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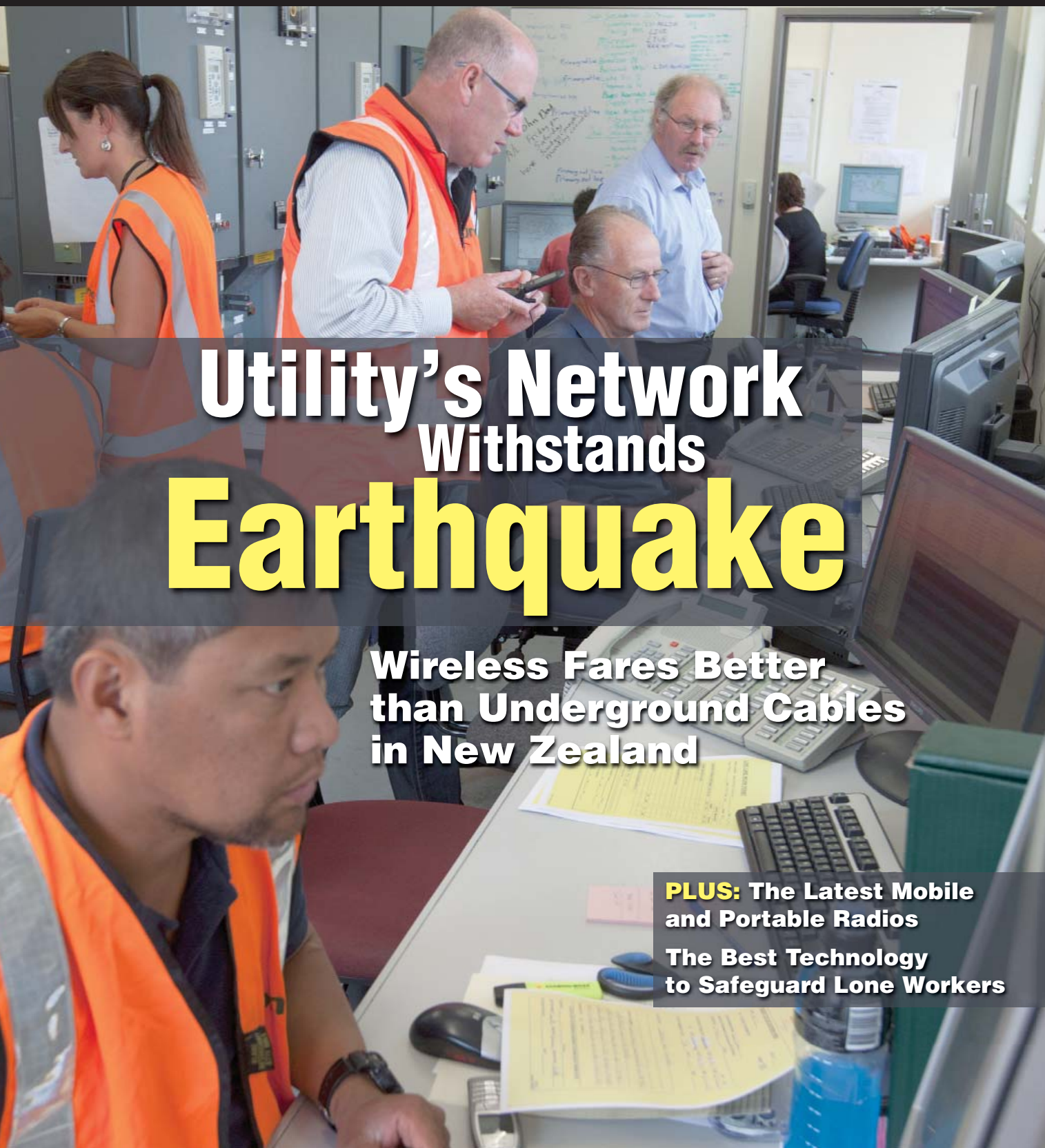

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Quarter 4 2011

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Zetron Console Systems:

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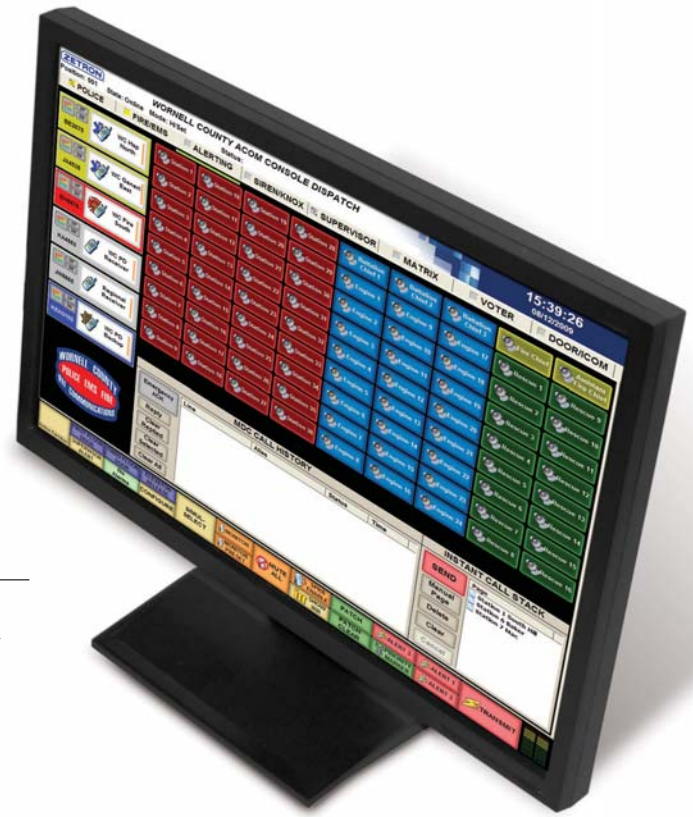

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Join the Technology Discussion

Several digital technologies are moving to the next phases, adding features and spectrum efficiency. Commercial TETRA Enhanced Data Services (TEDS) products are rolling out, and the first interoperability tests were recently conducted. See "World News" on Page 8 for more details.

In the Project 25 (P25) arena, the first Phase 2 systems are being deployed across the United States. Phase 2 of P25 integrates TDMA technology. The U.S. city of Houston procured one of the largest municipal P25 systems in the country using Phase 2 technology. The public-works layer of the TDMA network is scheduled to be fully operational in January 2012, and the larger public-safety layer will be fully operational in September 2012. Spectrum efficiency was one of the reasons the city selected Phase 2 technology; there weren't enough RF channels available to meet the city's capacity requirements using Phase 1 25-kilohertz equipment.

In October, Tait Electronics is hosting a P25 Phase 2 roundtable, which will bring together end users, consultants and other industry professionals to discuss this latest addition to the public-safety communications standards portfolio. *RadioResource International* is the exclusive media partner of the event, and readers are encouraged to help drive the discussion by contributing to the online forum at www.p25phase2.com. If you have questions about how to prepare for Phase 2, this forum is a great source of information and discussion.

We'll cover the highlights of the roundtable online and in WORLD NEWS, our email newsletter. The discussion will undoubtedly further our coverage of Phase 2 into 2012 as well. Of course, TETRA, Digital Mobile Radio (DMR), digital Private Mobile Radio (dPMR) and analog technologies are also on our radar, and we'll have articles on all these technologies as well throughout the coming year.

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

If you have suggestions or comments on specific technologies or any mission-critical communications topic, please send them. We appreciate the feedback.

Sandra Wendelken

Sandra Wendelken, Editor
swendelken@RRMediaGroup.com

RadioResource INTERNATIONAL

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

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Hytera Buys Rohde & Schwarz's TETRA, PMR Business

Hytera Communications and Rohde & Schwarz announced the sale of Rohde & Schwarz Professional Mobile Radio (PMR) to Hytera. The value of the deal was not disclosed.

The acquisition gives Hytera, the largest Chinese provider of PMR equipment, a larger TETRA play. Hytera previously offered mainly Digital Mobile Radio (DMR) equipment including handsets. Rohde & Schwarz doesn't provide terminals.

"Partnering with Hytera will give us a competitive edge, especially in projects involving a large or continual demand for terminal equipment," said Dr. Georg Haubs, president and CEO of Rohde & Schwarz PMR. "Moreover, we will get better access to the Asian market. This means enormous growth potential in the field of PMR. We also have high expectations in the DMR business."

The new owner takes over Rohde & Schwarz PMR unchanged, including all employment relationships, contracts and customer relations. The Bad Muender, Germany, location will be maintained. The firm has about 110 employees.

Established in 1981, Rohde & Schwarz PMR joined the Rohde & Schwarz group in 1988 under the name R&S Bick Mobilfunk. In 2009, it became a 100 percent Rohde & Schwarz subsidiary and was renamed.

FRANKFURT, Germany — euromicron's subsidiary **telent** agreed to take over and to continue **Cassidian Communications**' analog radio activities in Germany. Going forward, telent will support the customer installations of Cassidian Communications in analog professional mobile radio (PMR) and assume responsibility for related product development and delivery, as well as repair, maintenance, spare parts management and services.

The analog product portfolio comprises base stations and radiotelephones for secure communications. Vendor-independent telent will contribute its experience in planning, providing consulting on and implementing PMR networks to the Cassidian customer installations.

Separately, Cassidian reorganized into two pillars: customer proximity and program execution. In addition, a strong focus is set on cyber security. The new structure is based on an increasingly dynamic market environment, European budget reductions and business perspectives in the emerging markets and their increasing security needs, a company statement said.

LONDON — The Digital Mobile Radio (DMR) Association announced two further successful Tier 2 interoperability testing sessions. One was between **Vertex Standard** and **Motorola Solutions**. The second session was between Vertex Standard and **Selex Elsag**.

For both sets of tests, all DMR Association mandatory and optional Tier 2 features were established to be interoperable. Mandatory features include group call, individual call (PATCS), individual call (OACSU), all call and emergency call. Optional features include call alert, radio check, remote monitor, emergency alarm and radio enable/disable.

The completion of these tests with the three companies increases the number of DMR vendors with formally tested equipment available in the market to five, including previous tests by **Hytera** and **Radio Activity**. The most recent testing took place 15 – 19 June, with the formal review and approval of the results occurring during July and August.

GLOSTRUP, Denmark — Motorola Solutions announced that its infrastructure and its mobile radio passed the TETRA Enhanced Data Services (TEDS) interoperability (IOP) testing conducted by Istituto Superiore delle Comunicazioni e delle Tecnologie dell´Informazione (ISCTI), an independent government test house appointed by the TETRA Association.

