilohertz FDMA standards.

The main players in the digital CR market are familiar industry names like Icom, Kenwood and Alinco. Vertex Standard and Motorola Solutions, both well known in markets outside of Japan as strong proponents of TDMA and DMR for the B&I market, are now catering to this new Japanese digital narrowband market with their own FDMA products. Currently, only the UHF band is authorized for use, but the Japanese government is expected to authorize use in the VHF band in the near future, creating further growth for 6.25-kilohertz FDMA technology.

The T-102 standard allows commercial use and local government and utility use. However, the first products compliant with this standard have been targeted at the taxi industry, which has a mandate to go digital by May 2016. It is estimated that half of the 250,000 taxis in Japan have switched to digital using a 1/4 pye QPSK modulation scheme, and almost all of these are larger companies with adequate financial resources. The remaining small to medium-size taxi companies may look at 6.25-kilohertz FDMA technology going forward.

It is still too soon to make an accurate assessment of just how the B&I industry in the Asia/Pacific region as a whole will migrate to digital and with what technology. However, according to industry data, we are still only 10 percent to 15 percent into the migration, so there is still a long way to go for the market as a whole. ■

Aaron Camp is the marketing manager at Icom's headquarters in Osaka, Japan. Camp is an active member of Icom's representation in the NXDN Forum and dPMR Association groups. Camp has lived in Japan for 20 years and has worked for Icom for almost 12 years. Email comments to editor@RRMediaGroup.com.

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Photo courtesy Tait Communications

China's Trunking Strategy

The Chinese government is developing a digital trunked technology that is poised to facilitate the country's evolution of existing analog networks.

By Trevor Laughton

China is developing a new standard for mobile radio — Professional Digital Trunking (PDT) — that represents a significant global initiative. For the first time, an LMR standard has emerged from China that will eventually have a global presence. The development represents Chinese organizations working together to create new technology standards designed for the Chinese environment. Many organizations will be watching closely to see how the standard emerges and how it may pave the way for further Chinese-based standards in the communications and technology industry.

PDT, driven by the Information and Telecommunication Bureau of the Chinese Ministry of Public Security (MPS), has a specific function. Originally called the Police Digital Trunking system, the standard is designed to meet the specific needs of China's public-safety sector and seamlessly interface with the current police geographic information system (GIS) dispatching platform. In addition, it is intended to provide features such as flexible networking, efficient dispatching, high-quality voice and data transmission, and secure encryption.

The standard also offers a broader national interest purpose. "PDT is the Chinese standard for digital trunking and has been implemented in such a way to remain free from the constraints of overseas patents," said Ma Xiao Dong, chief technology officer of the Information and Telecommunication Bureau at MPS. "The invention of PDT will greatly improve the development pace and strength of the Chinese police telecom industry. It will also provide a solution that is more suitable for Chinese police operation."

Standards Body

Three radio technologies — conventional analog, analog trunking (MPT 1327) and digital trunking (TETRA) — co-exist in the Chinese police mobile radio environment. All three systems are based on standards developed outside of China. For the past 20 years, Chinese police users have gained valuable experience and knowledge about trunked systems and their applications. New requirements have been identified for mobile communications networks, and a set of technical standards are being developed based on practical police needs, creating the technical route for PDT and providing the groundwork on which to develop the new standard.

In August 2008, the Chinese Police Wireless Telecom Technology Specialist Panel was established. The panel began working with local Chinese manufacturers to formulate the standard for the next generation of Chinese digital trunking radio systems.

In accordance with Chinese law and with the strong support of six major branches in the Chinese government, a number of enterprises and institutions specializing in the development, production, marketing and operation of special-use digital trunking systems established the Professional Digital Trunking System

Industry Association (PDTA). The association expanded the original meaning of PDT from Police Digital Trunking to Professional Digital Trunking, and broadened the system scope to make it applicable for other professional users with similar needs.

PDTA has 23 corporate members, including 22 Chinese companies and one international member, Tait Communications. Other foreign companies are negotiating to join the PDTA.

Tait Communications was invited as the first international member in recognition of the long-term relationship as a supporting partner of the Chinese police, providing the majority of its private networks deployed to date. The company supports open-standards technology, and is a supplier of MPT 1327, Project 25 (P25) and Digital Mobile Radio (DMR). Tait also is a contributor in the U.S. Telecommunications Industry Association (TIA) and the European Telecommunications Standards Institute (ETSI) committees that develop and govern standards.

The standards-based approach to PDT is intended to develop an open, competitive marketplace to deliver the technology. The MPS and PDTA are exploring conformance interoperability testing, again learning from what has worked well elsewhere in the world.

"Although PDT is China's standard, it has not been developed in isolation," said Tait China Regional General Manager Zeng Mianzhi. "It has strong parallels to the ETSI DMR trunking standard, but combines the advantages of other digital trunking standards plus unique local content to meet the specific requirements of the Chinese market."

Core Requirements

The PDT standard's intentions are to absorb the advantages of other standards to deliver the following:

- Spectrally efficient integrated voice and data services;
- High-quality voice communications with high immunity to background noise;
- Support for short messaging and satellite-based positioning applications;
- Effective and flexible network management and control through the consolidation of signaling and user information; and
- Encryption to ensure secure and confidential communications. The encryption is a key differentiator with the requirement to support a Chinese proprietary digital encryption scheme.

At a basic level, PDT closely resembles the ETSI standard for Tier 3 DMR: trunking, two-slot TDMA applied to 12.5-kilohertz channel spacing. The key benefit at this level is to halve the spectrum used in legacy analog networks, doubling the spectrum efficiency of the 12.5-kilohertz channels administered by China's State Radio Regulatory Commission.

Compared with the TETRA networks deployed in China to date, the

China's Hytera Sees Strong Global Growth for PDT

By Sandra Wendelken

Hytera Communications executives said the company has deployed several Professional Digital Trunking (PDT) systems in China, and they envision a future with PDT systems deployed in countries worldwide.

In China, Hytera installed a system to support the recent University games in Shenzhen and a multisite PDT trunking system for the Shenzhen Bay Custom and Immigration checkpoint. Hong Kong Customs is also using a Hytera PDT trunked system, along with the Guizhou Minority Civil Games and the Harbin Police. One of China's largest oil fields adopted a PDT trunked system.

"Outside of China, we have deployed a PDT trunking system in Guatemala," said G. S. Kok, vice president of research and development (R&D) for Hytera. "We have multisite test systems currently being set up in Thailand, Cambodia, Indonesia and Vietnam. We also have several enquiries from Europe, Latin America and the Middle East wishing to have PDT demonstration systems."

Kok said the company plans to support the strong market growth by relocating its manufacturing to the Longgang district in Shenzhen. "The new manufacturing facility has 10 times our current manufacturing floor space," he said.

The technology is inexpensive, and that is the main catalyst for growth, he said. "PDT is an open Chinese digital trunking standard that is extremely cost competitive because the manufacturers pay only token fees for the low-rate sine excitation linear prediction (SELP) vocoder developed by China Tsinghua University and no intellectual property rights (IPR) fees for the members," Kok said.

Hytera provides PDT portables, mobiles, repeaters, simulcasting and trunking solutions. The Chinese firm also has a team developing applications software for the products.

Executives said the PDT standard is "loosely" based on the Digital Mobile Radio (DMR) standard. Hytera also supplies DMR equipment. The fundamentals of PDT and DMR are the same; they are both TDMA, two-slot and four-level FSK modulation technologies.

"PDT is based loosely on DMR with the same 30-millisecond time slots," said Kok. "The differentiator is because PDT is developed in China, it is easier to implement. The main differences are in areas of DMR Tier 3, which are yet to be proposed."

Kok said one example is the GPS data handling, which is not defined in DMR Tier 3, but is already part of the PDT standard. PDT also defined the Air Interface Encryption (AIE) protocol, which may take a few years to define for DMR Tier 3.

"Minor differences can be seen where the DMR Tier 3 standards are still pending definitions," he said. "Hytera will follow the ETSI standards through software upgrades once these missing portions are defined." ■

Sandra Wendelken is editor of *Radio-Resource International* magazine. Contact her at swendelken@RRMediaGroup.com.

new standard will offer two key improvements:

■ Compatibility with the significant number of existing MPT systems used for police communications to ensure a smooth digital migration; and

■ Delivery of wide-area coverage at minimum cost with increased coverage compared with analog and superior voice quality to the edge of range.

These two factors are significant. TETRA networks are deployed in China's largest cities, yet the country is incredibly vast with analog conventional and MPT 1327 trunked technology public-safety networks. The need to digitize is clear — the current spectrum is consumed — but the geography of China means that further digitization is needed for maximum coverage and cost effectiveness.

Current Status

Three aspects of the standard, the encryption scheme, the speech vocoder and the approach to non-Chinese patents, are still being refined.

Encryption is an essential element of the PDT standard. Both software- and hardware-based encryption technology and the encryption management tools are being developed and will eventually be supplied by MPS-designated agencies.

PDTA vocoder trials and technical studies have narrowed the speech vocoder choice to the United States-sourced vocoder used in DMR and P25, a Russian vocoder, and a local Chinese vocoder developed by Tsinghua University. There is a strong desire to adopt local technology, but ultimately the choice will be based on cost and performance.

With respect to the vocoder and other elements, the PDTA looked at best practices based on a number of international radio standards, in particular the DMR standard. For both cost and security reasons, the PDT standard approach has been to develop alternative methods to ensure non-infringement with patents held by international companies. Although where possible, the PDTA is also looking to negotiate suitable terms for the use of these patents.

Given the current status of the standard, there is a long way to go before genuine open-standard PDT systems can be deployed. However the process itself provides interesting commentary on other international standards. The desire for PDT to take the best of other standards is a bold challenge and worthy of global attention. Certainly the global intentions for the standard have been signaled with the formation of the PDTA. ■

Trevor Laughton is the chief technical officer (CTO) at Tait Communications. Laughton, who has 30 years of experience, is involved in standards bodies around the globe and is a strong proponent of open standards and vendor interoperability. Email comments to editor@RRMediaGroup.com.

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An Olympic Network in London

Photos courtesy Airwave

While the organizing committee builds a new TETRA network for the 2012 summer games, the country's public-safety network receives upgrades.

