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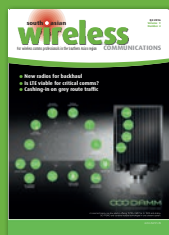
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Vietnam sees its first 4G services

Vietnam's Ministry of Information and Communications (MIC) has awarded 4G licenses to VinaPhone, Viettel, MobiFone and Global Telecommunications (Gtel).

According to the Department of Radio Frequencies, the country can only popularise 4G services as from 2018. However, operators have said that they can officially launch as soon as they receive their licenses.

VinaPhone has been commercially testing 4G mobile internet services in Phu Quoc Island and Ho Chi Minh City since January 2016. On 3 November, it became the country's first operator to offer LTE after launching services on the 1800MHz band in Phu Quoc. The island is now the first locality

in Vietnam to be fully covered with 100 4G BSTs. VinaPhone, which is owned by the Vietnam Post and Telecommunication Group, is planning a wide rollout of 4G services in 2017 with 21,000 BSTs to be installed nationwide.

Meanwhile Viettel, which is run by Vietnam's military, received its 4G license on 14 October and has begun installing equipment and infrastructure. The company has been testing 4G equipment in Ba Ria-Vung Tau and Hanoi since late 2015 and now plans to deploy infrastructure in Laos, East Timor and three provinces.

The operator's aim is to implement 4G services with the most widespread coverage throughout the country in the shortest period of time. Viettel

deputy general director Hoang Son says services will be officially launched in the first quarter of 2017 and will cover the whole territory.

The company claims it can provide 4G services on a large

scale as it did with 2G, and can offer low service fees thanks to "cheap" LTE devices. "For 2G and 3G, we had to buy equipment from telecom equipment suppliers. But now we can manufacture 4G equipment. This is a big advantage when deploying 4G," says Son.

From 2018, Viettel says it will replace imported products with ones that it has produced itself. The operator will also manufacture its own telecoms equipment. Its target is to research, design and make 70 per cent of its own infrastructure hardware by 2020.

At the time of writing, MobiFone announced 4G coverage in Hanoi, Danang and Ho Chi Minh City. Gtel has yet to disclose its plans.

Minister of Information and Communications Truong Minh Tuan (right) presents a 4G license to Nguyen Manh Hung, general manager of military-owned operator Viettel.

Pre5G in Malaysia and 'live' 5G in the Philippines

ZTE has carried out a live demo of its *Pre5G* equipment in Malaysia. And in a separate development, Smart claims to have achieved 5G speeds over a 'live' network in the Philippines.

At its *VOICE Towards 2020* summit held at the end of November, ZTE showcased its *Pre5G* FDD 1.75Gbps solution using its *R8854* which, at

12 litres, is claimed to be the world's smallest 4T4R remote radio unit.

The company says the technical combination of 4x4 MIMO, 256 QAM, and five carrier aggregation meant that the peak rate for a single UE reached a steady 1.75Gbps.

Speaking at the time, ZTE Malaysia GM Ge Yuqiao said: "ZTE *Pre5G*

is building a bridge to 5G, enabling global operators and users to have an early experience of high-speed service analogous to 5G in advance."

Meanwhile in mid-December, PLDT subsidiary Smart said it had achieved 5G speeds of 2.5Gbps using 100MHz with latency of just one millisecond. In a demo conducted at the Nokia

Manila Technology Centre in Quezon City, it leveraged the vendor's *AirFrame* data centre platform to support high-performance and low-latency requirements.

Smart's innovation team will continue to collaborate with the Technology Centre to conduct joint research for the development of 5G technology.

Mobile operators prepare for software defined networks

Nokia is helping two operators in the region to transform their networks by using SDN technologies.

In November, Dtac announced that it will become Thailand's first cellco to implement an SDN-ready IP/optical network. The company will use flagship products from Nokia to bolster its backbone to support a network that will eventually deliver ultra-broadband mobile access to more than 40 per cent of the country's population.

Dtac needed a core network to handle increased data demand, but also with the open interfaces and the programma-bility necessary to support a migration to SDN. The operator will replace its existing IP core routing and DWDM infrastructure with Nokia products such as the *7950 Extensible Routing System* and the *1830 Photonic Service Switch*.

"Over the last two years, we've seen demand for mobile broadband grow exponentially," says Dtac CTO Prathet Tankuranun. "As we prepare for future

CTO Prathet Tankuranun says the deployment in Thailand is an important step in Dtac's migration towards full SDN automation.

advanced technologies, we've made a strategic choice for an SDN-ready IP/optical network because it gives us the control and agility needed to run an efficient network that can rapidly adjust to evolving demand patterns."

The company is also deploying Nokia's *GMPLS* wavelength routing engine control plane at the optical layer. It's claimed this will provide automated network operation

with the "highest level" of service protection for maximum reliability.

Meanwhile, further east in the Philippines, Globe Telecom will also use the Finnish vendor's IP, optical, and carrier SDN technologies to enhance its enterprise data services network.

Globe's aim is to expand coverage across the islands, including in the Autonomous Region in Muslim Mindanao (ARMM). Using Nokia's

carrier SDN platform, it will also be able to provide flexible data services such as bandwidth-on-demand nationwide.

Globe has recently gained access to new LTE spectrum. As part of a separate agreement, it will also use Nokia's help to transition to a flexible cloud-based network infrastructure as it prepares for IoT and 5G.

The vendor will deploy its 4.5G Pro technology using the 5G-ready *AirScale* base station and *Flexi Zone* small cells in the Visayas and Mindanao regions. This will provide broadband access to some of these areas for the first time.

Nokia says Globe will also be able to use Mobile Edge Computing and advanced CA techniques to deliver "virtually unlimited scalability and dramatic improvements" in speeds and capacity. Additionally, it says the technology will enable lower power consumption, reduced opex, greater network automation, and enhanced network performance.

Singapore to trial 'Li-Fi' for wireless data transmission

Since launching in 2012, PureLiFi has developed the *LiFi-X* system which consists of the world's first Li-Fi dongle.

Singapore's Infocomm Media Development Authority (IMDA) will trial emerging technology that utilises light to transmit data wirelessly.

'Li-Fi' (light fidelity) has been developed by Scottish company PureLiFi which has recently received financial backing from Singaporean investment firm Temasek. PureLiFi claims its technology can turn every light in an office, home, car or even street light into a wireless internet access point.

According to researchers, light spectrum is 10,000 times wider than RF spectrum. Li-Fi operates in visible light frequencies between 400THz and 800THz. As this is at the higher range of the electromagnetic spectrum, the technology is able to deliver higher capacity throughput of up to 1Gbps.

The of idea of using off-the-shelf light bulbs for super high-speed transmission initially came from research carried out by Harald Haas, professor of mobile communications at Edinburgh University's School of Engineering/Institute of Digital Communications. In 2012, Haas co-founded PureLiFi and is the company's chief scientific officer.

Since then, the firm has released three iterations of its Li-Fi system. They include the *LiFi-X* which consists of the world's first Li-Fi dongle, and is also available in the form of a LiFi-integrated luminaire developed in partnership with French lighting manufacturer Lucibel.

In November, Singapore's Minister for Communications and Information Dr. Yaacob Ibrahim said the IMDA will facilitate joint-industry Li-Fi trials by removing some of the regulatory barriers. All frequency fees for technical Li-Fi

trials will be waived to encourage interested companies to conduct assessments.

A PureLiFi spokesperson was unable to provide any more details about the trials in Singapore, but said: "We are certainly working on bringing our products to the Singaporean market throughout 2017, and the regulator's support is a great stepping stone for that process."

True uses Atom GPS for network time sync

True is using Huawei's Atom GPS platform to deliver high-precision time synchronisation for its 4.5G networks in Thailand.

The operator uses inter-site CA to enhance cell edge coverage and traffic rate, but this technology requires high-precision time synchronisation. As a result, True faced a challenge for its backhaul network based on how to provide more agile time synchronisation for 4.5G networks.

According to Huawei, one conventional solution is to deploy GPS on each base station. But it says this requires large-scale GPS deployment and clear line-of-sight to GPS antennas which leads to difficultly in site selection.

Another conventional solution is to use the IEEE 1588v2 Precision Time Protocol solution on the IP RAN. But Huawei says this needs network-wide support for the protocol and hop-by-hop measurement of fibre asymmetry, leading to difficult deployment and high costs.

True has overcome the problem by using the vendor's Atom GPS at Pre-Agg nodes, and 1588v2 configured for access routers on the IP RAN.

Compared to GPS deployment on each base station, Huawei reckons its solution "greatly saves" TCO and is not limited by site selection. And compared to 1588v2, it claims Atom GPS can support 1588v2-incapable networks and is free of hop-by-hop measurement.

Satellite helps monitor water levels in Malaysia

Applied Satellite Technology (AST) and HDL Solutions are helping the Malaysian government collect and monitor data from the country's flood-prone northern areas.

In 2014, the region was hit by the worst flood in decades. It affected more than 200,000 people and was responsible for 21 deaths.

Most of the sensors that had been deployed to collect weather monitoring data were destroyed during the disaster. MNOs were forced to shut down their towers which were transmitting monitoring data back to the Malaysian Department of Irrigation and Drainage for analysis and decision making purposes

With little or no data available, government agencies were unable to

forecast and predict the water level at dams and rivers.

Working with AST and HDL, a Malaysian company specialising in real-time monitoring systems, the government has now deployed a more robust and reliable system for the continuous monitoring of rainfall and water levels.

It uses environmental monitoring systems from Taiwan-based AQUAS, Inmarsat's satellite network, L-band *BGAN* M2M terminals, and AST's *IRIS Terminal Manager* data and asset management application.

The solution was initially deployed in a few trial areas. After a successful evaluation, it will now be implemented in 300 new sites over the next six to eight months.

ABS supports Indonesia's first free-to-view TV service

ABS says SMV's aim is to deliver high quality entertainment and educational content that is affordable to all.

ABS and licensed DTH broadcast services provider Sarana Media Vision (SMV) will launch Indonesia's first free-to-view platform.

Called *SMV FreeViewSat*, the service will initially broadcast more than 60 television channels nationwide via ABS' satellites. It will be simultaneously available via 75cm Ku-band dishes from 75°E on *ABS-2* and *ABS-2A*, and via 1.6m C-band antennas from 159°E on *ABS-6*. ABS says this gives customers the choice of small dishes or

larger ones with better rain protection.

The partners say the *FreeViewSat* model will promote maximum distribution, and that the set-top box and dish will cost less than USD35. Since Indonesia already has more that 10 million C-band antennas installed, a rapid adoption rate is expected.

"The goal is to deliver high-quality entertainment and educational content affordably to all," says ABS CEO Tom Choi. "For the first time, everybody, not only the affluent or those in the

urban areas, will be able to receive high-quality programming for free, with just a one-time purchase of an STB and dish."

He adds that *FreeViewSat* will also give advertisers the first real opportunity to potentially reach Indonesia's entire population, even in rural areas.

At launch in January 2017, the platform will carry at least 30 local free-to-air channels and more than 30 international channels. The aim is to grow the number of channels to more than 100 in the first six to 12 months.

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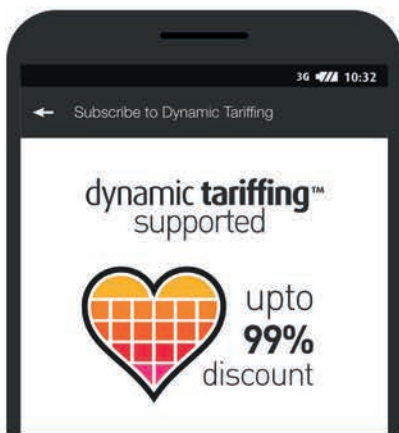
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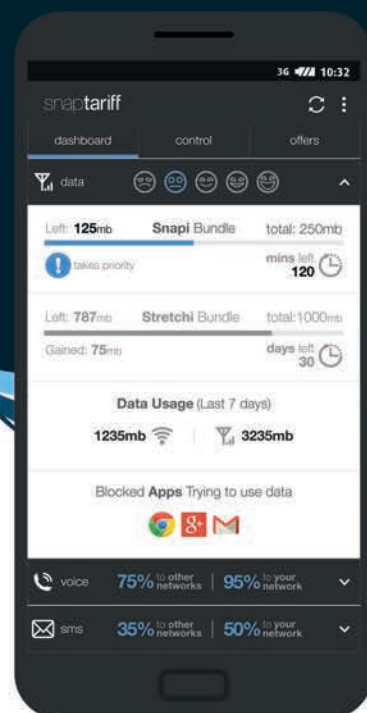
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Fourth cellco in Singapore

Australian communication services provider TPG Telecom has won Singapore's new entrant spectrum auction (NESA). It acquired all of the frequencies available – two lots of 2 x 5MHz of 900MHz and eight lots of 5MHz of 2.3GHz. TGP paid a total of SGD105m, and expects to invest a further SGD200m-300m to establish a mobile network with nationwide coverage by September 2018. The regulator also received expressions of interest from MyRepublic and airYotta. The latter did not meet the pre-qualification criteria.

Auction postponed

Myanmar's sale of 1800MHz spectrum has reportedly been postponed. The auction was due to take place in 2016 but according to a Ministry of Transport and Communications official quoted in the *Myanmar Times*, it will now take place in March 2017. Previously, the ministry announced that the 1800MHz band will be distributed equally among the country's operators which currently include Ooredoo, Telenor and state-owned MPT. A fourth firm, run by a local business consortium and Vietnam's Viettel, aims to launch services next year.