TEDS is the only available mobile data standard that can be deployed in wide-area mission-critical environments in the 380 – 430 MHz band where most TETRA systems are deployed, Motorola said in a statement. IOP certification ensures the products have been rigorously tested and the functions listed in the certificate fully meet the TEDS standard.

LONDON — CML Microsystems acquired the exclusive rights to the RALCWI low bit-rate vocoder products from Spirit, a Moscow-based software company. CML originally licensed RALCWI from Spirit a few years ago to run on its proprietary system on chip (SoC) DSP technology.

RALCWI is a low-bit rate vocoder technology that facilitates the transmission and reception of highly compressed voice over inherently noisy narrowband radio channels. In this area, RALCWI is positioned to address the high-quantity/low-cost, digital PMR markets. Mass voice storage contributes to highly compressed digital voice, reducing memory and backup requirements.

MILAN, Italy — Selex Elsag, a

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Finmeccanica company, was formed following the merger of Selex Communications and Elsag Datamat. Selex Elsag designs and develops technology systems, solutions and services for information and communications technology, security, automation, professional and defense telecommunications, logistics and mobility, and avionics. Headquartered in Italy and with operations in the United Kingdom, United States, Germany, Turkey, Russia and Romania, Selex Elsag employs more than 7,400 people worldwide.

COLOMBES, France — The creation of **Thales Communications and Security**, a company combining the joint skills of Thales Communications and Thales Security Solutions and Services in the fields of defense, security and ground transportation was announced. The merger reflects the growing convergence of information management issues, a statement said.

EUROPE

BRUSSELS, Belgium — The European Parliament adopted a resolution on universal service and 1-1-2. After several months of debate, members of the European Parliament (MEPs) agreed on a set of actions to raise citizens' awareness of 1-1-2 and improve its functions.

Created in 1991, the European emergency number operates in all European Union (EU) member states, but is unknown to 74 percent of Europeans. In its resolution, the parliament called on the European Commission and the member states to improve the use of information and communications technologies by emergency services. To this end, MEPs proposed a set of initiatives to improve the regulation, foster sharing of best practices and effectively allocate EU funds.

The commission was also requested to propose performance indicators in view of measuring the quality of service. Member states were encouraged to deploy an effective automatic notification service to inform citizens of upcoming emergencies and disasters.

ST. PETERSBURG, Russia — During 2010 and 2011, the largest regionwide TETRA network in the northwest federal region of Russia was deployed with **DAMM Cellular Systems** infrastructure. The network consists of 32 sites, and St. Petersburg and the surrounding regions in the northwest region, close to 50,000 square kilometers, are complete. The system counts 20,000 subscribers and has a capacity of up to 65,000 subscribers. The system services public safety, government agencies, and commercial

Continued on Page 13

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European Collaboration on Public-Safety Broadband Spectrum

By Thomas Weber

European agencies are working together in the Electronic Communications Committee (ECC) to establish a harmonized frequency band for public-safety broadband services. A new project team FM49 will focus on medium- and long-term (before 2025) spectrum realization and to develop a roadmap for the timeframes and necessary steps needed. The evaluation of suitable bands for Europeanwide harmonization of spectrum, both below and above 1 GHz, will take into account cross-border communications issues and public protection and disaster relief (PPDR) application requirements, including issues such as interoperability.

Public-safety broadband requirements from industry and public-safety users have already been described in the European

Telecommunications Standards Institute (ETSI) system reference document TR 102 628 and were sent from ETSI to the ECC frequency management working group (WGFM). Existing ECC deliverables for PPDR purposes include the ECC Decision (08) 05 on the harmonization of frequency bands for the implementation of digital PPDR radio applications in the 380 – 470 MHz range and ECC Recommendation (08) 04 on the identification of frequency bands for the implementation of broadband disaster relief (BBDR) radio applications in 5 GHz, as well as ECC Decision (06) 05 regarding air-ground-air (AGA) operation of the digital land mobile systems for the emergency services and ERC Decision (01) 19 regarding direct mode operation (DMO) frequencies for emergency services.

FM48 has terms of reference for three years. The next step is to agree on a roadmap for FM49 action at the first meeting. Officials will review all the spectrum requests received and related requirements and submit a proposal to the CEPT ECC for the identification of frequencies for broadband PPDR applications.

Continued from Page 10

and industrial users.

The St. Petersburg government appointed Tetrasvyaz to operate a uniformed TETRA communications system with more than 3,000 subscribers. The network includes a mobile solution for rapid response services in rural areas. The mobile solution can be switched on in a few minutes, and is communicating with the rest of the system via a satellite channel.

All public transport services covering St. Petersburg use the network, with applications supporting the dispatch control center, signaling control, electronic passenger timetables and telemetry. In addition, commercial and industrial companies subscribe to network services.

DERBY United Kingdom —Team Simoco was awarded a contract for SSE's professional mobile radio

(PMR) network across its distribution areas in the north of Scotland and south of England. In the first stage of the five-year agreement, Team Simoco completed a detailed assessment of U.K. electric utility SSE Telecoms' operational requirements in Scotland and England.

Following SSE's acceptance of a detailed functional design specification (FDS), Team Simoco will install a mix of products, including Xfin technology, central to the networking system and providing SSE with an advanced communications network to support its operations, whatever the terrain. The SSE system will cover an extensive operational area, and the design specification and installation takes in varying terrain.

ASIA

BEIJING — Tait Electronics opened a new facility in Beijing to further expand and strengthen its delivery of communications solutions and enable stronger growth. Beijing marks the third new international facility opened by Tait since January 2010.

SYDNEY, Australia — Zetron is participating with **Airwave Solutions Australia** and other radio equipment vendors in Airwave's new Project 25 (P25) solution center. Customers can use the center to test selected P25-compatible solutions to see how they work together.

Zetron is the only participating console vendor whose products use the P25 Console Subsystem Interface (CSSI) and Digital Fixed Station Interface (DFSI). Other radio infrastructure vendors taking part in the center

Police Federation of Australia Calls for Dedicated 700 MHz Spectrum

By Michelle Zilis

The Police Federation of Australia (PFA) submitted a filing to the Senate stating that Australia's public-safety agencies (PSAs) need dedicated spectrum to build a high-speed mobile broadband network and urged a 20-megahertz spectrum allocation within the 700 MHz band.

The report addressed why the PFA believes PSAs need high-speed mobile broadband communications. Australia's 55,000 police officers rely on narrowband radio communications.

The federation is pushing for 20 megahertz of spectrum for use during the next 15 years. The organization said the spectrum is needed to enable the more than 26 commonwealth, state and territory agencies to upload and download data across the country. The filing quotes a Motorola Solutions report and Canadian report.

The 700 MHz band will be made available soon as analog TV is relocated to other bands. 700 MHz spectrum is harmonized with the Asia-Pacific spectrum plan and will coexist with the 800 MHz narrowband networks deployed extensively in Australia and the rest of the region. The International Telecommunication Union (ITU) Public Safety and Disaster Relief (PPDR) spectrum in 800 MHz is intended for narrowband (less than 25 kilohertz) applications, and ITU recommended the adoption of 700 MHz for public-safety agency broadband services in the region, the filing said. In addition, PPDR devices are planned for the 700 MHz bands.

include **Harris**, **Tait Radio Communications**, **Auria Wireless**, **ComGroup**, **RFI** and **Icom**.

LATIN AMERICA

SAO PAULO, Brazil — U.K. manufacturer **Entel** supplied its Global Maritime Distress and Safety System (GMDSS) survival craft radios to Petrobas, the largest oil exploration company in Brazil and the third largest in the world. The portables will be used aboard Petrobas' fleet of vessels that service the off-shore oil and gas industry.

BOGOTA, Colombia —Rohde & Schwarz won an order for air traffic control applications in Colombia. The state-owned air traffic control organization AeroCivil ordered a total of 152 radios, which will serve the entire Bogotá flight information region at 20 locations.

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Photos courtesy Orion and MiMOMax Wireless

Wireless Withstands Earthquake

A New Zealand utility's wireless network fared better than its copper and fiber-optic infrastructure following the country's earthquake.

By Sara McCormick and Paul Daigneault

At 12:51 p.m. 22 February, a 6.3-magnitude earthquake struck one of New Zealand's largest cities, Christchurch, claiming at least 180 lives and causing catastrophic infrastructural damage throughout the entire region. This was the second major earthquake to hit the region since a 7.1-magnitude quake struck Christchurch and the surrounding province of Canterbury in September 2010. The second quake was New Zealand's deadliest earthquake in the past eight decades. Power and phone lines went down, and many cellular sites became either quickly congested or disconnected. Thousands of commercial, industrial and residential entities throughout Canterbury and Christchurch lost voice communications and power. The following is a case study of how one utility's network fared during and after the earthquake.

Top: Orion's emergency backup operations site; bottom: 10 percent of copper cables were destroyed because of the quake

Orion's Network

Christchurch and central Canterbury's power distribution network, owned by Orion New Zealand, is one of the largest electricity networks in New Zealand. The network covers 3,000 square miles of diverse geography, including Christchurch City, Banks Peninsula, farming communities and high country. It delivers electricity to about 193,000 homes and businesses. Orion uses an independent, integrated and hardened private communications network specifically designed to meet its requirements for both mission-critical voice and data. The network topology was customized to ensure high performance and reliable mission-critical communications, especially under adverse environmental conditions when other systems may fail.

The network is comprised of various telecommunications

Continued on Page 20

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Who is Hytera

Hytera, the leading designer and manufacturer of innovative radio communications equipments, offers complete portfolio & customized solution, ranging from conventional terminals to DMR, TETRA digital radios, trunking systems to data applications, to government, public security, utility, transportation, and enterprise & business users across the world.

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.

Learn more about us, please visit: www.hytera.com
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*Source: IMS Research 2011

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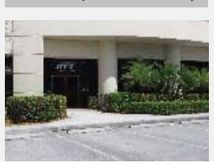

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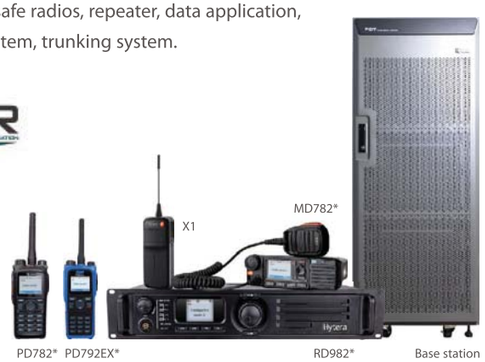

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"Because our wireless radios operate in licensed UHF frequencies and have relatively wide-beam antennas, antenna towers can be skewed up to 45 degree angles and still retain functionality."