By Michelle Zilis

In preparation for the 2012 Summer Olympic Games, London addressed communications concerns in two fashions — building a standalone network for Olympic staff and completing massive network upgrades to the country's public-safety network.

The majority of the events will take place within greater London in a variety of new, existing and temporary facilities. An anticipated 200,000 people will work in some facet during the games. The London Organizing Committee of the Olympic and Paralympic Games (LOCOG) is tasked with the daunting job of organizing all the moving parts, including 17,000 – 18,000 LOCOG staff and volunteers who will require some form of voice communications. These jobs range from stewards to sanitation crews to anti-doping officials to security personnel, as well as drivers and all associated with the transportation of athletes to and from venues. To appease each of the groups needing communications, LOCOG contracted Airwave, a network service provider, to supply a purpose-built, independent private mobile radio system, named Apollo.

Around the same time, the Home Office, U.K.'s governmental department responsible for immigration control, security and order, assessed what the Olympic games would bring in terms of security threats. The Home Office established the Olympic Security Directorate (OSD), which was tasked with ensuring the country's first responders were ready for the increased demand brought on by the influx of tourists and athletes. The directorate determined that the nation's public-safety network needed to be enhanced and parts upgraded to handle the increased security measures. In November 2009, the National Policing Improvement Agency (NPIA), on behalf of the OSD, awarded Airwave another completely separate and independent contract to

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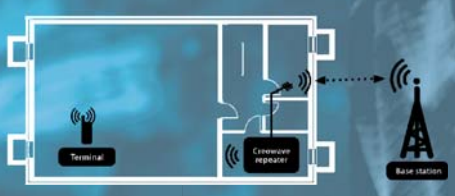

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An Airwave engineer works on a network antenna.

upgrade the current first-responder system.

Apollo

LOCOG's stand-alone TETRA network is designed to provide mobile radio access to each of the more than 30 competition venues, including facilities located in Olympic Park, Glasgow, Manchester, Coventry, Weymouth and Old Trafford. Airwave will operate and maintain the system, as well as provide headsets through subcontracted manufacturers.

The national Emergency and Public Safety Services (E&PSS) network has strict stipulations about who can use the network. For example, a taxi company would not be allowed to use the public-safety network because it does not meet the first-responder requirements, said David Sangster, U.K. services director, Airwave. LOCOG could not demonstrate that its needs would fall within the strict E&PSS requirements, because the LOCOG network will be the prime means of venue-based communications for the organizers, so LOCOG was forced to build a separate network.

When LOCOG released a tender for the network, one stipulation was for the network to be entirely independent, Sangster said. "It was a very important stipulation that the network was not interoperable [with the E&PSS network]," he said. With Apollo handling the communications of some 17,000 – 18,000 users, the LOCOG view was that the majority of users operating on Apollo should not have access to the E&PSS network. "It could do more damage than good," he said.

The damage could result from simple miscommunications, such as users not understanding the public-safety protocols and how the network is used, to jeopardizing important information by allowing non-public-safety users to have privilege to it. Sangster said a small number of users would benefit if the two systems operated together, but overall the numbers do not support this. The security personnel hired by LOCOG will operate on the Apollo network.

Airwave, along with several other companies, replied to the tender request and in June 2008 was awarded the contract to build the network and operate it end to end, as well as supply all the terminals. The system will use several equipment manufacturers' products. Part of the contract included a Tier 3 sponsorship of the games.

"We were impressed with the ability of Airwave to prepare for and cope with large-scale events that present similar communications challenges to those we anticipate during London 2012," said Derek Graham, senior manager for telecoms at LOCOG. "We were also attracted by the fact Airwave already worked with the emergency services, as we knew we would need to work closely with the police, fire and ambulance services throughout the event. Airwave seemed a natural choice for us to partner with."

The Apollo network will feature TETRA technology, which is also used on the national E&PSS network. "TETRA has really great attributes," Sangster said. Several of the key features important for the network are the ability to quickly establish a call, the resilience of the system, the digital benefits such as clarity, and the security considerations. "Also TETRA is very tried and tested," he said.

The system will cover all venues and the land within the boundaries of each venue area. East London will be the home to the largest part of the network. The main system is expected to include, at a minimum, 10,000 radio handsets, 2,000 vehicle-based radios and 350 desktop radios, which will be primarily used in control rooms. The control rooms/network management centers will oversee the several 1,000 talk groups operating on the system.

The system features many aspects to ensure resiliency. There will be no single points of failure, because the whole network provides multiple paths for everything, including secondary cables and switches. If there is a problem, one of the two network management centers monitoring the system will make sure the system cuts over to the secondary sites, Sangster said.

Remote Areas

Other technologies may be used to provide services for peripheral events, Sangster said. The extensive cycling areas, sailing areas, football stadiums and torch network all required special attention. In some remote locations, Airwave facilitated satellite sites. The bike routes provided the most challenging coverage plan, taking into account the length and attendant issues with regard to logistics and traffic management, said Martin Benké, U.K. network services director, Airwave.

"We were able to deploy a solution by using radio repeater equipment operated from two light aircraft flying above, which relayed radio signals from users on the ground to the control center and vice versa," Benké said. "The talk traffic was in turn taken back to the LOCOG technical operations

The system features many aspects to ensure resiliency. There will be no single points of failure, because the whole network provides multiple paths for everything, including secondary cables and switches.

center in Canary Wharf via VoIP."

Two additional mobile base stations were deployed to provide coverage to various venue control centers, which were then connected back into the main Apollo network. And a temporary, separate analog UHF/VHF radio system was deployed to provide communications between the race envoy and the race control center.

"The aircraft test was quite historic," Sangster said. It was designed to offer a footprint of the race path coverage area. The test was used during a time trial, but it was decided that the aircraft aspect was not the most practical solution and would not to be used during the games, Sangster said. Instead, the network deployed more sites with base radios along the route.

Original in-building coverage plans for the venues have worked successfully. At press time, Airwave officials said about eight venues still required coverage, and so far they had not encountered issues with indoor coverage. "We have a lot of experience with this, and it's been helpful to use that experience," Sangster said. "Generally we know where additional coverage will be needed and what to anticipate."

Apollo Tests

LOCOG's Apollo network formally went live in mid-2011 and in June began a number of tests on the system, known as clusters one, two and three. "We're testing the obvious stuff," Sangster said. "We're testing the network, the talk groups, the users." The tests also are designed to examine the distribution, which must give out the more than 17,000 terminals each morning and collect them each night. Each terminal must be assigned to the correct user, ensuring the user can communicate with the correct talk groups for the assigned duty. LOCOG's management systems are also being put to the test to ensure everyone knows how to properly use their terminals.

"Now that Airwave has delivered the private mobile radio service using the Apollo network, our staff are using it operationally in the run-up and during test events," said Gerry Pennell, LOCOG chief information officer. "This will ensure they have sufficient time to understand the system and get the best out of the equipment and network."

Blue Light Network

In the early 2000s, Airwave built and still operates a TETRA communications network for the country's police. The network was later extended to include all fire and ambulance responders. The government mandated that all first responders use the E&PSS network, informally known as the Blue Light Network. The network currently offers interoperability to all police, fire and ambulances and covers 99 percent of Great Britain's land mass.

Shortly after London was awarded the 2012 Olympics, the OSD recognized that the public-safety network needed large-scale systemwide upgrades to increase its capacity in preparation for the event. "The contract was principally for the London area," Sangster said. The £39 million contract included retuning all 312 London base sites and 1,280 base radios, in addition to introducing new base stations to the city. The contract called to upgrade a number of existing base stations in London so each could host up to 2,500 users at any one time. Other key sites across the country also had base sites retuned. In Dorest, new base stations were deployed to provide offshore coverage for the sailing events. Airwave also developed a new software feature to allow more capacity. The goal of all of the upgrades was to increase the network's capacity to ensure the additional police, fire and ambulance personnel deployed in the area will maintain secure, reliable communications. "We wanted to ensure we were making the biggest use of spectrum," Sangster said.

The network upgrades have been in operation for more than a year, Sangster said. Last August, riots erupted in London that put the new system upgrades to the test. "There were 1,600 police officers in London, and they were all able to talk to each other using their own radios, just by switching to a new talk group," he said. "It really showed the network's strength."

Because all the country's first responders operate on the same network, when a local force is overwhelmed by an incident, other forces around the country can send officers to help. During the riots, which took place from 6 – 10 August 2011, 25 forces provided services. "The higher capacity point, with that influx of first responders, was very beneficial," he said. "We would have managed without it, but it was nice to have the capacity in place."

Apollo's Future

The Apollo network, named after one of the 12 Olympian gods from Greek mythology, will operate through the completion of the Paralympic Games. After December 2012, the network's future is unclear.

"We're still considering all our options," Sangster said. The spectrum is considered to be the scarcest part of the system. Options being considered include putting the spectrum toward an operational network to make a network more efficient, as well as considerations for a number of energy infrastructure options, such as smart grids. "We have a whole host of things to consider," he said. ■

Michelle Zilis is managing editor of *RadioResource International* magazine. Contact her at mzilis@RRMediaGroup.com.

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World Cup City Builds TETRA Network

Image courtesy Belo Horizonte Office of the Mayor

World Cup security in the Belo Horizonte area

Belo Horizonte, Brazil, prepares to host part of the event by designing a new network to secure the stadium, city and main roads.

By Cristiano Torres do Amaral and Pedro José Rosa de Oliveira

The FIFA World Cup is one of the biggest sporting events in the world, comparable in size and popularity only to the Olympic Games. Brazil is the only country that has participated in every World Cup, but hosted only once in 1950. However, in 2007, Brazil won the right to host the 2014 World Cup. In May 2009, FIFA announced the 12 host cities for the event in Brazil. One of the cities is Belo Horizonte, the capital of the state of Minas Gerais, with a population of about 2.5 million people. The city is located about 800 kilometers from Brasília and 400 kilometers from Rio de Janeiro.

FIFA recommended specifications for the security requirements for the city and its surrounding area to ensure there is appropriate security infrastructure for the media, delegates and teams. Security requirements include control of access and parking to the stadium areas within a two-kilometer radius, control of the public on the access roads to and from the stadium, and one access road with an exclusive lane for emergency vehicles and police. The citywide security was already set by local authorities and includes the stadium area, city center and main access roads into the city.

