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Inside

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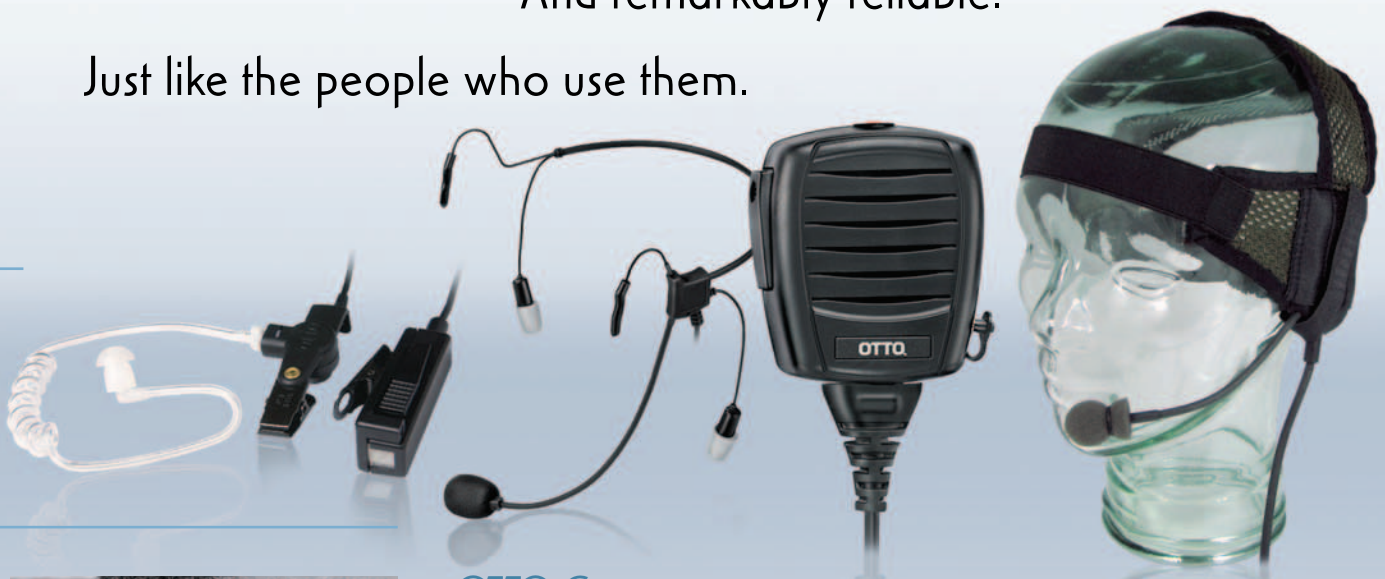

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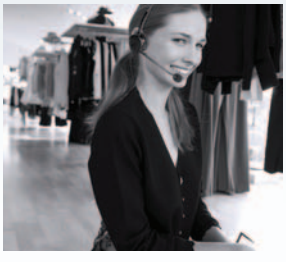

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How to contact us: wwwRRMediaGroup.com or

Editorial	Sales	Subscriptions
edit@RRMediaGroup.com	info@RRMediaGroup.com	lfriday@RRMediaGroup.com
Phone: +1 303 792 2390 ext. 20	Phone: +1 303 792 2390 ext. 10	Phone: +1 303 792 2390 ext. 15
Fax: +1 303 792 2391	Fax: +1 303 792 2391	Fax: +1 303 792 2391

IN EVERY ISSUE

Cover photo courtesy Team Simoco

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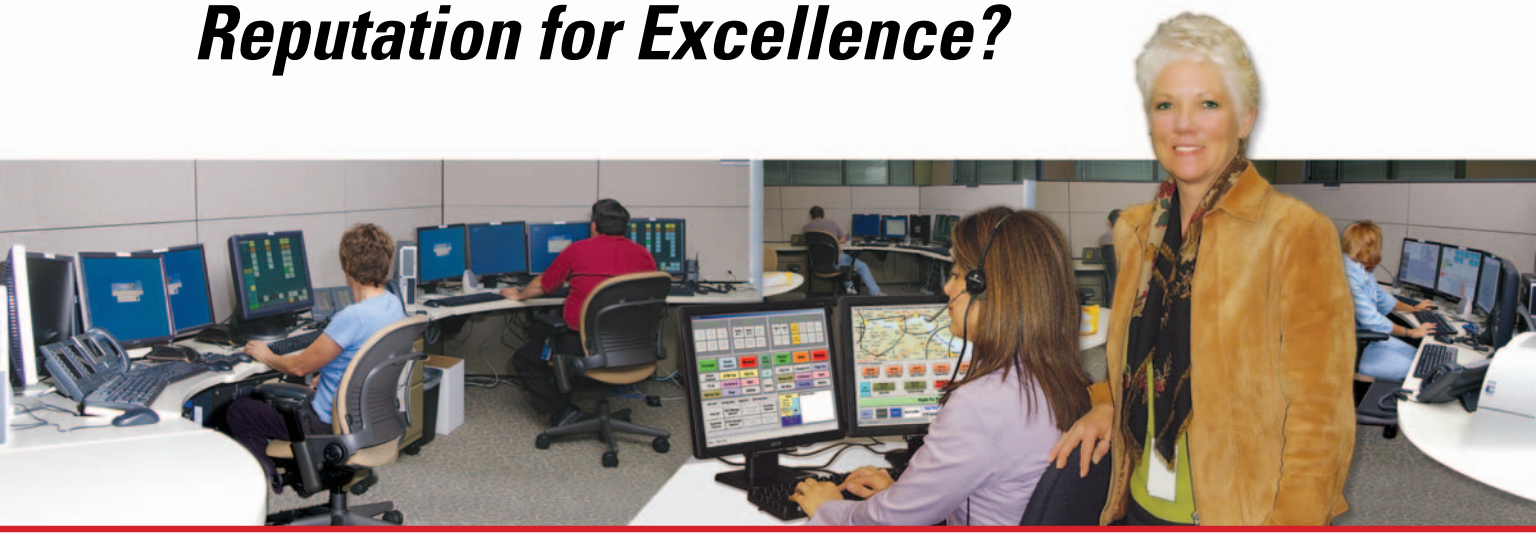

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Watch for Your **World News** e-Newsletter

With the TETRA World Congress (TWC) wrapping up in May, we're reminded of the increasing number of digital networks being deployed throughout the globe. The event, back in Europe this year in the beautiful city of Munich, was quite a success with many new products and deployments announced. For a roundup of TWC news and products, turn to Pages 14 and 36 of this issue.

Although digital networks are increasing, analog and conventional systems are still prevalent and critical to many communications users worldwide. The applications are diverse. On Page 28, you can read about a small but highly important communications deployment in Rwanda. The network is helping deter poachers at the Nyungwe National Park and is an important tool for the successful re-introduction of the elephant to the park. Perhaps not as flashy as a data application or as expansive as a nationwide public-safety network, the one-site system is nonetheless critical to the park's rangers and the wildlife.

Latin America is another geographic region where the majority of mobile radio networks are analog technology. Some countries are deploying TETRA or Project 25 (P25) systems, but for the majority of users, analog systems fulfill their daily communications needs. Many market watchers think Latin America could be poised for strong short- and long-term growth based on several factors. For more insight on this dynamic area, turn to "Global Forum" on Page 46.

To keep you up to date on industry news related to analog or digital mobile radio networks, we plan to launch in August a new e-mail newsletter targeted specifically at readers of *RadioResource International*. This monthly e-mail will offer an in-depth news story and the latest professional mobile radio (PMR) headlines from across the globe. Our goal is to provide as much information as possible to help you do your job, and the new World News e-newsletter will provide you with more frequent and timely information. Visit our Web site, RRImag.com, to subscribe.

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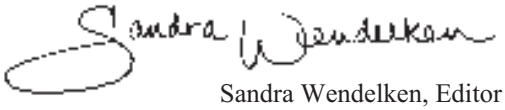
If you're involved with an extraordinary mobile radio network or have news to share for the new e-newsletter, we'd be excited to learn about it. Please contact me with your ideas; we welcome your input.



Sandra Wendelken, Editor
swendelken@RRMediaGroup.com

RadioResource INTERNATIONAL

RadioResource International delivers wireless voice and data 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 commercial and private 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.

PUBLISHER/EDITORIAL DIRECTOR
Paulla A. Nelson-Shira, pnelson-shira@RRMediaGroup.com

EDITOR
Sandra Wendelken, swendelken@RRMediaGroup.com

MANAGING EDITOR
Lindsay A. Gross, lgross@RRMediaGroup.com

ASSISTANT/WEB EDITOR
Michelle Zilis, mzilis@RRMediaGroup.com

WEB SITE ADMINISTRATOR
Lola Friday, lfriday@RRMediaGroup.com

GRAPHIC DESIGNER
Brad Hamilton, bhamilton@RRMediaGroup.com

VICE PRESIDENT
Mark E. Shira, +1-303-792-2390 x11, mshira@RRMediaGroup.com

ACCOUNT EXECUTIVE
Jeff Peck, +1-303-792-2390 x12, jpeck@RRMediaGroup.com

CLASSIFIED ACCOUNT EXECUTIVE
Debra Sabin, +1-303-792-2390 x13, dsabin@RRMediaGroup.com

CIRCULATION MANAGER
Lola Friday, lfriday@RRMediaGroup.com

PRODUCTION MANAGER
Michael Portaro, mportaro@RRMediaGroup.com

EXECUTIVE ASSISTANT
Melissa Richey, mrichey@RRMediaGroup.com

ADMINISTRATIVE ASSISTANT
Sharon Knell, sknell@RRMediaGroup.com

CORRESPONDENCE
Editorial, advertising, and circulation correspondence should be addressed to: ***RadioResource International,*** 7108 S. Alton Way, Bldg. H, Centennial, CO 80112-9977, USA Tel: +1 303 792 2390, Fax: +1 303 792 2391.
Editorial e-mail: edit@RRMediaGroup.com
Advertising e-mail: info@RRMediaGroup.com

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Utility Group Explores TETRA in the U.S.

The Utilities Telecom Council's (UTC) Technical Division will form a working group to address technical issues related to the use of TETRA technology in the United States. During a meeting at UTC's annual Telecom 2009 conference and exposition in June, executives from five TETRA manufacturers, including Motorola, agreed to work together through the group.

In the past, there have been questions about whether intellectual property rights (IPRs) held by Motorola block the technology from the North American market. Chuck Jackson, Motorola Sales and Service Inc. (MSSI) vice president and director of system operations, said the past issues have not been IPR based, but rather that TETRA doesn't meet FCC requirements and therefore is not a U.S. standard.