— Neville Digby, Orion senior systems engineer

Continued from Page 16

technologies, including copper symmetric digital subscriber lines (SDSL), fiber-optic cables and MiMOMax Wireless UHF point-to-point and point-to-multipoint intelligent IP radios. Combined, these technologies provide a complete and comprehensive mission-critical communications solution including teleprotection, supervisory control and data acquisition (SCADA) and packet-based Ethernet IP data. Copper SDSL and fiber-optic technologies service the central Christchurch area and are primarily deployed underground within the urban areas of Orion's network, while outer Christchurch and Canterbury are predominantly serviced by UHF radios.

Orion's network topology is designed to provide redundancy, versatility and flexibility. Even during adverse circumstances, strategic and thorough site engineering and robust software protocols ensure that the network remains either operational or can be swiftly and remotely repaired and rerouted if outages occur. All highly critical communications sites have access to at least two communications paths.

Orion's core communications network doesn't use public-access solutions, such as leased lines and public microwave or cellular networks. As a result, the utility can retain control, reliability and independence of the private network, ensuring high security and enabling better customer service during crises and day-to-day operational activities.

The Earthquake Strikes

When the earthquake struck in February, severe damage was sustained to both Orion's communications and electrical networks in some areas. Thousands of commercial, industrial and residential customers throughout Christchurch lost power because of tripping protection equipment and infrastructural damage. Massive earth movement stretched some underground cables up to 1 meter and caused more faults than Orion would

normally see in a decade. Four substations were severely damaged. Some network equipment in Christchurch's central business district (CBD) was either damaged from falling debris or covered beneath condemned buildings.

"In some areas, the shaking was so violent, wires were simply pulled off poles and the barge boards of houses," says Roger Sutton, former Orion CEO. "The earthquake caused large transmission lines to clash together, producing some pretty spectacular fireworks displays."

Much of Orion's communications equipment originally built into concrete or immersed within liquefiable soils was instantaneously torn apart or stretched beyond functional tolerance, including both underground copper SDSL and fiber-optic cables. Orion reported that because copper SDSL cables were smaller, more malleable and were laid at blunt angles, they withstood further shock and sustained less damage compared with fiber-optic cables. Despite this, the intensity of the quake destroyed about 10 percent of SDSL cables and more fiber-optic cables, preventing critical SCADA communications and leaving a number of areas in the network inaccessible.

Four of the utility's substations, including the New Brighton substation, were severely damaged because of the earthquake.

The Recovery

While wired communications equipment was damaged from the force of the quake, Orion's hardened UHF IP radios continued to perform. Overhead and underground cable damage was not a factor. Tower misalignment from ground movement also did not affect the IP radios as they operated in licensed UHF frequencies and used wide beamwidth antennas. Days and weeks after the quake, staff realized that a number of radio antennas were in fact skewed from aggressive land movement, but maintained communications. Other telecommunications providers experienced network

Orion workers shovel silt from one of the utility sites following the February earthquake.

failure when their microwave solutions ceased to operate after microwave towers tilted from the force of the quake.

"Because our wireless radios operate in licensed UHF frequencies and have relatively wide-beam antennas, antenna towers can be skewed up to 45 degree angles and still retain functionality," says Orion Senior Systems Engineer Neville Digby.

The remote software capabilities of Orion's UHF IP radio communications enabled the network to promptly and automatically facilitate recovery efforts minutes after the quake. Remote radio reconfiguration and fault repair functionality meant that when minor disruptions were experienced, the UHF IP radio network self healed and re-routed almost instantaneously. This eliminated the need for network operators to physically commute to substations if a path was down, a particular advantage given that many Christchurch roads were destroyed by land movement, flooded from liquefaction and grid locked by traffic.

One of Orion's UHF IP radios at a central point-to-point base station radio became inaccessible because of further infrastructural disturbance from aggressive aftershocks. The radio network automatically used rerouting adaptation protocols to reroute the data to the next available radio link. The protocols prevented data loss and network disturbance during subsequent aftershocks. After investigating the network, an official reported no apparent data loss even during and seconds after the quake.

When Orion became blind to areas of its network that were inaccessible, they initially worked to restore functionality by connecting to the remaining public cellular towers to gain visibility, assess the damage and determine where repair efforts were needed. However, the cellular sites proved ineffective because of congestion from heavy public use and limited capacity to operate from reserve power. As a result, critical SCADA data was transmitted intermittently, preventing a reliable and consistent communications link from being maintained.

Immediately seeking alternatives, Orion installed an additional UHF IP radio to connect to its fully operational mission-critical radio communications network. The UHF IP link was installed in the middle of Christchurch, across a 12-kilometer non-line-of-sight path. This IP radio link provided Orion with the network visibility required to restore electricity to some of the severely affected areas of the network.

Lessons Learned and Planning

During the weeks after the earthquake, Orion staff began to repair existing communications equipment and deploy alternative solutions to restore less critical communications links. Orion's UHF IP radios assisted to restore areas of both communications and electricity networks. This was because of the well-engineered topology of the radio network and the radios' robust software protocols and ability to promptly self heal. Engineers noticed nothing out of the ordinary with the performance of the radios, which meant one less thing to worry about when other areas of the network experienced severe disturbance. Digby says that the earthquake "simply confirmed our choice of UHF IP radios as a mission-critical communications solution. There was, and still is, no other alternative."

The Christchurch earthquake demonstrated that wireless communications solutions continued to perform when overhead and underground cables, public cellular and microwave solutions failed. While public systems went down from damage, loss of connectivity and congestion, during and after the fatal earthquake, Orion retained a high level of independence, control, accessibility and certainty of its privately operated communications network. It is still too early to determine which solutions Orion plans to deploy when permanently restoring its communications network. However, the earthquake has only further confirmed that radio communications are highly reliable and are the best alternatives for its mission-critical communications network.

"Orion's core purpose is to consistently deliver a safe, secure and cost-effective supply of electricity to our customers," says Geoff Vazey, acting CEO of Orion. "This year we've worked hard to restore essential infrastructure to a region facing its biggest natural disaster." ■

MiMOMax Wireless marketing specialist Sara McCormick spent the past three years providing communications for high-tech telecommunications solutions. She has worked with many technical professionals in New Zealand and in a number of international markets.

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TETRA analyzer in a drive test minivan

TETRA System Analysis

Effective analysis can ensure optimum quality of service on mature digital networks.

By Tom Riedl

As TETRA networks come of age, it sometimes becomes more difficult for network managers to maintain the high quality of service (QoS) that professional mobile radio (PMR) users expect from their network operations. In a mature TETRA network, many people will have worked on the network configuration over time. After adding cells or clusters of cells, different settings can occur in some of the many parameters that define the behavior of TETRA network elements.

If TETRA users report bad network performance to their radio network management, the problems generally stem from three causes:

1. Bad connection quality, unavailability, slow call setup or restoration, or call interruption because of bad coverage or poor link budget;

2. Failing handovers resulting in unavailability and interrupted calls because of bad neighbor channel configuration; and

3. Services not working because of interoperability problems.

Efficient analysis tools can help discover and overcome mismatches in network configuration. They can help maintain a network service, which can satisfy the high demands of professional users. Running a network without a regular QoS and performance analysis with a TETRA air interface analyzer can result in serious problems. The following explains how performance analysis can be done.

Beyond Drive Tests

Downlink radio coverage is the most important QoS parameter. If a mobile station does not receive a base station signal, it will not become active or usable, but remain in scan mode for the rest of its battery lifetime. The first step for efficient network operations is to provide and sustain sufficient downlink radio coverage for the cellular network. In most cases this is performed using drive test receivers, which prove in a map-supported display that there is enough field strength across a specified threshold in the desired area of coverage.

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An automatic parameter check in a TETRA network analyzer can identify erroneous parameter settings, allowing the user to simulate coverage during a critical cell change while performing a drive test.

Many network managers think this kind of drive test is sufficient for radio coverage. But downlink coverage provides only one direction of the radio connection. The link budget for the uplink connection between mobile station transmitter (TX) and base station receiver (RX) is as important, but more sensitive. If coverage problems are reported, some network operations increase base station TX power. Operators also sometimes increase the power for network acceptance test to disguise bad radio planning. The radio link works in the downlink, but not in the opposite direction, because the TX power of the mobile station is lower than the base station's TX power, resulting in a radio cell that is too large.

Problems similar to this can be discovered while looking at a TETRA protocol analyzer. Mobile stations that have problems reaching the base station will show an increased rate of retries of their uplink signaling before they get an acknowledge message. A retry counter can help isolate problems in known regions with poor radio coverage.

One TETRA parameter (RXLEV ACCESS MIN) defines the minimum RX level on a mobile station that will register into a base station cell. This parameter is often set too low, such as at -115 dBm, allowing the mobile station to register to the base station even at low RF levels. Sometimes this setting is used to disguise bad radio planning. In urban environments this makes limited sense, because the mobile station can't effectively reach the base station on its own. An automatic parameter check in a TETRA network analyzer can identify erroneous parameter settings, allowing the user to simulate coverage during a critical cell site change while performing a drive test.

Handover Success

Handovers are a critical and complex step in network operation. The

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3 Network Performance Problems and Causes

1. Bad connection quality, unavailability, slow call setup or restoration, or call interruption because of bad coverage or poor link budget

2. Failing handovers resulting in unavailability and interrupted calls because of bad neighbor channel configuration

3. Services not working because of interoperability problems

mobile station needs to calculate many parameters to provide a seamless transition from one cell to another. If a handover fails during a call, the call is dropped. If a mobile station is in idle mode, the failing handover will cause the mobile station to return to scan mode, resulting in a new registration. While the registration is going on, the mobile station can't place or receive calls.

The prerequisite for an improved handover success rate is good coverage, frequency planning and parameter planning for neighbor cells. The main control channel (MCCH) of the serving cell is continuously broadcasting a set of neighbor cells (NC) to all mobile stations. These neighbor cell information elements (NCIE) contain channel numbers (CN), location area (LA) and other parameters about the supported services and configuration of the NC. It is essential that the NCIE are correct and, in the case of network setup changes, updated to reflect the actual situation. Mismatches in neighbor channel configuration will eventually lead to the handover problems mentioned.

