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Worldwide Buyers Guide 2012

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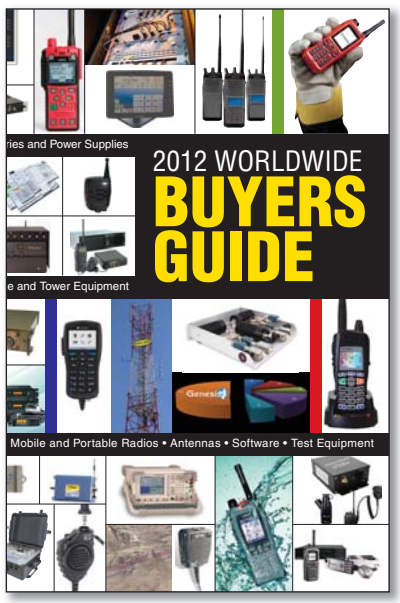
As the national TETRA public-safety network slowly rolls out, Germany sees steady analog markets, as well as the emergence of other digital technologies. *By Max Zerbst and Hans-Joachim Langermann*



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From TETRA and Project 25 (P25) equipment to CAD software to interoperability equipment to mobile-data and asset-tracking technology, the Worldwide Buyers Guide is a veritable resource, featuring nearly 600 companies and the products and services they provide to the global mobile-communications market. Use this handy guide to find all the information you need.

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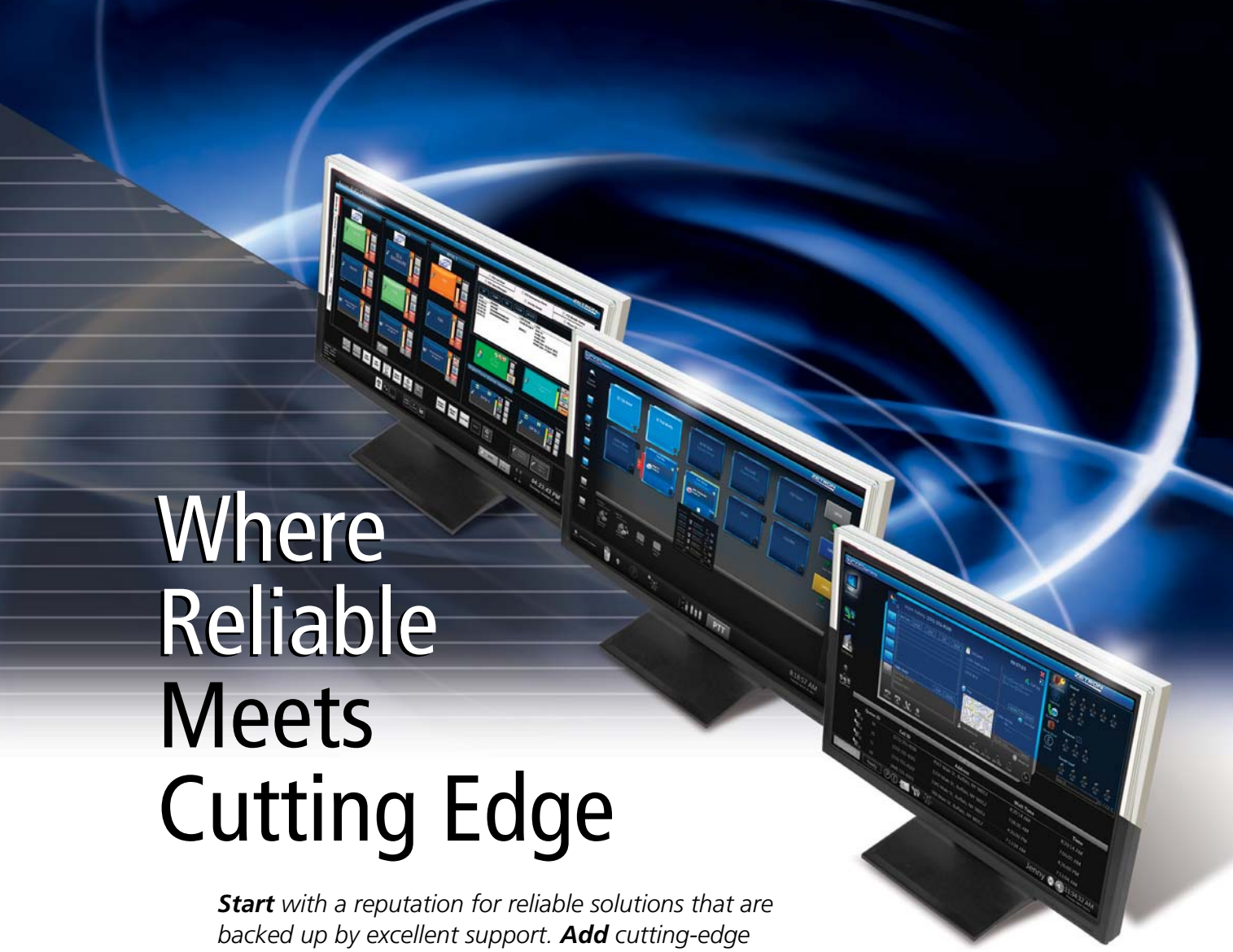

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Fifth Annual Buyers Guide

Welcome to the fifth annual Worldwide Buyers Guide. It is a dynamic time in the industry with the majority analog user base looking to upgrade systems or at least maintain networks that are in place. Many technologies, products and services are available to help mobile radio users as they look ahead to equipment purchases. The need for broadband systems is also coming into play for mission-critical industries in some countries and markets.

This guide will help with the often complicated buying process for our industry. You'll find details on wireless voice and data providers from manufacturers and software companies to services firms and distributors and manufacturers' representatives. The Product Category Index, which begins on Page 32, includes 184 different categories of products with a list of the vendors that manufacture or develop that product or software. Then use the company indices to find websites and more information. You'll find nearly 600 companies listed in the indices that begin on Page 20.

The online version of this information is also available at RRImag.com. Just click on SuperGUIDE on our home page. If your company isn't included, download a company profile from the website and return it to us or contact us at profiles@RRMediaGroup.com.

Our editorial and research staff goes to great lengths to ensure the data is updated and accurate. If you have suggestions for future content or feedback on something we've already covered, please contact us.

In addition to the large amount of company and product data in this issue, learn how both analog and digital networks are prevailing in the German market with the article beginning on Page 14. Interestingly, Germany's digital market has affected the established analog market in unexpected ways.

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

Sandra Wendelken, Editor
swendelken@RRMediaGroup.com

RadioResource INTERNATIONAL

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

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ASIA/PACIFIC

Australia Considers 800 MHz Public-Safety Broadband Spectrum

Australia is investigating the possibility of allocating spectrum to public-safety agencies in the 800 MHz band to support the deployment of a national interoperable mobile broadband network. The Public Safety Mobile Broadband Steering Committee is working with the Australian Communications and Media Authority (ACMA) as part of its review of the 805 – 890 MHz band. The ACMA is reviewing evidence provided by the committee, but has not made a decision regarding allocating broadband spectrum for use by Australia's public-safety agencies.

The ACMA is also working with the Asia Pacific Telecommunity (APT) and the International Telecommunication Union (ITU) on arrangements for personal protection and disaster recovery (PPDR) purposes for both narrowband and broadband in the Asia Pacific Region (ITU Region 3).

Sydney

The broadband steering committee also identified the need for arrangements with private sector telecommunications organizations to provide additional broadband capacity if required by Australia's public-safety agencies during major events, incidents or natural disasters or in remote areas where network construction is not viable.

The committee is developing an implementation-planning framework for a nationwide interoperable mobile broadband capability and will soon commence work on the governance arrangements for oversight to the implementation and operation of a broadband network.

The Standing Council on Police and Emergency Management (SCPEM), established by the Council of Australian Governments (COAG), is expected to review the committee's report at its next scheduled meeting in July. The outcome of SCPEM's consideration is likely to result in a report to COAG by the end of 2012.

Since its formation in May 2011, the Public Safety Mobile Broadband Steering Committee has completed work on three consultancy projects focusing on public-safety agency requirements and demands. Projects focused on the costs associated with a range of models for consideration, technical aspects and radio spectrum calculation, which all include backhaul infrastructure required for a national broadband network.

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SINGAPORE — Selex Elsag was awarded a contract by **NEC Asia Pacific** to upgrade the Singapore North East Line (NEL) TETRA communications system. Selex Elsag supplied NEL's existing TETRA system, which provides voice and data communications between operating control center (OCC) operators and other users of the network.

The communications upgrade is in line with the purchase of 18 new trains to meet increased projected ridership.

HAMBANTOTA, Sri Lanka — China Harbour & Engineering Co. (CHEC) of Sri Lanka selected **Cassidian** to equip Hambantota International Airport with a secure TETRA radio network. Hambantota International Airport will be inaugurated in September as the second international airport in Sri Lanka.

Queens Radio Marine Electronics in cooperation with the Cassidian team based in India will install, commission and activate the system, called Claricor. The new network will include an AVL function and can be integrated with planned airport security systems.

TAIPEI, Taiwan — Taiwan-based Vee TIME continued the expansion of its Taiwan high-speed railway (THSR) broadband network with **NewNet**'s WiMAX technology.

WELLINGBOROUGH, U.K. — The TETRA market shipped the largest number of terminals in 2011. The market saw growth of more than 9 percent compared with the terminals shipped in 2010, according to data from IMS Research.

Although growth is projected for the next five years, 2011 may be a high in terms of the level of growth. The year saw significant developments in regions outside Europe including the Middle East, Africa, South America and Australasia. "The success TETRA has had in the European arena is now being emulated in other markets, where new devices that offer enhanced capabilities including ATEX, covert and TETRA Enhanced Data Services (TEDS) are now gaining traction in the public-safety and security markets," said Deryn Evans, mobile radio market analyst at IMS Research.

TOKYO — Icom announced an internal reorganization and created new technology and production teams.

"Icom's recent organizational changes reinforce the company's mission of becoming a true solution provider," said Icom America President Hiro Nakaoka. "By restructuring our sales team and offering more support to technical services, Icom continues to provide innovative solutions for our internal and external customers."

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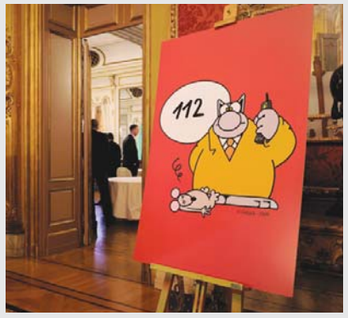
EUROPE

EENA Releases Next-Generation 1-1-2 Standard Document

European Emergency Number Association (EENA) released the first public version of the next-generation 1-1-2 Long Term Definition (NG 1-1-2 LTD) standard. The document provides the necessary elements to design a modern and efficient emergency call management process, where citizens can reach 1-1-2 with voice, text, videos and pictures and where data can be shared to facilitate the intervention of first responders.

To ensure global interoperability, EENA re-used existing standards as much as possible. In particular, European public-safety answering points (PSAPs) adapted work from the U.S.-based National Emergency Number Association (NENA). The NG 1-1-2 LTD document defines a long-term architecture for European emergency services



and remains voluntarily close to the NENA i3 standard.

"This is undoubtedly a key milestone reached. Europe was lacking such a reference document, and hence, we are proud to release the NG 1-1-2 LTD today," said Hannes Tschofenig, who has been drafting next-generation emergency services standards since 2004 and chairing the EENA NG 1-1-2 Technical Committee since 2009.

As in NENA i3, the core concept is the deployment of Emergency Services IP Networks (ESInets) to foster interoperability between emergency agencies, improve redundancy and benefit from the availability of larger pools of resources.

"This is a crucial document for the future of our emergency services and for the safety of European citizens," said Cristina Lumbreras, EENA technical director. "We are grateful to our NG 1-1-2 committee members and to our friends at NENA."

The document will be updated to include new standards and specifications, as well as to cope with rapidly changing technologies. Additional documents preparing the transition from E1-1-2 to NG 1-1-2 will also be published.

INTERNATIONAL

P25 Group Completes Digital Audio Tests

The Audio Performance Working Group (APWG), a working group under the Project 25 Interface Committee, completed work on digital versus analog audio performance testing under high-noise conditions.

The U.S. Public Safety Communications Research (PSCR) performed the tests. Representatives from PSCR, Project 25 (P25) standards groups, manufacturers, and fire and law-enforcement agencies collaborated to create a test plan intended to further characterize the background noise performance of analog and digital communications technology.