Elitecore powers YTL

Malaysian telco YTL Communication will use Elitecore's *Revenue and Customer Management* platform as part of its roll out of LTE and VoLTE services. Elitecore – which is now part of Sterlite Technologies – says its NFV-ready and virtualised platform comprises integrated policy and charging, 3GPP AAA, convergent billing and fulfilment. It also offers mobile self-care catering to voice, data and VAS, supporting multiple networks such as LTE, Wi-Fi and WiMAX.

AsiaSat relocates satellite to help Spacecom at 4°W

Asia Satellite Telecommunications (AsiaSat) has agreed to relocate *AsiaSat 8* from its current location of 105.5°E to Spacecom's 4°W orbital position.

The satellite will be co-located with Spacecom's *AMOS-3* for a four-year period and is expected to begin service in 1Q17. Spacecom has an option to extend the agreement for an extra year.

Following testing, *AsiaSat 8's* beams will cover the Middle East, central Eastern Europe and Africa, enabling Spacecom to provide additional capacity and services to its customers. The company's CEO and president David Pollack says: "*AsiaSat 8* enables us to continue serving our customers at 4°W following the expected end of life of *AMOS-2* and provide them with additional capacity and services."

Israel-based Spacecom has suffered two major satellite losses over the last 12 months. In November 2015 it lost contact with *AMOS-5 (see Rocket Power feature, Q1 2016)*, and in September of this year, the firm's greatly anticipated *AMOS-6* was lost when the Spacecom rocket carrying it exploded on the launch pad. *AMOS-6* was due to provide broadband services to Africa from 4°W, and its entire Ka-band payload had been bought by Eutelsat and Facebook.

Hong Kong-based AsiaSat's next satellite is planned for launch in early 2017 and is currently on order from Space Systems/Loral. *AsiaSat 9* will carry a Ka-band payload as well as 28 C- and 32 Ku-band transponders. It will replace *AsiaSat 4* and cover APAC from 122°E.

At the start of December, AsiaSat said that once it had received the required regulatory approvals, its will re-position *AsiaSat 8* to 4°W where it is expected to arrive within 45 days.

PSN to use Newtec for rural broadband

Newtec's *Dialog* platform will be used for a broadband project in Indonesia. Local satcoms service provider Pasifik Satelit Nusantara (PSN) will deploy the Belgian company's technology to deliver broadband access to underserved rural areas as part of a USO initiative spearheaded by the Ministry of Communication and Information Technology.

As part of the *Dialog* system, PSN has been supplied with Newtec's

4IF hub module and hundreds of *MDM3100* satellite modems featuring the company's *Mx-DMA* return link technology to provide services using C-band transponders. It will use the multi-service platform to deliver satellite internet access to schools, government offices and 'puskesmas' or community health clinics.

PSN CEO Adi Rahman Adiwoso says: "This access will make such a huge difference to the lives of those in

rural areas of Indonesia, where more traditional means of connectivity are unreliable or non-existent."

According to Newtec, PSN evaluated various options based on SCPC and MF-TDMA technologies before opting for *Dialog*. It says this was because the platform offers high throughput VSAT capabilities as well as *Mx-DMA*. Newtec claims this delivers the efficiency of SCPC with the dynamic bandwidth allocation capability of MF-TDMA.

Coast guard patrol boats rely on R&S radios

The Philippine Coast Guard has enhanced the reconnaissance, pursuit and communications capabilities of its ten new Multi-Role Response Vessels (MRRV) with secure radio equipment from Rohde & Schwarz (R&S).

The first MRRVs arrived in the Philippines in August and are now equipped with R&S's *M3SR Series4400* and *Series4100* software defined radios for secure voice and data communications. The *4400*s provide continuous AM and FM transmission coverage at VHF and UHF frequencies from 100MHz to 512MHz, while the *4100* radios are said to deliver "reliable and easy to set up" shortwave communications.

The *M3SR Series4400* software defined radios are designed to provide continuous AM and FM transmission coverage at VHF and UHF frequencies.

An automatic message handling system is also part of the package. The MRRVs will have situational awareness through the *Map Track*, email, chat and file transfer features of R&S' *Postman III* software. This has been optimised for communications over HF and VHF/ UHF radio networks with variable data rates. Because the software is

IP-based, R&S says it can interface with standard IP infrastructures such as LAN/WAN and satcoms.

The vessels are also equipped with the vendor's *DDF205* which monitors radio emissions from 8kHz to 6GHz and covers direction finding of signals ranging from 20MHz to 3GHz.

R&S says the device combines its new *EB500* monitoring receiver with the accurate correlative interferometer DF method. It claims this unique combination offers precise radio direction finding with sensitive radio monitoring capabilities.

The Philippine Coast Guard plans to equip its other vessels with the same kind of radio equipment.

Singapore tests eSIMs for always-on M2M comms

Giesecke & Devrient (G&D) is providing the testbed for the remote provisioning of eSIMs to IoT devices as part of a trial with PUB, Singapore's national water agency.

G&D has replaced the existing SIM cards in some of PUB's utility sensors with eSIMs. The sensors will continue to collect field data and send them to PUB's server for monitoring and analysis. But G&D's *Remote eSIM Management* system will allow them to be technically switched between different mobile networks as required without direct physical intervention.

Singapore's three current MNOs, M1, Singtel and StarHub, will all participate to ensure the highest level of network coverage. G&D will be responsible for coordinating with all partners.

The assessment is being carried out by Singapore's Infocomm Media Development Authority (IMDA). One potential use of the remote eSIM management system is the switching of networks upon expiry of a mobile network contract.

Aileen Chia, the IMDA's assistant chief executive and DG, says: "The trial will explore the viability of using eSIMs to enable always-on, machine-to-machine communications without the hassle of having to physically replace SIM cards when switching operators."

The trial began in November and is expected to run for at least two months. According to G&D, the project has the potential to highlight the possible need for regulation changes across the region.

Omantel Wholesale connects Asia and Africa

Omantel Wholesale is interconnecting the *Gulf to Africa (G2A)* and *Silk Road Gateway - 1 (SRG-1)* cable systems to deliver ultra-low latency networking between Asia and Africa.

SRG-1 connects Oman to Pakistan with onwards connectivity to Afghanistan, China, Iran, Turkmenistan and Tajikistan.

There are two cable landing points in Pakistan – Karachi and Gwadar. These then connect to MultiNet's long haul fibre network with several connection points throughout the country, such as in Lahore and Islamabad. From Torkham and Chaman, *SRG-1* crosses the border to connect Kabul and Kandahar respectively in Afghanistan.

G2A connects Oman to Somalia via two redundant landing stations in Puntland (Bosaso) and Somaliland (Berbera). The system provides onward connectivity to Ethiopia and will connect Kenya, Mogadishu and South Africa in 2018 and 2019.

The company says it will connect to the Ethiopia border from Berbera, and then Ethiopia Telecom will extend the cable from into its national network.

The total investment in both projects will be more than USD80m.

Omantel Wholesale claims to be the only provider in the world that is able to offer rapid access between Asia and Africa via geographically diverse routes. *G2A* and *SRG-1* add to its more than 20 undersea cable investments which include a high-speed link between Singapore and Frankfurt.
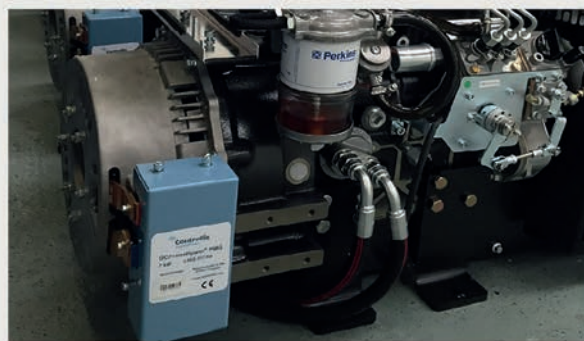
Citycell to be shut down

Citycell, which became Bangladesh's first MNO after launching in 1989, has been shut down by the local regulator and its spectrum has now been suspended. Despite repeated requests, the operator has failed to pay fees to the government amounting to BDT477.51bn (USD60.8m). These have been outstanding since 2012 and include spectrum and license renewal charges as well as other dues. Citycell was Bangladesh's only CDMA network operator.

Duopoly to end

A third cellco is expected to join Globe and PLDT in the Philippines next year. The National Telecommunications Commission is planning to sell unused and unallocated spectrum in one block by mid-2017. It will include 3G frequencies forfeited by PLDT after buying Digital Telecommunications in 2011, as well as spectrum in the 700, 2500 and 3500MHz bands returned by PLDT and Globe Telecom as a condition for acquiring San Miguel's telecoms assets earlier this year. Five firms have so far reportedly shown an interest in acquiring the spectrum.

Market expanding

India's wireless subscribers reached 1,049.74m at the end of September. According to regulator data released in December, 603.80m of those users are in urban areas while 445.94 are rural. Of the country's 12 MNOs, Bharti, Vodafone and Idea dominate with 24.76, 19.12 and 17.03 per cent market shares, respectively. The bottom three include state-owned MTNL (0.34 per cent), Sistema (0.64 per cent), and Reliance Jio (1.52 per cent), although the latter only started operations in September.

'Gatekeeper' controls Banglalink's SMS traffic

Banglalink has adopted Infobip's *sGate* firewall to protect more than 30 million subscribers in Bangladesh from receiving unsolicited SMS spam and preventing potential unlawful communications.

The operator says it needed a solution capable of handling high volumes of domestic and international traffic that could provide the visibility needed to ensure full security control of incoming messages to our users.

Infobip and its local partner Wintel worked closely with Banglalink to roll out *sGate* which monitors and controls both domestic and international inbound SMS traffic across the operator's network.

Infobip CEO Silvio Kutic says *sGate* will enable Banglalink to benefit from new revenue.

The platform monitors and filters SMS, USSD and HLR, detecting any abnormal traffic flows indicating fraudulent activity. It allows an operator to tackle threats by blocking or monitoring them more closely, and features preset control polices to ensure traffic conforms to the restrictions of the network.

By gaining full network visibility, Infobip says Banglalink will be able to increase network efficiency by understanding where congestion issues lie, and address unbilled A2P SMS traffic.

The vendor's founder and CEO Silvio Kutic says: "*sGate* will not only allow Banglalink to significantly reduce SMS threats on its network, but provide insight into SMS traffic which will in turn allow the network to become more streamlined and profitable."

Infobip has setup a dedicated Bangladesh-based support team that will also work with other operators in the region who use the platform.
Monetising A2P messaging – pp27-28

TrueMove H to track subscriber experience

TrueMove H has deployed Procera Networks' network visualisation technology to monitor its 2G, 3G and 4G performance in Thailand.

ScoreCard is designed to measure each subscriber's throughput, latency and packet loss at sub second intervals to gauge the ability of the network to deliver a high quality experience. Procera says the measurements include location, device and service plan attributes to provide context for each subscriber's traffic to ensure that the data are actionable.

The network is rated from A to F in key application categories including web surfing, streaming video, social media, real-time gaming, upload, download, and voice. TrueMove H's management can then quickly use the data and visualisation to further aid business investment decisions, maximise ROI, and reduce churn.

Procera adds that the engineering team can drill down deeper and analyse the actions to take at different locations in the network to resolve QoE hotspots, while the marketing department can also use the scores to identify the services which deliver high QoE.

The vendor points out that no personally identifiable information is collected from subscribers, and only the overall quality of the broadband service is measured and fed back to a centrally deployed system.

Ncell enhances customer support with network insight system in Nepal

Nepalese mobile operator Ncell is hoping to deal with customer complaints more effectively and increase the efficiency of its network management with Polystar.

"We needed to identify and address customers complaints more efficiently and effectively, which will enable us to increase customer satisfaction and the efficiency of our network management", says Ncell ICT director Andras Pali.

The cellco, which is part of Malaysia's Axiata Group, is using Polystar's *Network and Customer Insight* solutions to collect and correlate real-time data from all elements across its 2G and 3G network infrastructure.

By using available raw data, the Swedish firm says its platform interprets complex information so that it can be accessible to any user, which means that specialist knowledge is not required.

The data collected is organised and filtered so that different personnel, such as engineers, customer care agents, product managers, etc., and their teams have clear visibility of information and intelligence that is relevant to their roles.

"The platform is intended to be adopted by more staff, extending access to rich data through our organisation," says Pali. "We expect to secure greater insight into subscriber and device behaviour, which will allow us to increase subscriber loyalty by delivering not only a better experience but also more attractive products and service offers."

According to Polystar, *Network and Customer Insight* can be deployed on any network technology from a single platform, and on any protocol or interface, reducing cost of ownership and simplifying deployment.

The firm adds that the solution will also make a "valuable and significant" contribution to Ncell's network evolution and enhancement plans. It says that as the operator expands its cell sites, it can also use the information to understand configuration issues more rapidly.

Maldives fisheries to get satphones

Ooredoo and Thuraya will supply mobile satellite products and services in the Maldives. The initial phase of the agreement will see fishermen provided with voice products and broadband connectivity.

The fishing industry is the second-largest industry in the Maldives and is traditionally the main occupation and major source of income for many people.

The country's government has said that as from 2017, commercial fishing operators have to fit their vessels with satcoms equipment and supply crews with satellite phones. This is in line with the approach adopted by other fisheries management authorities throughout the world.

Thuraya says that by equipping fishing vessels with its *SatSleeve* and *SatSleeve+* hotspot devices, fishermen will have access to monitoring systems and services that address multiple requirements such as issues of distress and safety.

The devices are adaptors that transform smartphones into satellite phones. It's claimed they offer fast and simple connectivity on the move, especially in remote areas where terrestrial networks have become unavailable or are unreliable.

They enable users to make calls, send and receive email and SMS, and access apps. Thuraya says they also come with a programmable SOS button that works even if the smartphone isn't connected.