The event also requires efficiency in the police communications system to maintain a high level of public security. The digital service recommendations included encryption, automatic monitoring of fleet vehicles using GPS and AVL, the ability to send and receive short message service (SMS) messages, as well as other applications. The goal is that digital technology will make communications more efficient and effective to help manage the large event.

TETRA technology is able to fulfill all of the listed requirements. In 2007, a TETRA radio system was installed and used in Rio de Janeiro to support public-safety communications during the 15th edition of the Pan American Games (see “Rio Prepares for World Stage,”

Quarter 2 2011). The following year, TETRA was chosen for the Olympic Games in Beijing. In both Rio de Janeiro and Beijing, the previous communications systems for public safety were outdated, operating mostly in an analog platform.

Based on the success of both networks, the research preparation for the 2014 World Cup found that TETRA should be used in Belo Horizonte as well. The research also recommended a strategic government plan to implement the TETRA radio system.

Network Design

The first stage of the TETRA network design defined the basic parameters of demand required for communications during the World Cup. The FIFA specifications advised that a host city can cope with three to seven games within the duration of the 30-day event. However, the teams involved can stay 30 to 60 days before the start of the tournament. In 2010, Johannesburg, the host city of the final match in the World Cup of South Africa, received about 1 million people throughout the event that included soccer fans, official delegations, international media and temporary workers.

The United Nations (UN) recommends a minimum of one police officer per 250 people. Therefore, in a city with a population of about 2.5 million people such as Belo Horizonte, 15,000 police officers will be required. This means there should be 3,500 radios, including 3,000 portables, 400 mobiles and 100 fixed station units, in use.

In 2010, Johannesburg, the host city of the final match in the World Cup of South Africa, received about 1 million people throughout the event.

The second stage of the TETRA design was defining the base station locations. Base stations should be located near every World Cup-related area or zone in the city. However, the priority should be placed on the areas or zones with the largest concentration of people, such as the soccer stadium, known locally as Mineirão.

Network Specifics

To meet demand in the Mineirão Stadium, the access point to the TETRA network must have at least 16 carriers in compliance with the 28 carriers available in Brazilian legislation. The principal cell must have a device that is

With the city's population of about 2.5 million people, 15,000 Belo Horizonte police officers will be required during the event. This means there should be 3,500 radios in use.

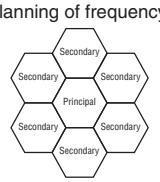
able to combine the 16 carriers used at 380 MHz. These 16 carriers are sufficient to cope with the traffic in the most intense point in the network. Considering the Brazilian law, the remaining 12 carriers will be spread between the six secondary cells in an area of 3.8 square kilometers. Each of the secondary cells must use two carriers, enabling them to support traffic of 3.87 total traffic per cell (Erl) and grade of service (GoS) of 5 percent to four stations per carrier in the voice.

The 16 carriers can process voice data simultaneously from 64 mobile stations operating at 28.8 kilobits per second (kbps). The packets require a gateway that has network throughput of 1.8 Megabits per second (Mbps). The voice communications from four mobile stations contain 2,040 bits on 56.67 milliseconds, in the air interface with digital modulation of 28.8 kbps. If necessary, these bits must be sent by switching and management infrastructure (SwMI) to other cells of the network or dispatch center. However, the project should consider the operation in voice plus data (V+D). In this case, the network throughput to gateways requires rates even greater.

The geographic base used for the computational modeling has a spatial resolution of 90 meters and is derived from the mapping of the terrestrial relief Shuttle Radar Topography Mission (SRTM). The data was supplied by the United States Geological Survey (USGS) and provided to the Brazilian Agricultural Research (Embrapa). The total area is about 30 square kilometers with altitude ranging from 500 meters to 1,300 meters. The terrain is also varied, with high-density buildings in the stadium vicinity as well as valley areas, subtropical vegetation and a lake area.

Based on the topology suggested for the base stations, it is possible to measure the infrastructure necessary for the radio network. To serve the entire city and the surrounding area, it will take about 90 location points for base stations. The network investment is estimated to be approximately US$90 million, which would include purchasing equipment and installation services. As an important project, it will require the attention of the local government administrators to prepare the international bidding process for the telecommunications manufacturers. The global nature of

Parameters for Computational Modelling

Parameters			Description
Planning of frequency 	Frequency range (MHz)		380
	Bandwidth per channel (kHz)		25
	Number of channel (cluster)		28
	Amount of cells		7
	Carriers per cell (principal)		16
	Carriers per cell (secondary)		2
Number of users	Fixed base station		150
	Handheld		2,000
	Vehicle-mounted radio		500
	Dispatch console		30
Service	Total traffic per cell (Erl)		50
	Average time of calls (s)		90
	GoS (%)		5
Terminal	Statistical mode		Mobile / 99%
	Polarization		Vertical
	Climate		Continental subtropical
	Power (W)	Fixed base station	5
		Handheld	1
	Antenna gain (dBi)	Fixed base station	3
		Handheld	0
	Antenna height (m)	Fixed base station	15
		Handheld	2

This table considers the computational model of the TETRA network.

the bidding process will reduce costs because of the wide competition.

Another important aspect related to the deployment of access points requires the licensing and coordination of the frequencies at 380 MHz. Thus, implementation of this project depends on the authorization of the Brazilian telecommunications regulatory agencies and the environment. This authorization does not involve great complexity; however, it requires skill from the supplier to meet the targets set for licensing.

Finally, investments in public security are fundamental to the success of the World Cup in Belo Horizonte. The event will showcase both the national and local government worldwide. The TETRA network installation is technically feasible to meet the demand for secure and efficient communications. It is vital that those charged with the security of the city are using modern equipment that offers the capability of providing critical communications at this important international event. ■

Cristiano Torres do Amaral is a telecommunications specialist of the Military Police of Minas Gerais, as well as an engineer and professor of Technical School of Minas Gerais (POLIMG). Amaral is a post-graduate student in electrical engineering at Federal University of Minas Gerais.

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Shortfalls related to the security of the Project 25 (P25) standard identified last year generally can be resolved through sound operational and information security procedures.

By Bill Pagones

Discussion about security surrounding professional mobile radio (PMR), particularly shortfalls of the Project 25 (P25) standard related to security, have become commonplace. The problems identified are not limited to the P25 technologies, but affect wireless communications as a whole. While some of the issues identified are technical in nature, the vast majority can be resolved through sound operational and information security procedures.

Members of the Project 25 Technology Interest Group (PTIG), an organization of users and manufacturers of P25 systems, have significant experience in how P25 radios are designed and how they are encrypted. PTIG recognizes the inherent weaknesses in any radio system, but also strives, in concert with the U.S.-based Telecommunications Industry Association (TIA) and the Project 25 Steering Committee, to address those weaknesses and decrease the risks involved.

No radio transmission, however protected or encrypted, is totally immune to selective attacks. The best we can hope for is to protect the radio from these attacks by following best practices and to encrypt radio transmissions to the highest level possible consistent with the sensitivity of the information being protected.

P25, published as a suite of TIA-102 standards, is a global standard for public safety and critical communications for PMR. Arguably, it is the most robust digital standard for public-safety-grade radios in the world, and the predominant standard in North America. From a security perspective, the P25 standard enables the ability to securely transmit sensitive information among users of a system. The degree of encryption, such as the algorithm strength and complexity of the key, is the means of protection. Encryption for public-safety-grade radios can range from simple scrambling to complex 256-bit key advanced encryption.

The P25 suite of standards adopted 256-bit advanced encryption standard (AES) as its choice for securing, to a high degree, radio traffic that must be protected. The P25 Block Encryption Protocol (TIA-102.AAAD-A) also allows the use of the data encryption standard-output feedback (DES-OFB) and triple encrypted DES (3DES). A large number of U.S. users still operate DES-OFB. As a result, many agencies operate both DES-OFB and AES to allow encrypted interoperability options for their agents in the field. The U.S. federal government strongly recommends all public-safety agencies migrate to AES for increased message security.

With any technology there can be misunderstandings, based on certain assumptions that can be construed as vulnerabilities or weaknesses in the use of the technology. In this regard, P25 radio systems are no different. It is obvious that public-safety communications are specifically designed to provide highly reliable communications. In some cases, a radio is the only lifeline an officer has available. An agency might want to protect specific information, but in an emergency situation, the ability to talk unencumbered may overcome the need to protect the information. The relative

vulnerability of P25 radios to jamming or eavesdropping depends partially on what assumptions are made when exposing its weaknesses.

This topic has been discussed a great deal in recent studies and in recently published articles. This article will detail some of the key myths that have led to misunderstandings about P25 and how it behaves, and offer the facts. These facts may calm some of the artificially created uncertainty and uneasiness about the performance of P25 systems in the public-safety radio marketplace.

Myth No. 1:
Encryption and Security Features Are Expensive

Not long ago, the cost of encryption was almost as expensive as the radio itself, not to mention the extra equipment required to rekey the radios. With current radios, the cost to include encryption is a fraction of the total cost associated with the radio. Some vendors have inexpensive solutions to implement standardized encryption algorithms as part of their product offerings. Other vendors provide encryption choices at various cost levels, but even the highest price option is significantly less than early implementations of encrypted PMR.

While the cost of encryption for radios has decreased, the infrastructure necessary to support encryption and other security features remains fairly expensive. Even though the infrastructure is expensive, the return on investment (ROI) is fairly quick. One example is over-the-air-rekeying (OTAR), the ability to rekey an entire radio fleet without having to manually and physically update every radio. The use of OTAR could offset the cost of the necessary additional infrastructure with significant reduction in resources, such as manpower, which could be used elsewhere.

Although there is not a monetary value readily available, encryption and security services provide improved officer safety and mission integrity by protecting critical information. Clear transmissions have been shown to alert suspects of pending raids and other time-sensitive information.

Myth No. 2:
PMR Encryption Creates Audio Quality and Coverage Issues

When analog was dominant, cipher feedback encryption could cause significant coverage loss — as much as 3 dB loss — and could degrade audio quality. With the advent of digital PMR and the output feedback algorithms used by both DES and AES, coverage and voice quality are no longer an issue because of encryption. All encryption is done after the voice is processed by the vocoder, and encryption is a digital packet stream, having no impact on audio quality and not introducing any degradation of range

4 Project 25 Security Myths

1. Encryption and security are expensive.
2. LMR encryption creates audio quality and coverage issues.
3. P25 is highly susceptible to jamming.
4. P25 radios are not secure.

or signal quality. Unfortunately, the earlier shortcomings forced some public-safety agencies to adopt operational policies that dictated unencrypted transmissions. Because of this myth, many of these operational policies have not been updated for digital implementations.