The tests used a modified rhyme test (MRT) method, which played a single word through the test setup and then asked the listener to select the correct word from a list of rhyming words. The MRT method was used to compare the performance of four reference models.

The test conditions aimed to represent real-world background noise situations and alternate use of breathing apparatus masks (SCBA) and PASS3 alarms typically required at fire scenes. In the clean channel scenarios, analog and digital audio performance was statistically equivalent as observed in four out of eight scenarios. Three of these four scenarios used the SCBA mask fitted with a voice port. Analog audio performance scored higher than digital in the other four clean channel conditions scenarios. Three of these four scenarios used the SCBA mask with an internal microphone.

In the six degraded channel scenarios, digital performed statistically better than analog as observed in the degraded channel in five scenarios. It was noted that holding the microphone closer to the voice port resulted in improved digital audio performance. Analog and digital performance was observed to be statistically equivalent in the final degraded scenario.

The use of different PASS alarms had no significant impact on audio intelligibility; however, the use of a mask with an internal microphone improved intelligibility in all analog cases, and most digital cases. Also, the full-rate and half-rate digital reference models were observed to be statistically equivalent in all scenarios.

"Great strides have been made over the past three years in improving intelligibility in high-background-noise environments," said John Lambrou, chair, APIC systems task group. "Continued efforts in the industry hold the promise of even more improvements."

Photo courtesy RADIODATA

Digital and Analog Prevail in Germany

As the national TETRA public-safety network slowly rolls out, Germany sees steady analog markets, as well as the emergence of other digital technologies.

By Max Zerbst and Hans-Joachim Langermann

The rollout of the national German TETRA network for public safety and security (PSS) continues; nevertheless, the rollout is delayed and behind the schedule and expectations of the PSS users. Other TETRA networks are deployed in the country, spread among public transport, utilities, municipalities and industrial applications. During the past three years there have also been deployments of Digital Mobile Radio (DMR) and NXDN-based networks throughout the country.

Some regions still have public trunked service available based on MPT 1327 analog technology. The largest MPT 1327 public network covers a region in southwest Germany. In fact, apart from the digital deployments, the country is experiencing a certain revival of analog products and systems. Although market forecasters report the market share of analog professional mobile radio (PMR) products will decrease below 20 percent in the long run, there is a strong demand for analog terminals and infrastructure, largely because of the delay of the PSS TETRA network.

Because the nationwide TETRA network was expected to be available sooner, PSS organizations reduced spending on maintenance of their analog terminal equipment. At the same time, manufacturers stepped out of the analog business. The result of the delay is now an increased demand for analog mobile terminals, which are certified according to German PSS specifications. Last year RADIODATA, located in Berlin, sold thousands of analog mobile terminals. The demand is expected to continue for the next two or three years. According to PSS insiders, the analog simulcast networks will be kept alive at least until 2020.

Fire Networks

A similar situation is occurring with radio coverage in large buildings and shopping malls. Analog radio coverage is activated on demand, such as in the case of a fire. In general, the systems are composed of one or more base stations used as simulcast repeaters with frequencies in the VHF high band, driving a leaky-feeder cable or more seldom a distributed antenna system (DAS). In most cases, redundancy is required for the base stations, and the leaky-feeder cable is then formed as a ring. The radio communications for the firefighters is full duplex, which avoids the need to press a push-to-talk (PTT) button.

The requirement for the network installations is part of the building permission and is a prerequisite for final approval. As such, the building owner has to bear the cost for procurement, operation and maintenance. The technical rules applied are specified by the regional fire service organization.

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According to PSS insiders, Germany's analog simulcast networks will be kept alive at least until 2020.

the analog systems have developed from the delayed rollout of the digital PSS network. Although the TETRA rollout has advanced in highly populated areas, TETRA has not yet arrived at many of the fire services, which are still operating on their analog radio equipment. The primary reason for this delay is the split in responsibility over the fire services. An agency of the federal government oversees the TETRA network deployment. The fire services depend on budgets from their local states in Germany, and the fire service budgets are determined by whichever state the fire service is located. In many of the poorer states, the fire services face delays in deploying the new TETRA network because they can't afford it.

Germany's Spectrum

All this is made even more difficult by an ongoing discussion about the right approach for TETRA in-building coverage, such as direct mode operation (DMO), repeaters for the outdoor PSS network and base stations with switching capabilities. As a result of these obstacles and pitfalls, the preferred technology for new buildings is still analog.

In Germany spectrum for TETRA and MPT 1327 networks is allocated in the UHF band, at 380 – 400 MHz for PSS users and 410 – 430 MHz for non-PSS applications. Traditionally, VHF bands low and high are reserved for two-way radio with assignments toward essential users, such as public transport, utilities and industry. A few years ago, a refarming process started for the VHF high band to change the channel bandwidth from 20 kilohertz to multiples of 6.25 kilohertz and to suspend the assignment of spectrum to users. This is why some DMR and NXDN-based networks can be operated in VHF high band.

Many electric utilities still operate analog two-way radio networks with frequencies in the VHF low band and as a specialty use full-duplex communications. Their radio networks normally serve large areas with a relatively small number of users.

According to statements of the German regulator Bundesnetzagentur, the spectrum in the VHF low band can be kept for DMR deployments. Again, the regulator weakened the traditional assignment and avoided any preference for a technology, either analog or digital, to be applied.

DMR Deployments

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Worldwide these are the first DMR trunked radio system deployments operating in VHF low band at around 70 MHz.

conducive to DMR network deployments for electric utilities. These deployments are special because they use frequencies in VHF low band, and they are DMR Tier 3 networks, trunked radio systems according to European Telecommunications Standards Institute (ETSI) TS 102 361-4 (DMR Systems Part 4: DMR Trunking Protocol). Worldwide these are the first DMR trunked radio system deployments operating in VHF low band at around 70 MHz. The advantage is that existing sites could be used, including uninterruptible power supplies (UPS) and antenna constructions. The radio coverage shows no particular difference between a digital and an analog-based radio site, provided frequency and emitted radio power (ERP) are the same. A DMR channel has a slight advantage over an analog channel because of the digital coding of the air interface and its capabilities of redundancy and error correction.

The architecture of a DMR Professional Radio (DIPRA) network supplied by RADIODATA is composed of base stations and a central switch, all interconnected by IP-based communications. At the switch site, there is interconnection to private automated branch exchange (PABX), public-switched telephone network (PSTN) and LAN. The latter is a prerequisite for data applications over DMR and for managing the DIPRA network. A DMR network in north Germany has been used in the day-to-day operation of the utility since last year, while acceptance for a DMR network in the middle of the country is expected to be achieved this quarter.

As in many other countries of the world, PMR in Germany is in a transition phase from analog to digital systems. While the digital business gains momentum, uses of analog technology continue as well. ■

Max Zerbst is the principal consultant with Datasel Consulting in Springe, Germany. He formerly was vice president, marketing and sales, for Rohde & Schwarz BICK Mobilfunk. Zerbst has 30 years of experience in the field of mobile radio, spanning systems development, product management, business development, and marketing and sales. Contact Zerbst at max.zerbst@datasel.eu.

Hans-Joachim Langermann is the CEO of RADIODATA in Berlin. He joined the company in 1983, and in 1998, he was appointed managing director and CEO. Langermann's experience spans almost 30 years.

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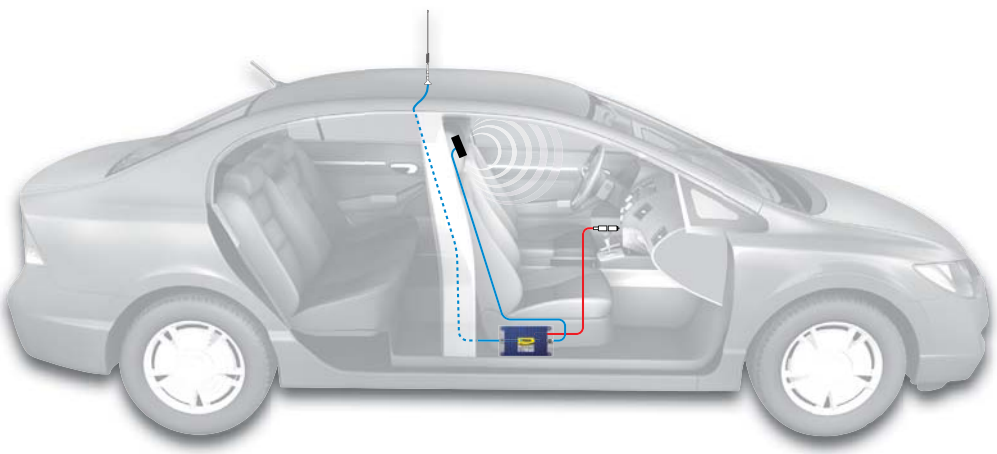

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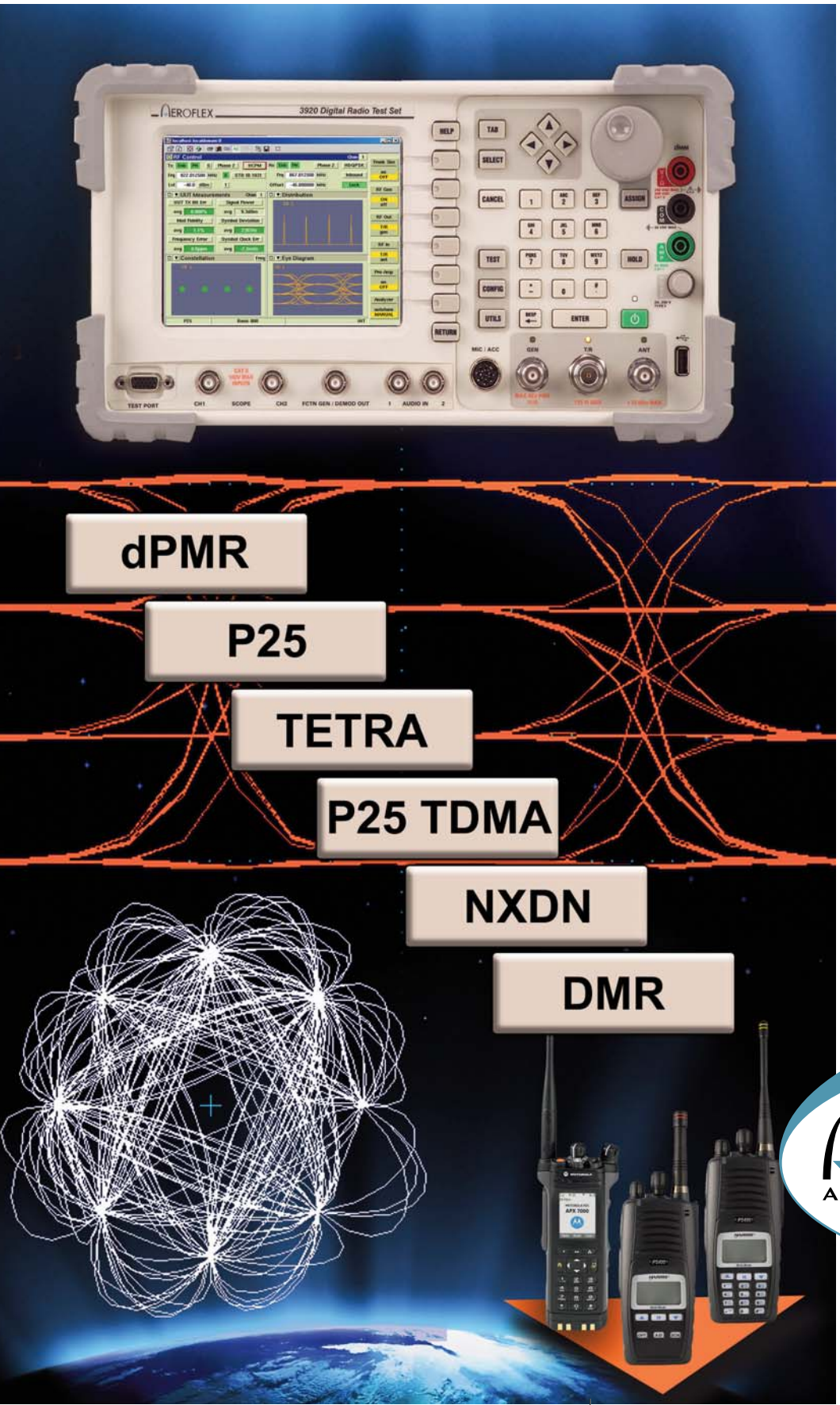