The first step is to check if the channel numbers of the physically adjacent cells are in line with the channel numbers announced in the NCIE. All MCCH must have NCIE active. If a mobile station is transferring from one cell to another and the new cell has no NCIE available, the mobile station will lose network connection and return to scan mode as soon as it needs to leave the cell.

The number of NCIE should also match the real situation. Some network operators choose the easy way and include all cells in a network to the list of NCIE. TETRA allows up to 31 NCIE in one cell, but this can lead a mobile station to register not in the obvious NC, but in a more distant cell. Cells with equal frequencies can never be adjacent and must be avoided in the NCIE definition. The result can be higher load on the

MCCH because of increased and useless signaling, or a failing handover, as the mobile station tries to hand over to a nonoptimum cell. A TETRA network analyzer can check the NCIE for consistency and will highlight mismatches in announced and actual NC information.

Similar problems can be observed when a base station broadcasts wrong information about the NC's service and load situation. NCIE information broadcasted by the serving cell will be assumed for the NC itself. TETRA parameters such as ACCESS PARAMETER and RXLEV ACCESS MIN will be part of the C1/C2 level calculations, the input for the mobile station's decision when a handover will be started. If the parameters are not set in the NCIE similar to the actual NC, the handover will either fail or the mobile station will be forced to perform the next handover because the actual coverage is much worse than it was announced. In an extreme case, this leads to a ping-pong situation, where a mobile station is bouncing back and forward between two cells. This results in poor service quality, slow call setups and an extremely high MCCH load because of useless signaling messages.

An example would be a network where TETRA packet data — subnetwork dependent convergence protocol (SNDCP) — service is a standard feature and is used continuously for vehicle-based data terminals. So SNDCP service should be available on all cells. In this case, the NCIE on the serving cell announces the availability of SNDCP service on the NC. But as soon as the mobile station performs the handover, it gets a different message for the new cell's own broadcast information. Now it seems that SNDCP is not supported, although it should have been. The mobile station will suspend the data connection on this cell, and the vehicle terminal will not be operational. In this case, police officers couldn't download information from their central registry.

Interoperability Problems

TETRA equipment is tested strenuously to ensure interoperability between systems of different vendors. However, the TETRA standard leaves a big portion of undefined space, and some proprietary and supplementary services aren't covered by the interoperability process and cause problems in the field. Old software releases on base stations and switch and management infrastructure (SwMI), as well as on mobile stations, can also cause incompatibilities.

An example is the TETRA EG-Mode, which provides a longer battery life for mobile stations by saving energy, but only works in proprietary network installations. A TETRA protocol analyzer with a message sequence chart can easily

Some proprietary and supplementary TETRA services aren't covered by the interoperability process and cause problems in the field.

trace step by step how a mobile station (Brand A supports EG-Mode) tries to register to a base station (Brand B does not support EG-Mode). The base station acknowledges the protocol data unit (PDU) with the request for EG-Mode, but not the request itself. The correct behavior would be to either confirm or reject the attachment of the mobile station. In a realistic network, the base station would just ignore the request to attach to the cell. The mobile station will never register to this cell. Such analysis can only be done with a protocol analyzer that supports simultaneous analysis of both up- and downlink. It is impossible to get reliable results based on simple mobile stations with protocol tracing software.

Other Considerations

Base stations are the most important part of a TETRA radio network and need regular maintenance. While operating 24 hours, seven days a week, these network elements can slowly degrade in performance similar to any other technical system. External influences such as static and lightning discharge on the antennas also decrease receiver performance. A base station maintenance test would take only a TETRA base station tester and a few minutes. Base station testers allow automatic testing of one transceiver (TRX) module in service mode, while the other TRX is still in normal operation. Therefore, the base station service does not need to be suspended; the traffic capacity will be reduced only while the test is being performed. The test includes transmitter performance, such as TX power, modulation vector and frequency errors, and receiver sensitivity to check if the TRX module is still ready to work within TETRA specifications and to support the best possible network service.

All of the examples have been seen on operational networks and are not simulated; these examples have reduced QoS for real TETRA users. With the right test equipment and several simple QoS test procedures, TETRA network quality can be maintained with high availability to enhance professional radio users' safety and effectiveness. ■

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Safeguard Lone Workers

Select the best digital technology to protect workers in hazardous environments.

By Wolfgang Berkau

Automation has introduced greater levels of efficiency and safety, but at a price. Fewer workers on site can mean fewer eyes to watch each other's safety, and the increasing number of employees who work alone has resulted in high demand for efficient personal security systems.

When implementing a safety and security solution, companies must ensure that the selected system satisfies the latest technical guidelines and regulatory requirements. Devices forming part of a hazards management system must be completely compatible, efficient and robust, as well as supported by a suitable infrastructure. System infrastructure must ensure the safety of the workforce and meet a company's specific requirements.

Companies in the chemical and petrochemical sector, especially the gas industry, provide an excellent example. Because of the nature of their operations, they must contend with a broad spectrum of hazards requiring specialized technical solutions, while also having many employees working alone in isolated positions, without direct supervision. This is where a personal emergency signal (PES) system can make a crucial difference to the safety of lone workers in hazardous environments.

PES Applications

PES systems can be used wherever people find themselves in potentially hazardous situations. The hazards can be posed by machinery, material, unauthorized human intervention or other factors. For a PES system to be effective, its operation and management must be simple, efficient and foolproof. Faults or emergencies must be recognized rapidly and localized precisely to mitigate the consequences as far as possible. In an emergency, a prompt response can occur only if the operational management team can immediately identify the precise nature and position of the alarm. Based on this information, various interventions can be initiated, ranging from the deployment of emergency teams to an evacuation. Long reaction times and poorly coordinated actions cost a great deal of money and human lives. An efficient hazards management system that provides reliable information and clear instructions to all employees can make the difference between life and death.

At the same time, the realities of the business environment can't be ignored. Hazards management with an integrated PES system can represent a significant capital investment, and a new acquisition must make business sense. Future proofing is another consideration. The solution should allow the system and areas of application to be upgraded and expanded as quickly and cost efficiently as possible. The deciding factor is the flexibility of each respective solution. The aim should

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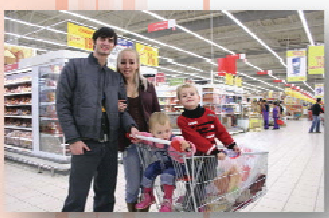

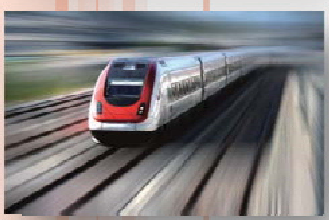

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SMP508	245g	130 x 58.5 x 36mm	8 hrs	Li-polymer 1200	16	VOX Operation RF TX Power:4W FM Radio ▲ LCD Display ▲ PTT ID Display ▲	UHF 330 – 400MHz UHF 400 – 470MHz UHF 435 – 480MHz VHF 136 – 174MHz
SMP528 ▲	260g	130 x 58.5 x 36mm	8 hrs	Li-polymer 1200	128		

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Personal emergency signal (PES) systems make a crucial difference to the safety of lone workers in hazardous work environments.

be to offer complete protection for personnel and property, without enormous cost or coordination implications.

Legal Implications

In the past, a PES system often was viewed as a luxury, but with the ever-increasing importance of occupational health and safety, minimum standards were set by legislation and various organizational guidelines. In Germany, the Employers' Assurance Associations laid down a framework of conditions as part of health and safety rules. These rules define situations in which personnel may not work alone and out of sight and hearing of other workers unless they use PES systems that comply fully with the requirements of BGR139.

The Employers' Assurance Associations requirements also define certain monitoring mechanisms to ensure that only fully functioning handsets with 100 percent serviceable sensors and thoroughly tested localization systems can be used for security applications. These are monitored and controlled from a central control point. A fault arising in a standard, consumer-grade device often will go unnoticed. A certified PES handset will automatically raise a technical alarm so that the faulty equipment can be taken out of service.

Current-generation PES handsets fulfill the legal requirements and combine communications, messaging and localization in a single device. In many cases, the information flowing between the PES handsets is managed and analyzed by a hazards management system. The net result is that users can be monitored more efficiently, and a far higher level of safety — especially for lone workers — can be assured.

Industrial plants post signs, slogans and posters warning of all manner of hazards. This is why PES systems are required wherever employees are exposed to particular hazards and/or are working alone.

An efficient hazard management system that provides reliable information and clear instructions to all employees can make the difference between life and death.

In the industrial communications industry, a differentiation is made between standard, PES and ATEX handsets. A standard device is used for communications within a group. The keypad must be suitable for use with gloved hands, and the menu management must be clear and self explanatory. Handsets are equipped with impact-resistant casings (IP65 class) and comply with the relevant norms and guidelines. For anyone working in explosive atmospheres, the law requires that the handset must satisfy the ATEX directives. These specially developed devices and their accessories are fully ATEX compliant.

Ensuring Reliability

During the course of a normal workday, situations can arise that the device can interpret erroneously as an emergency, even if the best-designed sensors are employed. To err is human, but technology is not allowed this leeway, and every false alarm undermines the credibility of the entire PES system. False alarms must be avoided to prevent complacency. The likelihood of false alarms is reduced significantly if automatic alarms are provided with predefined delays in addition to a pre-alarm. A pre-alarm will draw the attention of the employee to the message that is about to be transmitted. If the pre-alarm is triggered, the user knows that the alarm must be cancelled manually.

After termination of the pre-alarm, typically after 15 seconds, the handset switches to the main alarm, which is then relayed directly to the control point, determining the type of assistance required. Under certain circumstances, this may be done after consultation with the person requiring assistance via the emergency communications facility. The sooner response teams can be on the spot, the faster the casualty can receive assistance. This reduces the

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Current-generation PES handsets not only fulfill the legal requirements but also combine communications, messaging and localization in a single device.

health harm, which in turn limits the costs of treatment and recuperation of the employee injured in an industrial incident.

Testing is essential to the overall reliability of the system, and PES handsets must undergo a comprehensive sensor test at the point of start-up. During actual use, serviceability of the device is checked cyclically. All events are logged as a rule, allowing individual alarms to be scrutinized at a later stage.

PES System Components

A well-designed TETRA-based handset should provide interference-free internal communications and a wide range of voice and group call features paired with comfortable telephony functions known from the integrated services digital network (ISDN) standard. In addition, comprehensive messaging functions should be available to users. The system should allow text messages and alarm reports to be entered manually by users and automatically by the computer system. In situations in which every second counts, precious time can be saved if users can easily preprogram their own text messages and then, in an emergency, transmit them at the push of a single button.