Myth No. 3:
P25 is Highly Susceptible to Jamming

All wireless communications are susceptible to jamming. Public-safety agencies deal with unintentional jamming regularly. The act of selective or intentional jamming is far more problematic for system administrators. The source of the jamming is often not known and may not be regularly interfering with the communications system. In most cases, mitigation solutions are available to deal with the interference. As the interference increases in complexity, the mitigation strategy and solution increase in complexity and cost. While a number of articles discuss the use of commercial-off-the-shelf (COTS) products to jam public-safety communications, in almost every case, these incidents are highly localized and require significant modifications to the COTS product.

Myth No. 4:
P25 Radios Are Not Secure

P25 was designed as a public-safety-grade interoperable communications standard. Encryption and security services were added, as an option, for agencies requiring secure communications. Security services that include encryption and the choice to use them are solely policy and operational decisions made by the jurisdiction or agency implementing the communications system.

The P25 suite of standards includes more than half a dozen standards specifically focused on security services. These services include encryption, key fill device interfaces, OTAR, key management facility (KMF), and key fill device protocols and link layer authentication. The P25 Steering Committee, in cooperation with TIA, the National Institute for Standards and Technology (NIST) and Institute for Telecommunication Sciences (ITS), is continually

identifying and drafting new standards to further the security services portfolio. Additionally, the published standards are reviewed and updated regularly to correct discrepancies, oversights and issues related to interoperability. Several items to address message authentication, replay protection, KMF-to-KMF key sharing and link layer encryption are in development.

The Block Encryption Protocol document specifically addresses how DES, 3DES and AES should be implemented for P25. Originally the document was developed and published when DES was the primary U.S. federal standard for encryption. It is notable that none of the security vulnerability studies and published articles that stimulated this discussion has shown evidence of being able to compromise the AES key.

The U.S. Federal Partnership for Interoperable Communications (FPIC) recognized a large number of DES implementations are still active in the public-safety community. Acknowledging the fact that myriad other protection algorithms are available, the FPIC also recommended that agencies implement only the AES 256-bit algorithms and retain DES only where needed for interoperability purposes. The FPIC encouraged agencies to migrate to the more secure AES algorithm as soon as possible. The DES algorithm is increasingly more susceptible to brute-force exhaustive key search attacks. The P25 Steering Committee, in coordination with the P25 User Needs Subcommittee, adopted the FPIC recommendation to make the 256-bit AES algorithm the primary encryption method as published in the P25 statement of requirements (SoR) dated April 8, 2011.

"There is nothing inherent in P25 that makes this problem any worse than in any other communications system (including analog)," said John Oblak, chair of the TIA TR-8 private PMR systems engineering committee. PTIG members will continue to educate the community on how the P25 standard improves public-safety communications. PTIG members, TIA and the P25 Steering Committee work together to continuously update all aspects of the standard to enhance its performance and mitigate security vulnerabilities.

In many ways, P25 is a vast improvement over what public-safety agencies used not so long ago and what some still use. P25 improvements serve not only total system functionality, but also improve the ability to protect mission-critical information. Many public-safety agencies are leveraging P25 to help address the technical, operational and economic challenges faced in the communications environment. Benefits realized through the use of the P25 standard include not only improved security, but improved interoperability across jurisdictions and levels of government, enhanced spectral efficiency, increased competition among vendors and backward compatibility to allow graceful migration to new technologies. ■

Basil (Bill) Pagones is the executive director of the Project 25 Technology Interest Group (PTIG). Visit www.project25.org for more information. Email comments to editor@RRMediaGroup.com.

Product Expo: Site and Test Equipment

Aeroflex

Aeroflex announced new features for the 3920 Digital Radio Test Set including Project 25 (P25) Phase 2 TDMA functions in support of

emerging and evolving worldwide two-way radio standards. The latest capabilities extend the versatility of the instrument for digital technologies including Digital Mobile Radio (DMR), digital Private Mobile Radio (dPMR) and NXDN technologies. With the release of software version 2.0.0.1, the test set now adds new features to the already extensive list of features.

www.aeroflex.com

Agilent Technologies

Agilent FieldFox analyzers are ideal for installation and maintenance in wireless and aerospace/defense applications. Designed for indoor/outdoor use, the analyzers are Mil-PRF Class-2 compliant, have no fans and no vents, and weigh 2.8 kilograms. Model N9912A

is an integrated RF analyzer, 4/6 GHz. The seven instruments in one box include cable and antenna analyzer, spectrum analyzer, interference analyzer, signal source, network analyzer, vector voltmeter and power meter. Model N9923A is a handheld RF vector network analyzer (VNA), 4/6 GHz, and provides built-in QuickCal (full two-port cal), distance-to-fault (VSWR), vector voltmeter and power meter.

www.agilent.com

Aluma Tower

Aluma Tower developed the patent-pending Smart Technology design. The Smart Tower empowers the end user to control the

tower, generator, and heating, ventilation and air conditioning (HVAC) system of a unit via text messaging. The tower design technology transmits, via cell phone, the location, height and wind speed data, while preserving the integrity of the equipment, Aluma executives said. The Smart Generator allows the user to start and stop the generator remotely, making available live feeds on the frequency, amperage, voltage and fuel level, and control the temperature via cell phone.

www.alumatower.com

Anritsu

The MW8208A PIM Master is a test solution that brings the advan-

tages of Anritsu's Distance-to-PIM technology to 850 MHz band applications. The trouble-finding tool allows field technicians and engineers to accurately and quickly locate the source of passive intermodulation (PIM), whether it is in the base station antenna system or in the surrounding environment. With the device, users can uncover the distance and relative magnitude of all static PIM faults simultaneously, including those resulting from dirty, corroded, over-torqued and microscopic arcing connectors.

www.anritsu.com

Bird Technologies Group

Bird's Antenna and Cable Monitor (ACM) series is a solution for monitoring transmission antenna systems. Designed to measure forward and reflected true average power and calculate VSWR, the unit works with any modulation and detects antenna and cable faults that

transmitter-internal VSWR monitors may not detect, company officials said. Models are available from 136 MHz to 2.4 GHz, and all units provide alarms for low or high power and high VSWR. Also included as standard is a push-to-talk (PTT) input to avoid false alarm triggering when the transmitter (radio) is not keyed.

www.bird-technologies.com

C4i

The C4i Radio Interface Unit (RIU) provides a seamless interface between radios and telephony using VoIP technology. It can be used as a stand-alone radio over IP (RoIP) gateway or as part of a larger

C4i communications solution. While stationed at the radio or repeater site, the unit allows users to implement an IP connection to communicate with consoles, saving cost over leased lines and providing greater flexibility, C4i executives said. The standards-based unit allows users to connect the unit to other networks, such as a countrywide network or incident commander.

www.c4i.com

CommScope

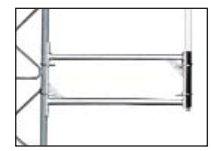
OneBase InSite Connect remotely controls and monitors the subsys-

tems inside each remote site and enables network operators to coordinate and manage the conditions at all sites across their networks. The product is OEM agnostic, capable of controlling and monitoring a wide array of devices from subsystem manufacturers. The unit has two main components. The Remote Controller Unit (RCU) is a rack-mounted solution deployed at each site throughout the network that can manage and monitor up to 88 individual subsystems. Each RCU feeds into a centrally located Control Management System (CMS) that enables operators to remotely manage and monitor thousands of sites.

www.commscope.com

Comtelco

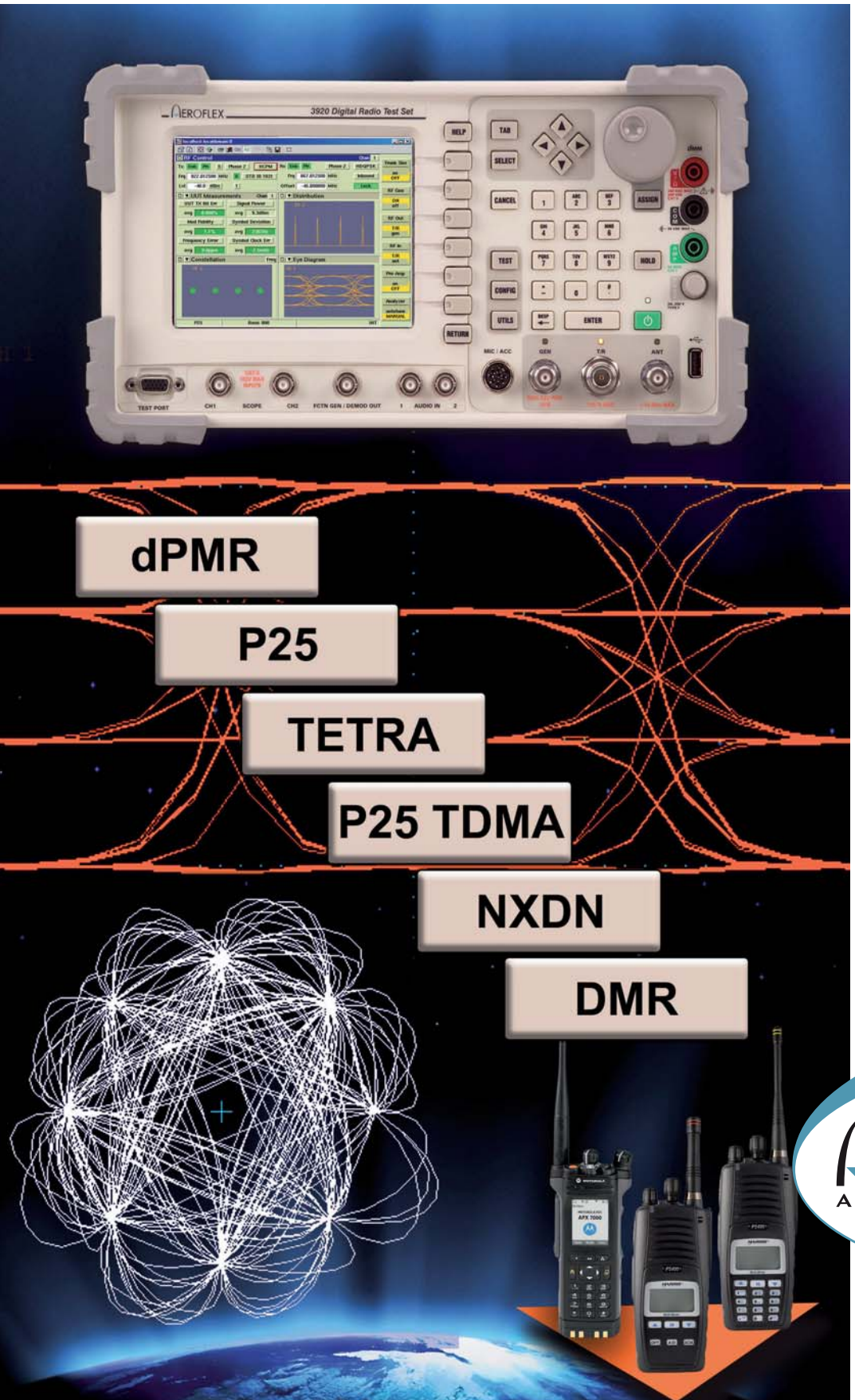
Comtelco's Tower Side Mount Kit was designed for use with Comtel-