Jackson said if all the technical and spectrum-related issues are worked out, Motorola would not prohibit the technology's use in North America. However, he said there must be a technical document put together among the vendors describing

how TETRA will be developed in the U.S. market. Otherwise, one vendor could manufacture TETRA for the U.S. market one way, and another vendor a second way, and the different flavors may not be interoperable. "If UTC works to resolve the FCC type-acceptance issues and the spectrum planning requirements to ensure no interference to other users, Motorola will license TETRA's IPR," Jackson said.

The group is tasked with identifying appropriate U.S. spectrum bands for the technology and addressing channel spacing, emission mask changes and other technical issues. Bill Moroney, president and CEO of UTC, asked the group, which includes TETRA vendors, UTC members and consultants, to have a document in place that addresses the technical changes needed to meet FCC Part 90 rules within 60 days.

UTC officials said they are not promoting TETRA, but satisfying their members' interest. UTC members include communications managers and engineers from U.S. electric and other utilities.

Phil Kidner, CEO of the TETRA Association, said pilots of the technology will be under way concurrently with the technical work. BC Hydro, the third-largest electric utility in Canada, will begin a trial of TETRA technology in coming weeks. Kidner said non-public-safety pilots in the United States would be announced soon.

Kidner said the BC Hydro pilot will include two or three sites, and equipment is being delivered and installed in coming weeks. The pilot will include infrastructure and terminals from Teltronic and subscriber units from Sepura. The TETRA manufacturers represented at the UTC meeting included Motorola, Rohill, Sepura, Team Simoco and Teltronic.

NORTH AMERICA

SUWANEE, Georgia, USA — Five additional companies joined the NXDN Forum, established in July 2008 to promote the NXDN digital air protocol for use with 6.25- and 12.5-kilohertz narrowband technology. The five new members include Anritsu, CML Microsystems, Etherstack, General Dynamics SATCOM Technologies and Meteor Communications.

The eight founding members are Kenwood, Icom, Kenwood USA, Icom America, Aeroflex Wichita, Daniels Electronics, Ritron and Trident Datacom Technologies. Kenwood markets its NXDN-based products under the NEXEDGE brand, and Icom markets its NXDN-based products under the IDAS brand.

EUROPE

BRUSSELS, Belgium — The European Commission selected two satellite operators, **Inmarsat Ventures** and **Solaris Mobile**, to provide mobile satellite services (MSS) across Europe, although the decision may bring legal proceedings. The services, such as emergency communications, high-speed Internet access, and mobile TV and radio, will be provided over reserved 2 GHz spectrum.

Member states must now ensure that Inmarsat and Solaris have the

ASIA

Tait Employee Develops Historical Display

Ian Gardiner, one of the original 12 employees of Tait Electronics, developed the company's historical display, fulfilling the wish of late company founder Sir Angus Tait. The audio-visual installation tells the story of Tait's origins and history across 40 years.

Lady Hazel Tait, Sir Angus Tait's widow, opened the Tait historical display at Tait's headquarters in Christchurch, New Zealand, in May. "I think Angus would be very pleased with the display," Gardiner said. "He'll be looking down on us having a chuckle."

Frank Owen, Tait Electronics incoming managing director, said the display

A new display in New Zealand shows Tait's history, spanning more than 40 years.

signals the company's commitment to the future while recognizing its history that can be traced back six decades.

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right to use the frequencies identified in the commission's decision and to operate their respective systems. The providers must be authorized to use their satellite systems all over Europe for 18 years from the selection decision. Commercial service should start within 24 months from this selection decision at the latest, subject to commitments to an earlier launch made by operators in their applications.

The new services will offer wireless communications to millions of EU consumers and businesses all over Europe thanks to portable terminals carried by a person or mounted on a car or ship, according to the commission.

The two providers that weren't selected both released statements noting their disappointment with the EU. ICO Global Communications is challenging the process, having initiated legal proceedings in September 2008, seeking the annulment of decision No.626/2008/EC of the European Parliament. ICO contends that the decision is illegal and should be annulled.

BASKINGSTOKE, United Kingdom — Motorola announced research into Europe's public-safety agencies and major industrial users regarding their communications systems. Analysis from interviews with 196 organizations revealed 82 percent of respondents demand fast, resilient communications, which improve the safety of users and extend the range of applications available in the field. Motorola officials said the requirements underline the ongoing importance of TETRA technology.

The study, conducted by IDC for Motorola, canvassed the opinions of executives with roles in purchasing decisions across eight countries in Europe, the Middle East and Africa (EMEA) from public safety, oil and gas, and transport sectors. Nearly 80 percent of respondents are keen to see improvements to technology, improving existing systems. About 44 percent of organizations believe that technology must easily connect teams working in high-pressure environments.

"Sixty-six percent would like to see technology support the delivery of more information to field teams, while 61 percent demand that technology improves situational analysis — the facility to access video feeds or remote databases and file reports in the field, or even to access images and video feeds comes into this category," said Pim Bilderbeek, vice president of European telecoms consulting for IDC. "Also, 61 percent of organizations identify the need for GPS/mapping technologies; these applications are very important to enhancing the safety of field teams and the interest in them adds further weight to the strong consensus indicated by 74 percent of the respondents that safeguarding teams is central to investing

in communications systems."

MALDON, Essex, United Kingdom — David Taylor accepted a role of nonexecutive director at **Samdale**, following his retirement from **Sepura**. Taylor has more than 45 years of experience in a variety of management roles within the radio communications industry.


David Taylor

VIENNA, Austria — Peter Prater joined the **Frequentis** staff in the United Kingdom as key account manager. Prater, who is chair of the British Association of Public-Safety Communications Officers (BAPCO) South West and South Wales Region, will be responsible for Frequentis' relationship with the Metropolitan Police Service.


Peter Prater

MIDDLE EAST

MUNICH — Rohde & Schwarz Professional Mobile Radio and the Kuwait National Petroleum Co. (KNPC), one of the world's largest oil companies, signed a US$7.6 million contract for the delivery of a TETRA radio system. The network is scheduled to be completed by April 2010.

KNPC employees will communicate using the digital radio system to ensure fault-free and safe operation of the refineries. In addition, the network will provide smooth communications when the crude oil is loaded onto ships and tankers.

BASINGSTOKE, United Kingdom — Zetron announced multiple deployments of its DCS-5020 digital consoles for a public-safety and border-control communications project in the Middle East. Comprising more than 60 operator positions, the systems provided under the contract allow seamless integration of TETRA and legacy analog communications systems, as well as enable integration of telephony and Web-based services.

The system was reconfigured to a large, single deployment consisting of 15 operators, plus several smaller control rooms.

LATIN AMERICA

MEXICO CITY — Mexican telecom regulator Cofetel released quarterly statistics that revealed overall Mexican telecommunications industry growth to be at 14 percent in the fourth quarter of 2008, a decrease from 33 percent growth for the same period in 2007. However, trunking services were up 26.1 percent in the quarter.

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TWC 2009 NEWS

Following is a list of some announcements made during the TETRA World Congress:

- **Team Simoco** completed a citywide digital TETRA radio network in Beijing.
- **EADS Defence & Security** will extend the TETRA radio network of Stadtwerke Mnchen (SWM), one of the largest public TETRA networks in Germany.
- **Motorola** won a contract to provide AENA Alicante Airport in Spain with a TETRA digital radio system.
- **Rohde & Schwarz Professional Mobile Radio** won the 4.8 million euros ($6.7 million) bid to install a digital radio system for the Saxony highway system.
- **Sepura** secured the first major order for TETRA radios to the German state of Bavaria.
- **Airwave** launched a German-based operation from which it plans to develop new business opportunities in Germany.
- **EADS Defence & Security** completed a new TETRA-based communications network, selected in 2006 by ROSKOSMOS, Russia's space agency, to refurbish the trunked network at Baikonur Cosmodrome.
- **Motorola** was awarded contracts by the Cheshire Police Authority and the Sussex Police in the United Kingdom for mobile and handheld TETRA terminals.
- A range of public services in Toulon Provence Méditerranée, France, plans to roll out **Sepura** TETRA radios.
- **EADS Defence & Security** was awarded a contract for the extension of the Surgutneftegas TETRA network in Russia.
- BMW Special Vehicle Group agreed to integrate **Sepura**'s mobile radio display directly with the Blue Light display of BMW Group's iDrive system.

TETRA World Congress 2009 Draws Record Crowd

By Paulla A. Nelson-Shira

Despite a fragile economy, more than 2,500 attendees assembled at Munich's International Congress Centre (ICM) to make the 2009 TETRA World Congress (TWC) the largest ever. The location was surely a benefit, because Germany boasts the largest TETRA system in the world. Plus there was pent-up European demand for a hands-on TETRA experience because the TWC was in Hong Kong last year. For the first time, the show floor had more activity than the sessions.


Kees Verweij


Entertainment at the gala

Most of the sessions demonstrated the many uses of TETRA in a variety of end-user applications. Although public safety holds court for monetary investment, the transportation market now ranks number one in contracts with 33 percent of new contracts, followed by public safety with 32 percent of new contracts. Utilities came in third with 10 percent of contracts and other business and industry makes up the rest.

Although the ETSI TETRA technical committee is working on the next evolution of a standard for broadband services, there is the problem of available spectrum. The TETRA memorandum of understanding (MoU) called on the radio administration communities of the EU to join together to allocate spectrum, which could take years, if ever, to achieve a solution. Only time will tell if politics can be put aside to accommodate the spectrum necessary to sustain a TETRA broadband solution.

The biggest news at TWC was the announcement of the first TETRA trial in North America. Suppliers Teltronic and Sepura teamed to build a pilot system for BC Hydro in Canada. The trial was scheduled to commence in June.

On a lighter note, the gala was held in true Munich fashion, with beer flowing and classic Bavarian entertainment. TETRA Association Chairman Phil Godfrey cracked a keg and awarded Kees Verweij the outstanding contribution to TETRA award for his "almost unlimited appetite to contribute and to share his knowledge with others…" Verweij is an engineer for public safety in the Vts Police Netherlands organization.