The second phase of the agreement, which came into effect towards the end of 2016, targets the 105 plus island resorts across the Maldives. In what's described as a pre-emptive and precautionary mandate by the government, all resorts and tourist facilities are now required to install satellite communication equipment as an added safety measure for holidaymakers and visitors.

Thuraya's *SatSleeve* devices are adaptors that turn smartphones into satellite phones.

BSNL chooses Aptilo service management

Indian telco Bharat Sanchar Nigam Limited (BSNL) will use Aptilo Networks' *Service Management Platform (SMP)* to deliver and manage carrier-class wireless services.

BSNL is said to have 90 million mobile users as well as more than eight million broadband customers.

Headquartered in Sweden, Aptilo Networks specialises in carrier-class systems to manage data services with functions for authentication, policy control and charging.

Its *Service Management Platform* is being provided to BSNL via system integrator ICOMM. According to the vendor, *SMP* is "highly scalable" and will support the operator's rapid growth. It also claims the platform is a critical component of Wi-Fi calling and the Internet of Things.
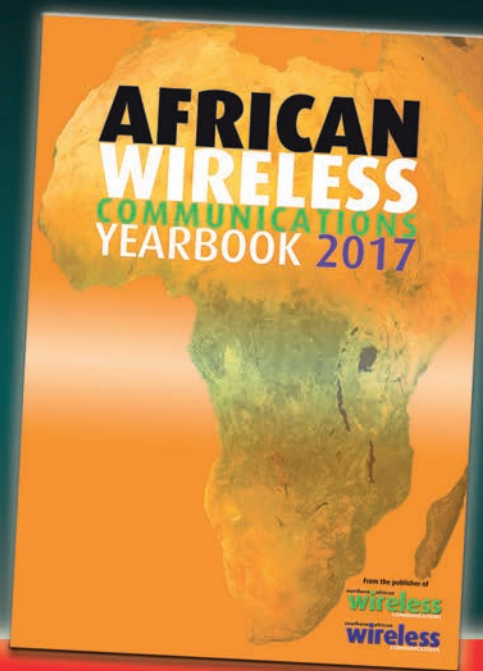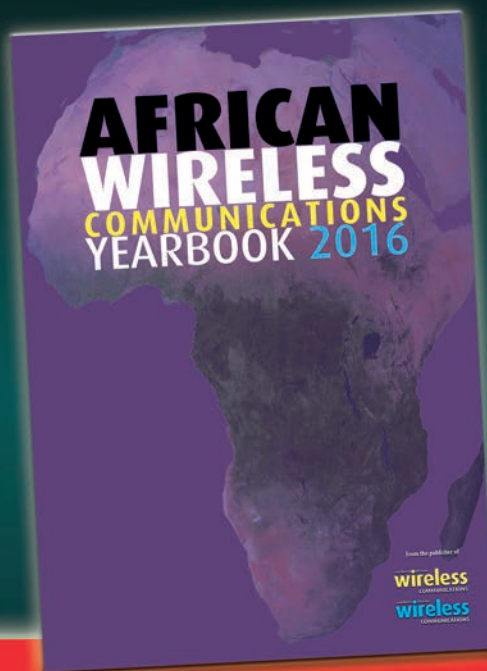
Critical Communication made easy

DAMM is a world-leading provider of Critical Radio and broadband Communication solutions to industrial, commercial and public safety customers. The DAMM TetraFlex® system is 100% IP based. It offers the most rugged, reliable and easily scalable communication system available for mission critical communication. The full package from DAMM includes infrastructure, built-in applications as well as soft terminals:

• **Decentralized infrastructure** offering rugged, compact indoor & IP65 encapsulated outdoor base stations in any combination – now even across technologies

• **Built-in applications** including Network Management, Dispatcher, Voice & data Log System and Group Bridge to manage your assets and improve performance

• **Use any radio** with the DAMM TetraFlex® System

• **Utilize your tablet or smartphone** to extend coverage and data capacity. The complete range includes Android, iOS or Windows soft terminals, operating through WiFi, LTE or other technologies

A Cross-technology one-box solution

DAMM's latest innovation, the DAMM Multi-Tech Platform enables voice and data communication across technologies, including TETRA, TEDS, DMR and Analog in one fully integrated system. The new BS422 is the world's first outdoor base station featuring these 4 technologies in one box. With a simple click in the software, the BS422 can be set to run in any technology mode, or even multiple of these. Cover your needs today and tomorrow with a technology independent one-box solution featuring:

• **Multi-Technology** – presenting the world's first outdoor base station featuring 4 technologies in one box: TETRA, DMR Tier III, TEDS and Analog

• **Multi-Frequency** – extending coverage by supporting VHF and UHF mode in all technologies

• **Multi-Carrier** – providing a flexible, cost-efficient solution by enabling up to 4 carriers in one system, and even combining multiple technologies in one box

• **Simulcast** – available for DMR and Analog, and now also offering repeater functionality for TETRA and TEDS

The DAMM TetraFlex® Concept

The DAMM decentralized infrastructure means the network design is a 100% IP-based architecture with distributed intelligence. This gives full flexibility in site and capacity expansions, meeting the constantly changing needs of the industry. Each site can stand alone with the full TETRA feature set. DAMM TetraFlex® offers integrated solutions with a true IP backbone, and boasts features that are ideal for mission critical communications, such as scalability, redundancy and remote management.

Trusted by industry leaders worldwide Hundreds of successful companies worldwide have put their trust in DAMM´s TetraFlex® system, and are now enjoying the benefits of staying agile in a changing and highly competitive market. Let's help you think big, start small and scale fast.

• TETRA
• DMR Tier III
• TEDS
• Analog

4 TECHNOLOGIES IN ONE BOX

IP65

OOO DAMM
Critical communication made easy

Contact damm.dk to learn more

Axiata secures towerco funding; completes Bangladesh merger

Malaysia's Axiata Group and its wholly owned subsidiary Edotco has announced a record USD600m equity private placement deal with Innovation Network Corporation of Japan (INCJ) and Khazanah Nasional. This is the first equity raising exercise for Edotco and is claimed to have set a new benchmark as the largest global tower sector private placement in 2016.

Established in 2012, edotco is described as Asia's first integrated telecoms infrastructure services company. Its end-to-end solutions in the tower services sector include leasing, colocation, build-to-suit, energy, transmission and O&M.

The company currently operates and manages more than 25,000 towers in its core markets across Malaysia, Sri Lanka, Bangladesh, Cambodia, Pakistan and Myanmar.

Axiata and Airtel's merged firm in Bangladesh will be headed by Mahtab Uddin Ahmed.

Edotco CEO Suresh Sidhu says: "The additional capital injection will provide the capacity to execute [our] growth strategies including expansion within Asia via key acquisitions and further in-country organic opportunities."

INCJ, a Japanese public-private investment company, has committed USD400m for primary shares in the firm. Its key interests in Edotco are said to be its unique portfolio in Asia's high-growth frontier markets, "solid" customer contracts, strong management team, and independent operating model.

Meanwhile, Khazanah is the strategic investment fund of the Government of Malaysia and has committed USD200m for secondary shares. Axiata says these secondary shares will help reduce its debt.

Definitive agreements are expected to be finalised and signed in January 2017, and Axiata will remain Edotco's majority shareholder following the transaction's successful closure.

In separate news announced in mid-November, Axiata and Bharti Airtel have now completed the merger of their respective subsidiaries in Bangladesh.

The amalgamation of Robi Axiata and Airtel Bangladesh is said to be the first telecoms merger in Bangladesh. Axiata now holds a 68.7 per cent controlling stake in the combined entity, while Bharti holds 25 per cent. The remaining 6.3 per cent continues to be held by the existing shareholder, NTT DOCOMO of Japan.

The merged company will operate as Robi Axiata with Mahtab Uddin Ahmed as its MD and CEO. He claims the merger will secure a faster rollout of mobile broadband across Bangladesh, as well as contribute "significantly" to the country's overall economy. He adds: "Our work now as a combined entity will be focused towards providing our 32.2 million subscribers an unparalleled portfolio of innovative mobile and broadband offerings at affordable rates."

Axiata and Bharti first entered into discussions to explore the possibility of combining their business operations in the country at the start of 2016.

MFS transactions in developing markets to reach USD500 billion

The total transaction value of mobile financial services (MFS) in emerging markets will be nearly USD500bn in 2021, according to Juniper Research. The figure represents an increase from the USD198bn estimated for 2016, and includes domestic money transfers, deposits on loans, insurance products and savings accounts.

In a research report published in November (*Mobile Financial Services in Emerging Markets: Money Transfer, Loans, Savings and Insurance 2016-2021*), Juniper believes that by introducing insurance offerings, operators have the opportunity to substantially reduce churn levels. It cites the example of Telenor India's *Suraksha* life insurance scheme which has seen nearly 50 per cent of its 45 million user base sign up since launching in December 2015.

"The model underpinning the *Suraksha* scheme – requiring consumers to top-up airtime on a monthly basis to receive the insurance cover – should be widely replicated," says research author Lauren Foye. "It enables operators to maintain average revenue levels within low income, low ARPU pre-paid environments, and allows consumers to reap the benefits of microinsurance cover."

However, Juniper warns that a key challenge is tailoring financial service products to the needs of individual markets. Its study highlights cases of several early implementations of MFS in markets such as India, the Philippines and Nigeria that achieved limited adoption where products were often ill-suited to their target audience.

Nonetheless, the research highlighted Asia-Pacific as a region which, while currently under-served due in part to the complexity of national regulations, has strong potential for future product launches.

Whilst restrictions, largely due to cultural beliefs, have been in place previously, Juniper believes attitudes are changing in under-served regions. For example in 2017, Indonesia saw *Kashmi*, its first ever microloans product. Additionally, specialised products have been launched to address religious requirements, such as *Achuwat* in Pakistan which provides interest free loans to meet Sharia requirements.

Singapore to retire 2G networks in 2017

Retailers and equipment suppliers in Singapore will not be allowed to sell 2G-only mobile devices to consumers after the end of this year.

Earlier in December, the Infocomm Media Development Authority (IMDA) said it will de-register 2G-only mobile devices as from 1 January 2017. It added that after this date, only those with a Dealer's Individual License (DIL) may continue to sell 2G-only devices solely for export purposes and/or overseas use.

The authority defines 2G-only mobiles devices as those that can only operate in the 880-915MHz/925-960MHz (GSM900) and 1710-1785MHz/1805-1880MHz (GSM1800) frequency bands. They can include mobile phones, POS terminals, M2M equipment, etc.

The IMDA ultimately wants to end all 2G networks and services in Singapore after 1 April 2017. It said retiring the legacy networks will enable it to re-allocate spectrum to meet the increasing demand for higher-speed mobile data and more advanced services.

The authority will continue to work with the country's three cellcos

INVESTMENTS, MERGERS & ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
20/10/16	Wipro	Appirio	Company	USD500m	Wipro claims its take-over of the US-based global cloud services company will create one of the world's largest cloud transformation practices in today's 'as-a-service' & digital economy.
1/11/16	SpeedCast	Harris CapRock	Company	USD425m	SpeedCast says acquisition strengthens its "already strong" position in maritime industry, in which Harris CapRock has a leading position in the fast-growing cruise sector. The combined entity will service more than 6,200 vessels, hundreds of rigs & platforms, as well as enterprise & government customers around the world.

– M1, Singtel and StarHub – to facilitate the migration of 2G users to 3G or 4G. It said customers with 2G phones will be allowed to upgrade their devices while still maintaining their current plans and prices with no additional subscription costs.

In the meantime, the IMDA warned that any retailers and equipment suppliers found to be in breach of the DIL license condition for selling unregistered 2G-only mobile devices for local use could face a financial penalty.

LeoSat and Thales Alenia Space sign new deal to finalise LEO constellation

Thales Alenia Space and LeoSat Enterprises have moved into the second phase of their collaboration to develop a low Earth orbit (LEO) satellite constellation.

The signing of their phase B contract in September follows the initial stage which resulted in the preliminary definition of the LeoSat constellation in 2015. The companies say this validated the technical feasibility of the system and its compatibility with other Ka-band services.

Phase B concerns the detailed definition of the overall system architecture and performance specifications, including both the ground and space segments. It will finalise the manufacturing plan, paving the way for the production and deployment of the entire constellation of 78 to 108 high-power Ka-band satellites.

LeoSat says its programme brings together for the first time a range of tried and tested systems, including optical inter-satellite links, gigabit class, onboard processors, flexible steerable antennas, and RF over PCBs. Thales adds that following its recent acquisition of RUAG's opto-electronics business, it now has the ability to provide an in-house solution for the constellation's critical optical inter-satellite link technology, which is key to overall system performance.

The satellites will use Thales' enhanced *EliteBus* platform which has been designed to offer higher payload power and mass while optimising launch cost and schedule.

LeoSat says its constellation will offer very high-speed broadband, low latency and secure global connectivity. It will comprise from 78 to 108 high-power Ka-band satellites in low Earth orbit, providing global service for large corporations and government agencies.

Through the use of tracking spot beams and specific anti-interference techniques, the constellation promises to prevent interference with geostationary and non-geo satellite orbiting systems operating in the same frequency band. The system is also designed to support and co-exist with anticipated terrestrial use of Ka frequencies.

Mark Rigolle, CEO of LeoSat Enterprises, says: "We have already signed our first customer contract which is a very strong endorsement of our unique solution offering the highest performance of any existing or planned system, including fibre."

Intelligent lighting next "big thing" for new age electrical firms

Bajaj Electricals will integrate and develop Gooee's IoT-enabling technology with its lighting products.

Headquartered in the US, Gooee is a smart lighting startup firm and claims to have created the world's first "Full-Stack" operating platform to connect lighting manufacturers to the IoT.