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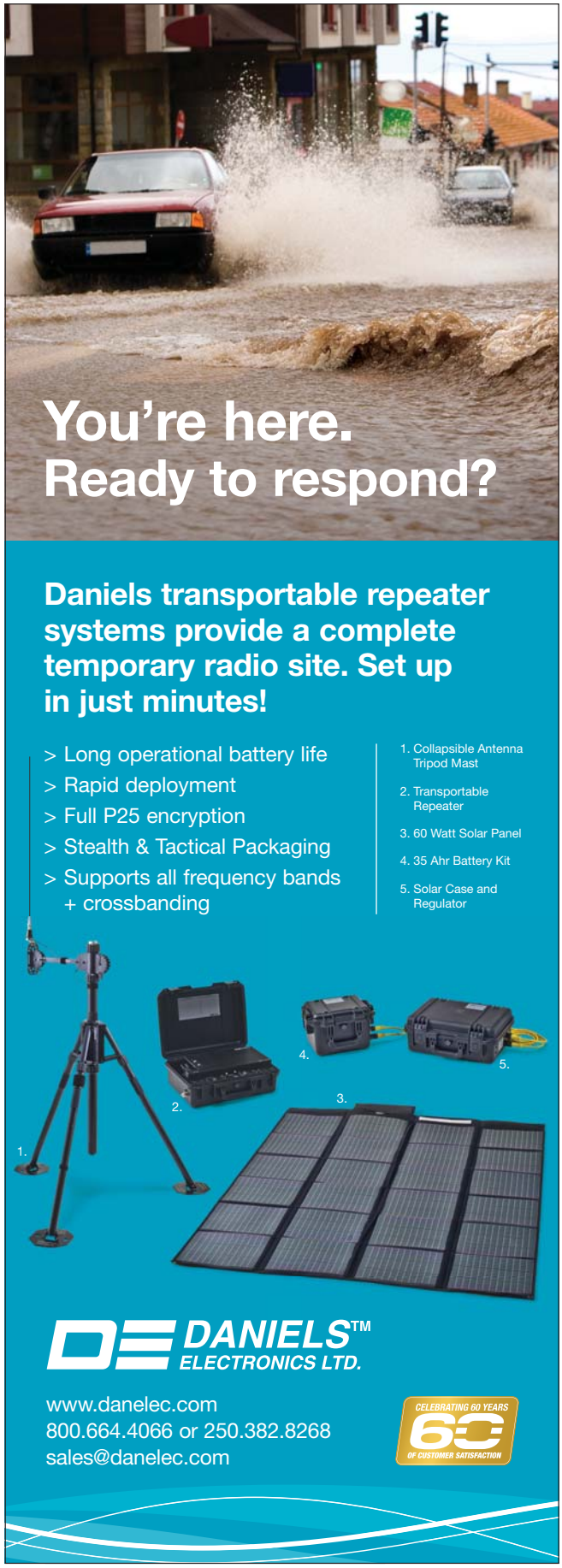

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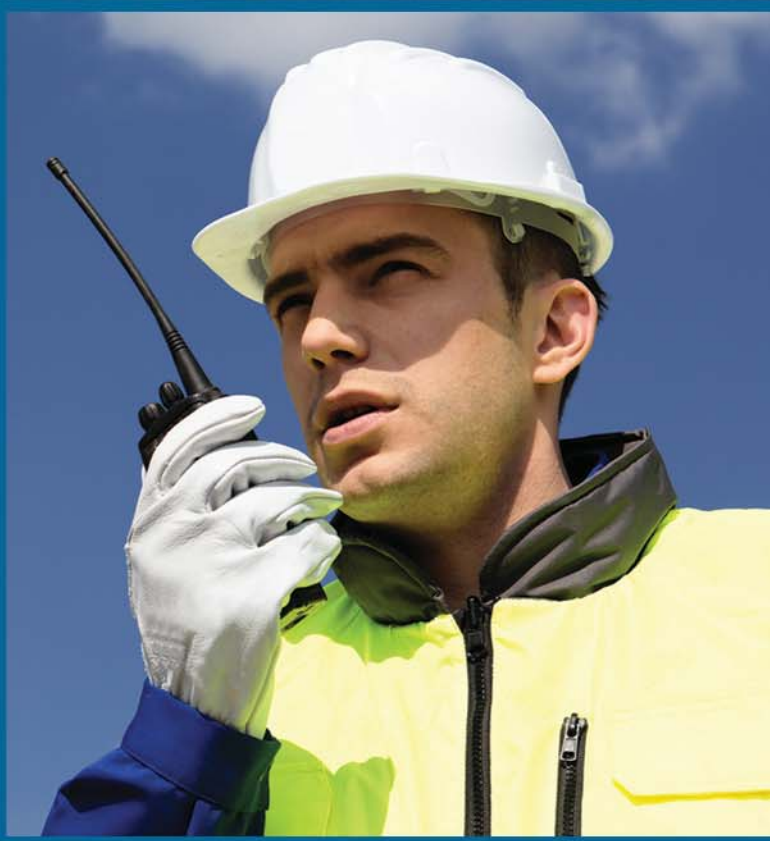

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Air802 (B, S)
Albrecht Telecommunications (RF, S)
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American Wireless (RF)
Anritsu (T)
Antcom (RF)
AR RF/Microwave Instrumentation (RF, S)
Axell Wireless (B)
Bird Technologies Group (B, S, T)
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CommScope (B, RF, S, T)
Comprod Communications (B, RF, S, T)
Creowave (B, T)
Crescend Technologies (RF)
Cubic Defense Applications (RF, S)
Datron World Communications (RF)
dbSpectra (B, T)
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EMR (B, RF, S, T)
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ANTENNAS

(B=base station, E=embedded, G=GPS, I=in-building, MW=microwave, M=mobile, MB=multiband portable, P=portable, S=satellite, SA=smart/adaptive, W=wireless and mobile data)

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4RF Communications (MW)
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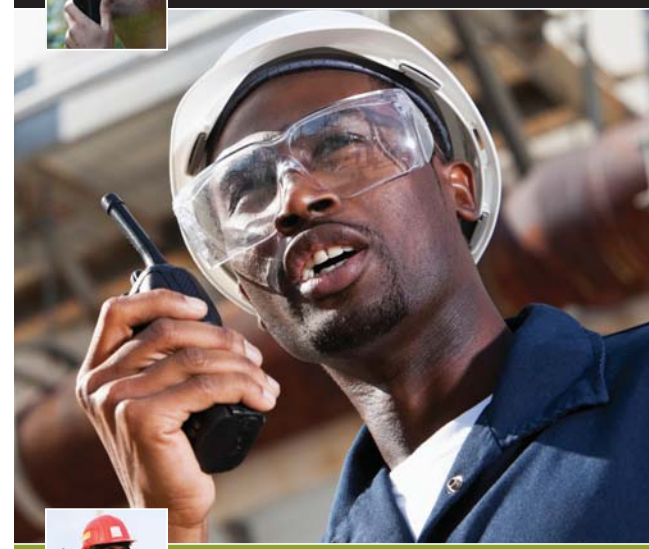

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Datron World Communications
DragonWave
EMS Technologies
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IPWireless
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RadioMobile, div. of RF Industries
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RF Neulink, div. of RF Industries
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Runcom Technologies
Safety Vision
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Sentor Monitoring and Control Systems
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SkySweep Technologies
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Telsate Telecomunicações
Tunnel Radio of America

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Havis
Jotto Desk
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MotoSAT
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PanaVise Products
Precision Mounting Technologies
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RadioMobile, div. of RF Industries
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Wade Antenna/Taco Antennas

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SCA
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Swissphone Telecom
Unimo Technology
United Communications
USAlert
Veetronix
WiPath Communications

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Critical Response Systems
Daniels Electronics
DX Radio Systems
Funkwerk Security Communications
Sonik Messaging Systems
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Antenna Factor
Berkeley Varitronics Systems
Center Systems
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Compuquest
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DX Radio Systems
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EMS Technologies
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Stancil

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Active Power
Alpha Industrial Power
Astrodyne
Benelec
Clary
CommScope
Compuquest
DuraComm
DX Radio Systems
Emerson Network Power
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Innovative Circuit Technology (ICT)
Kyocera Solar
Motorola Solutions Newmar
Pioneer Energy Products (PEPRO)
ReliOn
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Telsate Telecomunicações
Trylon TSF
Tunnel Radio of America
Ultralife
VFP
Winco
Xantrex Technology

Converters/Inverters
(C=converters, I=inverters)
Absopulse Electronics (C, I)
Air802 (C)
Alpha Industrial Power (C, I)
Analytic Systems (C, I)
Astrodyne (C, I)
Astron (C, I)
DuraComm (C, I)
DX Radio Systems (C)
Eaton – Power Quality (C)
Elektronika Naglic in Drugi dno Domzale (C)
Emerson Network Power (C, I)
Imark Communications (C, I)
Innovative Circuit Technology (ICT) (C)
Kyocera Solar (I)
Lind Electronics (C, I)
Motorola Solutions (C)
Newmar (C, I)
Pioneer Energy Products (PEPRO) (C, I)
RFI Antennas (I)
RFI EMEA (I)
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Solarcraft (C, I)
SunWize Technologies (I)
Telsate Telecomunicações (C, I)
Tripp Lite (I)
Ultralife (I)
Wilmore Electronics (C, I)
Xantrex Technology (C, I)

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Alpha Industrial Power
Aluma Tower
Dupont Building
Emerson Network Power
FWT
Imark Communications
VFP
Winco

Load-Management Equipment
AC/DC Industries
Alpha Industrial Power
Comm-Net 2000 Manufacturing
Lind Electronics
Sentor Monitoring and Control Systems
Tripp Lite

Power Supplies
Absopulse Electronics
Air802
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Tripp Lite
Winco

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Eaton – Power Quality
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Hytera Communications
IdaTech
Innovative Circuit Technology (ICT)
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RFI Antennas
Rohde & Schwarz
Selex Elsag

Radio Data Communication Solutions

DSP4200/2K

USB 2.0
Certified Drivers
Small Cabinet Size

The DSP4200/2K is our latest commercial CLOVER DSP Modem featuring a USB 2.0 connection to the PC, certified drivers for Windows, and a small aluminum enclosure.

HAL CLOVER technology is voice bandwidth, real-time adaptive waveform and protocol ARQ designed specifically for data communications where signal strength and quality vary.

Our 40th year of quality product and support.

M4200

Lightweight
Ruggedized
USB Powered

The M4200 is our newest product designed for field opearations where a small and lightweight ruggedized all aluminum enclosure is required.

The M4200 cabinet design is ideal for operation in harsh field environments where weight and size constraint are important factors. Power is obtained from the notebook USB port saving precious transceiver battery power.

Easy to use software solutions for all products.