co XL series base stations. The heavy-duty side mounts feature a galvanized finish. Each kit is supplied with 4.45-centimeter stainless U-bolts for easy installation on a Rohn 45-type tower. For a larger tower leg, stainless steel strapping (not supplied) can be used.

www.comtelcoantennas.com

One Test Set for All Your Narrowbanding Test Needs



Whatever land mobile radio system you rely on, the Aeroflex 3920 has the capability to test it. With multiple radio test systems for P25, MOTOTRBO™, TETRA, NXDN™, dPMR, and now P25 Phase II TDMA, the Aeroflex 3920 has the POWER and accuracy to test today's technologies.

The Aeroflex 3920 is the first digital and analog radio test set to provide full coverage of all of the major narrowband digital radio standards, for both mission critical and professional radio systems. With the new capability to test P25 Phase II, the Aeroflex 3920 is leading the way in narrowband radio test. Other radio test sets can't measure up to the 3920. Only the 3920 provides accurate, reliable, and complete radio test and alignment. The Aeroflex 3920 is the one test set for all your test needs.

FREE DEMO! Call 1-800-835-2352 to request a Free Demo and put the 3920 exclusive capabilities to the test!

Learn more by going to **www.aeroflex.com/RRQ2** and request a data sheet on the 3920.

AEROFLEX
A passion for performance.

www.aeroflex.com

Davicom

Davicom intelligent site monitoring solutions, Davicom MAC, are designed to remotely monitor and control transmitter sites, reducing

operating costs and downtime, company executives said. Immediate access to real-time site information, such as transmitter status, RF power, antenna VSWR, audio/video levels, mains power presence, temperature, tower lighting, fire alarm and building security status, can be a mouse click away. The decision-making commands go beyond conventional telemetry systems.

www.davicom.com

dbSpectra

The DSCC series 700, 800 and 900 MHz transmitter cavity combiner offers a broadband performing combiner in compact packaging with 12.7-centimeter cavities. Other features include two- to 24-channel

availability, lower cost than standard cavity combiners supporting 150-kilohertz channel-to-channel spacing, low insertion loss, and easy field tuning and expansion, company executives said. The isolator has a built-in 30 dB coupler test port for tuning under power and 110 watts RF power forward and reflected capability. Frequency ranges include 763 – 776, 851 – 869 and 935 – 940 MHz. The combiner offers an operating temperature range of -30 to +60 degrees Celsius.

www.dbspectra.com

Eagle Eye Power Solutions

The LB series DC load banks are designed for acceptance testing, discharge testing, battery capacity testing, battery maintenance and

other testing for DC power with load. The unit is portable, durable and safe, and comes with data-management DataView software. The series can monitor a system's voltage during discharge. The unit's optional DAC feature displays and records the voltage of each cell during discharge so users can evaluate the health of each cell.

www.eepowersolutions.com

General Dynamics Satcom Technologies

Featuring comprehensive Project 25 (P25), NXDN and Digital Mobile

Radio (DMR), such as MOTOTRBO, test capability, the General Dynamics R8000 analyzer is ideal for digital radio tests. The portable, full-featured radio test set weighs 6.35 kilograms and features a spectrum analyzer comparable with stand-alone instruments with a noise floor of less than -120 dBm.

www.gdsatcom.com

Innovative Circuit Technology (ICT)

The Site Inverter 300 was designed to meet the needs of many 12-, 24- or 48-volt DC-powered communications sites that have links,

multiplexers, switches, remote terminal units (RTUs), digital video recorders (DVRs) or other components that require AC power. With 300 watts of sine wave output, efficiency of more than 90 percent, and all connectors on the back close to wiring connections, up to three inverters can be installed in a single 1RU rack space. An accessory option routes power to two front-mounted outlets on the rack if needed.

www.ict-power.com

Midian Electronics

Midian Electronics released its updated InterMod Calculator software

to predict the possible occurrence of intermodulation products that may cause receiver interference at a repeater site. The enhancements to the InterMod include supporting frequencies from 1 MHz to 999 GHz, 6.25-kilohertz channel spacing, generating CSV reports, Internet mapping and more. The device can be used with a PC to solve intermodulation interference problems at sites.

www.midians.com

Mobile Mark

The Mobile Mark yagi antennas provide directional data transmissions in an attractive and compact package, company officials said. The antennas are encased in a protective radome and measure 19 centimeters from the tip of the radome to the antenna mount. Two

models are available. The YAG8-W-3C covers 2.4 – 2.5 GHz and 4.9 – 6 GHz and offers 8 dBi gain. The YAG12-5500-3C covers the upper band, 4.9 – 6 GHz and offers the higher 12 dBi gain. The antennas can be used for dual-band Wi-Fi 2.4/5 GHz coverage, backhaul at 5.8 GHz, public-safety 4.9 GHz or dedicated short-range communications (DSRC) intelligent transportation services (ITS) at 5.9 GHz.

www.mobilemark.com

Narda Safety Test Solutions

Nardalert S3 is an advanced non-ionizing radiation (NIR) monitor designed to be used as a wearable or fixed-area sensor. The unit

features field-replaceable sensors, a large-color display and comprehensive user-friendly software. The unit touts a new mechanical design with removable sensors that provide for rapid field support and unlimited upgradeability for users. The model's top-mounted color LCD simplifies operation and improves situational awareness, company executives said. The device is readily chargeable through a computer USB port, and employs light, sound and vibration alarms. Narda engineers included a protective silicon skin for field use, and interchangeable belt or lanyard clips. The device can be deployed with NBM-580 for collecting readings from multiple Nardalert meters and probes.

www.narda-sts.us

Test Leader

Now with TETRA Capability!

General Dynamics' R8000B is the next generation radio test set that is transforming the two-way radio industry. The fully portable (14 pound), software-defined R8000B tests every major digital radio protocol - including TETRA – and now features the industry's best spectral purity in a multipurpose instrument.

Unmatched Performance

The R8000B features:

- Support for APCO P25, P25 Trunking, TETRA, DMR and NXDN protocols
- Industry leading spectral purity (phase noise -95dBc @ 20kHz offset; residual FM less than 4Hz)
- The ultimate in flexibility and expandability – firmware updates and options can be added via front panel
- A spectrum analyzer comparable to expensive standalone instruments – noise floor as low as -140dBm

The R8000B is more powerful, more flexible, more accurate and thousands of dollars less expensive than commonly used test instruments whose weight and inflexibility keep them anchored to the test bench.

To set up a product demonstration with a manufacturer's representative in your area, visit our website at www.gdsatcom.com/CTEreps.html.

GENERAL DYNAMICS
SATCOM Technologies

Omnitronics

The 619DSRI is an eight-port, four-wire E&M digitally controlled audio bridge. The bridge can be used to combine audio paths from

HF/VHF/UHF radios, microwave or Ethernet. The bridge has been deployed in rebanding applications, providing continuity between old and new narrowband frequencies, Omnitronics officials said. With its ability to dynamically and remotely configure radio networks, the bridge combines conventional, trunked and digital radios and makes communications safe and productive, officials said. With a single-button push (pre-programmed CTCSS/ in-band/DTMF/Selcal), it is easy to operate.

www.omnitronicsworld.com

PolyPhaser

PolyPhaser's DAS-P is a radio frequency surge protector series with

ultra-low passive intermodulation (PIM) characteristics (PIM third order is less than -155 dBc 2 by 20 watts) and telemetry options for network systems where DC voltage is needed to power towertop electronics. The series offers throughput voltage of less than 50 volts 2 kA and throughput energy of less than 1mJ 2 kA in a weatherproof, bulkhead-mounted enclosure. The surge protector meets International Electrotechnical Commission (IEC) 60529 IP67 standards and is AISG and RoHS compliant.

www.protectiongroup.com

Racom Products

Racom manufactures two automatic station identifier models for transmitters, base stations and repeaters. Model 1214V is an automatic voice station identifier that identifies the transmitter in voice,

and its call sign is recorded with a microphone. The device includes three system monitors, three timers, 600-ohm output and speaker. Model 701 provides automatic transmitter identification in Morse code and has three timers and monitors. The device's call sign and parameters are programmed with a PC.

www.racomproducts.com

RF Industries

Precision quality 7-16 DIN adapters are desired for lab and field passive intermodulation (PIM) test applications. The low-loss, low-VSWR

adapters are designed for portable antenna and cable analyzers where high-grade adapters are needed. The P2RFA-4013-SS kit gives users the six most needed 7-16 DIN and N adapters for bench and field. Adapters are machined to exacting specifications with white-bronze-plated bodies and stainless steel coupling nuts. Sweep test charts are included.

www.rfp2.com

Sentor Monitoring and Control Systems

Sentor Remote Wireless Monitoring and Control systems monitor and control all site functions at tower sites. The intelligent and program-

mable automation controller incorporates programmable analog and digital inputs and outputs controlled by the Fuzzy Logic software written in English. The system allows users to measure accurate transmitter forward and reflected power before and after the combiners using low-priced industry available couplers. Using the graphical user interface (GUI) software, fully active pictures show all readings, security and batteries, and send alarms.