TETRA certainly knows how to pick venues. Next year's World Congress is scheduled for 24 – 27 May at the Suntec Singapore International Convention and Exhibition Centre. Considering the growth of TETRA in Asia, Singapore should be an outstanding location for TWC 2010. ■

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Digital Systems Land in Airports

Airports around the world embrace private digital mobile radio networks to enhance cost efficiencies, security, workflow management, and baggage and asset tracking. **By Ian Carr**

Airports are super-charged, high-octane, magnified microcosms of the real world. Everything is fast-paced, urgent and secure, and a high level of efficiency is necessary to ensure operations run smoothly, from the check-in desk to takeoff. Effective communications lies at the heart of this; it's the lube that ensures the smooth running of airport operations. Getting the right communications system in place is crucial. A strong radio system will streamline operational efficiency, improve airport management, enhance security and improve key relationships with airlines and the traveling public. An ineffective network will result in the reputation of a poorly managed airport, known for lost luggage and flight delays.

Radio communications have evolved rapidly in recent years, from vertically integrated systems built to meet the needs of the flag carrier, to a more horizontal airport-centric and task-focused system to better serve an increasing number of airlines and increased airport capacity. Creating a single, secure, integrated radio network enables service companies to communicate effectively and ensures optimum turnaround times without having to be concerned about the complexities of deploying, managing and financing base station infrastructure and capacity. This enables a virtual team of various service providers to be formed thousands of times a day to focus on the essential task of turning around a single aircraft before being disbanded and reformed to address another flight with a different airline elsewhere within an airport.

Further benefits are accrued through economies of scale, enabling airports to be supported by leading-edge digital technologies such as TETRA and Project 25 (P25) radio that any company would find difficult

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to afford alone. In this manner, the modern airport can be supported by the same mission-critical radio technologies as the emergency services.

Going Private

System capacity and performance are musts for the time- and mission-critical airport environment. Information needs to be relayed to the right people immediately through guaranteed channels of communications, and companies operating within the airport need to have the reassurance that the radio network will stand up to demands placed on it when most needed. It's this guarantee of continuity that makes private digital radio systems so well suited to the airport environment. Commercial networks aren't designed to cope with the extreme and concentrated needs of incident management that can arise in an airport. For truly resilient, emergency-ready communications, a dedicated private radio network is necessary.

Strong uptake of private digital radio across many of the world's airports is being predicted. Advances in technology and data compression tools mean effective data communications over a digital radio network — enabling voice, data and images to be transmitted over a single secure network, guaranteeing effective communications whatever the situation. So where can digital radio systems help, and why are they so well suited to the airport environment?

Right time, right place. The cost of turning a plane around quickly is significant, but the cost of not getting off the stand on time is even more important. Setting aside the cost of additional ramp time resulting in delays to the next flight arrival, there are wider implications. For London's Heathrow Airport — the world's busiest international airport — its takeoff and landing slots define ultimate airport capacity.

Baggage transfers, security checks, catering, cleaning, refueling and engineering checks are just a few routine procedures that take place between takeoff and landing, as well as the essentials of getting gate staff, crew and passengers to the right stand at the right time. All these key elements must arrive accurately and as

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- 16 Channels
- DTMF Encoder
- 2-Tone Decoder

VHF (5W/2W) / UHF (4W/2W)
7.5V DC 1500mAh Li-ion
56(W) x 110(H) x 32(D)mm

142g (Without Batt)

Voice Recording Pager VRP-100 / VRP-400

VHF
136~174MHz / 5 Bands
UHF
400~470MHz / 8 Bands

- Pocket Size-Easy to carry
- Light Weight
- High Quality Speaker & Sound
- Rain Proof (IP-54)
- 2-Tone
- Vibrating & Voice Storage Mode

2.4V DC Ni-MH / 3V DC (2xAAA)
54(W) x 83(H) x 24(D)mm

82g (Without Batt)

new

TETRA Portable MU-1000

350~380MHz
370~400MHz
400~430MHz
450~470MHz
806~870MHz

- True Color Menu driven GUI
- Push To Talk & Trunking(Telephony)
- Group Call & Individual Call
- Short Message Service
- Packet Service
- Roaming & Handover
- GPS based Location Service
- E2E Encryption

1W for 800MHz / 3W for 400MHz
7.5V DC 1800mAh / 1350mAh Li-ion
48.5(W) x 146(H) x 34(D)mm
(With 1800mAh Battery)
280g (With 1800mAh Battery)

new

RoIP Gateway & Wall Radio

- 4 Communication Channels for different type of radios (with/without internet service)
- Stimulated Communication with TETRA, VHF and UHF
- Stimulated Communication with Skype
- High Quality Voice
- Gateway:
  292(W) x 65(H) x 170(D)mm
- Wall Radio Box:
  360(W) x 60(H) x 240(D)mm

- Visit homepage www.unimo.co.kr/eng for more products.
- All products with ISO 9001 and ISO 14001.
- All products are made in KOREA.
- CE, FCC, IP54 and MIL-STD 810 E/F approved.

CE FC

* All specifications are subject to change without notice.

UNIMO Technology

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E-mail: radiosales@unimo.co.kr http: //www.unimo.co.kr/eng

scheduled to maximize the capacity of the modern airport. Crucial to effective airport management is knowing where resources are and their task status at any given time. Are they engaged in a task or available to receive a new instruction? Equally important is the ability to communicate accurate, unambiguous instructions and to receive updates on task performance and the progress of a flight being ready for departure.

Workflow management systems — together with AVL and localized mapping of runways, taxiways and airside vehicle routes — enable constant mapping of available resources. Sending the nearest fuel tender, baggage truck or transit bus not only saves time and increases efficiency, it also reduces the amount of airside traffic. And with incidents more likely to occur on taxiways and service routes, that is a major safety benefit.

Security. Security is a top priority for airports. Airport security personnel operate in a fast-paced environment that offers no room for mistakes. Time is mission critical where security is concerned, and a major advantage of operating over a digital radio network is that security staff located anywhere in the airport can receive instant remote access to information in real time.

Digital networks have the capability to link IP-based surveillance systems, transmitting voice and data communications and allowing photographic images to be viewed remotely by security personnel via PDA or handset anywhere in the airport to allow a timely and preventative response to any situation.

Locating luggage. Baggage reconciliation and tracking is a key element of airport management. Ineffectively tracking baggage poses an immediate security concern and can prove detrimental to working relationships with airlines. On the flipside, effective baggage handling can reduce turnaround times, ensure airlines take off on time and significantly enhance the customer experience. The right communications system can effectively track baggage from the check-in desk to hold and back to the reclaim halls. Text messaging and wireless application protocol (WAP)-enabled photographic downloads can help baggage handlers get access to information in real time, ensuring the swift and efficient processing of passenger baggage and freight and to meet short transit times for connecting flights.

Get the Picture?

The benefits of digital radio extend beyond the terminal buildings to the tarmac, for effective management of on-site incidents or accidents. Damage

Sending the nearest fuel tender, baggage truck or transit bus not only saves time and increases efficiency, it also reduces the amount of airside traffic.

to vehicles, airport equipment or the runway are all par for the course in aviation management. But waiting for the relevant staff member to travel across site, assess the damage and return to the office to take the required action can cause severe delays to operations. With a digital system in place, ground staff can photograph and record specific damage on the spot and transmit the data in real time to the operations center, where immediate decisions can be made on the best course of action. This approach helps to guarantee any delays are kept to a minimum, streamlining airport management and enabling airlines, ground staff, baggage handlers and airport managers to communicate more easily and to coordinate operations more effectively.

With TETRA radio networks increasingly being deployed, the airline industry can access previously unavailable services such as Internet and WAP-based applications, which until now, were only available on public cellular networks, opening a new era of truly secure data services.

Network and software service providers are building application-focused solutions that enable radio users at airports such as Heathrow to access a range of mission-critical applications. The highly tuned solutions deploy TETRA networks and the latest digital compression techniques to maximize application performance over the relatively narrowband world of radio networking.

In this manner, the potential of TETRA and P25 radio systems to support the fast-paced demands of the airport environment is evolving rapidly. Business-savvy radio network integrators and operators are working with the airline industry to mold infrastructure, terminal and software applications into tangible, secure solutions for immediate and cost-effective deployment. Getting the right information to the right people at the right time over a single unified radio network keeps the wheels of aviation well oiled. ■

Ian Carr is the managing director of radio communications specialist Team Simoco. Carr has 28 years of industry experience managing commercial, manufacturing and operational performance. E-mail comments to editor@RRMediaGroup.com.

TEDS Advances

Release 2 of the TETRA standard moves closer to commercial deployments.

By David Taylor

TETRA is one of the main digital technology options for mission-critical radio users. The technology is evolving, with TETRA 2 — including TETRA Enhanced Data Service (TEDS) — promising improved services. According to many of the top manufacturers attending the latest TETRA World Congress (TWC), systems are nearing commercial deployment.

TETRA 1 — which includes versions of the specification prior to September 2007 — is mature, and hundreds of systems are deployed, with many hundreds of thousands, potentially more than 1 million, terminals. These terminals use voice and data features, including status messaging, short data, circuit-mode data and IP packet data. IP packet data can be either single-slot or multislot packet data (MSPD). All these data transmission systems work on the standard 25-kilohertz TETRA carrier and seamlessly present applications to users. There is also some use of concurrent services, with simultaneous voice and short data and simultaneous packet and short data. The 25-kilohertz carrier limits data rates, and the typical throughput of MSPD will be 12 kilobits per second (kbps) with some error protection applied.

TETRA 2 is the name given to a number of enhancements to the TETRA standard. These include improvements to the data rates, known as TEDS, as well as changes to allow terminals to operate at greater distances from the base station, typically used for ground-to-air applications and planned changes to the code to improve compatibility with UMTS services. The latest air interface document, EN 300 392-2 V3.2.1, covers the TEDS and ground-to-air changes.

TEDS

TEDS provides a suite of data services as an adjunct to the voice and data component of TETRA. It operates alongside TETRA; the radio will initially use the TETRA control channel and voice services on TETRA, although there are now a number of data-only devices. If the radio wants to operate at a higher data rate, it will request access to the TEDS carriers.

TEDS has a range of channel bandwidths and a range of data formats, which result in data rates between 10 and 518 kbps; in practice, the full-rate modulation is only usable in a line-of-sight unfaded situation, which reduces the maximum rate to 345 kbps. Channel bandwidths can be 25, 50, 100 or 150 kilohertz, and modulation schemes can be 4, 16

Photo courtesy EADS

or 64 QAM — the latter with several coding rates. There is also the possibility of π/8-D8PSK in a 25-kilohertz channel. The higher rate modulations will degrade the sensitivity, so that range is reduced compared with the TETRA 1 signals radiated from the same site. For 64 QAM in a 150-kilohertz channel, this could be up to 16 dB degradation in range performance.