HAL Communications Corp.
1201 W Kenyon Road
P.O. Box 365
Urbana IL 61803-0365 USA

Website: www.halcomm.com
Email: halcomm@halcomm.com
Tel: (217) 367-7373 Fax: (217) 367-1701

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Solarcraft
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Tripp Lite
Trylon TSF
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Xiamen Puxing Electronics Science and Technology
XTechnics Group
Zetron

RADIOS
Mobiles/Portables
(MA=mobiles analog, MD=mobiles digital, M6.25=mobiles 6.25 kHz, MB=multiband, PA=portables analog, PD=portables digital, P6.25=portables 6.25 kHz)
3M Peltor (PA, PD)
Abell Industries (MA, PA)
BatteryJack (PA, PD)
Benelec (MA, MD, PA, PD)
Blue Star Radios (MA, PA)
C4i (MA, MD, PA, PD)
CAPE (PA)
CeoTronics (MD)
Ceragon Networks (MD)
Cleartone Telecoms (MA, MD)
Codan (MA, MD, PA, PD)
ComGroup Australia (PA, PD)
Comlab (MA, MD, MB)
Communications-Applied Technology (PA, PD)
Comsystems (MA, MD, PA, PD)
Connect Systems (MA, M6.25, PA, PD)
Datron World Communications (MA, MD, MB, PA, PD)
Detracom (MA, MD, PD, P6.25)
DX Radio Systems (MA, PA)
Eartec (PA, PD)
EF Johnson Technologies (MA, MD, PA, PD)
Elektronika Naglic in Drugi dno Domzale (MA, MD, PA, PD)
Entel UK (PA)
Etelm (MD)
Etherstack (MA, MD, M6.25, MB, PA, PD, P6.25)
Giant International (MA, PA)
GRE America (MA, MD, PA, PD)
Harris Public Safety and Professional Communications (PSPC) (MA, MD, M6.25, MB, PA, PD, P6.25)
HME (MD, PD)
Holzberg Communications (MA, MD, PA, PD)
Hytera Communications (MA, MD, M6.25, PA, PD, P6.25)
Icom (MA, MD, M6.25, PA, PD, P6.25)
IHM (MA, MD, PA, PD)
Imark Communications (MA, PA)
Kenwood (MA, MD, M6.25, PA, PD, P6.25)
Kenwood USA – Communications Sector (MA, MD, M6.25, PA, PD, P6.25)
Kirisun Electronics (MA, PA, PD)
Klein Electronics (MA, PA, PD)
Link Communications (MA, MD, PA, PD)
Maxon (MA, MD, PA, PD)
Midland Radio (MA, MD, PA, PD)
Mobat USA (MA, MD, PA, PD)
Motorola Solutions (MA, MD, M6.25, PA, PD, P6.25)
Phonak Communications (PA)
Quantun Electronics (MA, PA)
Raveon Technologies (MD)
Relm Wireless (MA, MD, PA, PD)
Rescom Sales (MA, MD, PA, PD)
Ritron (MA, M6.25, PA)
Satel (MA, PA)
Schnoor Industrieelektronik (MA, MD, PA, PD)
Selex Elsag (MA, MD, PA, PD)
Sepura (MD, PD)
Sigtech Wireless Technologies (MD, PD)
SmarTrunk Systems (MA, PA)
South Midlands Communications (MA, MD, PA, PD)
Special Electronics and Designs (MA, MD, PA, PD)
Spectrum Communications (MA, MD, PA, PD)
ST Electronics (Info-Comm Systems) (MA, MD, PA, PD)
Tait Electronics (MA, MD, PA, PD)
Team Simoco (MA, MD, M6.25, PA, PD, P6.25)
TecNet International (MA, PA)
Tekk (MA, PA)
Telsate Telecomunicações (MA, MD, PA, PD)
Teltronic S.A. Unipersonal (MA, MD, PA, PD)
Thales Communications (PA, PD)
Trilithic RF & Microwave (MA, MD, MB, PD, P6.25)
Tunnel Radio of America (MA, MD, PA, PD)
Unimo Technology (MA, PA)
USAlert (MA, MD, PA, PD)
Vertex Standard (MA, MD, PA, PD)
Vislink (MA, MD, PA, PD)
Wireless Pacific (PA, P6.25)
Xiamen Puxing Electronics Science and Technology (MA, M6.25, PA)

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New: funkwerk FC4 with colour display

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  - position
  - no-movement
  - time dependent
  - panic
  - tear-off
- Manual alarms via easy-to-reach emergency button
- Precise localization with room accuracy
- Professional messaging – supporting
  - alarm diversion
  - evacuation scenarios

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- prison guards
- guard services
- lone workers
- workers in hazardous areas

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P25 Radios
Benelec
C4i
Cassidian
Cassidian Communications
ComGroup Australia
Datron World Communications
DX Radio Systems
EF Johnson Technologies
Etherstack
GRE America
Harris Public Safety and Professional Communications (PSPC)
Icom
Kenwood USA – Communications Sector
Link Communications
Midland Radio
Motorola Solutions
Relm Wireless
ST Electronics (Info-Comm Systems)
Tait Electronics
Team Simoco
Thales Communications
USAlert
Vertex Standard
Westel Wireless Systems
Wireless Pacific

TETRA
3T Communications
Artevea Digital
Cassidian
Cleartone Telecoms
ComGroup Australia
Comsystems
Etherstack
Funk-Electronic Piciorgros
Funkwerk Security Communications
Hytera Communications
IHM
Kenwood USA – Communications Sector
Motorola Solutions
Rohde & Schwarz
Selex Elsag
Sepura
Sigtech Wireless Technologies
South Midlands Communications
Syntech Systems
Team Simoco
Teltronic S.A. Unipersonal
Unimo Technology

RADIO SYSTEMS
ACSB
Motorola Solutions

Conventional/Trunked
(CA=conventional analog, CD=conventional digital, TA=trunked analog, TD=trunked digital)
4RF Communications (TA, TD)
Abell Industries (CA)
Alligator Communications (TA, TD)
American Wireless (CA)
APD Communications (TA, TD)
Artevea Digital (TD)
Aviat Networks (TD)
Avtec (CA, CD, TA, TD)
Axell Wireless (TA, TD)
Benelec (CA, CD, TA, TD)
BridgeCom Systems (CA, TA)
C4i (CA, CD)
CalAmp (CA, TA)
Cassidian (TD)
Cassidian Communications (TD)
Catalyst Communications Technologies (CA, CD, TA, TD)
Center Systems (CA, CD, TA, TD)
Ceragon Networks (CD, TD)
Cleartone Telecoms (CA, CD, TD)
CML Microcircuits (CA, CD, TA, TD)
Cobalt AV/Comtronics (CA, CD)
Codan (CA)
Comlab (CA, CD)
CommScope (TA, TD)
Comsystems (CA, CD, TA, TD)
Connect Systems (CA, CD, TA)
Cubic Defense Applications (CA)
Daniels Electronics (CA, CD, TA, TD)
Datron World Communications (CA, CD)
dbSpectra (TA, TD)
Detracom (CA, CD)
DX Radio Systems (CA, TA, TD)
EF Johnson Technologies (CA, CD, TA, TD)
Elektronika Naglic in Drugi dno Domzale (CA, CD)
Encom Wireless Data Solutions (CA, CD)
Etelm (TD)
Etherstack (CA, CD, TA, TD)
FreeWave Technologies (CA, CD)
Frequentis (TA, TD)
Fylde Micro Systems (TA, TD)
GE MDS (CA, CD)
Harris Public Safety and Professional Communications (PSPC) (CA, CD, TA, TD)
Hoag Electronics (TA, TD)
Holzberg Communications (CA, CD, TA, TD)
Hytera Communications (CA, CD, TA, TD)
Icom (CA, CD, TA, TD)
Idylltek (CA, TA)
IHM (CA, CD, TA, TD)
Imark Communications (CA, TA)
IPMobileNet (CD)
JRD Communications (CA, CD, TA, TD)
Kenwood (CA, TA, TD)
Kenwood USA – Communications Sector (CA, CD, TA, TD)
Kirisun Electronics (CA, CD, TA, TD)
Maxon (CA, TA)
Midland Radio (CA, CD, TA, TD)
MiMOMax Wireless (CA, CD, TA, TD)
Motorola Solutions (CA, TA, TD)
Pacific Crest (CD)
Pantel International (CA, TA, TD)
Penta (CA, CD, TA, TD)
RAD Data Communications (TD)
Radiocrafts (TA, TD)
Radio IP Software (CD, TD)
RadioMobile, div. of RF Industries (CA)
Raveon Technologies (CD)
Relm Wireless (CA, CD)
RF Technology (CA, CD, TA)
Ritron (CA)
Rohde & Schwarz (CA, TA, TD)
Rohill Engineering (TA, TD)
Schnoor Industrieelektronik (CA, CD, TA, TD)
Selex Elsag (CA, TA, TD)
Sinclair Technologies (CA, CD, TA, TD)
SmarTrunk Systems (CA, TA)
Sonik Messaging Systems (CA)
South Midlands Communications (CA, TA, TD)
Spectra Engineering (CA, CD, TA)
Spectrum Communications (TA)
Spescom (TA)
Star Microwave Service (TA, TD)
ST Electronics (Info-Comm Systems) (TA, TD)
Survey Technologies Inc. (STI) (CA, CD, TA, TD)
Tait Electronics (CA, CD, TA)
Team Simoco (CA, CD, TA, TD)
TecNet International (CA, TA)
Tekk (CA)
Telepoint (CA, CD, TA, TD)
Telsate Telecomunicações (CA, TA)
Teltronic S.A. Unipersonal (CA, TA, TD)
Thales Communications (CA)
Trident Micro Systems (CA, CD, TA, TD)
Tunnel Radio of America (CA, CD)
USAlert (TA, TD)
Vertex Standard (CA, CD)
Westel Wireless Systems (CA, CD, TD)
Wireless Pacific (CA, TA)
Zetron (CA, TA, TD)
Zonith (CD, TD)

Microwave
4RF Communications
Alcatel-Lucent
Alligator Communications
American Wireless
Anritsu
Aviat Networks
Carlson Wireless Technologies (CWT)
Ceragon Networks
CommScope
Detracom
DragonWave
EMS Technologies
Exalt Communications
GE MDS
Hytera Communications
Pantel International
RAD Data Communications
Radio Waves
Rohde & Schwarz
Rojone
Ross Associates/Covert Systems
Sinclair Technologies
Star Microwave Service
ST Electronics (Info-Comm Systems)
Telsate Telecomunicações
Vecima Networks
Vislink

Narrowband (6.25 kHz)
CommScope
Connect Systems
Daniels Electronics
Etherstack
GE MDS
Harris Public Safety and Professional Communications (PSPC)
Hytera Communications
Icom
JRD Communications
Kenwood
Kenwood USA – Communications Sector
MiMOMax Wireless
Motorola Solutions
Survey Technologies Inc. (STI)
Team Simoco
Wireless Pacific
Xiamen Puxing Electronics Science and Technology

P25 Systems Equipment
Aeroflex
Axell Wireless
Benelec
CalAmp
Cassidian
Cassidian Communications
Catalyst Communications Technologies
Cimarron Technologies
CML Microcircuits
Daniels Electronics
Datron World Communications
DX Radio Systems
EF Johnson Technologies
Etherstack
Futurecom Systems Group
Harris Public Safety and Professional Communications (PSPC)
Icom
IPMobileNet
JRD Communications
Kenwood USA – Communications Sector
Metric Systems
Midland Radio
MiMOMax Wireless
Motorola Solutions
Pantel International
Penta
Raytheon JPS Communications
Relm Wireless
RF Technology
Sentor Monitoring and Control Systems
Sinclair Technologies
Spectra Engineering
ST Electronics (Info-Comm Systems)
Survey Technologies Inc. (STI)
Tait Electronics
Team Simoco
Thales Communications
Trident Micro Systems
Vertex Standard
Westel Wireless Systems
Wireless Pacific
Zetron

Repeater Controllers
Benelec
BridgeCom Systems
C4i
Cassidian Communications
Center Systems
Communications Specialists
Comsystems
Connect Systems
Detracom
Encom Wireless Data Solutions
Etherstack
Fiplex Communications
Hytera Communications
I.D. Systems
Idylltek
JRD Communications
Midian Electronics
Midland Radio
Rohde & Schwarz
Rojone
SmarTrunk Systems
Telsate Telecomunicações
Trident Micro Systems

Simulcast
Albrecht Telecommunications
Benelec
Cassidian Communications
Center Systems
ComGroup Australia
Comsystems
Daniels Electronics
Detracom
DX Radio Systems
EF Johnson Technologies
Etherstack
Harris Public Safety and Professional Communications (PSPC)
IHM
JRD Communications
Midian Electronics
MiMOMax Wireless
Motorola Solutions
Pantel International
Penta
Racom Products
RF Technology
Schnoor Industrieelektronik
Selex Elsag
Sonik Messaging Systems
Spectra Engineering
Survey Technologies Inc. (STI)
Tait Electronics
Team Simoco

Software-Defined Radio
Alligator Communications
American Wireless
Axell Wireless
CalAmp
Cassidian Communications
CML Microcircuits
ComGroup Australia
Communications Research Centre (CRC)
Comsystems
Cubic Defense Applications
DragonWave
DX Radio Systems
EF Johnson Technologies
EMS Technologies
Encom Wireless Data Solutions
Etherstack
GE MDS
Harris Public Safety and Professional Communications (PSPC)
Mobat USA
Motorola Solutions
Multiple Access Communications (MAC)
Pantel International
Selex Elsag
Thales Communications
Vecima Networks
Westel Wireless Systems
Zonith