The company specialises in the design, engineering and supply of hardware, software and data management components across the LED lighting value chain, and provides sensing, control and communication

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
24/10/16	David Barrass	Sepura	Interim CEO	Various	Various advisory & executive roles. Takes over as CEO from Gordon Watling who is on extended leave following medical advice.
24/10/16	Alan Lovell	Sepura	Chairman	Various	Various advisory & executive roles
24/10/16	Jason Smith	Inmarsat	COO	Rolls-Royce	President of nuclear business
26/10/16	Börje Ekholm	Ericsson	President & CEO	Patricia Industries	CEO. Due to join Ericsson on 16 January 2017.
26/10/16	Farhad Khan	Yahsat	COO	Airtel Africa	CCO
1/11/16	Alistair Carwardine	Cerillion	SVP APAC	M2 Group	Technology director
10/11/16	Mark MacGann	VimpelCom	Group chief external affairs officer	Uber	Senior board advisor & head of public policy EMEA
10/11/16	Jeffrey Hedberg	VimpelCom	Group chief people officer	Mobilink	CEO
15/11/16	Shihab Ahmad	Robi Axiata	Project director – integration	Banglalink Digital Communications	Chief strategy officer
24/11/16	Dato' Mohd Izzaddin Idris	Axiata Group	Non-executive board director	UEM Group	Group MD/CEO
25/11/16	Mark Chong	Singtel	Group CTO	Singtel	CEO international. Chong takes over from Tay Soo Meng who is retiring after 50 years with Singtel. He will retain an advisory role.
25/11/16	Arthur Lang	Singtel	CEO international	CapitaLand	CFO
28/11/16	Kalpak Gude	Dynamic Spectrum Alliance	President	OneWeb	VP, legal & regulatory
1/12/16	Mahtab Uddin Ahmed	Robi Axiata	MD & CEO	Robi Axiata	Deputy CEO
1/12/16	Supun Weerasinghe	Dialog Axiata	Group CEO	Robi Axiata	CEO
1/12/16	Carl Roberts	Epsilon	CCO	Verizon Group	VP, international carrier & wholesale division
1/12/16	Raymond Yeo	Epsilon	CFO	M1	CFO
6/12/16	Slavko Djukic	Zinwave	CTO	Ericsson	Head of strategy & solutions for small cells, DAS & Wi-Fi
8/12/16	Sjoerd De Clerck	Newtec	VP APAC	Barco Capital	Global director
13/12/16	James Martin	Zinwave	VP operations	TE Connectivity	Senior manager
16/12/16	Tan Kiat How	IMDA	Chief executive	Ministry of Communications & Information	Deputy secretary (cyber & technology). Takes up his position at Singapore's Infocomm Media Development Authority as from 1 January.
19/12/16	Michel Miglia	Advantech Wireless	Operations director	VP operations	MEP Technologies

components that integrate with an enterprise-scale cloud platform.

Bajaj Electricals is part of the USD20bn publicly listed Bajaj Group. Under its partnership with Gooee, the manufacturer and supplier of electrical products aims to provide consumers with better value for money and increased functionality. It plans to do this through enhanced lighting control, energy management, LED analytics and beacon management to support proximity marketing in retail applications.

Bajaj Electricals' executive president R. Sundararajan believes intelligent lighting is the "next big thing" for new age electrical solution companies across the globe: "Lighting as a Service is gaining momentum and we see a huge technology convergence with rapid technological evolution in every field."

Bajaj Electricals is the second Indian company to announce its proposed integration with the Gooee

Bajaj Electricals' executive president R. Sundararajan says 'LaaS' is gaining momentum around the world.

ecosystem, following Mumbai-based Crompton Greaves Consumer Electricals.

Yahsat and iDirect launch VNO satellite service

Yahsat and VT iDirect are working together to introduce VNO services across the existing footprint of *YahClick*, Yahsat's satellite broadband service.

Based on what's claimed to be the "industry changing" capability of VT iDirect's *Evolution* platform, Yahsat says the VNO offering will leverage the "high-speed and economical capacity" of *YahClick*'s Ka-band network.

It says service partners will be able to purchase their own bulk capacity which they can then fully manage and configure themselves to offer differentiated services. They will also be able to commission, control and monitor their own remote sites, while designing and configuring their end-to-end IP network.

As well as benefiting from high throughput capacity using its *Y1B* satellite's coverage area, Yahsat says partners will not be required to pay any upfront costs in order to operate as a virtual satellite network operator. Additional advantages are that partners receive capacity either as simple Mbps or Msps (mega symbols per second).

The service partners across *YahClick*'s markets, along with the Yahsat and iDirect teams that are training them on the new VNO service.

The new service is targeted to meet the high QoS demands of corporate and government customers. Yahsat says partners are empowered to create private networks, offer higher uplink speeds, and address market needs such as cellular backhaul, rural telephony, distance learning, etc.

It is also said to be supported by a "simple" pricing structure that covers all aspects of the offering, including the provision of VT iDirect line cards, round-the-clock support, teleport charges, access to high-speed internet backbone, as well as satellite capacity.

ASC appoints Decibel Technologies as regional representative

The ASC Signal Division of Communications & Power Industries (CPI), has appointed Decibel Technologies as its sales and service representative for the Indian subcontinent.

With responsibility for India, Bangladesh, Sri Lanka, Bhutan and Nepal, the company will sell the full line of CPI ASC Signal satellite, radar and high-frequency antennas in the region.

Keith Buckley, president of CPI ASC Signal Division, says: "By partnering with Decibel Technologies, we gain a large, in-region technology partner capable of supporting [our] full product line. It will enable us to more quickly and flexibly address our local customers' requirements in order to better support their needs."

Based in Gurgaon, Haryana, Decibel Technologies is a supplier of satellite ground communications products, systems and related services. According to CPI, it has been designing, delivering and installing complete turnkey systems and networks for customers in Asia and the Middle East for more than 30 years.

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
18/10/16	M1	Singapore	3Q16	SGD	604.5	74.6	3.7	Service revenues decreased 1.4% YoY. International calling & roaming continued to be impacted by OTT services & there was a slowdown in excess data usage. But progress made on various new initiatives around IoT & cyber security.
25/10/16	Bharti Airtel	India	2Q17	INR	24,652 (crore)	9,466 (crore)	NA	Total revenues for the quarter in India & South Asia (Bangladesh & Sri Lanka) totalled INR196,149m. This equates to YoY growth of 10 per cent.
27/10/16	Nokia	Finland	3Q16	EUR	5.95 (bn)	432	-0.02	Net sales for Networks business saw 12% YoY decrease. In MEA, the division's net sales amounted to EUR469M – a 14% rise from 2Q but a 7% decline YoY. The region currently accounts for 9 per cent of net sales for the Networks division.
27/10/16	Intelsat	US	3Q16	USD	542.7	396	NA	Earnings declined 7% YoY. Firm says "headwinds" continue to dominate its results, including pricing pressure: "[This reflects] oversupply conditions of wide-beam capacity for certain regions & applications, point-to-point telecoms infrastructure services moving to fibre alternatives, & limited new US government opportunities."
27/10/16	SES	Luxembourg	3Q16	EUR	1,490.1	1,060.9	NA	Reported EBITDA of EUR1,060.9m is 4.1% lower than prior period. Only new satellite planned for Asia is SES-12 which is due for launch 2H17. Six O3b orbiters also expected in 2018-19.
27/10/16	ZTE	China	3Q16	RMB	71,564	NA	0.69	YoY growth of 4.44% mainly attributed to sales in 4G system & optical transmission products in domestic & international markets, as well as devices & terminals in domestic market.
3/11/16	VimpelCom	Netherlands	3Q16	USD	2,372	896	0.13	Reported service revenue declined 3% YoY. Deal to merge Mobilink with Warid in Pakistan closed in July. Mobilink's service revenue increased 16% during quarter, supported by all revenue streams. Banglalink's service revenue increased 2% to BDT12bn, mainly driven by continued increase in data revenue of 45%, partially offset by lower voice revenue.
24/11/16	Axiata Group	Malaysia	3Q16	MYR	5.5 (bn)	2.1 (bn)	NA	Total QoQ revenue grew 2.8%, group's highest absolute quarterly revenue to date. Improvements attributed particularly to steady South Asian operations in Nepal (Ncell), Sri Lanka (Dialog) & Bangladesh (Robi).

Codan solves some practical issues for tactical radio users

Codan Radio Communications reckons its has addressed the most important issues for customers –

MANUFACTURER: Codan Radio Communications

PRODUCT: Sentry-HTM

MORE INFORMATION:
www.codanradio.com

reliability, affordability and ease-of-use – with the introduction of the *Sentry-HTM* high frequency software defined radio (SDR).

Based on what the Australian vendor describes as its "proven" *Envoy* HF SDR platform, the *Sentry-HTM* is said to deliver an advanced high-power radio solution with rugged and secure voice and data communications at an "affordable price point".

Featuring high-power voice and data in a single RF unit, the new radio is equipped with second-generation digital voice, frequency hopping, embedded GPS, 3G ALE, and IP/USB connectivity.

Codan says it is custom-built for mobile and base configurations, thus eliminating the need for an external amplifier and allowing for quick solutions during emergency situations. The firm adds that the system also

features a smart handset and a simplified intuitive menu system with multiple language options.

The new *Sentry-HTM* radio expands Codan's family of tactical solutions, which now includes the *Sentry-V* (VHF) handheld, *Patrol 2110M* (HF) manpack, and RIOS interoperability for computer, smartphone and radio integration.

PIM analyser addresses real-world challenges

Rohde & Schwarz (R&S) has exclusively added the *PiMPro Tower Series* PIM analyser from CCI

MANUFACTURER:
Rohde & Schwarz

PRODUCT:
PiMPro Tower Series

MORE INFORMATION:
www.rohde-schwarz.com

(Communication Components Inc.) to its mobile network testing portfolio.

In response to the continually increasing demand for higher data rates, R&S says operators have to increase the spectral efficiency of their networks up to the theoretical limit. However, it warns that the high sensitivity of LTE and LTE-A makes any interference even more noticeable.

The firm says the *PiMPro* is a "particularly lightweight" instrument which comes in a practical backpack

and is ideal for use on transmitter masts. The device has been designed to perform PIM, return loss, distance-to-PIM, and distance-to-fault measurements without requiring additional hardware, even in difficult-to-access areas.

R&S says its "excellent" measurement sensitivity of -135dBm and ability to reduce two-tone

transmit signals to 24dBm (100mW) make the analyser ideal for measurements on base stations and DAS.

It adds that the *PiMPro* offers two 40W output signals for PIM tests, making it the only instrument of its kind to address "real-world challenges in the field".
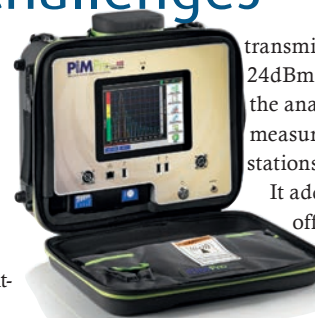
Low PIM connectors for wireless applications

Amphenol RF reckons its new 4.3/10 *Connector Series* offers "excellent", low PIM performance in a smaller, lighter design.

The connectors and adapters are engineered for the wireless market and are said to be ideal for applications requiring low passive intermodulation.

Amphenol RF says they have the same, robust design as 7/16 connectors but are smaller and up to 40 per cent lighter, allowing for much more dense, lighter weight applications.

MANUFACTURER:
Amphenol RF

PRODUCT: 4.3-10 Series

MORE INFORMATION:
www.amphenolrf.com

The 4.3/10 *Connector Series* are IP-67 compliant to protect against dust and water ingress for outdoor applications, and provide VSWR performance up to 6GHz.

Amphenol says separate electrical and mechanical components yield "very stable" PIM performance regardless of coupling torque, allowing for easier installation. It adds that silver plated contacts and white bronze plated bodies offer a high-degree of conductivity, corrosion resistance and durability.

Amdocs offers 'rapid and secure' monetisation

Optima is a digital customer management and commerce platform designed to monetise any product or service. According to Amdocs, it allows service providers to quickly enter a new vertical line of business or market.

The new platform is claimed to offer advanced revenue management capabilities to support pre- and post-paid customers and any B2B model, across all channels. It consolidates and expands on Amdocs' offerings for mid-sized communication businesses, MVNOs and digital enterprises, and is said to introduce a unifying business integration layer together with a "sophisticated" user interface with a common, cloud-based architecture.

For digital enterprises that use subscription-based business models, Amdocs says *Optima* offers support for multi-hierarchy, multi-regional and multi-vertical operations

with flexible engagement models, including SaaS pricing options.

Utilising JBoss technology and pre-defined REST APIs, the platform enables cloud-to-cloud connectivity, and can be easily integrated with third-party enterprise and customer management applications, as well as into social channels.

Amdocs adds that it also delivers intuitive self-service for end customers, thereby enabling digital enterprises to offer better-targeted services and quickly resolve customer issues.

MANUFACTURER: Amdocs

PRODUCT: Optima

MORE INFORMATION:
www.amdocs.com

Drones create 'towers' for meshed broadband network

Rajant Corporation and UgCS reckon they have come up with an easy way of allowing companies and governments to establish a broadband network for their drones.

According to Rajant, industrial users have been looking for a solution that will enable their drones to overcome weak or non-existent communication networks, bolster flight times, improve security, and scale their fleets. Working in partnership with Latvia-based UgCS, the company has developed the *AirMast Tethered Drone System*. This uses UgCS's ground-based command control software, Rajant's *BreadCrumb* drone module, and a tether system provided by Elistair.

BreadCrumb (*pictured*) is a light, small-form-factor radio that can be integrated on a single drone or a cluster of drones for fleet management purposes. Capable of handling various payloads, Rajant says its lightweight module integrated on the drone overcomes the obstacles of long distances, flight time and limited functionality.