Simulation work has shown that the 4-QAM modulation at lower channel bandwidths has a better performance — hence the increased range — than the π/4-D8PSK TETRA 1 signal, albeit with a lower throughput. There may be applications for the call-out service or for TEDS low-bandwidth channels to replace MSPD; however, this would require the terminals to be TEDS compliant. For example, a 25-kilohertz channel with 16 QAM and half-rate coding would have a throughput of around 19 kbps and similar RF performance to an MSPD channel. This is an improvement on current MSPD implementations.

As stated earlier, the current specification of TEDS requires it to sit alongside a TETRA 1 system. Even if the system is a data-only system, registration of the terminal must take place on the TETRA 1 control channel, and then the radio has to request TEDS data services, at which point it will be moved to the TEDS channel. This will happen whenever the radio is powered up.

For a new network being deployed for a user who only needs data services, this adds unnecessary complexity, with the network having TETRA 1 25-kilohertz channels and 50-kilohertz TEDS channels. It would be simpler for the signaling to take place on the TEDS channel, which is being developed within the

Throughput for Different TEDS Channels

Modulation type and coding rate	Channel bandwidth (kHz)							
	25		50		100		150	
	Uplink	Downlink	Uplink	Downlink	Uplink	Downlink	Uplink	Downlink
π/4-DQPSK, r = 2/3	15	15						
π/8-D8PSK, r = 2/3	24	24						
4QAM, r = 1/2	10	10	24	26	49	55	77	86
16QAM, r = 1/2	19	20	47	51	98	110	153	173
64QAM, r = 1/2	29	30	71	77	146	164	230	259
64QAM, r = 2/3	39	40	94	103	195	219	306	345
64QAM, r = 1	58	60	141	154	293	329	459	518

The throughput figures use all four time slots and include allowance for synchronization and pilot symbols, channel coding, and lower layer protocol headers and functions.

TETRA working groups. With so-called TEDS Direct Access, suitable data devices would operate only on the TEDS channel, registering and using the channel for data. For a data-only network, there is no need for a TETRA 1 carrier; while in mixed voice and data networks, large numbers of data-only devices can be supported on the TEDS rather than TETRA 1 control channel, reducing the load on the existing TETRA 1 control channel.

Interoperability Profiles

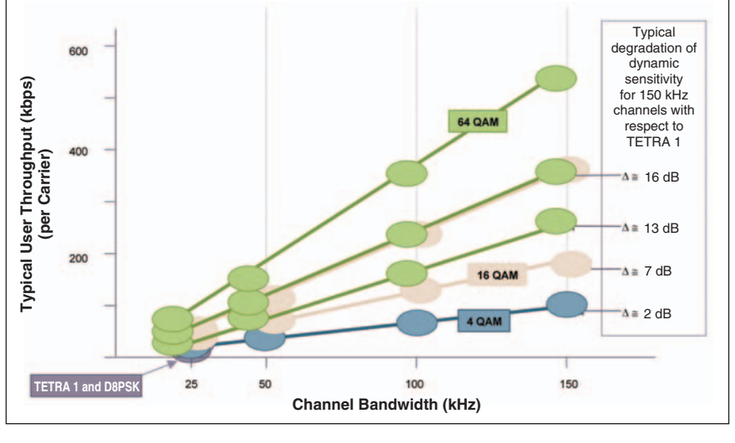
European Telecommunications Standards Institute (ETSI) Air Interface Specification EN 300 392-2 V3.2.1 was published in September 2007, with the work started in 2005. The publication of the air interface is an important element, but isn't the only element necessary for successful products that will work with all infrastructures. The success of interoperable TETRA systems and terminals is the interoperability process, led by the TETRA Association. The process uses the ETSI specification to develop a TETRA Interoperability Profile (TIP), which provides a baseline functionality of implementation of a feature and allows manufacturers to develop terminals that will interoperate with infrastructure and follow the implemented functionality. Alongside a TIP, a test plan shows how to test interoperability.

The TIP for implementing packet data, including TEDS, was published in December 2008. It covers only the 25- and 50-kilohertz channel bandwidths and specifically excludes the higher channel bandwidths of 100 and 150 kilohertz. The test plan, which details the tests to be performed during the TIP testing, isn't published yet. Therefore, no TEDS infrastructure or terminals have been submitted for TIP certification.

Another important element is the peripheral equipment interface (PEI). This is the access point on terminals that allows external data applications to communicate with the servers in the infrastructure. This is currently specified as an RS-232 port, although it allows other physical implementations as options. Clearly, this isn't suitable for even the moderate data rates provided by 50-kilohertz TEDS, and work is under way to develop a PEI for this purpose.

TEDS Advances

Signal Degradation at Various Modulation Levels and Bandwidths



Development of TEDS

TEDS requires development of

TETRA 1 systems tend to make efficient use of the communications links from the base site to the infrastructure, so these will need to be updated for the extra bandwidth available from TEDS.

infrastructure and terminals. For infrastructure, the work is generally required only at the base station and the communications links to the switch sites. Limiting the bandwidth to 50 kilohertz reduces the complexity of the development, and from a hardware point of view, if a supplier has recently upgraded its base site hardware, the hardware may already be TEDS capable and require only a subsequent software upgrade. Otherwise, changes to some of the equipment in the base station will be required.

TETRA 1 systems tend to make efficient use of the communications links from the base site to the infrastructure, so these need to be updated for the extra bandwidth available from TEDS. No terminals currently support TEDS, and suppliers must develop a new series of TEDS-compatible terminals — almost certainly mobile terminals rather than portables initially. This is less of a problem with new systems, but will slow the deployment of TEDS where there is a large user base of existing terminals because of the three- to five-year refresh cycles for TETRA terminals.

A further question is whether there is a demand for handheld and mobile terminals. Suppliers have indicated they are developing both devices, which is sensible, because they usually share the same software code base. One of the initial contracts for TEDS was the Norwegian public-safety radio network Nødnett; the project deployed TEDS for vehicular use to cover main roads and cities. If TEDS were deployed at anything other than 4-QAM levels for wide-area handheld use, more sites would be required than for a TETRA 1 voice network.

Equipment Availability

A snapshot of TEDS progress, including a dialog with a number of suppliers at TWC 2009, held at the end of May in Munich, showed that TEDS systems are nearing commercial

deployment. EADS showed a proof-of-concept TEDS system at TWC 2007 in Madrid with 64 QAM and a 50-kilohertz channel, with unprotected payload data passing at 160 kbps. EADS has public contracts to supply TEDS to South Africa for the South African Police Service (SAPS) and for VIRVE in Finland. Development is progressing to schedule, but no systems are live yet.

Motorola demonstrated a proof-of-concept 50-kilohertz TEDS application with various modulation rates at TWC 2009. Motorola has a contract for TEDS in Norway with Nødnett, where the plan is to install the system as a TEDS-capable TETRA 1 system and then enable TEDS capability. To do this, TEDS 50-kilohertz transceivers will be plugged into selected base stations with a subsequent software upgrade to give full TEDS functionality. TEDS trials are expected to take place later this year, with general availability of TEDS terminals early next year. Motorola executives see a need for vehicle terminals initially followed by PDAs and portable terminals later. They anticipate that future TEDS handheld devices will be an evolution of traditional portables, likely using new and innovative form factors.

No TEDS infrastructure or terminals have been submitted for TETRA Interoperability Profile (TIP) certification.

Selex Communications hasn't announced contracts, but has developed TEDS-ready infrastructure and is developing TEDS terminals. Field trials are planned by the end of 2009. Sepura is developing TEDS and is watching the parallel developments of EADS and Motorola. Until the interoperability process (IOP) for TEDS is under way, there are in effect two streams of TEDS development, and independent terminal suppliers are cautious of development efforts at this stage. This was the case in the early days of TETRA, and it remains a risk with such a significant update to the air interface specification. Teltronic also has a new base site transceiver capable of supporting TEDS with a software upgrade. ■

David Taylor is a lead consultant with Analysys Mason. He has worked on many TETRA projects, including the Airwave system in the United Kingdom, and Taylor has an in-depth knowledge of the TETRA standard. E-mail comments to david.taylor@analysysmason.com.

Radio System Protects Elephants

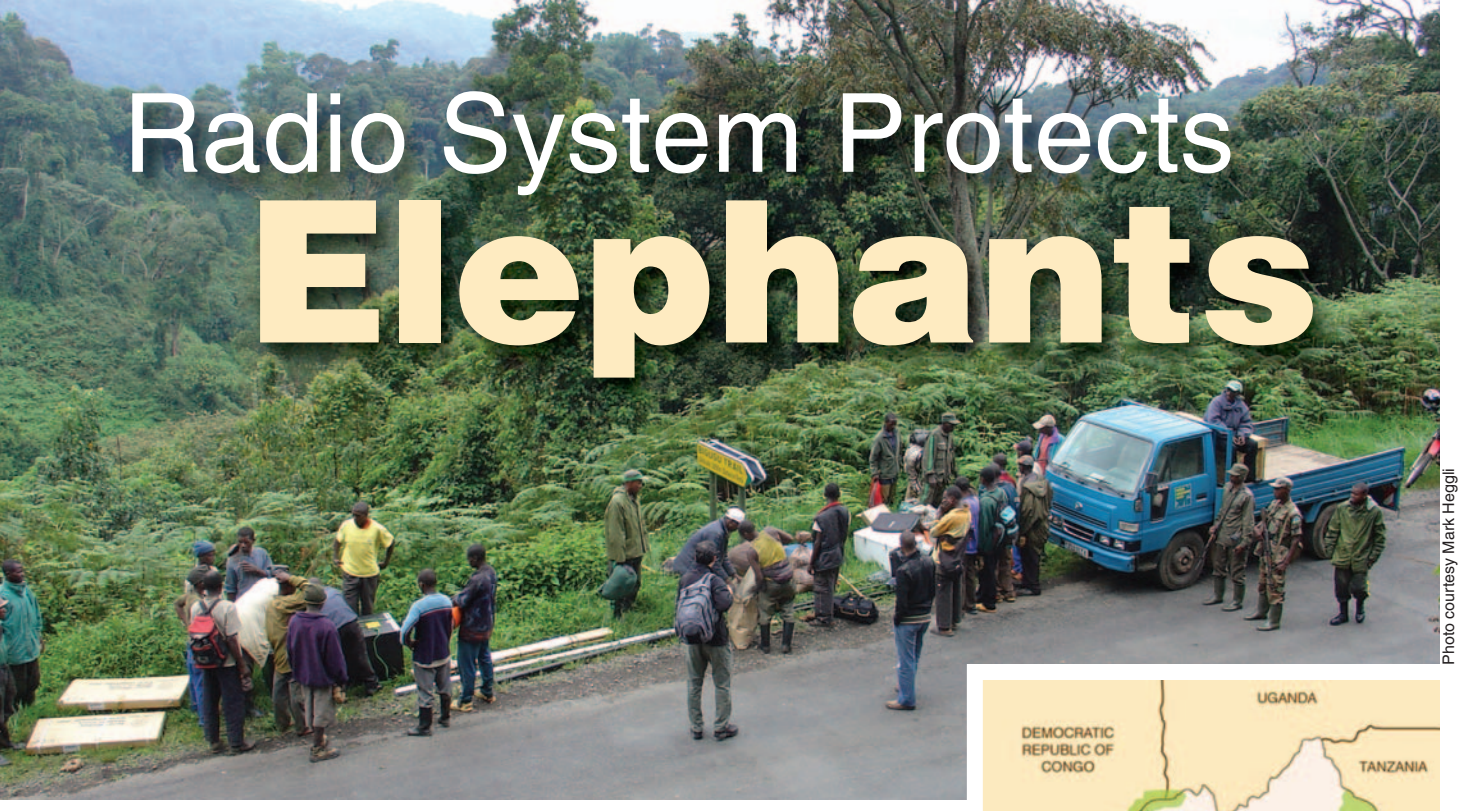


Photo courtesy Mark Heggli

Nyungwe National Park rangers needed reliable communications to protect wildlife and deter poachers in Rwanda.