State-of-the-art sensor technology can already recognize hazardous situations autonomously. An alarm is automatically triggered when the mobile handset exceeds a pre-determined angle of tilt, a lack of motion is detected, or if a man down's switch is not reset within a preset period of time. A position, man-down or time alarm is sent, together with localization information, to the central control point. Additional security is offered by the loss alarm, triggered if the handset is violently wrenched away. Even if the user is unable to do so manually, an immediate call for help is guaranteed.

The rapid localization of the casualty is every bit as important as raising the alarm. If an alarm sounds at the control point, the locality of the person requiring assistance is shown on a digital site plan. The floor- and room-specific position is determined by means of inductive, attenuation-free localization beacons. A loud tone generated by the handset itself also assists in rapidly locating the casualty. The maximum permissible time that can elapse between the alarm event being detected by the sensors and an alarm being received at the control point must be in accordance with relevant legislation and industry rules.

Base stations ensure optimal radio coverage throughout the site, guaranteeing full mobile speech and messaging functionality among the control point, response teams and those seeking assistance. Users requiring group communications and the ability to control response teams might prefer TETRA-based systems.

The industrial and service sectors have their own special situations and circumstances, requiring equally specialized safety and hazards management systems. These in turn demand appropriate, bespoke personal security systems and industrial radio communications solutions, all of which must satisfy the latest applicable safety standards. Safety and security considerations, as well as communications requirements of the client, determine the best technology.

The process of finding the most suitable system begins with the client and the vendor conducting a thorough needs analysis, which entails meticulous, holistic research into the relevant business processes and related data. The conditions prevailing in the organization must also be analyzed thoroughly. Factors that must be taken into consideration include equipment and systems already in use and whether the new system must offer guaranteed compatibility and interoperability with equipment supplied by other manufacturers. This is particularly important where planning calls for a PES or industrial communications system to be integrated with an overall hazards management system. If the system is to be expanded or enhanced at some point in the future, this must also be factored in. Multiple interfaces may be required to accommodate subsystems such as paging, closed-circuit TV (CCTV) monitoring and fire alarms within the global security system. These aspects must all be investigated, decided on and planned before the proposed solution is signed off.

All PES systems face one essential requirement: The greater the level of user acceptance, the greater the extent to which the system can reduce the consequences of emergencies. The effective and convenient communications characteristics of a modern handset combined with the emergency signal function can significantly improve safety and security, especially for lone workers. When deciding on a radio infrastructure, companies should consider the expansion capabilities of the preferred system, so that it can increase as the firm develops.

Ultimately, safety does not lie in the number people looking after each other but in the ones and zeros of a well-designed, fully optimized and properly implemented digital PES system. ■

Wolfgang Berkau is head of marketing and public relations at Funkwerk Security Communications, a company specializing in security and hazards management solutions for the industrial and service sectors. Email comments to editor@RRMediaGroup.com.

Product Expo: Mobile and Portable Radios

C4i

The SwitchPlusIP interoperable radio/telephony dispatch product upgrade includes a new interface that allows mobile users to access multiple Project 25 (P25) radio networks without connectivity to a base station, such as direct radio-to-radio or console-to-radio communications. Other enhancements include a radio interface unit processor upgrade, providing increased performance for mobile applications. The portable SwitchplusIP CommandCenter LT features the building block of the system packaged in a small, ruggedized container and functions the same in the field as it would in a dispatch center. Features include wireless push-to-talk (PTT) functionality, configurable operator roles and individual operating preferences.

www.c4i.com

Cassidian Communications

The THR9+ TETRA handportable radio features a large, simplified keypad that is optimized for use when wearing gloves, instead of a full alphanumeric keypad. The display provides necessary information in a clear format. The selected talk group, last sent status, selected profile, time, battery capacity and field strength are also visible on the display. The radio offers a night-vision display color scheme providing enhanced visibility and user safety when working in the dark. Excellent voice quality and battery performance ensure safe and reliable communications in the most demanding circumstances, company officials said.

www.cassidian.com

Codan

The 2110 Manpack transceiver is an ideal solution for portable long-distance HF voice and data communications. The radio combines voice with additional data interface capabilities and interoperability with military transceivers. The manpack is light, rugged, comfortable to carry and includes easy-to-use features. The unit is ideal for all types of terrain and weather conditions. With a range of antennas, backpacks and battery types, the 2110 series can be configured to suit a variety of applications.

www.codan.com.au

Datron World Communications

The Guardian II professional radio line is available in VHF and UHF single-band and full-spectrum triband portable models. With front-panel keypad programming, public-safety band interoperability and enhanced AMBE+2 vocoder audio quality, the radios provide first responders, federal agency and public-safety users with the features needed for efficient and reliable Project 25 (P25) communications, Datron executives said. The line offers P25 trunking, optional internal GPS receivers, multiple faceplate configurations, adjustable display layouts and 10 programmable auxiliary buttons. Security options include advanced encryption standard (AES), data encryption standard (DES-OFB), FIPS 140-2 (level 2 certified) encryption, over-the-air rekeying (OTAR) and enhanced emergency response software.

www.dtwc.com

Detracom

The DPE handportable is capable of operating in existing analog networks with five-tone and CTCSS and in the digital e-DMR DetraNet network. The handportable is equipped with a user-friendly keypad and color screen, ideal for the transmission and reception of short messages and various modes of operation. Optional GPS or GSM modules allow the radio to transmit the user's position and various types of alarm information over both networks. The radio's robustness and heavy-duty features add to its ease of operation, making the radio a highly reliable working tool for professional users, company officials said.

www.detracom.fr

Eartec

Comstar is a full-duplex wireless intercom featuring self-contained wireless headsets that operates without belt packs or external antennas. The radio headset is portable and powered by rechargeable battery or AC power. The capacity of each Comstar system is 12 users, including up to eight all-in-one wireless headsets. Wireless users enjoy full duplex, simultaneous talk communications within 400 yards in any direction of the Com-Center base. The system is dual channel and includes a conference switch so that two separate groups can talk privately or combine their signals. The system operates within the 1.92 – 1.93 GHz band.

www.eartec.com

EF Johnson Technologies

EF Johnson radios offer interoperability with Project 25 (P25) trunked and conventional modes, APCO 16 Motorola SmartNet/SmartZone and an option for P25 Phase 2 TDMA. The supplier implements AMBE+2 vocoder for superior digital sound. The 51FIRE ES portable with FIRESafe includes features such as locked fire ground mode, audible out-of-range tone sequencing, signal degradation announcement and evacuation alert through digital data messaging. The Lightning Control

RIEDEL

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Riedel Communications is the world's largest rental provider for temporary radio installations at world class events such as G8 Summits, NATO Summits, World Youth Days, World Championships or Olympic Games.

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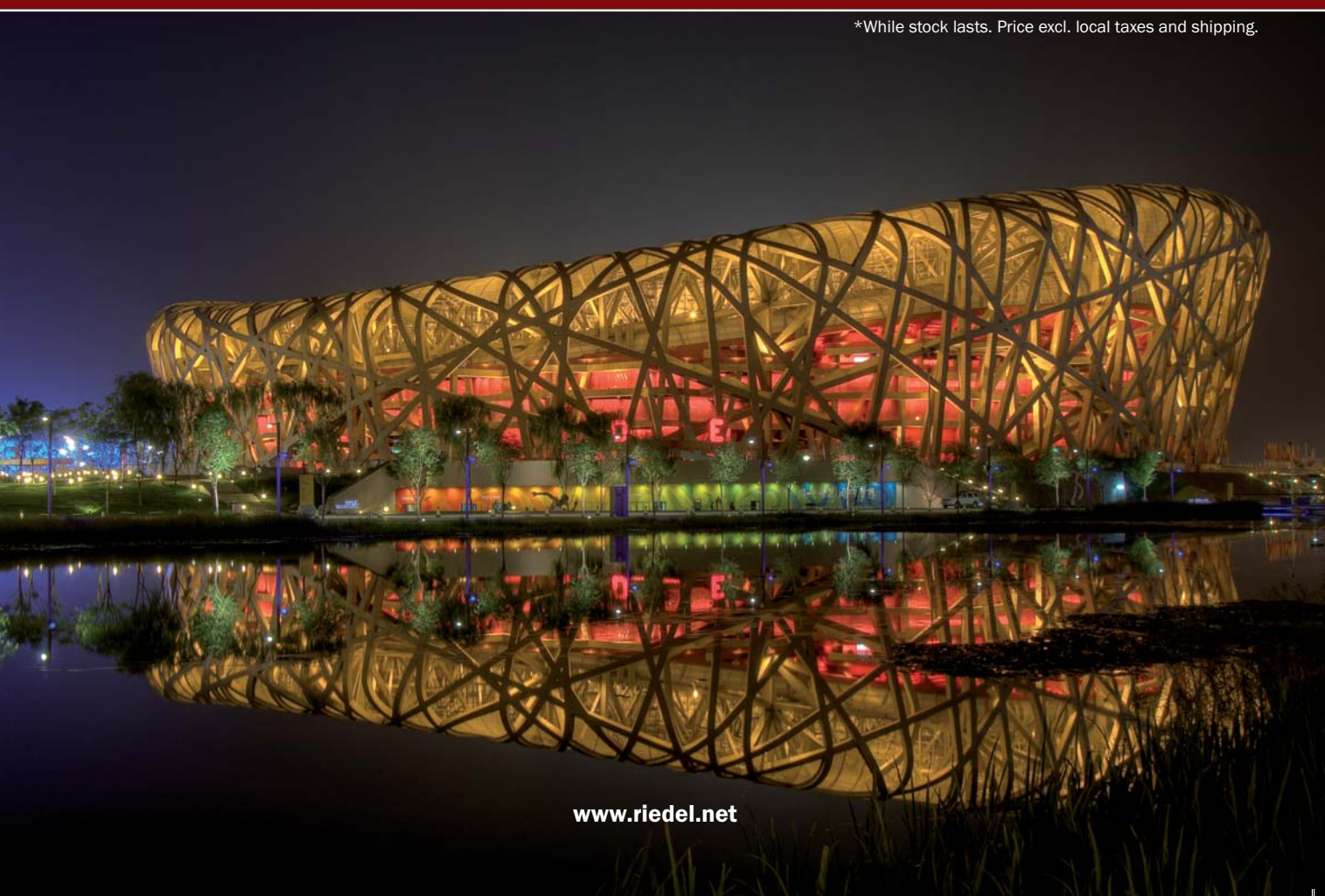

www.riedel.net

Head for ES series mobile radios uses an electroluminescent display, enabling high visibility in the brightest environments.
www.efjohnson.com