www.sentor.com

Survey Technologies Inc. (STI)

The STI-9400 system and STI Field Test 7 solution can test the cov-

erage and quality of a wireless system with field measurements. From analog audio quality to signal strength to Project 25 (P25) bit error rate (BER) measurements, the system and software can verify a wireless communications system's coverage and performance. Results are color contour plots of signal coverage and quality over the area tested or tiles quantifying the level of coverage in the area tested.

www.surveytech.com

TC Communications

TC Communications offers two site products for linking radio dispatch

centers and remote radio transmitters and receivers, an analog-over-Ethernet gateway and a 28-channel analog multiplexer. The analog over Ethernet gateway, Model TC3846-6, and the TC8000 analog fiber multiplexer link two-/four-wire analog, audio and intercom devices over fiber-optic networks.

www.tccomm.com

Times Microwave Systems

The Smart-Panel concept in shelter and base station protection elimi-

nates traditional entrance panel shortcomings. The shelter safeguards costly base station equipment. Offering true single-point grounding while eliminating the expense and possible incorrect installation of external grounding kits, the unit employs bulkhead mounting of the surge protectors, eliminating the traditional internal trapeze and external copper master ground bar, company executives said. The unit is weatherized and supplied with all the necessary installation hardware.

www.timesmicrowave.com

TWR Lighting

The L450 dual LED red/white, Federal Aviation Administration (FAA)

medium intensity LED tower light incorporates an advanced optical engineering design and LED technology. The light minimizes visual impact on the surrounding environment, while reducing power consumption. A built-in power module allows for a single controller and single-cable installation.

www.twrlighting.com

What sets the **Nardalert S3** apart from the pack?

EVERYTHING!

Designed & tested to be a wearable personal sensor

Powerful, software driven LCD monitor

Light, sound, & vibration alarms

Fully warranteed

ISO-17025 calibrated

Accurate...with no false alarms

Field replaceable sensors covering frequencies from 100 kHz to 50 GHz

As RF energy is introduced into more and more industries, there is a greater need to detect and minimize personal exposure. As with all things, when such a need is created there is a rush to fill that gap with cheap and questionable imitations. While it might be okay to buy a knock-off Rolex, the same practice, when applied to RF safety could be quite hazardous to your heath.

Simply put, Narda wants to assist you in the safe use of EMF's, and we manufacture the best equipment available in the world for that purpose. Be safe...and accept nothing less.

To learn more, please e-mail us or visit our comprehensive web site.

Scan using your Smart Phone or Tablet to access multiple language data sheets!

narda
Safety Test Solutions®
an L3 Communications Company

www.narda-sts.com

New Products

Digital Portable and Mobile

Motorola Solutions added the SL series portable and XPR 5000 mobile radio series to its MOTOTRBO portfolio. The portable is a thin Digital Mobile Radio (DMR) device targeted at business users. Features of the radio include a rugged, high-resolution color display; Intelligent Audio, which adjusts the radio's volume

to fit background noise; integrated Bluetooth audio; three programmable option buttons that allow up to nine favorite features to be programmed; a portfolio of data applications, such as work order ticket management, email, dispatch, network monitoring and telephone interconnect; vibrate alert, covert mode and integrated antenna; and a selection of earpieces, chargers and holders. The analog and digital XPR 5000 mobile radio includes full-color display, Intelligent Audio, customizable voice announcement, integrated GPS, text messaging, and integrated Bluetooth audio and data.

www.motorolasolutions.com

NEXEDGE Upgrades

Kenwood added an MPT 1327 trunking protocol option to its NEXEDGE NX series of digital/analog mobile and portable radios. The option allows the radios to be programmed in MPT analog mode and NXDN digital trunked/conventional mode for parallel operations, facilitating the transition to narrowband NEXEDGE operation. The option is available for the NX 200/300, NX-200S/300S and NX-210 portables, as well as NX-700/800 mobiles. The option will be available on additional models this year, company officials said. The company also added GPS and AVL features. The NEXEDGE system firmware version 2.8 provides expanded GPS/AVL capabilities for both repeaters and subscriber units, including additional identification and reporting, power on/off status and remote updating.

www.kenwood.com

Explosion-Proof Terminal

Funkwerk Security Communications introduced an explosion-proof TETRA terminal. The FT4 EX operates in the 450 – 470 MHz frequency range and includes ATEX and IECEx certifications for gas and dust hazards. In addition to TETRA communications functions, the product provides personal emergency signal functions and location functionality. The lightweight terminals are housed in an IP65 enclosure.

www.funkwerk-sc.com

Covert Radio Accessories

Savox Communications extended its line of professional radio accessories with new products including the Clarity

Professional Radio Communications Systems

Looking forward to your sincerely joining for great development with Kirisun!

Affordable
Reliable

DMR
DIGITAL MOBILE RADIO ASSOCIATION

DP770

DMR Portable Two-way Radio

Latest Technology

- Use Time-Division Multiple-Access(TDMA) digital technology which doubles the number of users on a single licensed 12.5kHz channel.
- Provides clearer vocal communications in digital mode and better coverage.
- Integrated voice and data enhances operational efficiency.
- Rich signaling with CTCSS/DCS/2Tone/5Tone/MDC1200 (In upgrade stage)

User-friendly design

- Tri-color LED Indicator for tx/rx status,calling,scanning.
- Two-in-one knob combine the volume&channel function control.
- Flexible,menu-driven interface.
- Operate in both Digital&Analogue mode,smooth the migration from analogue to digital.
- Text message.
- Send text message and predefined call via programmable buttons.
- Enhanced audio capability.

Versatile features

- Enhanced call management features,including emergency,PPT ID,call alert,radio check, radio enable/disable;privatecall,group call and all call.
- Real time clock(RTC).
- VOX
- User defined alerts.
- Optional board expandability（includes scrambler/encrypt,bluetooth,etc).
- Firmware upgradable for more features.

Rugged and reliable

- Compliant with DMR ETSI Tier 2 standard, IOP Testing ongoing.
- Meets IP67 standard along with U.S. Military Standards 810 C,D,E and F.
- Durable battery supporting long time operation.

Don't hesitate to contact us for further information!

Manufactured by Shenzhen KIRISUN Electronics Co.,Ltd.
Http：//en.kirisun.com
Contacts：Tel：+86-755 86095979
Fax：+86-755 86096018
E-mail：marketing.os@szkirisun.com

New Products

interference-free covert wireless solution, an inductive covert base unit, two-wire semi-covert kit and covert carriage solutions. The neckloop/microphone system includes a radio-specific connector, wireless receiver module and a wireless key fob push to talk (PTT). Used in conjunction with the RCR-7 subminiature wireless earpiece, the product removes electromagnetic interference. The Covert Base Unit (CBU) includes a radio-specific connector, a wireless receiver module with built-in PTT, a wireless key fob PTT and a Lemo plug for transmit and receive inductors. The two-wire kit includes an acoustic tube earpiece and small microphone/PTT unit with a clothing clip.
www.savox.com

TETRA Infrastructure

Etelm introduced its NeTIS advanced TETRA infrastructure. The system is

scaleable from a single site or base station to a fully networked, multisite digital trunked radio system. Each site can be interconnected over IP and microwave links. Advanced voice and data applications are supported.
www.etelm.fr

Trunked Radio Solution

Team Simoco launched its Xfin Enterprise trunked two-way radio system and application suite. The out-of-the-box system offers IP networks for up to three

sites and 12-channel capacity, enables base stations within each site to automatically communicate, and establishes a master base station that manages site trunk control and switching functions. The product integrates into existing corporate IP networks and handles voice and data calls as IP data over wired or wireless connections. Each base station functions as an IP device on the network and can be managed remotely or locally.
www.simocogroup.com

LMR System Analyzer

The R8000B communications system analyzer from **General Dynamics Satcom Technologies** is a lightweight, multifunctional radio frequency test

instrument. The analyzer features a residual FM specification of less than 4 hertz (Hz) and comes in a portable, 6.4 kilogram package. Features of the product include an option to support all major digital protocols, including Project 25 (P25), TETRA, Digital Mobile Radio (DMR) and NXDN; autotune automated test and alignment software, spectrum analyzer with noise floor down to -140 dBm, power meter that accepts up to 150 watts with no external attenuator; color liquid crystal display (LCD); dual display that shows carrier signal and recovered audio; remote front panel option to allow monitoring from a PC Web browser; and storage capacity for hundreds of user-defined setting presets.
www.gdsatcom.com

Power Sensor

Anritsu's MA24105A is a compact in-line peak power sensor that provides power measurement capabilities from 350 MHz

to 4 GHz. The product features a 2-milliwatt to 150-watt measurement range, which eliminates the need for lower power sensors, and provides forward and reverse measurement functionality. The product enables users to measure continuous waves (CW), multitone and digitally modulated signals. The product's 350 MHz bottom-end frequency makes it ideal for testing Project 25 (P25) and TETRA networks, company officials said.
www.anritsu.com

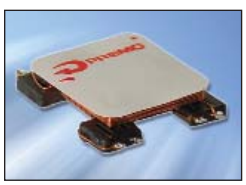
Distributed Antenna System

Axell Wireless launched a distributed antenna system (DAS) hub that supports frequencies from FM to 2.6 GHz. With a modular design, the optical master unit II (OMU II) solution can be configured for a variety of remote units from eight high-power MBF-40 series remotes designed for larger coverage areas to 24 low-power MBF-20 series remotes designed for smaller coverage areas. The solution supports multiple input multiple output (MIMO) configurations and up to eight base station sectors. The product also features an extremely low noise figure, maximizing capacity and data throughput across the DAS coverage area. Quick setup is provided by an automatic configuration routine that operates via a Web interface. Alarms and status messages can be communicated to an operator's network operations center (NOC) via simple network management protocol (SNMP) functionality.

www.axellwireless.com

NFC Antenna

Premo introduced a 13.56 MHz 3D-coil isotropic magnetic antenna for near field communications (NFC) applications. The