By Mark Heggli

Some North American vendors are seeing increased opportunities internationally for mobile communications equipment. Often, the equipment must be tailored to serve a specific application. For example, solar-powered repeaters are the only practical solution in some remote areas of the world.

Nyungwe National Park is located in the southwest corner of Rwanda. It is a natural game reserve for elephants and other large animals that have been devastated by poaching. Poachers killed the last surviving elephant in the park in 1999. The Wildlife Conservation Society and the Bronx Zoo in New York undertook an initiative to reintroduce elephants into the park. In support of this initiative, U.S. Agency for International Development (USAID) funded the establishment of radio communications infrastructure in the park so that park rangers could effectively do their jobs in tracking wildlife and deterring poachers. The project was under general management of the International Resources Group, which is involved in managing USAID projects around the world.

This project will hopefully encourage ecotourism in Rwanda through improved biodiversity conservation and in particular aiding the Nyungwe National Park in managing the natural flora and fauna of the park. The park intends to reintroduce the elephant, and with an increasing number of rangers and trackers, the survival of the elephant is optimistic.

Consulting firm Innovative Hydrology in California was requested to specify the radio equipment required for the park based on solar-powered supervisory control and data acquisition (SCADA) telemetry work previously done in other parts of Rwanda. Daniels Electronics was awarded the contract for the radio repeater equipment. Daniels built, configured and tested the complete radio equipment configuration prior to shipment, ensuring it was ready for easy installation in Africa. Comprod Communications provided site equipment, including a four-cavity VHF duplexer and a two-bay heavy-duty VHF exposed dipole antenna, for the project.

The Installation

Innovative Hydrology supervised the installation of the Daniels repeater in the park. The equipment was shipped from the United States to the Rwandan capital of Kigali. From there it was trucked to the park. It all arrived safely, and after a thorough check to make sure everything was there, it was prepared for transport to the site. The

Radio System Protects **Elephants**

Nyungwe National Park is located 2 degrees south of the equator with an altitude of 1,828 – 3,048 meters, which equates to comfortable temperatures during the day and evening.

The local laborers earn US$3 per day so manually carrying all the equipment up the 610 meters to the summit was cheaper than using helicopters to fly the gear to the top. A small army of porters carried everything — batteries, the repeater and a 7.62-meter steel mast — up the mountain. Daniels had preconfigured the radio repeater with duplexer in a cabinet. Once at the summit, porters uncrated the equipment and installed it in the repeater building.

Everything worked flawlessly on the first powerup. The team deployed the solar panels, installed the battery banks and wired the equipment together. Installing the antenna had a definite Rwandan approach. The lack of supplies wasn't a concern and did not slow down the installation. To mount the antenna mast, scaffolding was built using a machete and some nearby trees in less than two hours. From there it was a straightforward effort to raise and secure the antenna. The people of Rwanda are resourceful and creative.

The team tested the repeater from several locations around the park, and everything worked fine. Previously the park had maintained communications with three rangers who lived on the summit, relaying messages around the park by handhelds. Confusion was often introduced with the human relay method. With the successful installation of a solar-powered repeater, the rangers can now communicate throughout the park; a few rangers will remain to protect the equipment.

Since the installation, radio communications has increased at least five fold. Ranger stations that could never communicate with other ranger stations can now communicate and carry out the business of the park. The rangers and wardens are truly thankful for the equipment, and it was a rewarding project. ■

More Information

Wildlife Conservation Society
www.wcs.org

New York's Bronx Zoo
www.bronxzoo.com

USAID
www.usaid.gov

International Resources Group
www.irgltd.com

Mark Heggli is a consultant with Innovative Hydrology in Auburn, California, USA. The company's Web site is www.innovativehydrology.com. E-mail comments to editor@RRMediaGroup.com.

Base Stations and Repeaters

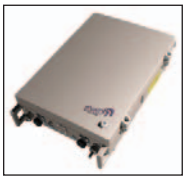
In this issue, we look at a variety of base stations and repeaters. For more information on a product, please contact the appropriate company via its Web site at the end of each listing. Be sure to mention that you found the information in *RadioResource International* magazine.

Alligator Communications

The Alligator Model 1800 frequency synthesized, redundant base station/repeater is available in the 400 and 900 MHz and 1.4 GHz bands. The Common Time base technology provides zero frequency offset between four internal RF modules, and a single adjustment of the transmit frequency calibrates the entire unit, company executives said. The station's built-in intelligence performs automatic checks of a warm standby transmit module and schedules rotation of the transmit modules. When any replacement module is installed, it automatically programs to the operating frequency. The unit features a built-in auto answer device for dial-up diagnostics. Visit the Web site www.alligatorcom.com.

Axell Wireless

The CSR438 is a TETRA digital repeater based on software-defined radio (SDR) technology that provides secure radio coverage in any TETRA network, company officials said. The repeater can be used to expand a base station's service area by filling in coverage gaps caused by terrain, buildings or tunnels, and into remote or rural areas. The SDR technology enables new wireless features and capabilities to be added to the existing radio systems through software upgrades rather than hardware upgrades. The repeater features low delay and high selectivity filter configuration parameters and alarm monitoring within the same hardware. Visit the Web site www.axellwireless.com.

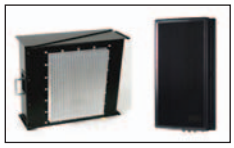


BridgeCom Systems

BridgeCom Systems' latest addition to the TL-NET line of products, the SSMC-1, functions as a single channel communications site that can be networked into a service provider's wide-area network. The solution contains the company's CS-540 FM repeater, TL-NET repeater controller and TL-NET Ethernet gateway packaged in a rugged wheeled case. The package requires a high-speed Ethernet connection to communicate on a wide-area network and supports operation in both conventional and logic trunked radio (LTR) modes. The solution can be custom built in several configurations where both UHF and VHF conventional and LTR are supported. Antenna duplexers for both bands are optional. Visit the Web site www.bridgecomsystems.com.

Comsystems

The BS2000 and COMREP55 are repeaters that work in the 66 – 88, 146 – 174 or 400 – 470 MHz bands and feature lightweight, weatherproof cabinets for wall or pole mounting. The cabinets are ideal for mounting apparatus that requires heat dissipation in an outdoor or nontemperature-controlled environment, company executives said. The cabinets are in 4-millimeter seawater resistant aluminum, and the integrated heat sink is a full-length extruded aluminum profile, which provides a large internal surface in the cabinet for cooling of any heat-producing equipment. All exposed surfaces are coated to prevent corrosion, and gaskets and locking screws prevent ingress of water and dust. Visit the Web site www.comsystems.com.



Damm Cellular Systems

The Damm TETRA BS421 outdoor base station and the BS41x indoor base station can be installed with up to four carriers at one site and with up to eight carriers, respectively. Both base stations are designed for a fully distributed IP solution, scalable from single to large ultisite networks, and are integrated with LogServer, Dispatcher and Network Management, and an internal GPS receiver. The base station can be mounted directly in the mast close to the antennas, providing full dual RX diversity for optimal sensitivity, and features a built-in duplex filter with an output power to the antenna of up to 10 watts. Visit the Web site www.damm.dk.

Daniels Electronics

Daniels' Project 25 (P25) Trunked Radio System provides a compact, low-power stand-alone system for customers requiring digital P25 communications for a large number of users from a single site. For police, fire or utility applications, the unit is a complete radio system that can be quickly deployed on a temporary or permanent basis without complex network or console interfaces, company officials said. The system builds on the existing MT-4E P25 conventional hardware platform and requires no changes to the RF hardware. Visit the Web site www.danelec.com.

GE MDS

The MDS Mercury series is built on WiMAX technology for high-speed and long-range industrial networking. Available in 900 MHz and 3.65 GHz, the unit is ideal for multiple environments and applications with simultaneous IP/Ethernet and serial connectivity, multi-megabit speeds, high security and industrial strength. The mobile data solution is for deployment where security, channel availability and high throughput are required, and the single-box solution cuts infrastructure costs up to 67 percent, company officials said. Visit the Web site www.gemds.com/mercury.

EF Johnson Technologies

The 2600 Series base station/repeater is part of the Conventional IP25 system solution that meets the requirements of Project 25 (P25) digital operation as well as TIA 603 analog operation. For added convenience and network management, the unit can interconnect through a network using industry-standard routers. Operating in VHF, UHF or 800 MHz frequency bands, the base station/repeater offers performance specifications suitable for crowded spectrum environment and heavily loaded sites, company executives said. Tuning software can guide the service technician through detailed tune-up and setup procedures, and Write-On flash memory enables updating of radio operating software via PC. Visit the Web site www.efjohnson.com.

Fiplex Communications

Fiplex Compact Repeaters for TETRA and Project 25 (P25) applications are a cost-effective solution to increase indoor and outdoor coverage of a system by providing extended coverage with minimum infrastructure investment, Fiplex executives said. Features include low and high output power, band and channel selective with out-of-band rejection, and over-the-air and Fiber Feed versions are available to fulfill different installation requirements. The repeaters meet all FCC and European Telecommunications Standards Institute (ETSI) regulations. The compact repeater family is also available for 700, 800 and 900 MHz, iDEN, GSM, W-CDMA, AWS, and LTE applications. Visit the Web site www.fiplex.com.