Entel

Entel's range of intrinsically safe products is approved to ATEX and IECEx standards. From entry level to MPT 1327 trunked

variants, the radios are built to deliver loud and crisp audio. The radios conform to IP68 waterproof rating in total water immersion to a depth of 5 meters for 1 hour. Coupled with Mil-Std construction, the radios are resistant to corrosion and designed to endure the everyday rigors of tough environments. Customers can choose from a wide range of frequency bands including midband 66 – 88 MHz, VHF and UHF.
www.entel.co.uk

Funkwerk Security Communications

The Funkwerk FT4 Ex TETRA radio was developed for chemical and petrochemical industries and meets many approvals, including gas and dust. The radio possesses a robust enclosure with IP65 certification. The FT4 S series handsets are equipped with personal security functionality for emergency situations including

manual and automatic alarms in combination with automatic location tracking in buildings. The radios are certified according to Germany's employer liability insurance association guidelines for personal emergency systems in hazardous workplaces (BGR 139), and the radios comply with DIN V VDE 0825-1.
www.funkwerk-sc.com

Giant International

The Olympia P324 business two-way radio features 4- or 1-watt

selectable power output and 32 programmable channel memories, providing a practical communications system. Additional features include a Li-ion battery pack, drop-in charger, hands-free operation and audible low-battery alert. The UHF radio is fully programmable, allowing use of fixed frequencies. For users who operate itinerant frequencies, the first 10 channels come preprogrammed on the common itinerant frequencies. A complete line of accessories is available.
www.giantintl.com

Professional 2-Way radio accessory manufacturer

Manufacturing in our own factory for 20-plus years

E38
Easy screw-on clear tube
Water-resistant

E26
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Suitable for either ear

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Suitable for either ear

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Nexus U-174/U plugs

H-500
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- Dual microphone for noise cancelling
- IP-68 rated

Bone conduction headset

For both listening and speaking

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Smart and Easy P2G

EA3
For EADS THR-9

EA2
For EADS
Jupiter TPH700

T3
For Hytera PD785

H-400
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- Can be used in all weather conditions
- Emergency button available

For over 20 years, we've been manufacturing speaker microphones and other accessories in our own factory. We continuously develop new products, including patented items and the IP68-rated speaker microphone, skull microphone and bone conduction headset shown here. We have advanced inspection machines that we use during the QC process. As an integrated service provider, we offer advantages such as stable quality and cost effectiveness. Customization services and product guarantees are available. Contact us today.

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T.+886 2 22250186 F.+886 2 3234 3494
Website: WWW.JEANCOUK.COM
Email: sales@jeancouk.com

Harris Public Safety and Professional Communications (PSPC)

The Harris XG-75 portable radio is a single-band radio for public-safety agencies operating on VHF and UHF frequencies. The portable supports multiple operating modes including analog conventional and Project 25 (P25) Phase 2 digital trunking. The radio supports the full range of P25 digital trunking features and includes Harris' active noise-canceling technology for improved clarity of both analog and digital calls in high-noise environments. The radio comes equipped with two microphones and an enlarged speaker chamber for audio quality.

www.pspc.harris.com

Holzberg Communications

Model DB-ANDY is a dual-band, compact portable radio that operates in 136 – 174 and 420 – 490 MHz. The radio features 4 watts and 100 channels, and comes with a rapid rate desktop charger, 1.5 ampere-hour (Ah) Li-ion battery, antenna and belt clip. Other features include priority scan, wide/narrow bandwidth, FM radio, dual-watch operation, alphanumeric display, CTCSS/DCS, voice scrambler, built-in voice operated transmit (VOX) function, busy channel lockout and alarm function. Optional accessories are available.

www.holzberg.com

Hytera Communications

As a product built to the Digital Mobile Radio (DMR) standard, the PD782 unit combines a compact yet durable design with versatile digital functions such as secure communications, texting, data management and GPS. The radio offers roaming, IP connectivity and IP57-rated water protection. The ability to operate in analog and digital ensures a smooth migration path for users, Hytera executives said.

www.hytera.us

Icom

Icom's IC-F3162D/F4162D and IC-F5062D/F6062D series are 5-watt handheld and 25-watt mobile digital and analog radios. The series is compatible with the digital Private Mobile Radio (dPMR) digital protocol Modes 1 and 2, peer-to-peer and multisite conventional repeater modes. Upgraded versions will be able to be used in dPMR Mode 3, a multichannel, multisite digital trunking

radio network that is fully managed by specific beacon channels at each radio site. The dPMR protocol is specified in the European Telecommunications Standards Institute (ETSI) open standard (TS 102 658). Using a 6.25-kilohertz narrowband FDMA technology, the radios offer many forms of voice and data applications including selective calling, status message, short data message, digital voice scrambler and IP network connectivity. The radios also provide analog features including two-/five-tone, CTCSS, DTCS, multiple scan functions and voice scrambler.

www.icom.co.jp/world

Kenwood

The NX-220/320 NEXEDGE VHF/UHF digital and FM portable radios are available in three versions. Supported modes include

digital 6.25-/12.5-kilohertz and FM analog modes in 25-/12.5-kilohertz and peer to peer to trunked, multisite, wide-area IP networking modes. The over-the-air programming feature allows the radios to be programmed remotely. The true mixed mode allows the radios to operate in analog with two-/five-tone, logic trunked radio (LTR) and digital 6.25-/12.5-kilohertz modes, without the need to install additional modules in the radio.

www.kenwood.com

Kirisun Electronics

DP770 is a two-way Digital Mobile Radio (DMR) unit that adopts two-slot TDMA technology. Radio highlights include clear communications, high efficiency of frequency use, long-distance communications, strong ability of anti-interference, battery saving technology, analog-and-digital compatibility, and voice data service. Application fields include public safety, public business, industry and commerce.

www.kirisun.com

Klein Electronics

The Blackbox Bantam professional two-way radio is compact, rugged and offers full power. Features include 16 channels, UHF/VHF, scanning, Li-ion battery, rapid-rate charger, PC programmable frequencies and customizable voice channels. The radio is narrowband compliant.

www.blackboxradios.com

Mobat USA

The Micom 3 HF radio transceiver line provides a high level of reliability for long-range wireless communications of voice, fax, email and data. The radio is primarily used as a mobile unit, with

its trunk-mount configuration maximizing operation convenience while saving cabin space. With the advanced technology and latest features, the device provides radio communications dependability and functionality and is priced to meet the needs of a wide range of organizations, company officials said. The radio complies with strict standards for radio communications equipment, including Mil-Std-810, ALE per Mil-Std-188-141B and Fed-Std-1045.

www.mobat-usa.com

Relm Wireless

The KNG S portable radio is a Project 25 (P25) conventional only radio, special edition KNG. The portable is loaded with features and incorporates the same menu system as the original KNG. Available in VHF/UHF, T2 and T3 KNG models, the radio is rated P25 digital and can operate with more than 14 hours of reliable communications everyday. Upgrade to the KAA0101, a compact 3.6-ampere hour (Ah) battery, and boost the battery life to more than 20 hours.

www.relm.com

Ritron

The PT series portable radio is compact, rugged and powerful. The portable offers 255 channels, 1-watt audio output, transmit power at VHF 5/1 watt or UHF 4/1 watt, meets Mil-Std-810F and IP65 ratings, two-tone decode/encode, seven character alphanumeric LED display and voice operated transmit (VOX). The radio is wideband and narrowband capable and PC programmable. The radio includes spring action belt clip, 1.8-ampere hour (Ah) Li-ion battery pack, antenna, drop-in fast rate charger and one-year warranty.

www.ritron.com

Selex Communications

The ElettraSuite PUMA T3 Plus is the latest dual-mode TETRA/analog FM/PM handheld. The radio is a high performance handset designed for users relying on mission-critical communications. A complete range of standard and Bluetooth accessories are integrated to extend the product's versatility.

www.selex-comms.com

Sepura

The Sepura Color Console (SCC) complements the Sepura SRG3900 mobile radio. The console's high-resolution color screen allows the display of high-quality photographs and maps.

The unit also introduces three text mode sizes and a new night mode that reduces glare for night driving. In addition, the console offers high levels of water and dust protection, with a IP67 rating, making it ideal for installations in hostile environments, company officials said.

www.sepura.com

Tait Radio Communications

The Tough Project 25 (P25) TP9100 portables feature recognized encryption testing, certified interoperability and digital audio clarity. With the portables, designed with the needs of public-safety users in mind, officers can roam between network and communicate in analog mode and talk groups. The radios are manufactured to work in the 700/800 MHz, UHF or VHF bands. In addition to flexible software and customizable hardware options, the radios can be used on conventional, trunked and simulcast networks.

www.taitworld.com

Team Simoco

Team Simoco provides TETRA and professional mobile radio (PMR) radio communications products and services to organizations around the globe. The company develops radio solutions such as PMR, TETRA and Digital Mobile Radio (DMR) and works with technologies such as Bluetooth, Wi-Fi, VoIP and digital signal processors (DSP). Operating in an increasing range of markets, deployments include emergency services, military, public sector, utilities and transport across the United Kingdom, Europe, the Middle East, Africa, South America and the Far East.

www.teamsimoco.com

Teltronic

The HTT-500 handheld features 3 watts of RF output for improved coverage, 1 watt of audio and more than 18 hours of battery power. The handheld is ready for a number of latest features including Bluetooth connectivity, a tamper-proof E2EE module, a WAP browser, GPS and man-down capability. The radio is solid, tough and durable, yet small and lightweight, company officials said. The radio's intuitive graphical color interface is easy to learn and efficient, officials said.

www.teltronic.es

Unimo Technology

The PZ-100NW and PZ-400NW support 512 channels with

graphic display and feature voice equalizer, whisper mode, wireless cloning, programmable home channel, scrambler and descrambler, remote stun and revive, and emergency function. The radios operate at 136 – 174 MHz and 400 – 470 MHz and offer output powers of 2/4/5 watts. With 2.2-ampere hour (Ah) Li-ion batteries, the radios features optional Bluetooth and GPS. The radios are IP67 waterproof type accepted, and passed all of the company's harsh condition tests items, including shock and drop tests.