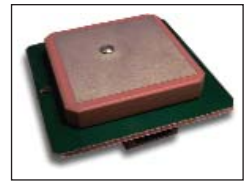


antenna features a high surface resistance nickel-zinc (NiZn) ferrite core material and low initial permeability, providing stable performance in temperatures ranging from -40 degrees Celsius to 85 degrees Celsius. The product has the same format as the company's 3DC15 transponder line and is offered with 3, 6, 9, 18 and 60 uH inductance values. The surface mounting device (SMD) configuration allows integration in an automatic printed circuit board assembly process.

www.grupopremo.com

GPS Embedded Smart Antenna

Tallysman Wireless debuted its TW5115 GPS embedded smart antenna/receiver. The antenna includes the STA8058 Teseo GPS L1-band



receiver integrated circuit from STMicroelectronics, which supports wide area augmentation system (WAAS), European Geostationary Overlay Service (EGNOS) and multifunction satellite augmentation system (MSAS). The antenna also features a low noise amplifier stage, tight out-of-band BAR pre-filter to reject interference and a tuned antenna element for maximum GPS signal reception. Housed in a compact, low-profile form factor, the antenna includes a National Marine Electronics Association (NMEA) 0183 standard output and complementary metal oxide semiconductor (CMOS) interface.

www.tallysman.com

New Products

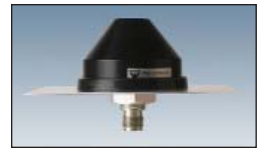
Portable Satellite Antenna

Vislink announced the Advent Mantis MSAT man portable data terminal, a triband satellite antenna system designed to be rapidly deployed in hostile environments. The system can be deployed in less than five minutes from arrival to satellite acquisition. The product weighs just under 12.7 kilograms to be carried by one person. The antenna features a 66-centimeter reflector that can be used in the Ka, Ku and X bands. Power is provided from either mains or 12 volts direct current (VDC) operations.

www.vislink.com

Low-Profile Antennas

Procom UK Sales debuted two low-profile antennas. The PMA 2.4-TNC model

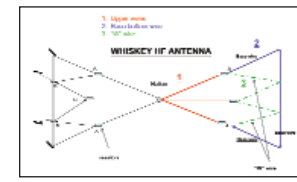


operates in the 2.4 GHz band, and the PMA 5.5-TNC model operates in the 5.5 GHz band. Both antennas provide omnidirectional coverage and approximately 0 decibels of gain. Each comes with a threaded Neill-Concelman (TNC) female connector. The 2.4 GHz model requires a ground plane of about 10 by 10 centimeters. Procom also introduced its SWR4000 analyzer, a compact wideband standing wave ratio (SWR) analyzer with a built-in signal generator, graphical display and data storage system. The analyzer works in the 30 MHz to 2.7 GHz range. The product features a multilayer menu system, swept SWR or return loss measurement, A-type USB interface, built-in real-time clock, LCD with backlight, rechargeable battery, auto power off and a 230-volt AC adapter.

www.procomuk.co.uk

HF Omni Antenna

The Whiskey HF from **Royal Communications International** is a rugged 1 kilowatt, omnidirectional multiwire antenna. The broadband antenna operates in the 2 – 30 MHz range with near vertical incidence skywave (NVIS) propagation and incorporates a dipole design. The product does not require a tuner or coupler and is ideal for automatic link establishment (ALE) and digital high frequency (HF) instant communications. Tactical and permanent versions are available. Voltage standing wave ratio (VSWR) averages 1.5-to-1, and solid contact ranges from one to 4,023 kilometers. The antenna requires no groundplane, which makes it ideal for rooftop or field installations. A lightweight mast, which is not



included with the product, is required.
www.royal-communications.com

Amplifier Certification

AR Modular RF received Joint Interoperability Test Command (JITC) certification for its AR-50 booster amplifier for the

PRC-117G radio. The amplifier boosts tactical radio signals from handheld and backpack multiband VHF/UHF tactical radio equipment. The product provides 50 watts of output with as little as 3 watts input. Two antenna ports are dedicated to line-of-sight (LOS) or UHF satellite. The system also features a switchable low-noise amplifier (LNA) and a multiposition RF output level control and can run on either battery power or 12- or 24-volt vehicle power systems.
www.arworld.us

Tactical Modem

HAL Communications introduced the M4200 Clover modem with a compact, lightweight ruggedized enclosure made of aluminum, making it ideal for operation in harsh field environments. A notebook USB port powers the modem. The Clover 2000 technology provides voice bandwidth, adaptive waveform and automatic repeat request (ARQ) and selective block

repeat. Additional features include virtual PC com port, radio control port and field upgradable firmware. Original equipment manufacturer (OEM) customization and software and hardware support are available.
www.halcomm.com

Indoor Broadband

Cambium Networks introduced its PTP 800i all-indoor solution designed to provide an alternative to installing and maintaining

outdoor wireless broadband point-to-point backhaul networks. The compact, rack-mountable system supports errorless and hitless adaptive coding modulation (ACM) with adaptive transmit power capabilities. Features of the system include up to 236 Megabits per second (Mbps) throughput, transmit power of up to 34 dBm, operation in the 6 and 11 GHz licensed bands, configurable channel bandwidths from 10 to 40 MHz and a proprietary air interface.
www.cambiumnetworks.com

RoIP Gateway

Zetron's 6300 radio-over-IP (RoIP) gateway series provides IP-based connections between radio dispatch backroom equipment and remote wireline radio resources. The gateways are ideal for

agencies migrating LMR systems away from leased lines toward IP networks, Zetron officials said. The product allows audio, serial and input/output settings to be adjusted through a Web browser. The gateway also features common four-wire circuits using Tone Remote Control (TRC) of radios and six- and eight-wire circuits using local and E&M control.
www.zetron.com

Lightning Protection

Times Microwave Systems introduced two lightning and surge protection products. The Times-Protect LP-WBX-N is designed for network equipment in the 2 – 6 GHz frequency band, covering several licensed operating bands as well as unlicensed Wi-Fi bands. The Times-Protect LP-GPX-05-N series incorporates

direct current (DC) pass design to protect GPS receivers that require up to 5 volts direct current (VDC) power to be supplied on the center pin for L1, L2 and L3 bands. It also includes a bidirectional filter-based design. Both products are housed in IP65-rated enclosures to allow for outdoor installations and are plated with white bronze to decrease galvanic corrosion issues and to increase the product's lifespan.
www.timesmicrowave.com

Direct Conversion Receiver IC

CML Microcircuits debuted its CMX7861 FirmCODEC analog front end for digital signal processing(DSP)/field-programmable gate array(FPGA)/microcontroller-based systems. The device combines codec, embedded signal processing and

auxiliary system support functions, providing an interface between analog and digital systems. Two operating modes are supported. In Codec mode, the product provides digital-to-analog and analog-to-digital conversion and a front-end intelligent codec for the DSP/FPGA/microcontroller. In modem mode, the product provides a transmit signal interpolator to aid in the modulation process by converting mapped symbols to a filtered, modulated output. Receive channel filters are also provided.
www.cmlmicro.com

Transceiver

Iridium Satellite announced the commercial availability of its Core 9523 transceiver, which is 90 percent smaller than

its predecessor. The product is delivered as a populated printed circuit board (PCB), allowing for compact partner product designs. Devices based on the transceiver can use smaller and lighter antennas, and provide higher data throughput and lower data latency, company executives said. The transceiver is included in the Iridium Extreme satellite phone.
www.iridium.com

Fuel Cell

ReliOn announced its E-1100v fuel cell system, a fully integrated system that produces up to 1,100 watts of power in a vertical-mount chassis. The system is available in both 24 and 48 volts direct current (VDC) models and offers several indoor and outdoor mounting options including rack, wall and cabinet. Emissions are limited to warm air and a small amount of water, making the product a clean energy solution.
www.relion-inc.com

UPS Batteries

Power-Sonic introduced its PHR series of high-rate uninterruptible power supplies (UPS) batteries designed for applications with high-rate discharge needs. The product was developed in response to customer demand for batteries with higher constant power yields, useful service life of up to 10 years and competitive cost/performance ratios, company officials said. The batteries range from 28 ampere-hours at 100 watts per cell (WPC) to 140 ampere-hours at 500 WPC.

www.power-sonic.com

Radio Adapter

Meretec Technologies released its ORIT IRIS, an adapter that provides a plug-and-play upgrade from analog to digital voice radio. The adapter provides digital capability while maintaining compatibility with analog infrastructure for public transportation applications. The adapter allows the use of up-to-date exchange units for the previously discontinued Telecar 9/-10 radios from AEG and other suppliers. The product includes an integrated 12/24 volt transducer, allowing one casing to be placed in the vehicle without further alterations. The company also debuted a handheld radio device. RITA is a firmware-equipped Icom handheld radio for digital and analog voice that shows received and decoded analog R09.xx telegrams as well as route, course and reporting point.
www.orit.biz

Radio Programming Services

American International Radio (AIR) launched its TRBOPROS radio programming service, which programs MOTOTRBO digital radios, TETRA, MPT and analog radios in a few clicks. The service offers generic and custom code plugs, a centralized database for code plug storage and follow-up and system performance optimization at the radio and system levels. The company also introduced its SafeGuard solution, which uses TETRA technology and is equipped with a real-time guard tour system, option board and alarms such as man-down, no-motion and emergency that can be monitored by a dispatcher.
www.airadio.com

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Events

16 – 17 April: British APCO 2012, Manchester, U.K. British Association of Public-Safety Communications Officers (APCO): +44 20 7973 6635, l.mcphail@hgluk.com, www.bapco.co.uk

17 – 18 April: LTE Latin America, Rio de Janeiro. Informa Telecoms & Media: +44 20 7017 5506, itmevents@informa.com, www.lteconference.com/latam

1 – 3 May: APCO Global Congress, Dubai, United Arab Emirates. Association of Public-Safety Communications Officials (APCO) Global Alliance: www.apcoglobalcongress.org

6 – 9 May: Vehicular Technology Conference (VTC) 2012 Spring, Yokohama, Japan. IEEE Vehicular Technology Society: www.ieeevtc.org/vtc2012spring

14 – 17 May: TETRA World Congress, Dubai, United Arab Emirates. Informa: +44 20 7017 7878, www.tetraworldcongress.com

20 – 23 May: UTC Telecom, Orlando, Florida, USA. Utilities Telecom Council (UTC): +1 202 872 0030, meetings@utc.org, www.utctelecom2012.utc.org