AirMast uses an intelligent winch system and a cable that powers the drone from the ground, allowing it to stay in the air for extended periods of time without any reliance on batteries.

Meanwhile, UgCS says its software is capable of managing an entire fleet of drones simultaneously, allowing multiple drone operators in the field to connect to a single server.

MANUFACTURER:
Rajant Corporation

PRODUCT: AirMast Tethered Drone System

MORE INFORMATION:
www.rajant.com

Industrial 4G router interconnects via VPN

The *IAP-4G* is a cellular router with integrated VPN functionality to ensure secure networking between different sites. It is also designed to facilitate the integration of external service providers.

Germany-based LANCOM Systems says the device has an integrated multimode LTE modem to offer data rates up to 100Mbps, and is backwards compatible with UMTS, EDGE and GPRS (3G and 2G). Power is supplied optionally by either a mains adapter or PoE (IEEE 802 3af).

Five IPsec VPN channels with hardware acceleration are integrated into the router upon delivery (25 are optional), and LANCOM says the highly secure IPsec connections can be established over any cellular network.

The company says the *IAP-4G* provides up to 16 securely isolated IP contexts with separate routing. This allows IP applications to operate between different networks while managing them on a single central router and, at the same time, keeping the different communication channels securely separated from one another.

Other features include an integrated firewall, an IP50-rated dust-proof metal housing, and an extended operational temperature range (-20°C to +50°C). There's also a mounting kit for installing the *IAP-4G* on top-hat rails or poles in harsh environments. A line of 3G/4G antennas completes the portfolio.
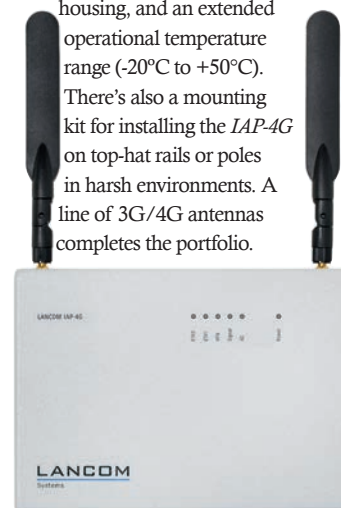
MANUFACTURER:
LANCOM Systems

PRODUCT: IAP-4G

MORE INFORMATION:
www.lancom-systems.com

Hunting system tracks RF interference

With its new *InterferenceAdvisor*, Viavi Solutions claims that hunting for sources of mobile interference can now take hours rather than days or weeks.

MANUFACTURER:
Viavi Solutions

PRODUCT:
InterferenceAdvisor

MORE INFORMATION:
www.viavisolutions.com

InterferenceAdvisor is a fully automated interference location solution. According to Viavi, it is easy to set up and allows one engineer to quickly and easily locate the sources of interference, even in an urban environment.

The system itself uses a lightweight portable omni antenna, and features voice prompts to direct the cell technician to the suspected interference location. Viavi says it gives engineers full spectrum control, and features an automated interference area indication and navigation guide, as well as a display for detailed interference signal monitoring. All of this can be managed from a Wi-Fi enabled *Android* tablet. There are also built-in accessories to minimise the cabling requirement.

Network Mind aims to control automation

Huawei is developing a system to apply machine learning to achieve intelligent, automated network traffic control through automatic detection and accurate prediction of traffic changes.

According to the firm, *Network Mind* facilitates the management of millions of network elements with millisecond response time, and automatic adaptation and optimisation based on service changes. It says the system will therefore help telcos and enterprises achieve differentiated, self-adaptive control of complex services in ultra-large networks.

At the end of last year, Huawei developed the first *Network Mind* prototype at its Noah's Ark lab. This is now being evaluated in collaboration with operators. It's claimed results of tests on live networks prove that *Network Mind* is highly efficient, flexible and reliable in complex network control.

"It is up to 500 per cent more efficient in realising KPIs (such as task completion and policy generation) than existing control methods using template-based algorithms or heuristic optimisation algorithms," says Huawei.

The firm says its system uses deep learning to enable effective abstract representations, while reinforcement learning supports self-adaptation and self-evolution. These technologies allow networks to learn and upgrade automatically based on real-time Big Data mining, thus realising automated and intelligent control and management.

Huawei claims *Network Mind* is over 50 times more efficient when analysing paths of large optical networks. It says this can cut the time it takes to analyse typical use cases, such as optical network failure prevention, from five hours to as little as six minutes. When network conditions and business models change, *Network Mind* is said to automatically adapt and renews its parameters to minimise impact on existing services.

CCS says each of its *Metnet* nodes has a wide field of view. This means that only one unit is required per lamppost which is far more acceptable to urban planners.

Still at the top of the tower

Despite the prospect of backhauling wireless networks using fibre, small cells and high throughput satellites, RAHIEL NASIR discovers that microwave's power is unlikely to diminish over the foreseeable future.

In a report published at the end of last year, MarketsandMarkets estimated that the global mobile and wireless backhaul market will grow from USD17.85bn in 2015 to USD33.15bn by 2020, a CAGR of 13.18 per cent. According to the research firm, while microwave has dominated the wireless backhaul market, it is slowly losing share because of the growing adoption of millimetre wave (MMW) equipment.

ETSI (European Telecommunications Standards Institute) defines MMW spectrum as frequencies in the 30GHz to 300GHz range, with wavelengths from 10mm to 1mm. Small cell equipment uses V-band (57GHz to 66GHz) or E-band (71GHz to 76GHz, and 81GHz to 86GHz) frequencies for applications such as backhauling mobile networks.

But as ETSI points out, there are barriers to using MMW spectrum. It says regulations for millimetre wave radio differ greatly from country to country, ranging from no rules to full regulation. The institute adds: "There is a lack of key components leading to high equipment costs. There is huge variety in the types of equipment and applications using this spectrum and there is still a lack of confidence in the technology."

Nonetheless, the outdoor small cell backhaul market is forecast to be worth more that USD2.2bn by 2020. In a research note issued in June 2016, IHS Technology said: "Outdoor small cell deployments were off to a slow start, but are now showing signs that they will grow significantly over the next several years, driven mostly by mobile operators' common need to enhance saturated macro cellular networks and improve the mobile broadband experience by adding capacity through dense low power node deployments."

IHS believes the real rise will begin in 2017, with steady growth through 2020 as deployments proliferate. As a result, it said a cumulative USD6.4bn will be spent worldwide on outdoor small cell backhaul equipment between 2016 and 2020.

The analyst added: "Although most deployments to date have been in urban and metro areas, there is life in the rural segment too: Vodafone and other operators are using small cells for outdoor coverage in rural areas, where the backhaul is not difficult and usually wireline."

Will the rise of small cells therefore lead to the decline of microwave as a backhaul technology? Far from it – perhaps even the reverse if vendors such as Ericsson are to be believed. In its *Microwave Towards 2020* report published in 2014, it said that even as the total number of connections grows, microwave's share of the

market will remain fairly constant. "By 2019, it will still account for around 50 per cent of all base stations (macro and outdoor small cells), and play a key role in last-mile access and a complementary role the aggregation part of the network," said the report.

It added that although microwave's overall share of the backhaul market may decrease over the coming years, the volume of macro and small cell base stations will continue to increase, ensuring that the total number of microwave-connected base stations will rise.

SAF Tehnika's *Integra* series includes its most powerful modem yet. It offers 3.5MHz to 60MHz channel bandwidth and up to 2048 QAM modulation support for universal network upgrades in a compact, single hardware design.

"Perfect" for dense environments

SAF Tehnika has launched the second generation of its *Integra* system. The platform combines the radio part, mounting brackets and modem interfaces into a single unit. The Latvia-headquartered company claims this makes it one of the most cost-efficient and easy-to-install radios on the market.

There are four models available in the new series and they're available in a variety of configurations. They include the *Integra-GS* single radio which is compatible with any manufacturer's antenna systems; *Integra-G* with integrated antenna; *Integra-W* radio plus antenna for wideband applications; and *Integra-WS* single radio for wideband applications.

All the units offer up to 1Gbps throughput capacity with header compression in 1+0 configuration. SAF says they feature the latest modem technology solution to enable coverage over longer distances due to better system gain at 256 QAM and with hitless ACM switching up to 2048 QAM. Bandwidth range goes from 3.5MHz

up to 112MHz in single hardware design. With optional ETSI Class 4 antennas, the firm reckons the *Integra* series radios are "perfect" for use in a dense microwave environment and variety of applications, from last-mile to backbone connectivity. Furthermore, SAF says models such as the *Integra-G*'s direct radio and antenna integration save the time usually spent on radio-to-antenna assembly and sealing.

The vendor also describes the radios as energy efficient and "unbelievably light". While the weight depends on the model, SAF says the standard *Integra-S* radio without the antenna weighs just 2.9kg, while the integrated version with the standard 60cm antenna weighs 4.9kg.

All the products are made from what's said to be an "innovative", EMC-compliant plastic material. SAF claims this ensures complete corrosion resistance which surpasses that of classic microwave antennas. In addition, the mounting bracket is optimised for wind-load reduction, ensuring a considerably higher wind resistance.

Other attributes include a built-in multi-core network packet processor which enables Carrier Ethernet performance with features like Synchronous Ethernet, header compression, and RADIUS authentication. There are three GbE ports per radio which allow using the built-in high performance Gigabit switch in all-outdoor environments. SAF says this facilitates shelter-free installations and means users can avoid the additional cost of expensive rack-mount switches.

Another significant addition to the latest range is a software controlled LED which indicates whether the radio has been synchronised with the remote end and is operating properly.

The *Integra-S* features a "slip-fit" radio design that allows integration with existing high performance antenna systems, or 2+0 aggregation setups for up to 982Mbps full duplex capacity without header compression. SAF adds that gigabit PoE port defines simple installation, while dual SFP slots enable fibre optic installation, giving the user "ultimate flexibility" in cable design.


Ericsson's *MINI-LINK 6352* is an outdoor unit for E-band. It features an embedded L2 switch, enabling full aggregation and switching between all traffic ports. The vendor claims this makes it ideal for multiple combinations of mobile backhaul solutions.

Earlier in 2016, Ericsson signed a global reseller agreement with Cambridge Communication Systems (CCS). It will use the UK-based company's *Metnet* system as a complementary small cell backhaul system.

CCS claims *Metnet*, which was first unveiled last February, is the world's first self-organising small cell microwave backhaul platform. According to the vendor, the system has a "unique" multipoint-to-multipoint architecture, with self-organising, self-healing links. It says *Metnet* operates in a single frequency channel with no radio planning required, and that each unit has a wide 270° field of view and supports multiple connections, so there's no need for manual alignment and only one is required per site. Each node supports connections to up to 16 others, and is also capable of providing GPS-derived local master synchronisation, with distributed timing recovery in the event of GPS failures.

By 2020, Ericsson believes high-capacity base stations will require backhaul in the 1Gbps range, whereas low capacity will be within the 100Mbps range. The company says microwave and fibre are the main types of transmission media that will meet these capacity requirements, and that a combination of the two is needed for networks on the road to 5G. The company reckons that it has the right solution to achieve this combination in the form of its *Router 6000* series and *MINI-LINK* radio units.

The *Router 6000* family is an IP access and aggregation portfolio that is SDN-enabled. The range includes small cell site routers to larger aggregation devices, optimised for 10G and 100G capacities. In February 2016, Orange Egypt (formerly Mobinil) became the world's first operator to deploy the *MINI-LINK* system. It is using the *MINI-LINK 6352*, an outdoor unit for E-band supporting 5.5Gbps capacity over 750MHz channel. The radio features an embedded L2 switch to enable full aggregation and switching between all traffic ports. According to Ericsson, this makes it ideal for multiple combinations of mobile backhaul solutions.
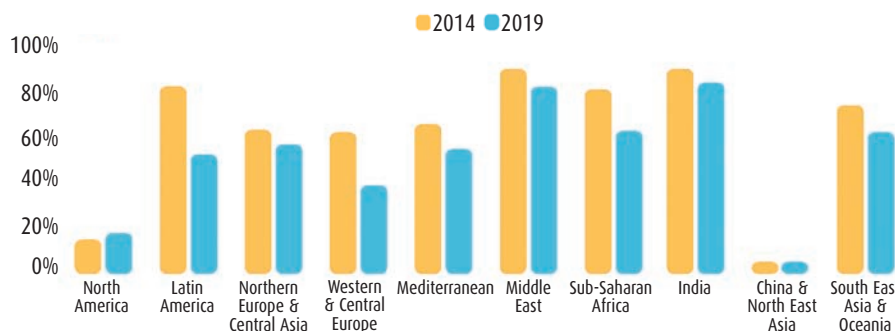
A 2014 study by Ericsson showed wide variation in the proportion of radio base stations connected by microwave in different parts of the world – ranging from single-digit percentages in China and North America, to around 90 per cent in India and the Middle East.

SOURCE: ERICSSON

By combining *MINI-LINK* outdoor units and indoor units, the firm reckons all network scenarios are supported. The portfolio spans all transport technologies (IP, MPLS, Ethernet and TDM) and all frequency bands (from 4GHz to 80 GHz), under a common management system. It also supports both line-of-sight as well as and non-line-of-sight (NLOS) configurations.

Fewer radios with HCMP

Cambium Networks clearly has security for mission-critical users uppermost in its mind. It has given its *PTP 700* product line a high-capacity multipoint (HCMP) software upgrade, enabling defence, industrial and public safety professionals to deploy a secure, high-efficiency multipoint system with up to eight locations.

The *PTP 700* with HCMP technology is designed to withstand rugged conditions and harsh weather. It is described as ideal for quickly establishing temporary, nomadic networks for first responder emergency response and stationary networks for defence agencies, as well as permanent deployments for border security, video surveillance and communications backhaul.