Icom Japan

Icom's IC-FR5000 series is a 50-watt FM and IDAS digital dual-mode repeater for VHF/UHF bands with 25-watt versions also available. The repeater has an IDAS conventional IP networking capability that links up to 16 IDAS repeaters via an IP network

and a single-site IDAS trunking capability. The unit comes in a two-unit height 19-inch rack mount design. In addition, the RC-FS10 remote communicator creates an IP-based virtual radio on a PC and can use the repeater series as an IDAS conventional base station from a remote location via an IP network. Visit the Web site www.icom.co.jp/world/idas.

Innovative Circuit Technology (ICT)

The CS120-15A/MOT12 is the latest addition to the Innovative Circuit Technology (ICT) base station series. The unit incorporates ICT12012-15A switching power supply factory assembled with the BASE-MOT12 base station cover and comes with an external

speaker. The base station provides a compact mobile radio base station housing that is individually customized to the Motorola XTL1500, XTL 2500 and XTL5000 mobile radios. The switching power supply delivers continuous trouble-free operation and incorporates extra filtering, providing a virtually noise-free environment. Visit the Web site www.ict-power.com.

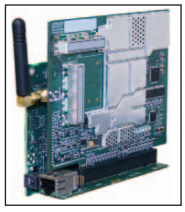
Kenwood Japan

NXR-700/800 is a digital and FM base/repeater unit for Kenwood's NEXEDGE systems that support both FM analog and NXDN digital fleets, as well as conventional, trunked and wide-area trunked IP network solutions. The base/repeater operates in

both 6.25- and 12.5-kilohertz digital channels and 12.5- and 25-kilohertz FM channels. The dual usage makes efficient use of current analog assets and can be adapted to a variety of business situations, company officials said. Visit the Web site http://nexedge.kenwood.com.

Lyrtech

The GSM femtocell portable radio software transceiver (PSRT) is a small-scale, short-range GSM base transceiver station (BTS) for homes and small offices. The station can register mobile



users, act as a standard BTS, and forward/receive voice and data over an Ethernet-based network. The base design features low-cost digital signal processor field-programmable gate array (DSP-FPGA) architecture that allows fully programming the baseband processing chain. The digital baseboard interfaces with a modular front end, making it easy to customize, and was ported to the PSRT, which allows it to operate as a stand-alone, short-range indoor femto BTS, using a pico BTS profile from European Telecommunications Standards Institute's (ETSI) GSM specifications. Visit the Web site www.lyrtech.com.

Midian Electronics

The RM-1 connects two two-way radios to transform them into a cost-effective repeater. The unit can be used as either a permanent repeater for pub-

lic safety and amateur radio operators, or as a temporary repeater for search-and-rescue operations. The repeater incorporates a DTMF decoder to provide authorized access and/or closure. Two modules can be used to create a cross-band repeater. Features include station identification (ID), programmable hang time and ID repeat time. Visit the Web site www.midians.com.

Midland Radio

Midland's 700 and 800 MHz base stations/repeaters feature 100-percent continuous duty, with up to 100 watts transmit (TX) output power, and provide a remote site operation reliability rate of 0.991 percent. The stations offer a 500-channel capacity, are program-

mable by channel for digital, conventional modulation or mixed mode, and are programmable by channel for base station or repeater operation. IP phone, tone remote interface and data encryption standard/advanced encryption standard (DES/AES) encryption are available. Midland also offers conventional Base Tech II analog-only low-band and VHF/UHF models from 50 to 110 watts continuous duty TX power. The base stations/repeaters offer a five-year warranty. Visit the Web site www.midlandradio.com.

Mobat USA

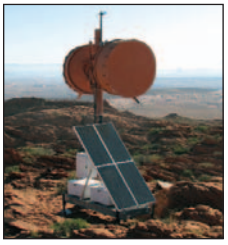
The RM-500 is a high frequency (HF) single-sideband (SSB) base station that operates in the 1.8 – 30 MHz range with a power output of 500 watts continuous. The base station is certified by Joint Interoperability Test Command

(JITC) for compliance with the military standard for automatic link establishment (ALE) and can sit on a desktop or be mounted in a 19-inch rack. Features include built-in 110/220 VAC power supply, desk microphone and continuous duty cooling. Optional features include 2ISB operation, internal Mil-Std 110 data modem and internal vocoder with National Institute of Standards and Technology (NIST)-approved advanced encryption standard (AES).

Also available are 125-watt and 1-kilowatt configurations and a full line of accessories, including special Air Force HF global software, antennas and tuners. Visit the Web site www.mobat-usa.com.

Peninsula Engineering Solutions

Peninsula Engineering Solutions designs and manufactures a full line of microwave RF repeaters from 1.5 to 11 GHz for remote locations. The repeaters are engineered to use little



electrical power — in most cases 30 watts of electricity — and can easily be powered using solar, wind or hybrid power sources, company executives said. The repeaters are compatible with all point-to-point microwave radio systems, and are active, nonfrequency shifting gain devices that can be economically substituted for back-to-back radios or passive reflectors. The repeaters work in -40 to 60 degrees Celsius with no shelter required. Visit the Web site www.peninsulaengineering.com.

Polycom

Kirk Solutions are built on the international Digital Enhanced Cordless Telecommunications (DECT) standard and include base stations and repeaters, as well as wireless phones that run on the networks. The wireless solution provides dynamic channel selection and allocation for high security and reliability, Polycom executives said.

The modular nature of the solution allows customers to expand coverage, voice traffic and the number of users. A number of different servers are available including the Kirk Wireless Server 300, which is a single-cell solution designed for server message blocks (SMB), and the Kirk Wireless Serer 600v3, which scales up to 1,500 wireless users. Visit the Web site www.polycom.com

Rohde & Schwarz Professional Mobile Radio

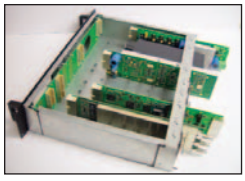
The DIB-500 R4 TETRA base station's ultra-compact, light design combines with low dissipation losses

and flexible input voltage. The base station ensures a high level of operating reliability and absolute availability because of comprehensive integration in scalable redundancy concepts, according to company

executives. Other features include remote monitoring and maintenance for simplified site management and reduced on-site visits, executives said. The base station also offers optimized transmission power and receiver sensitivity. Visit the Web site www.rohde-schwarz.com.

Rohill Engineering

The third-generation R-8070 is a TETRA base station transceiver that combines coverage enhancements with environmental qualities, Rohill officials said. The transceiver is fully Restriction of Hazardous Substances (RoHS) compliant. The power efficiency of the amplifier is more than doubled when compared to first-generation amplifiers, enabling savings on costs for electricity, air conditioning and power backup capacity at the base station site, officials said. Other environmentally friendly features include remote monitoring and control, remote software download and advanced functions such as a low-power standby option. The transceiver is TETRA Release 2 prepared. Visit the Web site www.rohill.com.



Sonik Messaging Systems

Sonik's PTX-150 and Wireless Messaging Base Station (WMBS) base stations are designed for continuous duty simulcast applications and offer remote diagnostics and alarms. The base stations are compatible with utility paging telemetry protocols, such as SA206, and offer upgradeability for Motorola and Glenayre legacy paging systems.

The base stations are custom designed to include filters, isolators, controllers, power supplies and GPS receivers, for improved frequency stability and simulcast timing. Sonik uses Zetron controllers and paging terminals in turnkey systems. Visit the Web site www.sonik.com.

South Midlands Communications (SMC)

Model FP1 is a desktop base station/power supply with built-in UPS facility for use with Motorola analog, digital or TETRA radios. The power supply unit (PSU)/UPS either operates from a float-charged internal battery or from an external 12 VDC supply. The AC supply can be 110 or 230 VAC. If the main power is unreliable, the battery charge level is indicated on a front panel meter. The steel construction of the housing allows the unit be used in harsh working conditions. Visit the Web site www.smc-comms.com.

Spectra Engineering

New options released for the MX800 base station can be selected and configured for three different levels of Project 25 (P25) functionality: the simple transparent P25 repeater, P25 base station or repeater modes with improved multiband excitation (IMBE) enhanced vocoder, and the fully integrated Fixed Station Interface (FSI). The FSI option incorporates a digital and analog interface with tone remote control that conforms to the latest P25 standards. Features of the FSI option include remote control and diagnostics over Ethernet, noiseless squelch, E&M type interface, alarm reporting, auto e-mail report generation and reduced current consumption. Visit the Web site www.spectraeng.com.au.

Tait Radio Communications

Tait added two transportable repeaters, the TB8100 (analog) and TB9100 (digital), to its range of rapidly-deployable communications solutions

for responders to quickly set up or extend a network on the move, company executives said. The lightweight repeaters use the same RF performance and software-based platforms as Tait's standard base station/repeater and come with easy-to-carry cases that each weigh 19 kilograms. The repeaters are interoperable, encryption capable and can be monitored and administered remotely via the built-in Task Manager. The repeaters provide full base station functionality, operating as either talk-through repeaters or line-connected base stations. Visit the Web site www.taitradio.com.

Teltronic S.A. Unipersonal

The Nebula is an Ethernet/IP-based base station. The base station offers distributed switching, with no circuit

switching required, and distributed intelligence, with up to 32 intelligent carriers per base station (SBS). The product features advanced local controller, which provides a full range of services in fall-back mode, and telephony gateways can be located in the SBS, providing distributed telephony interconnection. Additional features include a wide range of synchronous and asynchronous links between Node and SBS N2A protocol and full integration of voice and data applications developed by third parties. Visit the Web site www.teltronic.es.

Vertex Standard

The VXR-9000 rack mount repeater/base station can be mounted in a standard 19-inch rack and is available in 50- or 100-watt options for UHF and VHF. The repeater is designed for simplex mode with single-antenna operation or full-duplex mode with optional VXD-60 duplexer installed. The station can be programmed with up to 32 channels over a wide frequency range and can perform in repeater or base station mode depending on the application. Features include priority

channel scanning, six dual-function programmable keys, 47 CTCSS tones/108 DCS codes, encode and decode; CW identification transmitter; and CW message, compander per channel and D-sub 25-pin accessory connector. Visit the Web site www.vertexstandard.com.