Spread-Spectrum Radio
Air802
Albrecht Telecommunications
Alligator Communications
Aviat Networks
CalAmp
Carlson Wireless Technologies (CWT)
Communications-Applied Technology
Eartec
Encom Wireless Data Solutions
Etherstack
FreeWave Technologies
GE MDS
Great Fortress
HME
Location Technologies
Metric Systems
Pantel International
Radio IP Software
Schweitzer Engineering Laboratories
Sentor Monitoring and Control Systems
Solarcraft
Telsate Telecomunicações
Trango Systems
Trio Datacom

TETRA
3T Communications
Aeroflex
APD Communications
Artevea Digital
Axell Wireless
Cassidian
Cassidian Communications
Center Systems
Cleartone Telecoms
CML Microcircuits
ComGroup Australia
Comlab
CommScope
Comsystems
Damm Cellular Systems
Etelm
Etherstack
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South Midlands Communications
Spescom
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Team Simoco
Teltronic S.A. Unipersonal
Wireless Pacific
Zonith

VoIP/RoIP
3T Communications
4RF Communications
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C4i
Catalyst Communications Technologies
Cobalt AV/Comtronics
CoCo Communications
Communications-Applied Technology
Connect Systems

Cubic Defense Applications
Daniels Electronics
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Etherstack
Firetide
Frequentis
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Harris Public Safety and Professional Communications (PSPC)
Hytera Communications
Icom
IHM
JRD Communications
Kolibri Systems
Link Communications
MiMOMax Wireless
Motorola Solutions
Omnitronics
Pantel International
Penta
RAD Data Communications
Ritron
Selex Elsag
SmarTrunk Systems
Spectra Engineering
Spescom
Star Microwave Service
ST Electronics (Info-Comm Systems)
Syntech Systems
Telepoint
TracStar Systems
Tunnel Radio of America
Twisted Pair Solutions
Unimo Technology
VoiceInterop
Westel Wireless Systems
Zetron

REMOTE SITE MONITORING

Modems

Albrecht Telecommunications
Alcatel-Lucent
Asentria
Barnett Engineering
CalAmp
Carlson Wireless Technologies (CWT)
Cellular Specialties Inc. (CSI)
Cleartone Telecoms
CML Microcircuits
Compuquest
Cromack Industries
DX Radio Systems
Elektronika Naglic in Drugi dno Domzale
EMS Technologies
Encom Wireless Data Solutions
Etelm
Flash Technology, SPX div.
FreeWave Technologies
GE MDS
Hark Systems
HV Sistemas
Location Technologies
Maxon
Midian Electronics
Mobile Expertise
Motorola Solutions
RAD Data Communications
Radiocrafts
Radio IP Software
Raveon Technologies
Rojone
Satel
Sentor Monitoring and Control Systems
Sierra Wireless
SmarTrunk Systems
Tait Electronics
TC Communications
TecNet International
Telewave
Trident Micro Systems
Trio Datacom
Tunnel Radio of America
Unimo Technology
Vecima Networks
VoiceInterop

Remote Transmitter Units

4RF Communications
Alligator Communications
American Wireless
Antenna Factor
Asentria
Barnett Engineering
Berkeley Varitronics Systems
Broadcast Microwave Services
C4i
CalAmp
CeoTronics
Cleartone Telecoms
CML Microcircuits
Commtech Wireless
Compuquest
CriSys
Davicom, div. of Comlab
DPS Telecom
DX Radio Systems
EMS Technologies
Encom Wireless Data Solutions
Etelm
Etherstack
Flash Technology, SPX div.
GE MDS
HV Sistemas
Keltron
Kyocera Solar
Location Technologies
Maxon
Metric Systems
Midian Electronics
Midland Radio
MiMOMax Wireless
Mobility Sound Technology
Motorola Solutions
Pacific Crest
PageTek
Radiocrafts
Raveon Technologies
Rojone
Satel
Sentor Monitoring and Control Systems
Solarcraft
Spectra Engineering
Team Simoco
Tekk
Telsate Telecomunicações
Trident Micro Systems
Tunnel Radio of America
Vecima Networks
Vislink
WaveKorea
Zetron

SCADA

4RF Communications
Alligator Communications
American Wireless
Asentria
Bayly/Coastcom
CalAmp
Carlson Wireless Technologies (CWT)
Center Systems
CML Microcircuits
Commtech Wireless
CriSys
Critical Response Systems
Cromack Industries
CTI Products
Davicom, div. of Comlab
DPS Telecom
Emerson Network Power
EMS Technologies
Encom Wireless Data Solutions
Encore Networks
Etelm
Etherstack
Federal Signal
Fial
FreeWave Technologies
GE MDS
Hughes Network Systems
HV Sistemas
Hytera Communications
Kantronics
Kyocera Solar
Location Technologies
Maxon
Metric Systems
MiMOMax Wireless
Mobile Expertise
Motorola Solutions
PageTek
Pantel International
Positron
RAD Data Communications
Raveon Technologies
RF Neulink, div. of RF Industries
Rohde & Schwarz
Satel
Schweitzer Engineering Laboratories
Selex Elsag
Sentor Monitoring and Control Systems
Sinclair Technologies
Spectra Engineering
Spectrum Communications
Tait Electronics
TecNet International
Tekk
Telepoint
Trident Micro Systems
Unimo Technology
Vecima Networks
Zetron

Software

Asentria
CeoTronics
CoCo Communications
CommScope
Commtech Wireless
Compuquest
CriSys
Critical Response Systems
CTI Products
Davicom, div. of Comlab
DPS Telecom

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Production times can also be improved by providing fewer interruptions using digital radio features such as text messaging for non-urgent communications and individual calling.

Furthermore, multiple dispatch locations can easily be connected to the centralized DX-Altus system. This means that dispatch operators can be in the most convenient location and work can be shared or taken over as required. In addition, features such as hot swapping and soft degradation ensure no operator downtime.

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International Sales: +61 7 3369 5733
sales@omnitronicsworld.com
www.omnitronicsworld.com

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Product Category Index

Eaton – Power Quality
Elektronika Naglic in Drugi dno Domzale
Emerson Network Power
EMS Technologies
Encom Wireless Data Solutions
Federal Signal
Fial
Flash Technology, SPX div.
Funk-Electronic Piciorgros
HV Sistemas
I.D. Systems
In Motion Technology
Integrated Tracking Solutions
Intergraph
Kantronics
Location Technologies
Manning Navcomp
MiMOMax Wireless
Motorola Solutions
NeoTerra Systems
OrecX
PageTek
Powerwave Technologies
Radio IP Software
Radixon
Raveon Technologies
RF Neulink, div. of RF Industries
Sentor Monitoring and Control Systems
Sierra Wireless
Signal Intelligence
SmarTrunk Systems
Solarcraft
Spectra Engineering
Team Simoco
Vecima Networks
VoiceInterop
XCel Tower Controls
Zetron
Zonith

Telemetry
4RF Communications
Alcatel-Lucent
Alligator Communications
American Wireless
Asentria
Benelec
CalAmp
Carlson Wireless Technologies (CWT)
Cellular Specialties Inc. (CSI)
CeoTronics
Cleartone Telecoms
CML Microcircuits
Commtech Wireless
Critical Response Systems
Cromack Industries
Davicom, div. of Comlab
Detracom
Digital Paging Co./Golden Sab Inc. (DPC/GSI)
DPS Telecom
Elektronika Naglic in Drugi dno Domzale
EMS Technologies
Etherstack
Flash Technology, SPX div.
FreeWave Technologies
GE MDS
Hark Systems
Harris Public Safety and Professional Communications (PSPC)
HV Sistemas
Hytera Communications
IDA
I.D. Systems
In Motion Technology
Kantronics
Kyocera Solar
Link Communications
Location Technologies
Manning Navcomp
Maxon
Metric Systems
Midland Radio
MiMOMax Wireless
Mobile Expertise
Mobile Mark
Motorola Solutions
PageTek
Panorama Antennas
Positron
Radiocrafts
Radixon
Raveon Technologies
RF Neulink, div. of RF Industries
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Selex Elsag
Sentor Monitoring and Control Systems
SmarTrunk Systems
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Sonic Communications International
Sonik Messaging Systems
Spectra Engineering
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Tait Electronics
TecNet International
Tekk
Telewave
Telsate Telecomunicações
Trident Micro Systems
Unimo Technology
Vecima Networks
WiPath Communications
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Transmitters
4RF Communications
Alligator Communications
American Wireless
Antenna Factor
Asentria
Berkeley Varitronics Systems
Broadcast Microwave Services
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Spectra Engineering
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Team Simoco
TecNet International
Tekk
Telepoint
Telsate Telecomunicações
Tunnel Radio of America
Vecima Networks
Vislink

Vendor-Specific Protocols
Bayly/Coastcom
Carlson Wireless Technologies (CWT)
CoCo Communications
CommScope
Commtech Wireless
Cromack Industries
CTI Products
Daniels Electronics
DPS Telecom
Eagle Eye Power Solutions
Fial
HV Sistemas
I.D. Systems
Keltron
Lea Antenne & Progetti
Location Technologies
Lyncole XIT Grounding
Metric Systems
MiMOMax Wireless
Motorola Solutions
Radiocrafts
Radio IP Software
Raveon Technologies
Schweitzer Engineering Laboratories
Sentor Monitoring and Control Systems
SmarTrunk Systems
Trango Systems
XCel Tower Controls

Video Surveillance
4RF Communications
Airaya
Alcatel-Lucent
Asentria
Bosch Security Systems
Broadcast Microwave Services
Carlson Wireless Technologies (CWT)
Center Systems
CeoTronics
Cleartone Telecoms
CoCo Communications
CriSys
Etelm
Firetide
GE MDS
Hark Systems
Harris Public Safety and Professional Communications (PSPC)
Intergraph
Matrox Graphics
Metric Systems
Motorola Solutions
Nice Systems
RAD Data Communications
Raytheon JPS Communications
Ross Associates/Covert Systems
Safety Vision
Schweitzer Engineering Laboratories
Selex Elsag
Sentor Monitoring and Control Systems
Solarcraft
Swann Communications
Technotrend
Telex Radio Dispatch
Telsate Telecomunicações
Vecima Networks
Verint Systems
Vislink

SATELLITE SYSTEMS EQUIPMENT

Mobile Data/Voice
(MD=mobile data, MV=mobile voice)
CES Wireless (MD)
CML Microcircuits (MD)
Codan (MD, MV)
CPI Communications (MV)
Data911 Mobile Computer Systems (MD)
EMS SATCOM (MD, MV)
EMS Technologies (MD)
Hughes Network Systems (MD, MV)
Mobile Expertise (MD)
Motorola Solutions (MD, MV)
MotoSAT (MD, MV)
Radio IP Software (MD)
RadioMobile, div. of RF Industries (MD, MV)
Satel (MD)
Sentor Monitoring and Control Systems (MD, MV)
Tallysman Wireless (MD)
TeleCommunication Systems (TCS) (MD, MV)
TracStar Systems (MD, MV)
Trident Micro Systems (MD)
Vislink (MD, MV)
WiPath Communications (MD)

VSAT
Encore Networks
Hughes Network Systems
Kyocera Solar
MotoSAT
Radio IP Software
Sentor Monitoring and Control Systems
Swissphone Telecom
TeleCommunication Systems (TCS)
TracStar Systems
Vislink

SERVICE PROVIDERS

(See Pages 28 and 30)

SITE/TOWER EQUIPMENT

Alarms/Access Devices
Asentria
Bosch Security Systems
CML Microcircuits
Compuquest
CTI Products
Davicom, div. of Comlab
DPS Telecom
EMR
Fial
Flash Technology, SPX div.
Hark Systems
Location Technologies
Midian Electronics
Motorola Solutions
PageTek
Quintron Systems
Racom Products
Rojone
Sentor Monitoring and Control Systems
XCel Tower Controls
Zetron

Beacons
Citel
CML Microcircuits
Dialight
Flash Technology, SPX div.
Funkwerk Security Communications
Nello
Sabre Site Solutions, div. of Sabre Industries
Specialty Tower Lighting
TWR Lighting
Unimar
XCel Tower Controls