Cambium says deploying multipoint connectivity in a remote environment previously required multiple channel allocations and multiple sets of point-to-point radio links. But by using HCMP, it reckons these missions can be deployed more quickly with fewer radios and less spectrum. "As an ultra-wideband radio, every *PTP 700* is ready for use virtually anywhere in the world supporting every band from 4.4 to 5.925GHz," states the firm. "And now with HCMP, every *PTP 700* can deploy as a point-to-point, multi-point hub or subscriber radio, as dictated by the next mission."

Cambium says its *PTP 700* is ideal for quickly establishing temporary, nomadic networks for first responder emergency response and stationary networks for defence agencies.

Other key features for Cambium's NIST FIPS 140-2 validated platform include: 450Mbps throughput; over-the-air re-keying for increased security and reduced maintenance efforts by automatically refreshing encryption keys in a hitless fashion; the vendor's *Dynamic Spectrum Optimization* capability that automatically samples and changes channels to avoid interference without affecting link service; and a portfolio of omni and sector antennas optimised for HCMP missions.

Proxim's recently released *Tsunami 10100L* range includes several variants including the *BSUSUA* shown here.

Proxim Wireless has certainly had a busy year with a number of new launches. For instance, in early December, the US manufacturer announced the worldwide availability of its *Tsunami 10100L* series which supports data rates of up to 400Mbps and is upgradeable to 866Mbps.

The new models feature 256 QAM and use *WORP*, Proxim's protocol software that is designed to allow multiple traffic streams with varying QoS needs to be bundled into one link. As a result, the company claims end users will see 300Mbps of usable data in a 40MHz channel.

The *10100L* products are based on the same hardware platform as the *Tsunami 10100* series. This means they include, amongst others, features such as a rugged IP67 design, PoE out, *Fast Connect* and *ClearConnect*. The latter is designed to help all *Tsunami* radio products withstand all but the most hostile RF environments.

The new range includes several product variants including *BSU*, *SUA*, *SUR*, and *QB*. The company says this provides customers with a wide variety of applications and deployment options across the series. It adds that with the ability to software upgrade the *10100L* to a full *10100* series, customers can "pay as they grow" by deploying the less expensive *10100L* product and upgrading to full 866Mbps capacity when needed for a "small" upgrade fee.

As with all its products, Proxim maintains two generations of backwards compatibility. The company says this means the *10100L* as well as the *10100* can interoperate with the *Tsunami 800* and *8200* series products.

Earlier this year, the firm also unveiled the *ORINOCO Quickbridge 9100* which is billed as the first wireless solution that combines a 2.4GHz access point and 5GHz backhaul.

The ruggedised enclosure features a WLAN access point with a carrier class wireless point-to-point backhaul radio for outdoor deployments. The company said combining the two functions into a single unit means a smaller hardware footprint, as well as reduced capital outlay and recurring site rental costs.

Meanwhile, the *Tsunami QB-826* series is described as an ultra compact, 1000Mbps, point-to-point backhaul link. Operating in the 5.900GHz to 6.425GHz band, the unit measures 126 x 219 x 65.5mm (to each end point) and comes as a complete "hop-in-a-box" outdoor unit delivering up to 100Mbps throughput.

It offers what's claimed to be "unprecedented ease of installation". Proxim adds that a 2x2 MIMO high power radio capable of 25dBm transmit power eases deployment in challenging areas, while NLOS capability is provided through the use of advanced OFDM.∎

The *ORINOCO Quickbridge 9100* combines a 2.4GHz access point and 5GHz backhaul.

MICROWAVE PATH ALIGNMENT IN "MINUTES NOT HOURS"

Sunsight Instruments has developed a *Microwave Path Alignment Kit* to make microwave antenna installations fast and accurate, thus saving valuable time and money for operators.

According to the company, current methods for microwave backhaul alignment take tower crews hours and sometimes even days to find the main lobe. Sunsight claims its kit cuts that time down to minutes.

It explains that the system does not need to wait to find the signal from the opposite side, and uses "very accurate" GPS positioning and dual communicating units to sync both sides and relay the precise position.

Sunsight says the system takes into account, height and curvature of the Earth, and that azimuth, tilt/roll, height and geographic coordinates can be captured and recorded.

Site engineers can send reports with all antenna measurements using any mobile device (*Android*,

iOS, *Windows*, etc.), and powering down or removal of radios is not necessary for pathing microwave link. Kit units can also be used independently for RF panel antenna alignment.

The firm adds that no additional software, post processing, or cables are needed, and that its all-inclusive kit is tested and proven to align antennas up to 150 miles apart.

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4G or not 4G?

Specialists such as Airbus Space and Defence believe the hybrid network approach is the right way to look at the role of LTE in a PMR environment.

...that is indeed the question. But what are the challenges of using LTE for public safety networks? RAHIEL NASIR discovers there's a long way to go before 4G can replace established PMR technologies such as TETRA.

Over the last few years, LTE has come under increasing focus in the two-way radio industry – could this cellular technology be used by critical comms users in place of more established PMR platforms such as TETRA?

According to Raquel Frisa, LTE and broadband services product manager for Sepura, the international regulation and industry bodies are determined to adopt LTE as the key technology offering complimentary broadband applications to current voice plus data and direct mode operation applications in mission-critical scenarios. "However, we foresee that the first professional deployments – 'LTE-based' and compliant with standard PMR functionality – will take more than five years and may not even be deployed until 2025."

Like many TETRA specialists, Sepura believes hybrid network solutions – a combination of narrowband and broadband technologies – will mean TETRA and LTE will co-exist for several years. But in some parts of the world things are already changing.

For example, earlier this year in the UK, the government began implementing a GBP1bn programme that will see the TETRA system used by the country's emergency services replaced by an LTE network. It will be provided by EE – the mobile operator that was originally setup as a joint venture between Orange and Deutsche Telekom (T-Mobile) in 2010 and acquired by BT (British Telecom) last year. EE claims its 4G network will "significantly improve" the efficiency of the emergency services by giving them access to the type of data and applications that have benefitted private businesses in recent years, and which have not all been possible using TETRA.

No substitute for TETRA

So does that sound the death knell for TETRA? Not quite. Motorola Solutions (which, incidentally supplies technology to the UK emergency services and has been appointed services partner under the new programme)

believes PMR will always be the "fail-safe" communication technology when it comes to public safety. Tunde Williams, the company's head of field and solutions marketing for Europe and Africa, says LTE will gradually integrate as an additional technology for public safety agencies. As a result, he reckons one of the biggest challenges for LTE is bridging between the two technologies.

Tunde adds that other challenges vary around the world, and could be issues like government spectrum designation, or integration challenges that are typical for any new technology deployment.

According to the TETRA and Critical Communications Association (TCCA), legal restrictions could severely limit possibilities of using LTE technology for public safety networks. As an example, Tero Pesonen, chairman of the association's critical communications broadband group, says some interpretations of the EU net neutrality directive prevent using commercial LTE radio access as part of the solution as public safety traffic is not allowed to be prioritised over

consumer traffic. He says this would therefore leave field operatives vulnerable in cases of network congestion.

This strikes a chord with Jochen Bösch, head of support and product management at DAMM. He believes that one of the main challenges with using LTE is frequency scarcity, especially where large spectrum is required to support high data throughput. But he adds that in most cases, this is a "nice to have" rather than a "must have", as TETRA technologies such as TEDS have the same spectral efficiency as LTE and can cover the mission-critical data needs.

Another issue for Bösch is actual network coverage. He says that compared to TETRA, the number of sites required with LTE is at least 10 times higher.

As a result of all these challenges, most experts in the PMR industry expect it to be some time before complete and mature LTE-based solutions become available. Airbus Defence and Space (ADS) adds its voice to the debate with the assumption that it will take around five years for LTE to reach the mission-critical maturity level of today's TETRA and TETRAPOL services.

Kai Schlichtermann, the company's spokesperson for secure land communications, says: "This relatively long period is needed for 3GPP to standardise the needed technology enablers and applications for mission-critical communication. The industry also requires significant time for product implementation and verification. In addition, trialling and piloting activities are needed to make sure that new solutions match well to the requirements of mission-critical users, use cases and operational processes. All this needs to be done before new solutions can be switched to operational use."

More information needed

In the meantime, Sepura's Frisa says hybrid models based on mobile virtual operations may appear – indeed this is already happening in

**Jochen Bösch,
Head of support
and product
management,
DAMM**

"Maybe LTE becomes successful on a nationwide public safety network. But at its current stage, it will have almost no chance in private industrial segments."
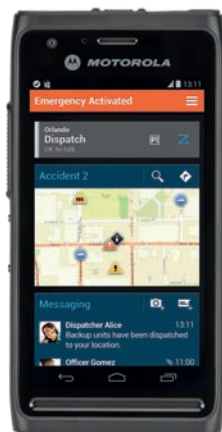
Motorola Solutions says its *LEX L10* (left) portable combines PMR features with capabilities more often associated with smartphones. It can be used with the *VML750* LTE modem (above) which connects equipment in a vehicle to the public safety LTE network.

Finland and Belgium. But she believes it is unlikely that public safety agencies will completely replace existing networks with this model.

According to the TCCA, the LTE technology that is available across commercial networks today is suitable for complementary, non-mission critical data services for public safety users. This is perhaps where the "bridging of technologies" that Motorola's Wiliams refers to above comes in.

But the TCCA goes on to point out that in order to harvest the benefits of LTE for field operations, the technology needs to become more information centric rather than voice centric. Pesonen says this is probably the most difficult challenge. So how can LTE integrate with legacy PMR technologies that are already in place?

"A lot can be done to gain synergies when narrowband PMR technologies are run in parallel with LTE, he says. "There are implementations that enable joint subscriber management, and use common transmission and sites. There are even proprietary implementations from a number of companies enabling group linking between TETRA and LTE as well as some terminal products that support both TETRA and commercial LTE."

However, Pesonen says much more needs to be done in these areas. For instance, he says 3GPP has recently accepted a study item to address the interworking between TETRA/P25 and LTE. This will enable the definition of official standard interfaces for exchanging mobility management and content information such as group and individual calls, as well as short data services.

But as Sepura points out, this feature is at an early stage and it does not expect to see the specification completed until further releases. So until such time as all the challenges have been met, specialists are developing PMR infrastructure that adds LTE radio access as an overlay to existing TETRA.

For example earlier this year, Sepura itself announced that its *eNEBULA* platform is now offered as a hybrid system for mission-critical voice and data, or in some cases as a pure LTE system for broadband data services.

The company says *eNEBULA* is based on multi-manufacturer open standards, offers multi-technology capabilities within a single network, and has been developed according to ETSI and 3GPP specifications and recommendations for TETRA and LTE radio access. The system allows the sharing of real-time video from urban,

mobile and body-worn cameras. Sepura claims it complies with the "most demanding" regulations for military grade equipment, and is built to withstand the "harshest" conditions.

"Our portfolio also includes hybrid solutions for terminals: the *MVC-6000*, a multi-technology vehicular console integrating TETRA and LTE, as well as our *SC20*, which is an LTE-ready TETRA hand portable," says Frisa.

Other TETRA manufacturers are also adding LTE support to their products. For instance, DAMM's Bösch says the technology can be easily integrated as a data backbone supplement via applications and gateways. "Depending on the integration on terminals, users in the future might just be required to wear one terminal for TETRA as well as for LTE coverage. The TCCA is working on a per protocol integration, but as the LTE standard for mission-critical comms is not fully finalised and released, this integration will last several years."

Integrating LTE

Motorola Solutions is a firm advocate of integrating LTE and PMR. Williams says: "We have made 'bridges' that make it possible for PMR products (radios) to communicate with LTE devices (smartphones/tablets/computers). Our *WAVE* product is an application that allows any radio to communicate with any other device, including smartphones, laptops, tablets and computers."

WAVE has been designed to provide a secure PTT platform for group communications. Motorola says it offers the ability to integrate with LMR, cellular, Wi-Fi, etc., making it possible for teams to use secure voice and data services regardless of network, carrier or device.

Meanwhile for Airbus, the hybrid network approach allows the secure and efficient integration of new devices and services with existing narrowband solutions. The company says it is currently working very closely with 3GPP to develop products that are in line with current and future industrial standards.

"Sharing existing TETRA or Tetrapol sites and IP backbones with broadband solutions is a decisive vehicle for smooth evolution, efficiency and cost savings," says Schlichtermann. "In fact, the hybrid approach means public safety organisations will continue to use TETRA or Tetrapol network for mission-critical voice and short data, and introduce

Left: Airbus Defence and Space's standalone *Tactilon Cell* can be used to create a small LTE network. It comprises a base station, terminals, LTE software and an app server for mission-specific apps. All the cell's features comply with 3GPP standards. Right: the recently launched *Dabat* integrates a complete TETRA radio and smartphone in one device. Airbus says it can work on any TETRA network.

mobile broadband services gradually, utilising and combining different mobile broadband implementation options."

Earlier this year, ADS unveiled a range of products that are said to be enable PMR network users to smoothly evolve from narrowband to mission-critical broadband.

The new *Tactilon* suite includes products that have been designed to help end-users to communicate effectively using LTE services. For example, ADS says the new *Dabat* integrates a complete TETRA radio and a rugged smartphone in one device. It features mission-critical functions, touchscreen, and front/back cameras. The vendor says the radio module offers all the functionalities once found only in TETRA devices, and can work on any standard TETRA network.

Some of the other products in the *Tactilon* suite include *Agnet*, ADS' multimedia communication application for smart devices. While bringing together established PMR services such as PTT and multimedia sharing via broadband, *Agnet* is also fully compliant with 3GPP standardisation. The company says this enables users to communicate with each other either via a PMR radio or a smart device.