New Products

TETRA Terminals and Switch

Motorola's MTP850S portable TETRA terminal is based on the MTP850 model and offers an intuitive mobile phone-style interface. The terminal features fully integrated voice and data services to provide access to

up-to-date information, a customizable menu system that includes talk groups, contact lists, mailbox, text messaging and the My Groups feature. The terminal also features man down, an emergency button, standardized 12-pin side connector and European Telecommunications Standards Institute (ETSI) Class 3L transmit power.

Motorola also introduced the Dimetra IP Micro TETRA switch and the CEP400 TETRA portable terminal. The trunked digital radio switch supports features such as integrated voice and data services and full-duplex IP telephony calls. The switch provides an interface to conventional analog systems for operators upgrading from analog to digital solutions. The CEP400 is a feature-rich digital two-way portable that offers users a cell-phone style user interface with loud and clear call clarity. Visit the Web site **www.motorola.com**.

Small TETRA System

Rohde & Schwarz Professional Mobile Radio developed an all-in-one solution, the AccessNet-T Campus IP, for small and regional TETRA digital radio networks. The

system offers exchange, base station and gateways in one box, making it ideal for operators of event venues or security systems, company officials said. The scalable and flexible system can be expanded to up to three base stations, as well as combined with other components from the product line for large networks. The system offers IP-based data transmission that eliminates the need for cost-intensive networking of the base stations via E1 lines. Communications via the public telephone system via a session initiation protocol (SIP)-based telephone interface is possible. Visit the Web site **www.rohde-schwarz.com**.

TETRA Terminals

Funk-Electronic Piciorgros launched a series of TETRA terminals, T-one, which features large, multicolor displays and user-friendly operation. The hand portable offers TETRA voice, data and encryption features and full interoperability with all networks, company officials said. The terminal also features GPS with the company's co-worker location feature. Visit the Web site **www.piciorgros.de**.

Data Module and Switch

EADS Defence and Security introduced TDM880i, a complete TETRA data module with GPS that can run as a stand-alone device or within integrated systems. The compact printed circuit board is built on the EADS i-range TETRA radios and is dedicated to positioning, telemetry, remote control and data transfer applications. The module offers 3 watts output power and operates in the 380 – 430 MHz frequency band.

EADS also announced the DXT3 TETRA switch, which uses the existing and new technical benefits from the DX 200 platform. The switch scales from small installations to big multiswitch nationwide solutions. The power consumption is low to save costs, and adding applications and operations is efficient, company officials said. Visit the Web site **www.eads.com**.

Vehicular Console

Teltronic S.A. Unipersonal's MVC 6000 multibearer vehicular console combines a variety of wireless technologies and applications over a single device, company officials said. The console has a transflective touchscreen designed for high visibility in direct sunlight. The console supports TETRA, Pro-

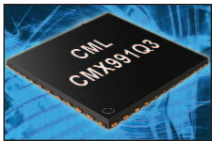
ject 25 (P25), Wi-Fi and mobile WiMAX. Mobile applications include e-mail, Intranet access, virtual private networks (VPN), navigation systems, video recording and integration with Teltonic's CeCoCo CAD dispatch solution. The console offers open architecture that allows users to incorporate third-party applications. Visit the Web site **www.teltronic.es**.

Wireless Dispatch System

Sungard Public Sector unveiled the DS2000C, a wireless enhanced dispatch solution based on the company's DS2000 suite of products. The out-of-the-box solution can support two to 12 seats and provides patching and interconnection of a range of communications and e-media. TETRA connectivity can be provided via PEI port fixed mobiles with session initiation protocol (SIP) and VoIP available to dispatch positions. The solution supports multiple languages and provides simple connectivity to other radio systems, telephone networks, closed circuit TV (CCTV), picture messaging and other e-applications. Visit the Web site **www.sungardps.com**.

RF Transceiver

CML Microcircuits' CMX991 is a high-performance integrated RF quadrature/low IF transceiver IC, which features an image-reject up-conversion modulation sys-



tem and flexible superheterodyne receiver. The product offers RF signal processing that is tailored for flexible operation from 100 MHz to 1 GHz, company officials said. The transceiver suits both narrowband and wideband wireless products including multimode analog/digital terminals, digital software-defined radio (SDR) for portable, mobile and base station designs. Intended applications include Project 25 (P25), Digital Mobile Radio (DMR) and general wireless data and satellite applications. Visit the Web site **www.cmlmicro.com**.

P25 FSI Access Point

The Fixed Station Interface Access Point (FSAIP-25) by **Westel RF Technology** is a Project 25 (P25) product designed to help users migrating from analog to P25 digital operations. The interface offers a way to connect to and control a P25 repeater over an IP network without having to replace existing tone remote and console

equipment. An Ethernet port supports the P25 Fixed Station Interface (FSI) for connection to the repeaters, and in-built P25 improved multiband excitation (IMBE) vocoding and data encryption standard (DES)-output feedback/advanced encryption standard (OFB/AES) provides end-to-end encryption. The product has a standard four-wire interface for connection to the console and is a one-rack unit (1RU) intended for 19-inch rack mounting. Visit the Web site **www.westelwireless.com**.

HF Modem

Codan introduced the RC-50 high-frequency (HF) modem for the Codan

2110M (military) manpack radio. The 9.6 kilobits per second (kbps) modem provides high-speed transmission of e-mail, imagery and other applications over challenging HF networks, Codan executives said. The modem supports Microsoft Outlook e-mail software and provides a wireless gateway to connect to Ethernet networks. The modem is fully integrated with automatic link establishment (ALE) capabilities and complies with Mil-Std-188-141B ALE and Fed-Std-1045 ALE standards. The unit is interoperable with commercial and other military-grade radios, frequency hopping and voice encryption. Visit the Web site **www.codan.com.au**.

Rapid Deployment Wireless Node

Excelerate Technology's RapidNet Wireless Perimeter is a rapid deployment wireless node that enables mesh networks to be quickly established to extend transmission

range of broadband satellite solutions. The node enables operational personnel to maintain phone, data, radio or video communications with mobile command and control facilities at distances of up to 300 meters per node with nearly limitless expandability, company executives said. The node head features a series of signal lights that indicate six operational modes. The tripod extends to a maximum height of 3.65 meters, and a tubular battery cell provides around eight hours of continuous operations. Visit the Web site **www.excelerate.info**.

Multipoint Link

MiMOMax Wireless released Multi-Point Digital Linking (MDL), which allows point-to-multipoint communications from a base

radio unit (BRU) to remote radio units (RRUs). The link uses a proprietary access scheme where up to 1,024 RRUs can be supported by one BRU. The link offers ultra-low latency, low jitter and flexibility and features the ability to host various interfaces. The link can be combined with the network digital link (NDL) to

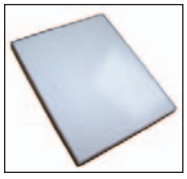
accommodate for harsh terrain and can be rack, pole or wall mounted. Visit the Web site **www.mimomax.com**.

Multifunctional RF Tester

The 2801 Multilock by **Willtek Communications** is a small, lightweight multifunctional RF tester that tests conventional and digital two-way radios. The tester is designed to support service shops repairing radio terminals and other RF equipment up to 3 GHz. The tester features an extra-large and bright display for operation in sunlight and has options for battery operation, remote control, cable fault finding and more. Visit the Web site **www.willtek.com**.

Directional Antenna

Cobham Antenna Systems, Microwave Antennas' Model FPA13-2.2R/1533 is a small, flat panel antenna with directional beam pattern for use within an information system for telemetry applications. The antenna offers 40-degree azimuth by 40-degree elevation and was designed to conform to existing technical and environmental specifications. The antenna has a frequency range of 2.2 – 2.35 GHz and 13 dBi gain with right-hand circular polarization. The antenna is discreet and unobtrusive in appearance, and its dimensions are 195 by 163 by 12.6 millimeters. Visit the Web site **www.cobham.com**.



Microwave Antenna

The HPLP1-18 by **Radio Waves** is a high-performance parabolic dish that is European Telecommunications Standards Institute (ETSI) Class 3 compliant. The 0.3-meters microwave antenna provides operators in Europe with a small and aesthetically pleasing solution on sites where Class 3 compliance is required to minimize interface in RF congested areas, company executives said. The antenna offers a five-year warranty. Visit the Web site **www.radiowavesinc.com**.

Portable Antenna

Sti-Co Industries introduced the Plug 'N Play Antenna for public-safety and covert vehicles. The magnet-mount antenna works with any portable antenna whip with a flush SP connector. The antenna is an easy install, suitable for temporary or permanent requirements, and can adapt to specific frequency applications, Sti-Co executives said. The antenna is available in base alone or with an optional whip. Visit the Web site **www.sti-co.com**.

Antenna Speaker Microphones

OTTO introduced two speaker microphones with improved coverage, the Storm antenna speaker microphone for Kenwood TK2180/3180 series radios, and the Evolution speaker microphone for Motorola XTS series radios. The microphones offer a design to achieve RF connection through the radio connector for improved communications. Both are sealed to withstand Mil-Std-810F, and the Storm has an IP68 rating. The microphones feature an emergency button, are fitted with a 360-degree rotating spring-loaded clothing clip and a 2.5-millimeter accessory jack accommodates earphone accessories for loud environments. Visit the Web site **www.ottoexcellence.com**.

Full-Duplex Encrypted System

Phonak Communications unveiled the Condor, a full-duplex encrypted wireless system. The durable, license-free all-in-one communications solution can be used out of the box and is comprised of a palm-sized radio unit, discrete under-the-shirt wiring and headsets. The system allows up to six users to communicate in full-duplex mode, and additional users can listen via the same closed network. All communications is over a secure encrypted channel. The system is 100-percent mobile because it does not require connection to a base station and uses only free-to-use frequencies, so no licenses are required. Visit the Web site **www.phonak-communications.com**.

Enhanced Mobile Technology

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advancements to its mobile virtual private network (VPN). Technology that allows users to simultaneously and securely access multiple wireless networks while maintaining reliable and continuous connection. The technology also allows users to access video, images and biometrics at the same time. The Concurrent VPN applications can be matched to technologies, allowing applications such as CAD to transmit over the most reliable wireless network available, while maintaining roaming and routing capability. Visit the Web site **www.radio-ip.com**.

Network Monitoring

Samdale launched an independent monitoring service of the U.K. Airwave nationwide TETRA network using Pegasus architecture that allows enterprise scalability to a national level with a network of fixed, portable and roaming probes. The probes are operated by multiple user organizations.