22 – 24 May: LTE World Summit, Barcelona, Spain. Informa Telecoms & Media: +44 20 7017 5506, itmevents@informa.com, ws.lteconference.com

19 – 22 June: CommunicAsia, Singapore. CommunicAsia: +65 6233 6638, www.communicasia.com

20 – 21 June: International Software Radio, London. SMi Group: Teri Arri, +44 (0) 207 827 6162, tarri@smi-online.co.uk, www.sdr-conference.com

27 – 29 June: Wireless Innovation Forum European Conference on Communications Technologies and Software Defined Radio, Brussels, Belgium. Wireless Innovation Forum: http://europe.wirelessinnovation.org

22 – 24 July: International Law Enforcement Technology Services and Products Exposition (INTERSEG), Sao Paulo. International Association of Chiefs of Police (IACP): +55 21 3035 3100, interseg@fagga.com.br, www.feirainterseg.com.br

19 – 22 August: APCO 2012, Minneapolis, Minnesota, USA. Association of Public-Safety Communications Officials (APCO) International: www.apco12.org

21 – 22 August: Australasian Natural Hazards Management Conference, Christchurch, New Zealand. Hazards Education: ahmc@hazards-education.org, www.hazardseducation.org/conference

11 – 12 September: Wireless China Industry Summit, Beijing. Radio Association of China: www.wirelesschina-summit.com

11 – 13 September: General Police Equipment Exhibition & Conference (GPEC), Leipzig, Germany. Exhibition & Marketing Wehrstedt: www.gpec.de

11 – 14 September: VSAT2012, London. Comsys: +44 1727 832288 www.comsys.co.uk

17 – 19 September: Professional Mobile Radio (PMR) 2012, Barcelona, Spain. IIR Telecoms & Technology: +44 20 7017 7878, www.iir-telecoms.com/event/PMR

18 – 19 September: LTE Asia, Suntec, Singapore. Informa UK: +44 20 7017 4555, http://asia.lteconference.com

22 – 26 October: ITS World Congress & Exhibition, Vienna, Austria. Intelligent Transport Systems and Services for Europe: http://2012.itsworldcongress.com

27 – 29 November: PMRExpo, Cologne, Germany. Exhibition & Marketing Wehrstedt: www.pmrexpo.com

4 – 5 December: RadioComms Connect, Melbourne, Australia. Westwick-Farrow Media: www.radiocommsconnect.com.au

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

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

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

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

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

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

Q212

By Duncan Swan

Digital Outlook Strong in Middle East

Exciting opportunities in the Middle East will require significant investment in digital mobile communications systems and devices as many major infrastructure projects are in their early stages. The projects seek to secure the long-term viability of a region — known purely for its oil and gas reserves — through the efficient and cost-effective movement of freight.

A series of ambitious transport projects heads the list. Some 30,000 kilometers of rail track are planned across the Middle East and North Africa, including the US$30 billion investment in a 2,200-kilometer rail link starting in northern Kuwait and linking the six Gulf Cooperation Council (GCC) countries on its way to Oman. In Saudi Arabia, key rail links continue to be implemented, with GSM – Railway (GSM-R) as the technology of choice. Undoubtedly, other heavy rail projects will follow, ensuring the Middle East will achieve communications interoperability and provide significant opportunities for GSM-R suppliers and integrators. That said, GSM-R has a limited life, with work already under way in the International Union of Railroads to look at future technologies.

Other rail initiatives are progressing. Following on the success of the Dubai, United Arab Emirates (UAE) Metro, a number of Middle Eastern cities are in the advanced planning stages of implementing their own metro systems. Doha, Qatar; Kuwait City, Kuwait; Abu Dhabi, UAE; and Bahrain have high-profile projects attracting significant investments. The mobile communications technology networks for metro systems is less rigid than for the heavy rail projects. With a successful implementation in Dubai, TETRA's position is strengthened by it being the technology of choice for metro and light rail projects worldwide. However, competition can be expected from the Siemens Airlink multitechnology broadband solution that operates on the recently opened metro system in Algiers, Algeria.

Investment also continues in the air industry, with a number of new or refurbishment projects under way at major airports, such as in Dubai; Muscat, Oman; and Bahrain. The Middle East has seen a major take-up of TETRA systems across the region both for the airport operators and airlines.

Much of the Middle East sits in International Telecommunication Union (ITU) Region 1, and the recent World Radiocommunications Conference 2012 (WRC-12) concluded with a decision to allocate additional UHF spectrum to mobile services in ITU Region 1. The new mobile allocation is at 694 – 790 MHz, beginning in 2015. The WRC-12 700 MHz agreement will provide a cost-effective basis for deploying mobile broadband networks, as well as bringing Region 1 in line with frequency allocations in Regions 2 and 3 and creating an almost global market for mobile devices in this band. In the private mobile radio network market, regulators will be pressured to allocate some of the 700 MHz spectrum for Public Protection and Disaster Relief (PPDR) use, mirroring decisions already taken in the United States. Should this happen, there is potential for a global ecosystem for PPDR systems and terminals, from which the Middle East can benefit significantly.

PPDR systems in the Middle East have generally mirrored Western Europe, with TETRA technology dominating. The region has set goals for the implementation of countrywide mobile radio systems to support the police and security functions. The pace of implementation has varied significantly across the region, with significant opportunity for completing current initiatives — such as in Saudi Arabia for the Ministry of Interior — and for new projects in countries such as Oman, where mobile communications are part of a wider converged digital network environment. There are also opportunities to migrate further public-safety and government agencies onto existing networks, requiring the provision of radio terminals, mobile-data devices and corresponding office applications.

The major industry sector that drives the regional economy, oil and gas, may prove to be a mobile communications battleground. A range of technologies are employed from MPT 1327 to TETRA, but the launch of Tier 3 Digital Mobile Radio (DMR) products earlier this year from a number of manufacturers provides another viable technology choice.

DMR Tier 3 products, with their lower overall cost of ownership, may be well-suited for both petrochemical complexes and pipelines. With superior range, the ability to support telemetry and supervisory control and data acquisition (SCADA) applications, and lower power requirements (vital in isolated areas), plus the planned availability of ATEX-compliant terminals, DMR will give more established technologies a run for their money.

The region is embracing digital mobile radio, and the continuance of investment in infrastructure projects with core mobile communications requirements will provide opportunities across the industry. ■

Duncan Swan is a partner at Mason, a division of the global ICT consultancy Analysys Mason. Swan is a member of the editorial advisory board for *RadioResource International*. Email comments to duncan.swan@mason.biz.

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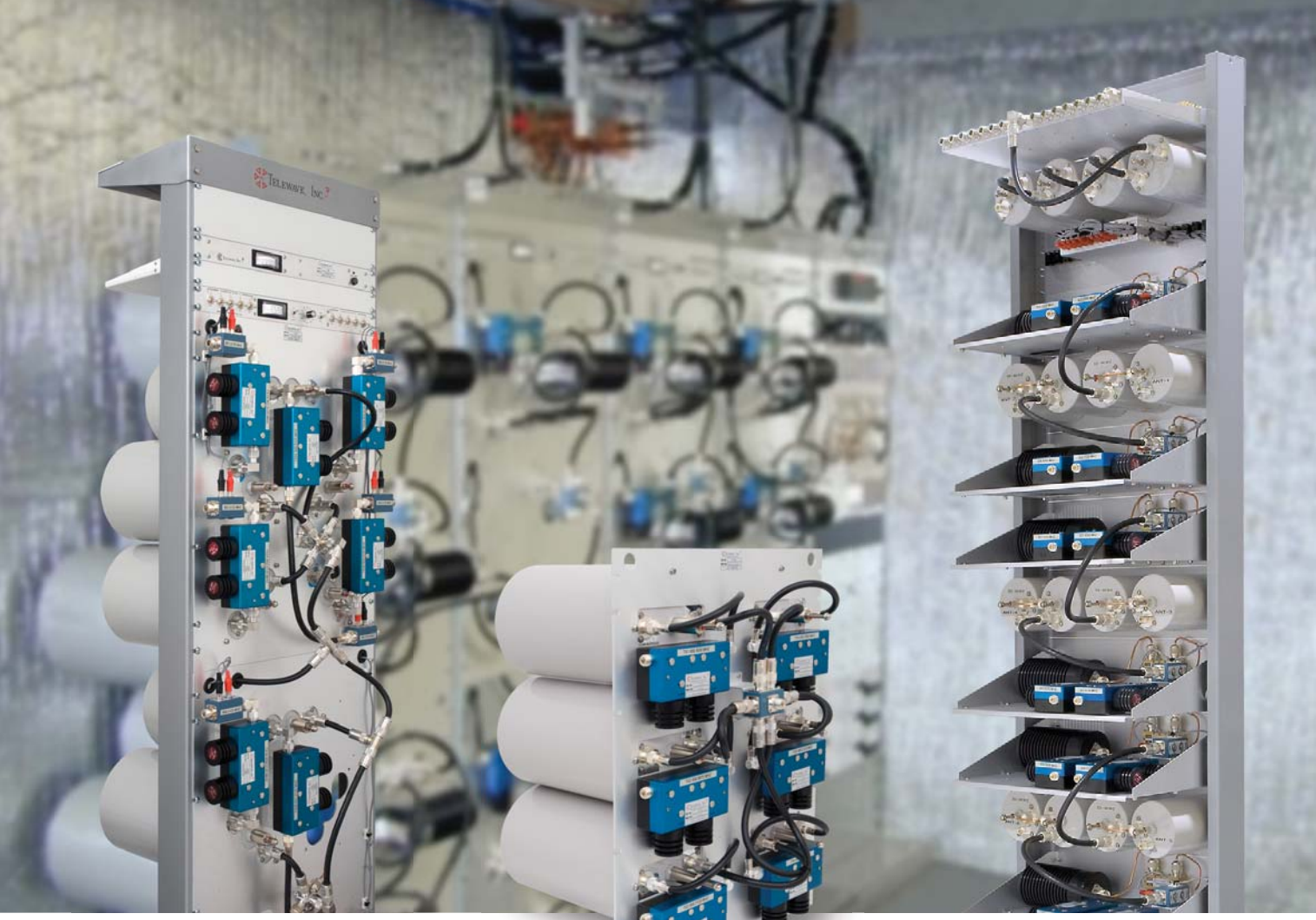

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