ADS therefore believes the hybrid network approach is the right way to look at the role of LTE in a PMR environment. And Schlichtermann says it will evolve: "LTE will substitute narrowband services entirely to a great extent at some point in the future. But as yet, nobody knows when this will exactly happen or how it will be done."

So will a new breed of PMR spawned by the marriage of LTE and TETRA eventually supersede traditional platforms? To answer this, DAMM's Bösch says you need to differentiate between networks for public safety and those used for mission-critical industrial operations.

"Maybe LTE becomes successful on a nationwide public safety network. But at its current stage, it will have almost no chance in private industrial segments, where TETRA and DMR will continue to be the key solutions for mission- as well as business-critical communication. If an LTE standard is finalised, frequencies become available, and markets are asking for LTE base stations, we will evaluate this."

Having said that, DAMM says its *TetraFlex* system already enables customers to integrate any LTE vendor infrastructure to it. They can then utilise TETRA's mature voice capabilities and enhance this with LTE data capacities. Or they can use the systems to extend voice and data communication coverage via a public LTE network using *TetraFlex* soft client apps that can run on many commonly available smartphones.

"With the current uncertainties in the market it is key to have open interfaces and open scalability towards the future, not only on capacity but also on technology," says Bösch. "*TetraFlex* is not just one technology – it integrates TETRA, TEDS, analogue and DMR into one platform, and further technologies can and will be added when the time for them has come. This avoids our clients from investing twice or being kept in a vendor lock, offering a scalability and flexibility exactly according to their needs within the given technical possibilities."

Schlichtermann echoes this view. He believes that the key for manufacturers to succeed in mission-critical communications is to completely understand the user's requirements. For Motorola Solutions, some of the key considerations here are the customer's budget, availability of spectrum, technology availability and suitability.

"From a technology point of view, the latest releases of LTE coupled with *WAVE 7000* will offer many of the features customers enjoy on an PMR system but not necessarily all," says Williams. "So it really depends on the customer's operations, what they need the technology to do, and a good understanding of 'what's good enough' for their deployment. For some that could be LTE. But many will continue to rely on TETRA for voice, and will deploy LTE for applications requiring high-speed data."

One of Motorola Solutions' key public safety LTE products is the *LEX L10*. Williams says this purpose-built portable broadband device combines the features of the company's rugged first-responder radios with capabilities more often associated with smartphones. "Together with the *VML750* LTE vehicle modem which connects equipment in a vehicle to the public safety LTE network, it facilitates unique applications. It delivers LTE voice services and real-time multimedia with full dynamic resource prioritisation, while ensuring full data security both in the office, on the street and in the vehicle."

End-of-life for TETRA

TCCA's Pesonen says TETRA has been the dominant critical communications standard during this decade, and predicts that it will continue to be so for narrowband spectrum during the 2020s. He adds that as the standardisation of critical features advances in 3GPP, it will be possible to do increasingly more with LTE. "It is expected that 3GPP LTE Release 15 functionality is sufficient to operate critical communication exclusively on LTE in large scale – limited use may be possible already with a smart implementation of Release 13."

However, Pesonen goes on to say that the installed public safety TETRA/Tetrapol networks in many European countries will reach their technical end-of-life by 2030. Which means that those countries will need to have switched to a critical communications broadband service by such time, or will have to re-invest in their current technology.

"This sets the deadline for the narrowband broadband transition window. The starting point is when the LTE implementations meet the requirements and the relevant frequency spectrum is available. This is expected to happen in the early part of the next decade at larger scale."

Pesonen says that in order for user organisations to move from their current mission-critical TETRA networks to LTE requires a great deal of trust – they need to ensure that they can continue to conduct their duties with, at the very least, the same levels of safety, security and efficiency as before.

"Therefore, it is imperative that LTE with high availability coverage is available with the critical features. Also, as this kind of transition processes tend to be very complicated on the administrative side, the interworking aspects of LTE and legacy PMR systems need to be solved. Finland is an example of a country that has already made a strategic guideline how to take steps to prepare the transition."

Clearly then, the 'traditional' PMR technologies are here to stay. And as Frisa states, Sepura does not envisage a medium-term replacement of narrowband technologies such as TETRA, P25 or DMR. "We think there will be a decade of co-existence of both narrowband and broadband LTE technologies. And later on, we forecast that there will be a market for them even when the PMR LTE specification is complete." ■

In so-called grey route network traffic, fraudsters exploit billing vulnerabilities between operators by generating and sending thousands of application to person messages disguised as person to person messages to consumers free of charge.

Finding the clearest route for traffic

With SIM box fraud on the rise, mobile operators face lost revenues as well as needless network congestion. ADITYA DHRUVA reveals how they can overcome the challenges and unlock the multi-billion dollar A2P opportunity.

For many years now, operators have primarily focused on spiralling person to person (P2P) messaging revenues. In the meantime, OTT vendors such as WeChat, WhatsApp, Facebook, amongst others, have managed to cannibalise operator messaging revenues, becoming the bane of their existence in the process.

MNOs chose to fight back with various strategies ranging from blocking OTT providers and introducing OTT data related tariffs to collaborating with the providers. But over time, this fixation with P2P revenues has led to one major casualty for operators: the monetisation of application to person (A2P) revenues. While cellcos were busy trying to thwart the OTT threat, 'black' and 'grey' route operators sponged A2P revenues off the networks.

In black route A2P traffic, the source and destination network lack any binding agreement regarding price and tariff, and the A2P messaging service offered is of low quality as well as illicit in nature. In grey route traffic, only one of the operators has a binding agreement in place. So how does grey route traffic work and why is it so harmful to the operator?

Going grey

In grey route traffic, the operator's P2P messaging network is used for plying A2P messaging services.

Fraudsters exploit billing vulnerabilities between operators by generating and sending thousands of A2P messages disguised as P2P messages to consumers free of charge.

For operators, it's nearly impossible to distinguish between fraudulent A2P messages and ones that are legitimate P2P. So they have no choice but to deliver them both so as to not obstruct legitimate P2P messaging, thus placing an enormous strain on their messaging infrastructure. This stress forces operators to shut down all suspected A2P messaging traffic.

Fraudsters have responded to these aggressive tactics by deploying tools such as SIM farms or SIM banks, and by redirecting messages through numerous SS7 points and routes to elude service provider shut downs.

Since P2P SMS is cheap (even free), it is bought in bulk using multiple SIMs and used for plying grey route A2P services. A typical SIM box stores a large number of cards controlled by a computer. These can be used to send unsolicited commercial communications (UCC) to subscribers costing operators billions of dollars in lost revenues.

Easy availability of bulk SMS facilities and advancements in SIM farming technologies has made it difficult for operators to track and block such threats. For example, location based detection and blocking of SIM box fraud can be easily thwarted by housing SIM boxes in mobile vans. Similarly, IMEI re-configuration is also complicating grey route traffic detection. All these developments have made it easier for fraudsters to remain one step ahead of the current systems and mechanisms of grey route blocking.

So without any binding agreement in place, the revenue is realised only by the operator terminating the message.

The loss of earnings is not insignificant. According to analysts at specialist telecoms intelligence firm Mobilesquared, 65 per cent of

USD173bn

USD142bn

Compared to person to person (P2P) messaging, application to person (A2P) revenues are forecast to account for almost half of total SMS earnings worldwide by 2020. SOURCE: GSMA INTELLIGENCE INDUSTRY ESTIMATES

A2P market is grey route, with the legitimate operator's share ('white' route) standing at a paltry 35 per cent. Considering the size of the A2P messaging market – worth US12.88bn in 2015 – operators have to be very careful not to let the revenue opportunity slip out of their fingers.

However, it is not just the revenue leakage that should be a cause for concern for operators. Grey route traffic can be equally damaging to network health and the credibility of the operator, as it spawns all kinds of illegitimate traffic in viruses to premium number frauds. A compromised network can also be used for disseminating UCC messages to unsuspecting subscribers.

These frauds are traced back to the operator, drawing the local regulatory authority's ire and subsequent penalties, as well as the possibility of costly and lengthy litigations for the cellco.

So, with the operators taking a hit on both the revenue and credibility front, there is need to drive systematic checks and balances to identify and block grey route traffic before it is able to do lasting damage to the operator's business.

Detect, destroy or cash in

Outside of white route traffic with its preset termination agreements, operators have no way to monetise A2P traffic on their networks. They often have no visibility into the grey route traffic, no filters in place, and no monetisation strategy.

Without adequate course correction (which is long overdue) Mobilesquared estimates that cumulative operator losses could rise to USD82.14bn from 2015 to 2020. This forecast is not unrealistic: without the proper checks and balances, illicit grey route traffic will continue to grow unabated with operators continuing to bleed revenues.

The increase in grey traffic is not so surprising when you consider that by the end of 2015 only 15 per cent of mobile operators were invested in the next generation of revenue assurance platforms. This exacerbates the problem as it shows the operator's lack of readiness to monetise the growing A2P opportunity.

Thus, given the lack of entry barriers in grey route messaging services and the rising ingenuity of the grey operators, a multi-layered approach – which involves detecting, shielding and monetising – is needed to tackle the issue.

The first layer detects the type of traffic travelling across the operator's network. Is it spam/fraudulent activity? If it is spam, how can it be blocked? And once it has become clear that this activity doesn't fall within the definition of spam, how do operators monetise traffic?

Detection is made possible by installing a software platform sitting on the messaging gateway. This then analyses incoming and outgoing traffic for any unusual activity, thus safeguarding the operator from becoming an unsuspecting originator of spamming activity. The software platform can also generate reports for all white or black list traffic, building a profile of all incoming and outgoing traffic.

Aditya Dhruva, VP & head of messaging & broadband solutions, Mahindra Comviva

Spam filters can be used to analyse traffic on a real-time basis, checking for chunks of text that look like spam, and alerting the operator or blocking the message if set by policy. Another method to catch spam is pattern checks. Here, the filter checks messages for repetitive patterns and triggers an alarm for the operator to check content originating from the same global title or number range.

However, if the grey route traffic is not spam or fraudulent in nature, the operator can monetise it by entering into a commercial arrangement with the SMS aggregator. Failing this, the grey traffic can be blocked. But in most cases the SMS aggregator will avoid blocking and agree to the commercial terms in order to keep its services running.

As an example, while working with one particular major operator, Mahindra Comviva was able to narrow down the problem of revenue leakages to three broad areas. Firstly, the client had no visibility into grey traffic that was eating into its revenues. This lack of visibility was also creating a stress on its SS7 networks. Secondly, the client experienced a continuous decline of A2P revenues with the increase in sophistication of grey route traffic. And thirdly, the fraudsters were using the operator's network for illicit UCC which exposed the host to litigations from the regulator as well as from subscribers.

Once all the challenges had been fully understood, filters and policies were implemented to block all grey route traffic and spam on the operator's network. The solution enabled the operator to charge a premium on A2P messages, leading to a 30 per cent increase in A2P revenues. And with UCC fraud eliminated, there was an 80 per cent reduction in customer complaints which led to a slowdown in subscriber churn.

Following the deployment, the operator was able to acquire new customers and aggregators, with some of them preferring to use white route traffic rather than have their services blocked entirely.

Conclusion

The security provided by mobile networks, increase in phone penetration, and the high open rates of text messages have combined to increase uptake of application to person messaging services. However, without the grey route visibility, operators will continue to lose out revenues as well as goodwill in the future.

Therefore, the next generation of revenue assurance platforms and firewall policies, combined with a willingness to leverage the big A2P opportunity, will determine an operator's success in unlocking the multi-billion dollar opportunity. ∎
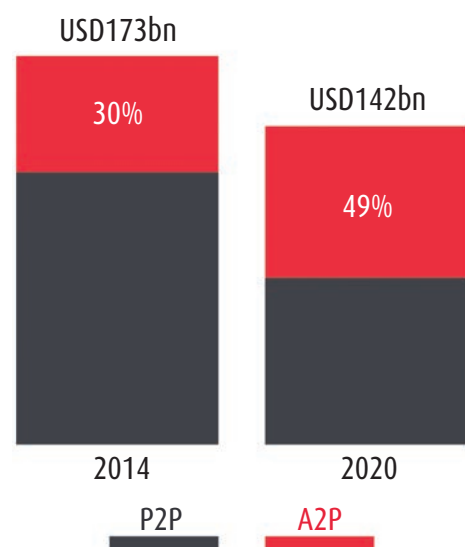
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First NB-IoT network set to go live

The world's first commercial NB-IoT networks will go live first in Spain, the Netherlands, Ireland and Germany, Vodafone has revealed.

NB-IoT is the newly agreed standard for an industrial grade low power wide area (LPWA) network layer that will allow millions of everyday objects to be connected to the IoT.

Vodafone's IoT director Ivo Rook says: "The questions of battery life and deep in-building penetration have now been answered by NB-IoT. The low cost of the modules means we can expect a new wave of connected devices and soaring market demand."

For Vodafone, the NB-IoT rollout will involve a simple software upgrade to its existing 4G base stations. The operator says this means that the rollout will be rapid and deliver nationwide coverage almost immediately.

The initial rollouts will be followed by other markets during the rest of the year with full coverage of Vodafone's global network by 2020.

Earlier in October, Vodafone said that it had completed the world's first test of

In October, the world's first test of an NB-IoT connected device was carried out with a sensor buried in a parking space at the Vodafone Plaza in Madrid.

an NB-IoT product on a commercial network. Vodafone Spain connected a sensor buried in a parking space

at the Vodafone Plaza in Madrid. A smartphone app displayed that the space was occupied when a car parked in it and went back to available when the vehicle left the space.

Vodafone reckons this practical demonstration illustrates how powerful NB-IoT has the potential to become, as it can underpin many services that can be created or enhanced with a communications layer. The company also hopes new products, services and applications will rapidly evolve with their system acting as a catalyst.