Cabinets
Aluma Tower
American Wireless
Cellxion, div. of Sabre Industries
CommScope
Comsystems
dbSpectra
Dupont Building
DX Radio Systems
Elma Electronic
Emerson Network Power
Imark Communications
Midland Radio
PDA Safe
Pioneer Energy Products (PEPRO)
Positron
Powerwave Technologies
Sabre Towers and Poles, div. of Sabre Industries
Shelter One
Solarcraft
Telewave
Tripp Lite
Tunnel Radio of America
VFP
Warehouse Cables
Winsted

Cable
4RF Communications
Air802
Antcom
Benelec
BroadWave Technologies
Calearo Group
Comlab
CommScope
Comprod Communications
Comtelco
Electro Standards Laboratories
Encom Wireless Data Solutions
GE MDS
Harger Lightning and Grounding
Hytera Communications
Mobat USA
Mobile Mark
Motorola Solutions
Radio Frequency Systems (RFS)
Radio Waves
RFI Antennas
RFI EMEA
Rojone
Skymasts Antennas
Spinner
Star Microwave Service
Telewave
Times Microwave Systems
Trilogy Communications
Tripp Lite
Warehouse Cables
Webb Industries

Cable Fault Locators
Anritsu
Bird Technologies Group
Electro Standards Laboratories
Motorola Solutions
Sentor Monitoring and Control Systems
TX RX Systems Bird Technologies Group

Combiners/Diplexers/Duplexers/Filters/Isolators/Multicouplers/Multiplexers
(C=combiners, DI=diplexers, DU=duplexers, F=filters, I=isolators, MC=multi-couplers, MP=multiplexers)
4RF Communications (C)
Ace Technologies (C, DI, DU, F, I, MC, MP)
Alcatel-Lucent (MP)
Aluma Tower (I)
Antcom (C, F, I)
Axell Wireless (C, DI, DU, F, I, MC, MP)
Bayly/Coastcom (MP)
Benelec (C, DI, DU, F, MC, MP)
Bird Technologies Group (C, DI, DU, F, I, MC)
BroadWave Technologies (C)
C4i (MP)
Cellular Specialties Inc. (CSI) (C, DI, DU, F, MC)
Center Systems (C, DI, MC)
Comlab (C, DU, F, I, MC)
CommScope (C, DI, DU, F, MC)
Comprod Communications (C, DI, DU, F, I, MC, MP)
Comtelco (DI, DU, MC)
Creowave (C, DI, DU, F)
dbSpectra (C, DI, DU, F, I, MC, MP)
DX Radio Systems (C, DU, F, I, MC)
Emerson Network Power (F)
EMR (C, DI, DU, F, I, MC, MP)
Fiplex Communications (C, DI, DU, F, I, MC, MP)
GE MDS (F, MP)
Great Fortress (MP)
G-Way Microwave (C, DI, DU, F)
Imark Communications (DU, MC)
Innovative Circuit Technology (ICT) (F)
Jaybeam (DU, F)
Kathrein, Scala div. (C, DI, DU, F, I, MC, MP)
Kathrein Werke (MC, MP)
L-3 Communications, Narda Microwave-East (C, DU, F, I, MC)
Lea Antenne & Progetti (DI, DU, F, MC, MP)
Midland Radio (DU)
Motorola Solutions (C, DU, F)
Narda Microwave West (L-3 Communications) (C, DI, DU, F, I, MP)
Positron (I)
Powerwave Technologies (C, DI, DU, F)
Procom (C, DI, DU, F, I, MC, MP)
Quintron Systems (MP)
RAD Data Communications (MP)
Radial Firm (C, DI, DU, F, I, MC)
Radio Frequency Systems (RFS) (C, DI, DU, F, I, MC)
RFI Antennas (C, DI, DU, F, I, MC)
RFI EMEA (C, DI, DU, F, I, MC)
Rojone (C, DI, DU, F, I, MC, MP)
Sinclair Technologies (C, DI, DU, F, I, MC, MP)
Skymasts Antennas (C, DI, DU, F)

South Midlands Communications (DU)
Spectra Engineering (DI, DU)
Spinner (C, DI, DU, F, MP)
Sti-Co Industries (C, DU, F, MC)
TC Communications (MP)
Telewave (C, DU, F, I, MC)
Telsate Telecomunicações (C, DI, DU, F)
Temwell (C, DI, DU, F)
Trak Microwave (C, DI, DU, F, I, MC, MP)
Trilithic RF & Microwave (C, DI, DU, F, I, MC, MP)
Tunnel Radio of America (MC, MP)
TX RX Systems Bird Technologies Group (C, DU, F, I, MC)
Webb Industries (C, DU, F, I, MC, MP)
Zetron (MP)

Connectors
Ace Technologies
Air802
Anritsu
Antcom
Benelec
Bird Technologies Group
Bomar Interconnect Products
BroadWave Technologies
Cellular Specialties Inc. (CSI)
CommScope
Comprod Communications
Comtelco
D.W. Electrochemicals
DX Radio Systems
Electric Railway Improvement Co. (ERICO)
Electro Standards Laboratories
EMR
GE MDS
G-Way Microwave
Harger Lightning and Grounding
Nearson
Procom
Radio Frequency Systems (RFS)
RF Connectors, div. of RF Industries
RFI Antennas
RFI EMEA
Rojone
Sabre Site Solutions, div. of Sabre Industries
Sinclair Technologies
Skymasts Antennas
Spinner
Star Microwave Service
Telewave
Times Microwave Systems
Trilithic RF & Microwave
Trilogy Communications
Tripp Lite
TX RX Systems Bird Technologies Group
Webb Industries

HVAC Control Systems
Bard Manufacturing
Compuquest
Emerson Network Power
Pioneer Energy Products (PEPRO)
Sentor Monitoring and Control Systems
VFP

Ice Bridges
CommScope
Fred A. Nudd
Nello
Rohn Products
Sabre Site Solutions, div. of Sabre Industries
Specialty Tower Lighting
Valmont Structures
VFP

Lightning-Protection Equipment
4RF Communications
Ace Technologies
Air802
Aluma Tower
Benelec
Cellular Specialties Inc. (CSI)
Citel
CommScope
Comprod Communications
Electric Railway Improvement Co. (ERICO)
Emerson Network Power
Encom Wireless Data Solutions
GE MDS
G-Way Microwave
Harger Lightning and Grounding
Hark Systems
Imark Communications
L-3 Communications, Narda Microwave-East
Lightning Eliminators and Consultants
Lightning Prevention Systems
Lyncole XIT Grounding
Mobat USA
Pioneer Energy Products (PEPRO)
PolyPhaser
Positron
Powerwave Technologies
Radio Frequency Systems (RFS)
Raycap
RFI Antennas
RFI EMEA
Rojone
Sabre Site Solutions, div. of Sabre Industries
Skymasts Antennas
Specialty Tower Lighting
Transtector Systems
Tripp Lite
VFP
Webb Industries
Zetron

Microwave/ MUX Equipment
4RF Communications
Alcatel-Lucent
Antcom
Artevea Digital
Aviat Networks
Bayly/Coastcom
Broadcast Microwave Services
Ceragon Networks
CommScope
DragonWave
DX Radio Systems
GE MDS
Praxsym
Procom
RAD Data Communications
Rojone
Sinclair Technologies
Spectracom
Star Microwave Service
Trak Microwave
Trango Systems
Trilithic RF & Microwave
Vislink
Zetron

Preamplifiers
Axell Wireless
Bird Technologies Group
Center Systems
Comlab
Comprod Communications
dbSpectra
EMR
Fiplex Communications
Kathrein, Scala div.
Kathrein Werke
Motorola Solutions
Praxsym
Procom
Radial Firm
Radio Frequency Systems (RFS)
Rojone
Sinclair Technologies
Telewave
Telsate Telecomunicações
Trilithic RF & Microwave
TX RX Systems Bird Technologies Group

Racks
Aluma Tower
American Wireless
Comlab
Comprod Communications
Comsystems
dbSpectra
DX Radio Systems
Elma Electronic
Emerson Network Power
EMR
Fylde Micro Systems
GE MDS
iKey
Kyocera Solar
Pioneer Energy Products (PEPRO)
Powerwave Technologies
Procom
Radio Frequency Systems (RFS)
Sinclair Technologies
Solarcraft
Spinner
Telewave
Tripp Lite
Tunnel Radio of America
VFP
Winsted

Shelters
Aluma Tower
Cellxion, div. of Sabre Industries
Dupont Building

When all your communications are critical, talk to us

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Product Category Index

Enviro Buildings
FWT
Imark Communications
PDA Safe
Pioneer Energy Products (PEPRO)
Powerwave Technologies
Sentor Monitoring and Control Systems
Shelter One
Sinclair Technologies
TowerWorx
VFP
Webb Industries

Site-Management Software
Asentria
Center Systems
Codan
Comlab
CommScope
Commtech Wireless
Compuquest
Computer Resources
Comsystems
CriSys
DPS Telecom
Eagle Eye Power Solutions
Federal Signal
Fylde Micro Systems
Hark Systems
Hytera Communications
Kathrein Werke
Location Technologies
LS telcom
Midian Electronics
Motorola Solutions
PageTek
Powerwave Technologies
Radio Frequency Systems (RFS)
Rohde & Schwarz
Selex Elsag
Sentor Monitoring and Control Systems
Signal Intelligence
SmarTrunk Systems
SoftWright
Survey Technologies Inc. (STI)
Team Simoco
Trylon TSF

Surge Protectors
AC/DC Industries
Ace Technologies
Citel
CommScope
DX Radio Systems
Eaton – Power Quality
Electric Railway Improvement Co. (ERICO)
Electro Standards Laboratories
Emerson Network Power
Encom Wireless Data Solutions
GE MDS
Harger Lightning and Grounding
Innovative Circuit Technology (ICT)
Lightning Eliminators and Consultants
Lyncole XIT Grounding
PDA Safe
Positron
Radio Frequency Systems (RFS)
Raycap
RFI Antennas
RFI EMEA
Rojone
Sinclair Technologies
Skymasts Antennas
Solarcraft
Spinner
Telsate Telecomunicações
Transtector Systems
Tripp Lite
VFP
Webb Industries

Switches
3T Communications
Ace Technologies
Alcatel-Lucent
Center Systems
Cisco Systems
Encom Wireless Data Solutions
Frequentis
Fylde Micro Systems
GE MDS
Hytera Communications
IHM
Motorola Solutions
Omnitronics
Quintron Systems
RAD Data Communications
Rohde & Schwarz
Rojone
Selex Elsag
SmarTrunk Systems
SolaCom Technologies
Spinner
Team Simoco
Technotrend
Trak Microwave
Trilithic RF & Microwave
VFP
Zetron

Tower Obstruction
Flash Technology, SPX div.
Kyocera Solar
Rohn Products
Sentor Monitoring and Control Systems
Sinclair Technologies
TWR Lighting
Valmont Structures
Webb Industries
XCel Tower Controls

Towers, Fixed/Mobile
(F=fixed towers, M=mobile towers)
Aluma Tower (F, M)
Antenna Products (F)
CommScope (F)
Comsystems (F, M)
Fred A. Nudd (F)
FWT (F, M)
GeoStrut (M)
Imark Communications (F)
Nello (F, M)
Pioneer Energy Products (PEPRO) (M)
Powerwave Technologies (M)
Rohn Products (F)
Sabre Site Solutions, div. of Sabre Industries (F)
Sabre Towers and Poles, div. of Sabre Industries (F, M)
Sinclair Technologies (F, M)
Skymasts Antennas (F, M)
South Midlands Communications (F, M)
Specialty Tower Lighting (F)
Tower Innovations (F)
Tower Solutions (M)
TowerWorx (F, M)
Trylon TSF (F)
TWR Lighting (F)
Valmont Structures (F)
Wade Antenna/Taco Antennas (F)
Webb Industries (F, M)
Winco (M)
XCel Tower Controls (F)

Voting Products
Center Systems
CTI Products
DX Radio Systems
GeoStrut
Midian Electronics
Motorola Solutions
RF Technology
Selex Elsag
South Midlands Communications
Spectra Engineering
Team Simoco

Waveguide
Antcom
CommScope
Nello
Pioneer Energy Products (PEPRO)
Radio Frequency Systems (RFS)
RFI Antennas
RFI EMEA
Rohn Products
Rojone
Sabre Site Solutions, div. of Sabre Industries
Spinner
Trak Microwave
Trylon TSF
Valmont Structures
VFP

SOFTWARE

CAD Software/Systems
(See PSAP/E9-1-1 Equipment)