www.unimo.co.kr/eng

Vertex Standard

The conventional VXD digital radio series operates on the Digital Mobile Radio (DMR) protocol and is compatible with other DMR models and brands. The line includes the VXD-720 digital portable radio, VXD-7200 digital mobile radio and VXD-R70 digital repeater. Key features include two-slot TDMA digital protocol, analog and digital compatibility, integrated voice and text communications and IP57 submersible portable radio. The unit's frequency ranges include 134 – 174, 403 – 470 and 450 – 512 MHz. Portable and mobile radios include dual-mode analog and/or digital scan and mixed-mode priority scan to operate in digital and still communicate with analog radio users of any brand.

www.vertexstandard.com

Wireless Pacific

Wireless Pacific's 250+ channel GTR professional handheld is available with built-in Bluetooth operation. The radio is available in 66 – 88, 136 – 174, 350 – 390 and 403 – 520 MHz bands and meets IP54 environmental conditions, as well as Mil-Std-810. User features include mobile voting, auto scan, channel scan, lone worker, unit ID/emergency identification, five-tone selective call, safety tone and remote kill/revive. The radios come with or without a full keypad and are designed to meet global type approval standards.

www.wirelesspac.com

New Products

Digital Radios

Icom Australia released the IC-F3103/4103 and IC-F5123/6123 series radios featuring

Icom Digital Advanced System (IDAS) technology and the FDMA protocol. The radios offer single and multisite conventional communications, as well as single-site trunking. The radios are capable of operating in mixed-mode digital and analog operation and feature built-in two-/five-tone, CTCSS and DTCS. Both radios are MDC 1200 compatible, rugged and meet Mil-Std-810 ratings.

www.icom.net.au

IS Radios

Sepura announced the addition of intrinsically safe (IS) products to its range of

TETRA radios. The launch strengthens the company's TETRA terminals market and extends its reach into hazardous "gas and dust" sectors, with IS ATEX/IECEx certified products, company officials said.

www.sepura.com

Upgraded TETRA Platform

Motorola Solutions announced Dimetra System Release 8.0, for its TETRA system platform. The software release will include the ability to connect to non-TETRA networks, including standards-complaint Long Term Evolution (LTE) networks, enabling public-safety agencies to achieve a future-ready solution for unifying communications across broadband and TETRA networks, company officials said. The new version features a simpler, more resilient and more cost effective TETRA system than previous versions for supporting mission-critical voice and data applications with an IT server-based platform. The software supports a next-generation architecture and includes automated system upgrade functionality.

www.motorolasolutions.com

IP Node

The Mobile IP Node from **Cassidian Communications** takes a holistic view of all routes from sender to audience while considering external conditions, message file size, priority, security level and physical location. The device then uses decision engines to select the optimum route based on user-defined parameters. The node can be used in a variety of frequencies, from satellite band to VHF and HF radios. The node doesn't have a built-in radio capability but can optimize and maintain a wireless network without technical intervention. The wireless device is housed in a case roughly the size of a cereal box and incorporates encryption technology.

www.cassidian.com

TEDS Test System

Aeroflex and fjord-e-design implemented a TETRA II test system on a portable radio tester, the Aeroflex 3920 Digital Radio Test Set. The test system allows transmitter and receiver testing of base stations and mobile

stations supporting the TETRA Enhanced Data Service (TEDS). In the demonstration, TEDS frequency division multiplexing (FDM) signals with 64 QAM modulation and eight subchannels in a channel bandwidth of 50 kilohertz were generated and analyzed, including the defined T4 test signal per the TEDS standard.

Aeroflex also released the 390XOPT604 automatic test and alignment software option for Motorola Solutions' APX 7000 and 7500 mobile radios. The dual-band radios can be configured with any two-band combinations, and the software will test and align both bands. Mobile power alignment is included in the option, and alignment time for both bands is about 16 minutes. Alignments are available for power, frequency, deviation balance and front end. Project 25 (P25) performance tests are available for modulation fidelity, symbol deviation and bit error rate. Results are automatically stored and can be moved to a computer or printed directly from the instrument.

The company also added Generic Measurement Suite to its PXI 3000 series of RF modular instruments, enhancing the capabilities of fast, flexible modular range of RF test equipment.

www.aeroflex.com

MIMO OTA Testing

Elektrobit (EB) announced its entry-level multiple input multiple output (MIMO) over-the-air (OTA) Long Term Evolution (LTE) testing system, giving users an easy way to start MIMO OTA testing. The system is scalable, allowing users to upgrade later beyond normal conformance testing. The 42-megahertz bandwidth system consists of three dual polarized antennas, a six-channel EB Propsim F8 radio channel emulator and required accessories. The system uses pre-defined realistic and repeatable single-cluster channel models.

www.elektrobit.com

Interference Analyzer

The Interference and Direction Analyzer (IDA) from **Narda Test Solutions** detects, analyzes and localizes interference and signals in an outdoor-capable device. The new functions and precision directional antennas make direction finding (DF) with the IDA-

3106 with SmartDF fast and convenient. The analyzer can establish the direction of the source independently and display the relative bearing in a polar diagram on the basis of a horizontal scan. The unit calculates the position of the interference source from several bearing results automatically and displays it. Determination of the position of an interference source is based on a GPS receiver in the measuring instrument, and the electronic compass in the antenna handle determines the direction, elevation and polarization.

www.narda-ida.com

Motorola Battery

BatteryJack offers a direct replacement for

the Motorola NTN4435 battery. The battery is a direct replacement for the XTS3000/3500/5000, the MTP200/300 series professional series radios. The battery is also compatible with all Impres technology chargers and radios. All Impres functions work while on the radio, including data storage, reconditioning function, date of manufacturer and fuel gauge communications. The unit's 4-ampere hour (AH) Ni-MH chemistry cells allow maximum run time. The battery also comes with a durable spring-loaded belt clip and is backed by an 18-month warranty.

www.batteryjackdealer.com

Power Regulators

Imark Communications released the Imark HR Hybrid Regulators for use with remote-area power systems. The regulators accept inputs from wind turbines and photovoltaic arrays simultaneously, and are designed to charge and manage battery banks. The regulators are pulse width modulation shunt regulators that use heavy-duty low-loss diodes and MOSFET power components. Three models are available for 48, 120 and 240 VDC (nominal) systems with nominal power capabilities of 6, 12 and 16 kilowatts. A 160-ampere blocking diode is provided on the photovoltaic input, and a 200-ampere three-phase rectifier is provided. The Imark Solar Regulators feature LEDs to show system operational status. Illuminated panel meters show battery voltage, charge current, battery temperature, wind input and photovoltaic input current.

www.imark.com.au

Wideband Antenna

The LPB-7-27-5SP low-profile rugged antenna from **Panorama Antennas** is a wideband vehicle antenna that covers the 746 – 960 MHz and 1.7 – 2.7 GHz bands. At 82 millimeters (mm) high, the antenna offers a robust high-impact radome that can be mounted on commercial or public-safety vehicles. The antenna is easy to install and cost effective.

www.panorama-antennas.com

UHF Antenna

The TRA3513 antenna line from **Laird Technologies** covers the frequency range of 351 – 366 MHz. Measuring 8.9 centimeters tall, the antenna features vertical and horizontal polarization components, giving the antenna diversity, frequency agility, low visibility, wide bandwidth and a low angle radiation pattern. The antenna's cross-polarization configuration ensures uninterrupted transmission in urban canyons and rural drop-off areas. The UHF antenna is designed for two-way radio communications, is IP67 rated and incorporates a rugged indoor/outdoor construction with a low profile.

www.lairdtech.com

GPS Receiver Platform

u-blox upgraded its GPS receiver platform u-blox 6 with improved sensitivity, significantly lower power consumption, improved anti-jamming performance, jamming detection and shorter time to first fix (TTFF). The new firmware delivers an improved tracking sensitivity down to -162 dBm with enhanced acquisition and re-acquisition sensitivity. Other features include AssistNow Autonomous, a free feature similar to assisted-GPS without the need for a host or external network connection, a power management technique, and a jamming detection feature that allows the GPS receiver to detect the possible presence of GPS jammers.

The company also announced successful testing with Rohde & Schwarz of u-blox's LEON GSM modem for eCall/ERA Glonass readiness, the European Union and Russian initiatives to capitalize on GSM and GPS technologies for vehicle emergency response services. The testing validates LEON's in-band modem capabilities.

www.u-blox.com

dPMR Processor

CML Microcircuits launched the CMX8341 single-chip digital Private Mobile Radio (dPMR) baseband processor targeted at low-cost, license-free dPMR radios conforming to the European Telecommunications Standards Institute (ETSI) standard, TS102 490. Features include dual-mode analog/digital operation, high integration and low power consumption. Complete analog audio processing is included with CTCSS and DCS sub-audio signaling.

The company also introduced other products to DuraTALK, a line of digital voice products that support voice-data generation, coding, transcoding, decoding, storage and scrambling functions for digital communications systems. The line consists of RALCWI technology, a low-bit rate vocoder technology that facilitates the transmission and reception of highly compressed voice over inherently noisy narrowband radio channels. Other new technologies include flexible coders and decoders, as well as multitranscoding.

www.cmlmicro.com

Filters

MiMOMax Wireless introduced the MiMOMax band-pass filters designed for the company's radios. The filters can also be used in conjunction with a suitable wireless transmitter or receiver, company officials said. The band-pass filter design is a low insertion loss, wideband filter system to fit in both antenna leads of a MiMOMax radio. With a 5-megahertz-wide design pass-band, transmit and receive frequencies can freely pass through the filter, while out-of-band signals are strongly attenuated. The product is ideal for sites with a large number of transmitters or a few high-power transmitters in adjacent or nearby bands that are likely to cause blocking problems.

www.mimomax.com

Communications Network

Arinc introduced RapydConnex, a global communications network for military and commercial mobile users who are unable to obtain the bandwidth, connectivity or capabilities they need

from their standard sources, company officials said. The network combines the capabilities of the mobile communications market, including bandwidth on demand. The open architecture allows for affordable integration, officials said.
www.arinc.com

Headsets

The new version of the IFB-REVARIO system from **Imtradex** is a communications system for control centers that works without Keeloq encryption. The wireless send button PTT-13WL and the IFB receiver enrich a standard wireless phone headset with a push-to-talk (PTT) function that is run by the digital exchange of individual serial numbers. This allows parallel operation of several systems without interference. The system also features a range control function that produces a continuous beep when a user steps out of range.