The probes automatically gather coverage and performance data, then encrypt and transmit the information live to a Pegasus server structured query language (SQL) database where the data is processed and analyzed in real time. If wireless connectivity is unavailable, the data is buffered locally on the probe and forwarded to the server when a wired or wireless connection is available. While fixed probes monitor key sites around the clock and provide immediate alerts of service affecting events, roaming probes can be fitted to vehicles to provide automatic, unattended drive test measurements. Visit the Web site **www.samdale.com**.

MOTOTRBO Application Board

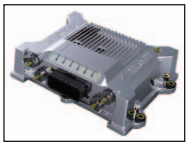
The Optional Board, by **MoniVox**, allows a Motorola MOTOTRBO radio to gain new functions. For a radio to perform functions from applications, the radio requires the Optional Board to be installed. Radio users can then personalize their radios and add functions such as man down, guard route control, lone worker, in door location, telemetry, access control and hundreds of other applications available with software. The company also offers three software options: MoniVox Classic, MoniVox Cabo Link MOTOTRBO and MoniVox Plus. Visit the Web site **www.monivox.com**.

Latin America Digital Maps

Tele Atlas announced the availability of new digital maps and related content covering Chile and Uruguay, along with updated maps of Argentina and Brazil. The company now offers coverage of five countries in Latin America, featuring more than 1.7 million kilometers and more than 750,000 points of interest (POI). The new maps offer additional content such as POIs to all the company's personal navigation, wireless, Internet, automotive and enterprise customers worldwide. Visit the Web site **www.teleatlas.com**.

Telematics Controller

The rugged TRAX MT-30SQ dual-mode telematics controller by **Morey** is an asset management product that helps fleet owners use, track and maintain equipment. The system employs wireless communications technology to access status and location



data of a company's vehicular assets worldwide, Morey officials said. The system received certification by the PCS Type Certification Review Board (PTCRB) for North America. Applications include fleet and trailer management; industrial automation control; and marine, security and asset management. The system also offers remote diagnostics and control. Visit the Web site **www.moreycorp.com**.

Software Integration

Zenitel developed a software interface between its Stentofon AlphaCom E IP-based communications system and Dvtel's Latitude NVMS 5.3 video security management software. The integration of the two IP systems features both video and audio monitoring by one central command

center or regional command centers across multiple sites. Call information can be monitored, and the associated camera can be queued on the Latitude system, showing the location of the call and logging all call activity including call requests, calls answered and calls cancelled, along with camera/video events with time and date stamping. The Latitude acts as the client, while the AlphaCom E system acts as a server and uses a broadcast mode to output the data. Visit the Web site **www.zenitel.com**.

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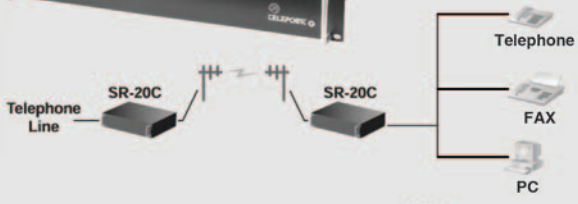

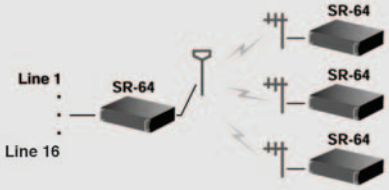

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22 – 24 July: Expo Comm Wireless Japan 2009, Tokyo. E.J. Krause & Associates: Beth Harrington, +1 301 493 5500, ext. 3312, harrington@ejkrause.com, www.expocomm.com/wirelessjapan

16 – 20 August: APCO 75th Annual Conference and Trade Show, Las Vegas, Nevada, USA. Association of Public-Safety Communications Officials (APCO) International: www.apco2009.org

2 – 3 September: Wireless China Industry Summit, Beijing. Peter Lee, +852 28651118, peter.lee@infoexws.com, www.wirelesschina-summit.com

15 – 18 September: 4G World 2009, Chicago, Illinois, USA. Trendsmedia: +1 617 259 2300, info@trendsmedia.com, www.4gworldsummit.com

5 – 9 October: ITU Telecom World 2009, Geneva. ITU: +41 22 730 6161, itutelecom@itu.int, www.itu.int/WORLD2009

21 – 23 October: SuperComm 2009, Chicago, Illinois, USA. Reed Exhibition: +1 203 840 4800, www.nxtcommshow.com

3 – 5 November: ID World International Congress, Milan. Wise Media: +39 02 8903 4100, idworld@wisemedia.com, www.idworldonline.com

9 – 10 November: 10th World Wireless Congress 2009, San Francisco, California, USA. World Wireless Congress: +1 650 288 4306, steve@delson.org, www.wirelesscongress.com

12 – 14 November: Port International India 2009, Mumbai, India. E.J Krause & Associates: +1 301 493 5500, petrillo@ejkrause.com, www.portinternationalindia.com

17 – 20 November: Milipol Paris, Paris. Milipol: +33 1 7677 1314, www.milipol.com

24 – 26 November: PMRExpo 2009, Cologne, Germany. EMW Exhibition & Marketing Wehrstedt: info@wehrstedt.org, www.pmrexpo.com

30 November – 4 December: IEEE Global Communications Conference (IEEE GLOBECOM 2009), Honolulu, Hawaii, USA. IEEE Communications Society: h.sweeney@comsoc.org, www.ieee-globecom.org/2009

8 – 9 December: Conference on Global Preparedness, Melbourne, Florida, USA. Global Center for Preparedness: +1 321 674 8342, cgpinfo@fit.edu, 411.fit.edu/cgp

2010

1 – 4 March: ITU Telecom Americas 2010, Buenos Aires, Argentina. International Telecommunication Union (ITU): +41 22 730 6161, telecominf@itu.int, www.itu.int

10 – 12 March: IWCE 2010, Las Vegas, Nevada, USA. Penton Media: Stacey Orlick, +1 203 358 3777, stacey.orlick@penton.com, www.iwceexpo.com

6 – 9 April: IEEE Dynamic Spectrum Access Networks (IEEE DySPAN), Singapore. IEEE Communications Society: h.sweeney@comsoc.org, www.ieee-dyspan.org/2010

20 – 22 April: BAPCO 2010, London. British Association of Public-Safety Communications Officers (BAPCO): www.bapco.co.uk

24 – 27 May: TETRA World Congress 2010, Singapore. TETRA World Congress: +44 20 7017 7878, enquiries@tetraworldcongress.com, www.tetraworldcongress.com

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2. Which of the following best describes your organization?

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

3. What is your function?

❑ A Corporate Management
❑ B Operations/Administration Management
❑ C Technical/Engineering Management
❑ D Sales/Marketing
❑ Z Others Allied to the Field—please specify _____

4. Do you recommend, specify or purchase radio communications equipment or services?

❑ A Yes ❑ B No

5. Is there any servicing of radio 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 _____

Q309

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Latin America Shows Promise for Telecom Growth

By Steve Baroch

Latin America is vast by any standard. The geographic region is typically considered to encompass Mexico south, which includes Central America to the end of South America and the Caribbean Islands. This includes 21 countries, 10 dependencies and more than half a billion people.

While some countries have been noted for frequent political instability during the past century, it may be the region's finest hour. Mexico is waging strong opposition to its drug problems and corruption, and ultimately, it should provide for a more stable country. Central America is in a period of peace with virtually no civil or cross-border wars. South America, with the exception of Venezuela and Bolivia, has generally stable, pro-business governments. Colombia, remarkably, is more stable now than many countries, and its tourism trade has been increasing in the double-digit percentage range for the past few years.

Tariffs need to be studied by anyone doing business in Latin America. Many countries have Byzantine tariff regulations, which can impact the ability to export to a country. Some countries offer tariff-free zones if a product is manufactured or assembled in certain disadvantaged regions of the country.

Regional Differences

Different regions act differently economically and culturally. Brazil and Mexico are each self-contained economic units and prefer to deal internally. Central American countries act as a unified block of nations and trade widely among themselves. South American countries demonstrate their cultural and historic distrust of each other, but this isn't to say that business is not done between borders; clearly it is. However, knowing which countries are willing or reluctant to do business with other countries can be beneficial.

No doubt the economic problems that have impacted the Northern hemisphere will continue to plague the Southern hemisphere. But the impact on the South has been slower to arrive. Martínez Lázaro of the Wharton School of the University of Pennsylvania says that 2009 will not be as economically painful in Latin America as it will be in other parts of the world. Lázaro predicts that in 2009, the Latin American economy will still grow by 2.5 percent. Projections for the United States, Europe and parts of Asia are much more dire. The German news agency Deutsche Press-Agentur is not quite as optimistic as Lázaro, but still predicts a 1.9 percent rate of growth for 2009. *Economist* magazine predicts that Peru will have tremendous growth at 5.5 percent, while Argentina, Brazil and Colombia will show about 2 percent growth. According to *Economist* predictions, Mexico will contract by 0.2 percent, and Venezuela will have a difficult year with an economic decrease of 3 percent.

The telecommunications market in Latin America is widely varied in its level of modernization and technology. Some countries, such as Bolivia and many of the Central American countries, are working with archaic systems. Other countries, such as Colombia and Chile, are technologically advanced.

Latin America has huge room for expansion. A good measure of technological advancement is the percentage of Internet penetration in a given market. For comparison, in June 2008, North America had 73.6 percent Internet penetration, South America had 27.1 percent and Central America had 18.5 percent. Clearly, there is room for technological growth.

Some areas of communications have advanced more quickly than others. Mobile telephony has grown tremendously. 2000 – 2003 saw an average growth rate of 33 percent in Latin America. "Explosive growth of cell-phone subscriptions indicates that emerging markets could rebound in the coming years — giving investors a heads up of impending profits," says Irwin Greenstein of the Contrarian Profits investing Web site. Some areas of communications, such as location technology, are just emerging. Two-way radio networks are still active. Digital two-way systems and products are available, but relatively slow to make inroads in the region because of higher prices than analog.

While any business venture is difficult and entry into a new region is more difficult, Latin America shows some promise in the short term and significant promise in the long term. Clearly, the more accustomed and familiar with the language and terrain a person is, the more successful the person will be. The technology markets in Latin America are active and ready to be supported by those willing to make the investment in money and time. ■

Steve Baroch has worked in electronics and telecom for more than 20 years and is a partner in The NetMark Group, a manufacturers' representative group covering the mountain states in the United States and all Latin America. The NetMark Group specializes in telecommunications and electronics products and was founded in 1993. Contact Baroch at sbaroch@thenetmarkgroup.com.

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