Custom
Airbiquity
Albrecht Telecommunications
Antcom
BridgeCom Systems
C4i
Cadex Electronics
Cassidian Communications
Catalyst Communications Technologies
Center Systems
Cleartone Telecoms
CoCo Communications
ComGroup Australia
CommScope
Compuquest
Computer Resources
Comsystems
CTI Products
Data911 Mobile Computer Systems
Digital Voice Systems Inc. (DVSI)
DPS Telecom
EMS Technologies
Etelm
Fial
Fylde Micro Systems
Genesis Group
Global Mesh Technologies Service
Hoag Electronics
HV Sistemas
I.D. Systems
IHM
Integrated Tracking Solutions
InterAct Public Safety Systems
Location Technologies
Locus Diagnostics
Manning Navcomp
Maxon
Mentor Engineering
MiMOMax Wireless
Multiple Access Communications (MAC)
NeoTerra Systems
PageTek
Penta
Portrait Software
RadioMobile, div. of RF Industries
RadioSoft
Radixon
Realtime North America
Schnoor Industrieelektronik
Selex Elsag
Send Word Now
Signal Intelligence
SoftWright
Team Simoco
TeleCommunication Systems (TCS)
Telesoft International
Valid8.com
Ventyx, an ABB co.
Visual Electronics
VoiceInterop
Winsted
Zetron
Zonith

Dispatch (business/industry)
3T Communications
Abell Industries
APD Communications
Artevea Digital
Avtec
Cassidian Communications
Catalyst Communications Technologies
Cisco Systems
Compuquest
CriSys
Critical Response Systems
CTI Products
Damm Cellular Systems
Data911 Mobile Computer Systems
EF Johnson Technologies
EMS Technologies
Etelm
Harris Public Safety and Professional Communications (PSPC)
HigherGround
Hytera Communications
IDA
IHM
InterAct Public Safety Systems
Intergraph
Keltron
Kolibri Systems
Logistic Systems
Mentor Engineering
Midian Electronics
Motorola Solutions
NeoTerra Systems
NetMotion Wireless
Omnitronics
Pantel International
Penta
PowerPhone
RadioMobile, div. of RF Industries
Rohde & Schwarz
Rohill Engineering
Schnoor Industrieelektronik
Selex Elsag
Send Word Now
Signal Intelligence
SmarTrunk Systems
SolaCom Technologies
Swissphone Telecom
Tallysman Wireless
Team Simoco
Telex Radio Dispatch
Teltronic S.A. Unipersonal
TETRAsim
Trimble
TriTech Software Systems
Ventyx, an ABB co.
VoiceInterop
Voice Print International (VPI)
WiPath Communications
Zetron
Zoll
Zonith

Engineering
3T Communications
Abell Industries
Airbiquity
Berkeley Varitronics Systems
BridgeCom Systems
C4i
Cleartone Telecoms
CommScope
Comsearch
Comsystems
Cromack Industries
DPS Telecom
DX Radio Systems
EDX Wireless
Electro Standards Laboratories
Elektronika Naglic in Drugi dno Domzale
Etherstack
Hoag Electronics
Location Technologies
LS telcom
Mentor Engineering
Motorola Solutions
RadioSoft
RCC Consultants
Signal Intelligence
SoftWright
Survey Technologies Inc. (STI)
Telesoft International
Teltronic S.A. Unipersonal
VoiceInterop

FCC Licensing
Abell Industries
CommScope
Comsearch
RadioSoft

Field Reporting (business/industry)
Abell Industries
APD Communications
Cassidian Communications
CriSys
Data911 Mobile Computer Systems
EMS Technologies
Hytera Communications
Integrated Tracking Solutions
InterAct Public Safety Systems
Intergraph
Location Technologies
Locus Diagnostics
NeoTerra Systems
NetMotion Wireless
Send Word Now
Sentor Monitoring and Control Systems
Syntech Systems
Trident Micro Systems
Ventyx, an ABB co.
Zetron
Zoll

GIS Mapping
3T Communications
APD Communications
Cassidian Communications
CES Wireless
Cisco Systems
ComGroup Australia
Comsearch
CriSys
Damm Cellular Systems
Data911 Mobile Computer Systems
DX Radio Systems
EMS Technologies
Environmental Systems Research Institute (ESRI)
Etelm
Etherstack
Hitech Systems
Integrated Tracking Solutions
InterAct Public Safety Systems
Intergraph
Location Technologies
Locus Diagnostics
Logistic Systems
LS telcom
Manning Navcomp
Maxon
Mobility Sound Technology
NeoTerra Systems
RadioMobile, div. of RF Industries
Radixon
Raveon Technologies
Selex Elsag
Send Word Now
SoftWright
South Midlands Communications
Survey Technologies Inc. (STI)
Swissphone Telecom
Trident Micro Systems
Trilliant
Trimble
TriTech Software Systems
Ventyx, an ABB co.
Zonith

Middleware
APD Communications
Avaya
C4i
CalAmp
CES Wireless
Commtech Wireless
Data911 Mobile Computer Systems
GE MDS
Integrated Tracking Solutions
Location Technologies
Locus Diagnostics
Manning Navcomp
Mentor Engineering
Motorola Solutions
NeoTerra Systems
NetMotion Wireless
Quintron Systems
Radio IP Software
RadioMobile, div. of RF Industries
Send Word Now
Sentor Monitoring and Control Systems
Trident Micro Systems
Twisted Pair Solutions
Ventyx, an ABB co.
VoiceInterop

Mobile-Data Systems
2ergo
3T Communications
Airbiquity
Albrecht Telecommunications
APD Communications
Avaya
CalAmp
Cassidian Communications
Center Systems
CES Wireless
Cleartone Telecoms
CoCo Communications

Compuquest
CriSys
Critical Response Systems
Damm Cellular Systems
Data911 Mobile Computer Systems
Detracom
EMS Technologies
Etelm
Fylde Micro Systems
Global Mesh Technologies Service
HAL Communications
Hitech Systems
HV Sistemas
IDA
I.D. Systems
InterAct Public Safety Systems
Intergraph
IPMobileNet
IPWireless
Kantronics
Kolibri Systems
Location Technologies
Logistic Systems
Manning Navcomp
Mentor Engineering
Motorola Solutions
MotoSAT
NeoTerra Systems
NetMotion Wireless
Radio IP Software
RadioMobile, div. of RF Industries
Raveon Technologies
Raytheon JPS Communications
Safety Vision
Selex Elsag
Send Word Now
SkySweep Technologies
SoftWright
Solarcraft
South Midlands Communications
Spescom
Tait Electronics
Tallysman Wireless
TeleCommunication Systems (TCS)
Telesoft International
Trident Micro Systems
Trimble
TriTech Software Systems
Tunnel Radio of America
Twisted Pair Solutions
Ventyx, an ABB co.
WiPath Communications
Zoll
Zonith

Network Management
3T Communications
Alcatel-Lucent
Anritsu
Artevea Digital
Asentria
Avaya
Aviat Networks
Axell Wireless
Bayly/Coastcom
CalAmp
CoCo Communications
Comlab
CommScope
Compuquest
Comsearch
Damm Cellular Systems
Datron World Communications
Detracom
DPS Telecom
DragonWave
EF Johnson Technologies
Electro Standards Laboratories
EMS Technologies
Etelm
Etherstack
Fial
FreeWave Technologies
Fylde Micro Systems
GE MDS
Genesis Group
Harris Public Safety and Professional Communications (PSPC)
Hytera Communications
In Motion Technology
Intergraph
Location Technologies
Locus Diagnostics
LS telcom
MiMOMax Wireless
Motorola Solutions
NetMotion Wireless
Omnitronics
PageTek
Powerwave Technologies
RAD Data Communications
Radio IP Software
RadioMobile, div. of RF Industries
RCC Consultants
Rohde & Schwarz
Rohill Engineering
Schweitzer Engineering Laboratories
Selex Elsag
Sentor Monitoring and Control Systems
Signal Intelligence
SmarTrunk Systems
Survey Technologies Inc. (STI)
Symmetricom
Team Simoco
Telesoft International
Teltronic S.A. Unipersonal
Trango Systems
Tripp Lite
Tropos Networks
Twisted Pair Solutions
Vecima Networks
Zonith

Operations
3T Communications
APD Communications
Artevea Digital
Avaya
Catalyst Communications Technologies
Comlab
Computer Resources
CriSys
Federal Signal
Hytera Communications
Location Technologies
Manning Navcomp
Motorola Solutions
NeoTerra Systems
NetMotion Wireless
RCC Consultants
Rohde & Schwarz
Sentor Monitoring and Control Systems
Ventyx, an ABB co.
Verint Systems

Paging
Avaya
Center Systems
Commtech Wireless
Compuquest
Computer Resources
CriSys
Critical Response Systems
Digital Paging Co./Golden Sab Inc. (DPC/GSI)
DPS Telecom
DX Radio Systems
EF Johnson Technologies
Fial
Hark Systems
I.D. Systems
IHM
Intergraph
Location Technologies
Midian Electronics
Motorola Solutions
NeoTerra Systems
Penta
Send Word Now
Sonik Messaging Systems
Swissphone Telecom
WiPath Communications
Zetron
Zonith

Records Management Systems (business/industry)
Avaya
Cadex Electronics
Cassidian Communications
Cleartone Telecoms
Computer Resources
CriSys
Data911 Mobile Computer Systems
Hitech Systems
InterAct Public Safety Systems
Intergraph
Location Technologies
Logistic Systems
Mentor Engineering
Motorola Solutions
NetMotion Wireless
RadioMobile, div. of RF Industries
Sentor Monitoring and Control Systems
Signal Intelligence
SmarTrunk Systems
SoftWright
Syntech Systems
Trimble
TriTech Software Systems
Zoll

RF Safety
Antenna Factor
Locus Diagnostics
Narda Safety Test Solutions
RCC Consultants
Sentor Monitoring and Control Systems

Terrain Propagation
Comsearch
Detracom
DX Radio Systems
EDX Wireless
Etelm
Harris Public Safety and Professional Communications (PSPC)
LS telcom
Motorola Solutions
Multiple Access Communications (MAC)
NeoTerra Systems
RadioSoft
RCC Consultants
Selex Elsag
SoftWright
Survey Technologies Inc. (STI)
Trilliant

Voice Recognition
ASC Telecom
Avaya
Cisco Systems
Location Technologies
Motorola Solutions
OrecX
Raytheon JPS Communications
Send Word Now
Spescom
Voice Print International (VPI)

Wireless Internet Applications
2ergo
Avaya
Catalyst Communications Technologies
Cellular Specialties Inc. (CSI)
Ceragon Networks
CES Wireless
Cisco Systems
CoCo Communications
Compuquest
CriSys
Digital Voice Systems Inc. (DVSI)
Electro Standards Laboratories
Encom Wireless Data Solutions
Hark Systems
HV Sistemas
I.D. Systems
Intergraph
Location Technologies
Manning Navcomp
Motorola Solutions
NetMotion Wireless
Radio IP Software
Send Word Now
Sentor Monitoring and Control Systems
SISTEC, SARL
TeleCommunication Systems (TCS)
Telesoft International
Trimble
TriTech Software Systems
Vecima Networks
VoiceInterop

TELEMATICS/ITS EQUIPMENT
EMS Technologies
Harris Public Safety and Professional Communications (PSPC)
Laird Technologies
Location Technologies
Mobile Mark
NeoTerra Systems
Peiker Acustic
Radio IP Software
Rojone
Sentor Monitoring and Control Systems
Tallysman Wireless
Trimble
WiPath Communications
Zonith