The company also introduced the multipurpose neckband headset series and the helmet set FireTalk. Firefighters, police and others can use the neckband headset line if they require a hands-free system that offers a high-performing noise-cancelling microphone and headset. The FireTalk offers communications for fire brigades that ensures reliable communications between different forces. The system consists of a waterproof electret gooseneck microphone, and a splash-proof and shock-resistant PTT button that easily integrates with helmets.
www.imtradex.com

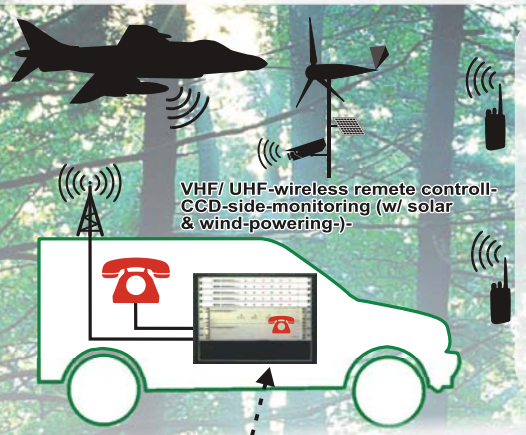
Multilingual Headset

The Multilingual Bluetooth Headset is a standard, full-featured Bluetooth-enabled mobile phone with an earpiece equipped with bidirectional language translation. **Invention Resource International** handles the headset development. The headset is equipped with hardware and software to function in the manner of a universal translator. When the user talks, his voice is detected by the device's voice recognition software. A customized speech and translation engine will then determine what the person is saying and translate it into the desired, pre-selected language of the listener. It will also possess a dictionary-stacking function, permitting users to add words, jargon and slang to the device's repertoire.

www.inventionresource.com

Radio-Trunking-System

1 for Car-Racing & Jungle-Fire-Prevention



Features :

- Automaticly searches for clear radio channels
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- Radio Calls, Cellphone Calls & Land-line phone Calls are all available
- Conventional Radio & Talk Around Modes to outside systems is available
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- Fleet dispatching & management operation
- Motorola, Kenwood, Vertex & Icom transceivers can be simply upgraded with the RG-Trunking-Board
- RG-450 transceivers are fully integrated for trunking & conventional operation
- Multi-site-systems can be linked-up by VOIP-PBX for roaming

Trunking-Option-Boards

RG-117-/
RG-117-R
For Icom™ radios)

VT-80 (for
Vertex™
Radios)

RG-860
(For Kenwood)

RG-380
Trunking board for
motorola Professional
Series Radios

RG-180
Trunking board for Motorola
Commercial Series Radios

RG-450 LTR & Smartrunk-Radio

No-need trunking-board installation --- RG-450 Transceiver has trunking (+) conventional-operation fully integrated··· no Trunking-board is necessary!

VHF 136-174 MHZ
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UHF 330-400 MHZ
400-450 MHZ
450-512 MHZ

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BTH-H-41-a

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Armada-OTH-Flex

RF-Scanner

(for Racing-car & Heavy-Industries-)

Regal Group

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Tel: (86-755) 8299-0210 // 8299-0276 Fax: (86-755) 8297 9065
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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 _____

Q411

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Europe's PMR Market Considers Digital, Broadband

By Thomas Lynch

The worldwide professional mobile radio (PMR) market is forecast to increase during the next five years, and even with the recent economic woes, the European market is no exception.

From 2010 to 2015, European terminal shipments are predicted to grow at a compound annual growth rate (CAGR) of 6 percent with revenues also increasing. The PMR market is undergoing reconsolidation as new technologies, legislation and increased usability requirements shape the future. Operational commitments are increasing, along with supplier requirements for efficiency. Coupled with the effects of the 2008 recession, the global marketplace requires mobile radio equipment suppliers to be more focused in providing the solutions required by the customer base. Manufacturers of mobile radio devices have adapted well and continue to release new products and upgrades.

Europe's migration to digital is set to increase during the next five years. The European installed base of digital radios is projected to increase from 25 percent of the total LMR installed base at the end of 2010 to more than 50 percent by the end of 2015. This is the highest rate of migration of any region including North America.

There has been considerable interest regarding data use in PMR systems. Many officials are beginning to integrate more data applications into their daily activities. Broadband technologies offer hundreds of times the throughput of the latest mobile radio networks and can transform the way organizations function, via applications such as real-time video.

The European PMR industry continues to debate the best broadband solution. Long Term Evolution (LTE) appears to be the forerunner, and it is accepted that LTE, used with Project 25 (P25), will provide public-safety broadband applications in the United States. In Europe, there are many obstacles, including issues surrounding the harmonization of spectrum and spectrum allocations specific to the PMR marketplace. Other technologies, such as TETRA Enhanced Data Service (TEDS) and the proprietary overlay systems for P25, are considered mid-term solutions because they do not offer the data rates and bandwidth associated with broadband.

The data requirements of end users will, in the near term, drive the market toward digital technologies. Although LTE is required, the needs of traditional PMR markets will alleviate any chance of a whole system overthrow, and a hybrid LTE/PMR market solution will evolve as the PMR standards adapt. Ultimately, the success of a broadband solution for the European PMR market will depend on the ability of regulatory bodies and governments to allocate spectrum to mission-critical users. The harmonization of spectrum throughout Europe may prove the overriding factor in the successful implementation of a broadband solution in the next decade.

Suppliers of solutions to the European licensed mobile radio market are looking to incorporate data applications. Applications have been limited because the primary use case was instantaneous voice. Traditionally, few options have been available to end users. Analog networks are essentially incapable of offering data, and high-end digital technologies can be too expensive for organizations other than those with public-safety and security functions to justify the additional benefits of data. Therefore, some end users in Europe migrated to cellular as a secondary communications channel for their data needs.

Digital PMR technology offers a suitable range of data services, such as man down, GPS, text messaging, group calls and call management, all with the reliability and security demanded by end users. After the short-term fix approach of using commercial cellular networks to address data needs, private networks based on traditional LMR technologies and LTE eventually will be widely used.

The future of the European PMR market is favorable and will become, if it isn't already, a target market for companies outside of Europe as well as the existing key suppliers. Data and features are key to the future innovation and success of digital and broadband technologies. The need for high-speed data video streaming will drive the implementation of broadband, but private LTE network rollouts will be limited during the next five years and will experience wider uptake toward the end of the decade. For more on the European market, IMS Research recently published "World Licensed Mobile Radio Report – 2011," detailing the worldwide PMR market, technologies, key verticals and future of mobile radio to 2015. ■

Thomas Lynch is the lead market analyst for the PMR and broadband division at IMS Research. IMS Research is recognized globally as a leading contributor of PMR research and consultancy. Email comments to thomas.lynch@imsresearch.com.

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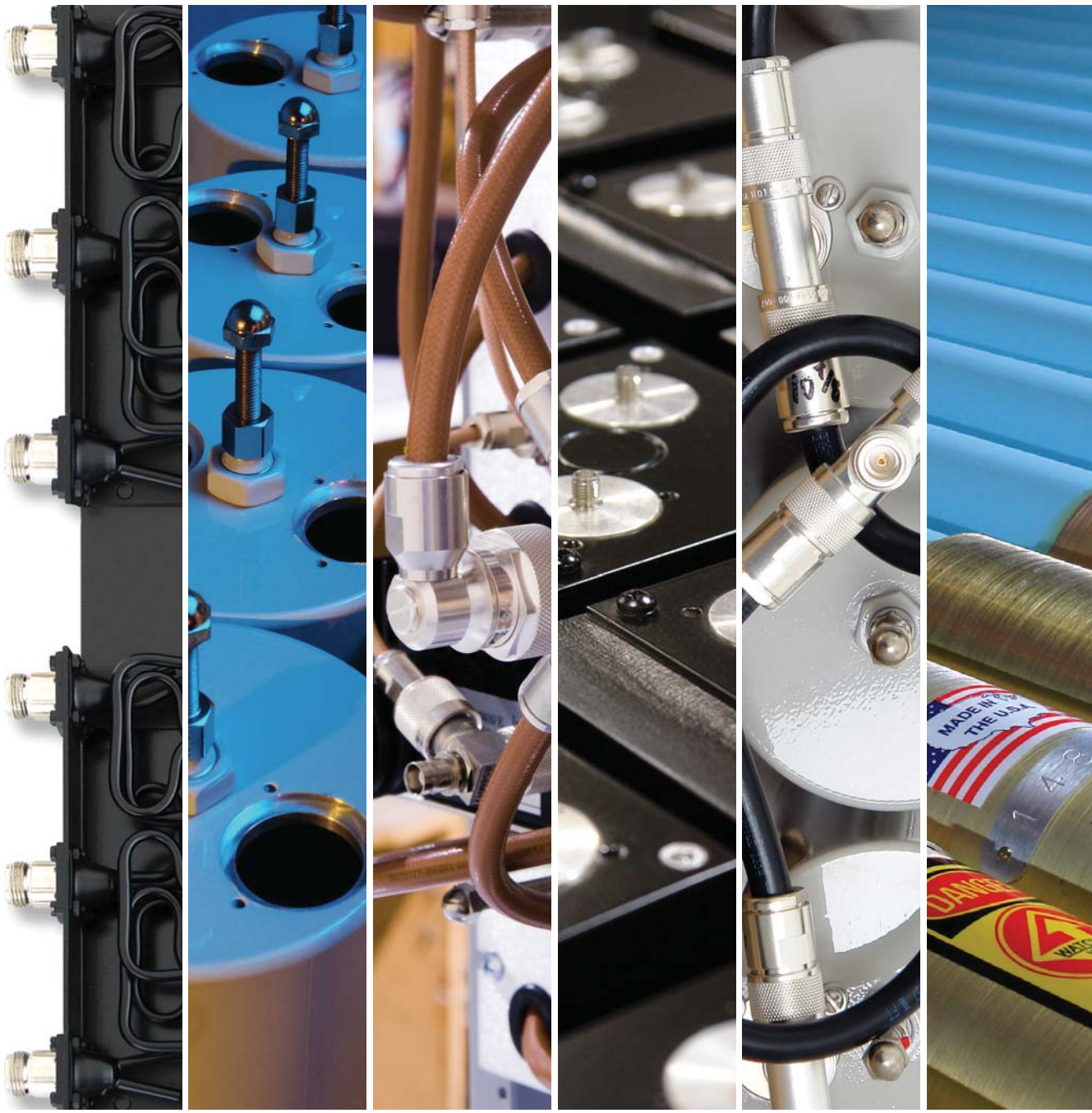

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