TEST EQUIPMENT
(D=direction finders, FS=field strength meters, FC=frequency counters, P=power monitors, RF=RF monitors, SM=service monitors, SA=spectrum analyzers, V=voltmeters/wattmeters)
Abell Industries (D, FC, P, SA, V)
Aeroflex (FC, P, RF, SM, SA)
Agilent Technologies (FC, SA, V)
Albrecht Telecommunications (SM)
Anritsu (D, FS, FC, P, RF, SM, SA, V)
Berkeley Varitronics Systems (D, P, SA)
Bird Technologies Group (FS, P, RF, SM, SA, V)
Communications Research Centre (CRC) (SA)
Comprod Communications (P, RF)
Cubic Defense Applications (D)
Davicom, div. of Comlab (P)
dbSpectra (P)
Doppler Systems (D)
EMR (P)
Etherstack (RF)
General Dynamics Satcom Technologies (P, SM, SA, V)
Hytera Communications (D, FS, FC, P, RF, SM, SA, V)
Kaltman Creations (D, FS, FC, RF, SA)
L-3 Communications, Narda Microwave-East (P, SA)
Link Communications (SM, SA)
Locus Diagnostics (RF)
Lyncole XIT Grounding (P)
Motorola Solutions (SM, SA)
Multiple Access Communications (MAC) (FS, P, RF, SA)
Narda Safety Test Solutions (D, P, RF)
Optoelectronics (FC)
PDA Safe (P)
Praxsym (FS, P, RF, SM, V)
RadioMobile, div. of RF Industries (RF, SA)
Radixon (D, FS, RF, SA)
Rohde & Schwarz (D, FS, FC, P, RF, SM, SA, V)
Rojone (RF)
Sentor Monitoring and Control Systems (P, RF, V)
Sinclair Technologies (FC, P, RF)
Spectracom (FC, RF, SA)
Survey Technologies Inc. (STI) (FS, P, RF, SM, SA)
Telewave (P, V)
Telsate Telecomunicações (D, FS, RF)
Times Microwave Systems (RF, SM, SA)
TX RX Systems Bird Technologies Group (P, RF, SA, V)

TONE SIGNALING EQUIPMENT
Albrecht Telecommunications
American Wireless
Antenna Factor
Avtec
Benelec
Bosch Security Systems
CES Wireless
Cimarron Technologies
Communications Specialists
Compuquest
Connect Systems
Critical Response Systems
Cromack Industries
DX Radio Systems
EF Johnson Technologies
GAI-Tronics
Hark Systems
Hoag Electronics
HV Sistemas
IDA
Location Technologies
Maxon
Midian Electronics
Motorola Solutions
NorComm
Optoelectronics
Pantel International
Penta
Racom Products
RF Technology
Selex Elsag
Spectra Engineering
Spectrum Communications
Thales Communications
Veetronix
Vislink
Zetron

WIRELESS LOCAL LOOP/RURAL SYSTEMS
4RF Communications
Aviat Networks
Berkeley Varitronics Systems
Carlson Wireless Technologies (CWT)
Cellular Specialties Inc. (CSI)
Ceragon Networks
Connect Systems
DX Radio Systems
Hark Systems
Hoag Electronics
Hughes Network Systems
Hytera Communications
Jaybeam
Kathrein, Scala div.
Kyocera Solar
Location Technologies
MiMOMax Wireless
Mobile Mark
Motorola Solutions
RF Technology
Rohde & Schwarz
Rojone
Runcom Technologies
Star Microwave Service
Tait Electronics
Telepoint
Telewave
Zetron

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Classifieds

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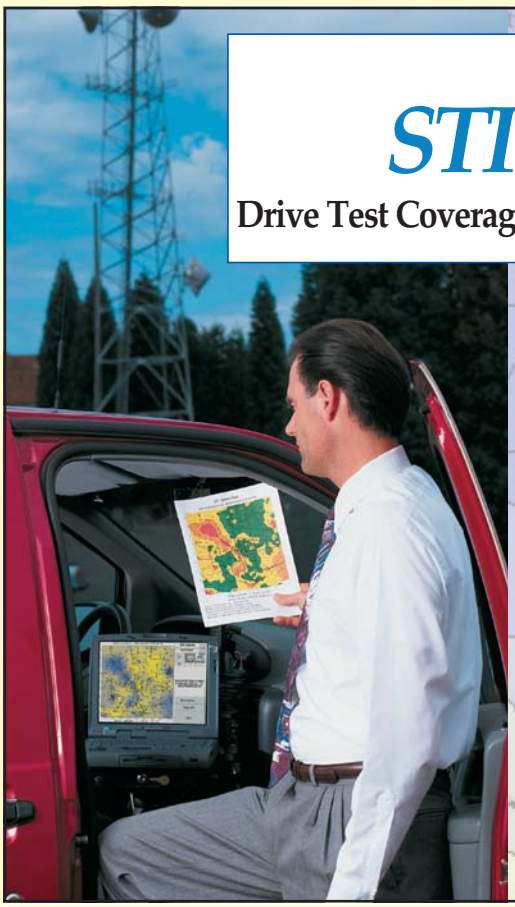
dsabin@RRMediaGroup.com

Software

New
STI Field Test 7
Drive Test Coverage Surveys / Indoor Building Verification



From RF field measurement to analysis and report, S T I Field Test 7 is the most cost-effective and easy-to-use Drive Test measurement and coverage verification solution on the market today.

New Capabilities Include:
USA and Canadian Street Data

Project-25 RF Quality Testing

Analog Audio Quality Testing

STI Tile Compliance Testing

Narrowbanding RF Quality Testing vs. Wideband RF Quality

Trunked, Simulcast, Conventional

Up-Link coverage tests from mobile

The first step toward improving system coverage is to understand current system performance.

STI Survey Technologies Incorporated
"Geographic Signal Coverage At Your Fingertips."

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By David Lum

Insights into Spectrum Management

Spectrum belongs to every country as a natural and renewable resource. It is limited because of the demand by so many different sectors of industry, commercial business, education/academia, research and government. Most of us believe that frequencies will always be made available for two-way radio systems, even if the spectrum takes a lot of time and justification to acquire. However, spectrum is becoming more limited and tougher to get.

In the regulatory world, when spectrum bands are being planned at the regional and global levels, everything is consensus-driven. It takes a long time, many technical discussions and negotiations to reach consensus. One must be patient.

Because spectrum planning is a 100 percent consensus process, everyone must compromise for agreements to be ratified; what you specifically want today may not ultimately be what you agree to. This process can happen in a regional open meeting, such as at the Asia-Pacific Telecommunity (APT), and in global open meetings, such as at the World Radiocommunications Congress (WRC). Eventually, progress is achieved when everyone has a little bit of what they want, and no one has a dominant position. Hence, when everyone is equally unhappy, success.

To speed up the process of discussion in meetings, everyone is given an equal voice to contribute and to air concerns. If no one says a word, it is taken by the chair of the meeting to indicate agreement and/or support.

Because the process begins at the regional and global levels, agreements made at these meetings flow upward eventually to the International Telecommunication Union (ITU), where they are ultimately ratified. Once ratified by the ITU, the regulator in your country is bound by law to comply with the agreement. These agreements may impact you in unexpected ways. In an effort to not be surprised by new international policies, meet with your regulator often to track developments at the regional and global levels. Better still, participate in the meetings to make your voice heard and your needs known. Those who attend are the ones who eventually make the agreements that affect everyone.

Spectrum planning has a 20- to 25-year view, and once spectrum agreements are ratified, they remain in place for a long time. If end users are required to move from one frequency band to another, it is incredibly disruptive to their operations and expensive. All spectrum-planning participants understand and are sensitive to this fact, and as a result, take their time to make sure that what they do is right for everyone.

The dominant wireless technology going after as much spectrum as possible is the cellular industry, known by regulators as International Mobile Telecommunications (IMT), composed of operators/carriers and manufacturers. Cellular carriers serve the consumer market, which has a market size measured in billions of people. So private spectrum can be reallocated to IMT if the in-country demand is for IMT and no one fights for private spectrum. Remember, silence implies agreement or support.

Many end users blame regulators for the lack of frequencies for two-way radio or wireless data systems. Spectrum is highly limited, and the regulator's job amounts to horse trading and refereeing. The regulator must decide how to balance the spectrum plans for all industries, services and applications, and they must do so while guaranteeing fairness and non-interference between all the parties involved.

Technology changes rapidly, and it is important to stay current on technology updates and new architectures and configurations that affect spectrum use. The regulators also must keep up to date with all of the technologies they manage, usually more than any end user. They must have a broad understanding of every technology that uses spectrum. Helping new regulators understand two-way radio technology and how it differs from cellular and paging technologies should be a priority.

In spectrum management, the regulators and wireless manufacturers are the most interested and involved parties because they want to harmonize on performance standards to keep costs low for end users. Without active end-user participation, regulators will do their best without that added knowledge. End users need to speak up or ensure that there is proper industry representation at the regulator meetings.

Government and public-safety users need dedicated spectrum for private Long Term Evolution (LTE) systems and narrowband digital two-way radio systems for managing disasters and major emergencies. If end users are not involved now to ensure that they have adequate spectrum, they will be limited in their future options. Contact your regulator and learn how you can get more involved so that you and your industry's interests are considered in long-term spectrum planning. ■

David Lum is the director of regulatory, product and support operations for the Asia/Pacific division at Motorola Solutions. Email feedback to david.lum@motorolasolutions.com.

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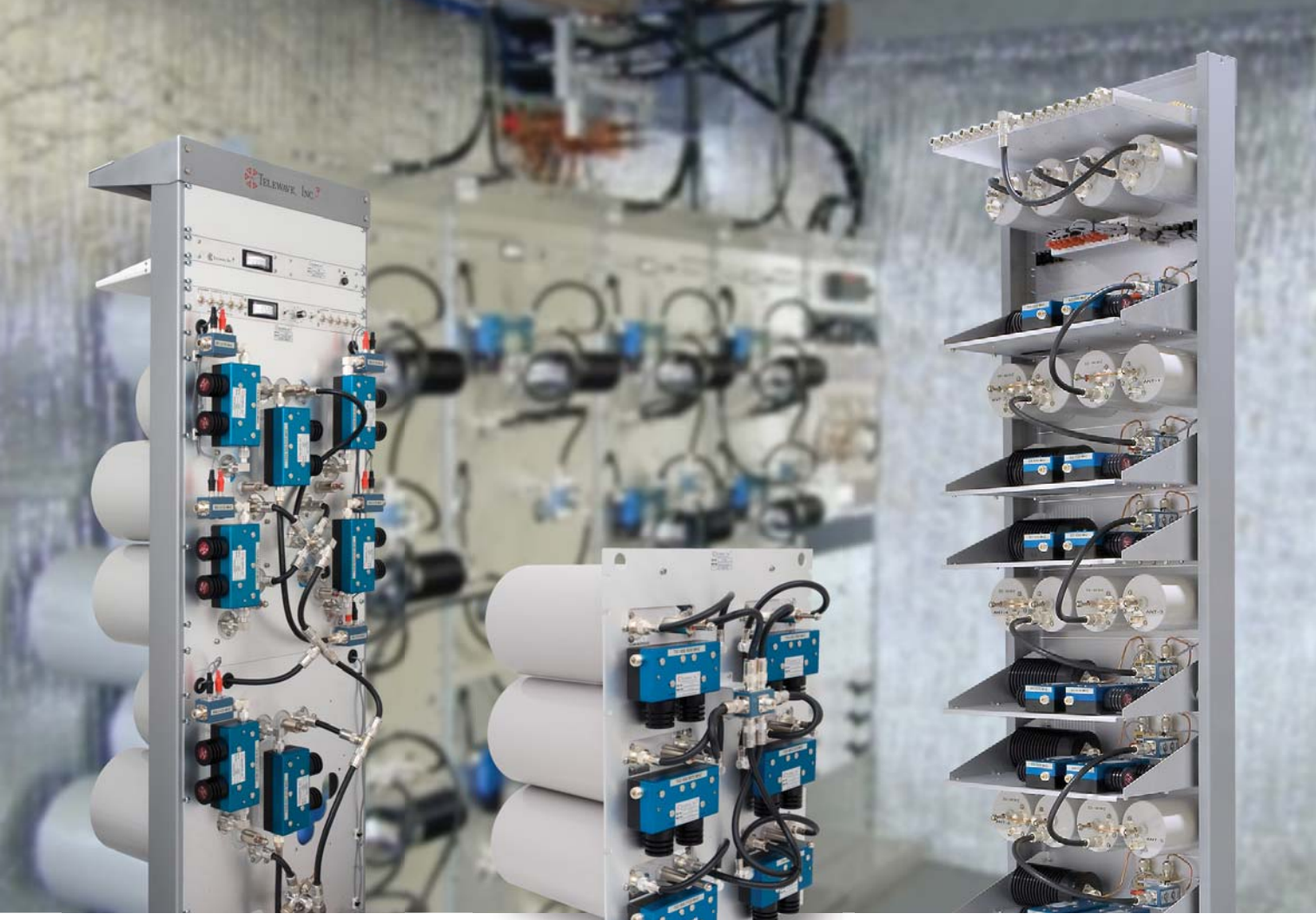

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