ITU develops universal laptop charger

A new standard has been developed by the ITU that delivers a universal charger for digital devices. Its aims is to improve energy efficiency and reduce e-waste.

Officially known as Recommendation ITU-T L.1002 or 'External universal power adapter solutions for portable ICT devices', it was developed by ITU-T Study Group 5, the union's standardisation expert group for ICTs, the environment and climate change.

ITU-T L.1002 specifies principles for the eco-design of laptop chargers to reduce no-load power consumption five times lower than the norm.

According to the ITU, one million tons of external power supplies are manufactured each year. When multiplied by the millions of such chargers in use, it says the new standard will greatly reduce the greenhouse gas emissions produced by these devices.

The union adds that the applicability of the charger to multiple devices, as well as design principles for the efficient use of raw materials, will greatly increase their lifetime and reduce the e-waste resulting from their disposal.

The ITU believes that the L.1000 series of standards will assist in meeting the e-waste target of the

Connect 2020 agenda, a shared vision for the sustainable development of the ICT sector adopted by ITU member states in 2014. This agenda includes the commitment of members to reduce the volume of redundant e-waste by 50 per cent by 2020.

"E-waste has grown into a significant challenge to environmental sustainability," says ITU secretary-general Houlin Zhao. "The L.1000 series of standards will contribute to the achievement of the targets set out by Goal 12 of the UN Sustainable Development Goals to ensure sustainable production and consumption patterns."

MCCA set up to promote 4G LTE for public safety

Nokia has launched the Mission Critical Communications Alliance initiative (MCCA).

As a global collaboration of MNOs, public authorities and first response agencies, the alliance aims to formalise standards in the use of LTE for public safety. Nokia adds that it will also enable innovations to take place between partners to further advance the technology and services on offer.

The company hopes the MCCA will bring various stakeholders to a single platform that will inform and guide policymakers on the benefits of LTE-based public safety solutions for robust critical communications services. More than 10 major service providers and agencies such as Mobile Radio Centre from Japan and Vodafone Hutchison Australia are participating in the programme.

4G LTE provides public safety services including first responders with mission-critical features, and several countries are already upgrading their public safety systems to leverage the technology.

For example, South Korea Telecom has recently demonstrated the capabilities of Nokia's *Ultra Compact Network*, a portable small cell-based LTE network that can provide 4G connectivity for public safety in remote locations.

Siemens' One-satellite interference localisation technology goes live

Eutelsat Communications has validated the performance of what's described as a unique, one-satellite geolocation solution that is now being deployed across its global monitoring network.

The *SIECAMS ILS ONE* service developed by Siemens Convergence Creators assists in the localisation of interference signals without the need for an adjacent satellite. This increases Eutelsat's ability to intervene in the event of accidental or deliberate interference to customer signals.

The new deployment is said to be significant because previously two geostationary satellites were needed in close proximity to obtain sufficient crosstalk for reliable geolocation signal processing. When a suitable adjacent satellite is within reach,

Siemens Convergence Creators one-satellite interference localisation goes live for one of the world's leading satellite operators. SOURCE: EUTELSAT, PHILIPPE STROPPA

operators still need to know exact position and velocities (ephemeris data) for accurate geolocation. This can only be guaranteed if affected and adjacent satellites are operated by the same provider, or if providers

share operational parameters.

Even for multi-satellite operators, Eutelsat points out that some satellites are isolated in terms of uplink frequency ranges, polarisation and footprint. This is especially true for Ka-band spacecraft where crosstalk is either not applicable or too small to be measurable.

Mark Rawlins, Eutelsat's director of the communications system control centre, says: "Having validated proof of concept, we are confidently deploying the unique one-satellite interference detection system.

"We are enhancing our ability to localise interfering signals transmitted to our global fleet of satellites so that customers from South America to Asia Pacific can benefit from even more reliable and secure communications."

MTN tests *Voyager*

MTN has become the world's first operator to deploy and test the *Voyager* open optical packet transport platform, after joining the Telecom Infra Project (TIP) earlier this year.

The TIP initiative was launched in February 2016 by Facebook, Deutsche Telekom, EE, Globe Telecom, Intel, Nokia, SK Telecom, amongst others. Their aim is to develop fresh approaches to building and deploying network infrastructure, while at the same time reducing costs and accelerating the rollout of internet connectivity.

MTN worked closely with the TIP community to field-test *Voyager* technology in its South African data centres. The tests were carried out at the end of October, and the operator claims the results showed the highest performance with zero packet loss, and potential for significant overall cost savings.

Ericsson and *M-Pesa* simplify water payments

Ericsson's M-Commerce Interconnect (EMI) service will be used to simplify mobile money payments and cash collection between Vodafone's *M-Pesa* system and businesses.

The first deployment under the deal will connect the mobile money platform with the growing network of Grundfos safe water kiosks throughout Tanzania and Kenya. Implementation in some of the other countries where *M-Pesa* is available is also expected to follow.

Grundfos' automated and connected kiosks (also known as water ATMs) dispense safe drinking water. But across rural Africa, 50,000 supply points have failed, mainly due to lack of funds and capacity for operations and maintenance.

Peter Todbjerg Hansen, MD of Grundfos Lifelink, says Ericsson and

Vodafone have solved this challenge: "It is now possible to pay for water with mobile money, and water revenue collection is safe and automated."

Ericsson believes Grundfos' use of *M-Pesa* simplifies the payment process by taking cash out of the equation,

Grundfos' automated and connected water kiosks – known as water ATMs – dispense safe, clean water (left) and accept payment via *M-Pesa* (above).

and that the solution removes the need for water service providers to integrate with every mobile wallet provider in a country. It says with EMI, any mobile wallet service from any service provider in any region can be used to provide payment.

Nokia and US Cellular test 5G technologies for fixed wireless

Nokia and US Cellular have tested 5G in North America and demonstrated 5G fixed wireless in both indoor and outdoor environments. As a result, the companies claim they have proved how a next-generation network can provide faster speeds and lower latency for customers.

US Cellular used an experimental 28GHz spectrum license granted to it by the Federal Communications Commission. It then deployed Nokia's commercially available,

5G-ready *AirScale* radio platform to stream six simultaneous 4K ultra high-definition videos.

For the outdoor testing, which was conducted at the operator's technology centre in Schaumburg, Illinois, the team set up a point-to-point, clear line of sight scenario between a base station and user equipment. To test the impact of a real-world environment, impairments such as dry wall, windows and metal panels were introduced, and testing was repeated by moving the

Nokia says *AirScale* can run any radio technology and is 5G ready.

base station and user equipment behind trees and foliage. The indoor testing was done in US Cellular's lab.

In both environments, Nokia says the tests delivered speeds of 5Gbps and ultra-low latency under two milliseconds over the 5G wireless link.

Ricky Corker, EVP and head of North America for Nokia, says: "Our tests show how 5G technology will not only enhance US Cellular's ongoing efforts to stay ahead of the needs of their data-hungry customers and businesses, but also create opportunities for new services requiring high bandwidth and low latency."

Peruvian city has fibre-like connectivity without wires

Axesat, a multinational provider of satellite solutions headquartered in Colombia, has begun providing broadband connectivity to ISPS as well as cellular services including LTE in the remote city of Iquitos.

Iquitos has a population of more than 400,000 people and is the largest Peruvian city in the Amazon province of Loreto.

Previously, it was connected only with legacy geostationary satellites or a series of microwave towers that carried internet signals through the jungles to POPs closer to the coast.

Using O3b's medium Earth orbit satellites and architecture, it's claimed Axesat is now not only

delivering fibre-like connectivity, but is also able to increase capacity as needed to keep up with rising demand – all without laying a single cable through the Amazon.

As businesses in Iquitos and its surrounding area have expanded, high-speed broadband has become essential to sustained growth. The new infrastructure will ensure Iquitos can compete with other cities such as Lima.

It is also hoped that the new data services will serve as an impetus for startup firms, as well as deliver much needed communications and data services for telemedicine, e-learning initiatives, e-government services, etc.

Satellite routers deliver high cellular data rates

Sevis Systems says its suite of *Intelligent Backhaul Optimisation (IBO)* apps now works across ND SatCom's 5G VSAT system.

The company says validation testing confirmed high-performance for 3G and LTE mobile services across ND SatCom's *SKYWAN* platform which is integrated with Sevis optimisers.

It's claimed this validation of the technologies delivers a high-speed and bandwidth-efficient solution to mobile network operators who want to expand 3G and 4G coverage to more remote areas.

The companies say joint testing of the *SKYWAN* 5G terminals and Sevis *IBO* included optimisation and TCP acceleration technology. They claim

this resulted in substantial bandwidth savings and boosted performance over high-latency geostationary satellite links provisioned for both 3G and LTE backhaul.

As part of the evaluation, the partners tested signalling as well as voice and data aspects of the network. This included: registration/deregistration; mobile originated/terminated voice calls; SMS; accelerated web browsing; and FTP/HTTP data sessions.

The backhaul optimisation tests looked at bandwidth savings using out-of-the-box *SKYWAN* 5G terminals, while the Sevis TCP *Acceleration* application was tested via HTTP browsing and file transfers.

DMR cleared for take-off at London airport

The UK's London Gatwick airport has installed a Digital Mobile Radio (DMR) system that aims to double its previous voice and data communications capacity.

The *Capacity Max* digital radio system from Motorola Solutions is designed to be used by 1,300 staff, both airside and groundside. It replaces an existing analogue communications network.

Motorola says staff will also be able to utilise the incoming system's data capacity with new applications. These include *TRBOnet PLUS*, the vendor's

dispatcher application that enables voice recording, mapping and event logging in the control room, as well as *iBeacon*, an indoor positioning feature which allows alerts to be sent to individual radios based on location.

Other built-in functionality includes settings for lone workers, geo-fencing to create restricted areas, and automated escalation protocols which, according to Motorola, will bring upgraded safety and security capabilities to the airport.

The company adds that as the system hardware is connected via Wi-Fi,

software updates can be transmitted via Gatwick's wireless network directly to equipment and endpoint devices, with less load on the core radio network.

"We have experienced significant growth over the past decade and we are now approaching the limits of our previous analogue system," says Simon Telling, IT project manager at Gatwick Airport Limited.

"Migrating to scalable, digital communications will double our capacity, and bring new capabilities that will help us improve efficiency and safety for staff, retail partners,

Change is in the air: the airport's new communications system will support 1,300 staff.
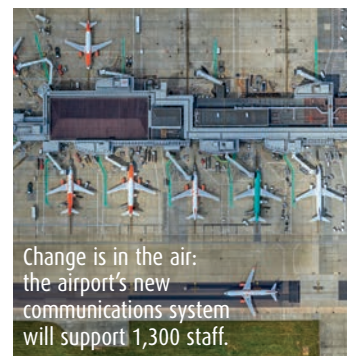
and passengers across the airport."

Gatwick is said to be one of the UK's most important transport hubs: 40.3 million passengers passed through its gates last year, a 5.7 per cent increase on 2014.

NASA completes unmanned test flight using Globalstar's ADS-B *ALAS*

NASA says it has successfully tested the operation of Globalstar's ADS-B *Link Augmentation System (ALAS)* with an unmanned aircraft.

ADS-B has been designed as a low-cost replacement for conventional radar. It allows pilots and air traffic controllers to 'see' and control aircraft with more precision and over a far larger percentage of the planet's surface than has ever been possible before.

Aircraft equipped with the system use GPS receivers that can identify their precise position from the GNSS constellation. This is then combined with other aircraft specific variables such as speed, altitude and heading to deliver complete aircraft location data. And when over the horizon, Globalstar says its satellite fleet can still accurately pinpoint the aircraft.

The test flight was carried out at NASA's Langley Research Centre. The initial results indicated continuous communication between an unmanned *Cirrus SR22* aircraft and Globalstar's satellite system, with only brief interruptions during extreme manoeuvring which it's claimed were reconnected quickly.

"NASA not only demonstrated that *ALAS* could perform well in manoeuvres, but also confirmed that complex data such as flight control commands and aircraft state and status could be passed to a controller over the same robust Globalstar link in real time," says Skip Nelson, president of ADS-B Technologies. "This tells us that *ALAS* could provide a single, secure and potentially encrypted portal between the aircraft and the ground."

The flights focused on testing the ability of the system to continuously

The tests involved a remote controlled Cirrus *SR22* aircraft connected via Globalstar's satellites. LIBRARY PHOTO

pass two-way data between the aircraft and NASA's ground control station using remote control capabilities.

High-performance VSAT delivered to LNG fleet

NSSLGlobal will replace the under-performing and unstable legacy VSAT system on board a fleet of 15 liquefied natural gas carriers operated by MOL Transport (Europe).

The new system meets the Japan-based logistics company's need for performance and support to deliver faster, more robust operational connectivity and ship-to-shore remote access, alongside improved crew welfare and MLC-2006 compliance.

MOL's fleet of liquefied natural gas (LNG) carriers will be the first to benefit from the new technology. NSSLGlobal says it was important that the installation took place while the ships continued in service. As a result, the company's engineers travelled with the ships and carried out the work in-situ before disembarking at the nearest port.

NSSLGlobal says that the new system it has put in place will give MOL's ships greater flexibility, stability and availability of communication services to operate more efficiently.

Commenting on why MOL chose to work with UK headquarterd NSSLGlobal, Pete Adsett, IT supervisor for MOL LNG, says: "Our very thorough tender process concluded that NSSLGlobal has the best combination of network performance, flat-rate pricing and support in the industry. The fact that NSSLGlobal owns and controls its own global VSAT network gave me the confidence it could deliver against our performance requirements and SLAs."

'Jurassic' village gets wireless connectivity boost

The village of Kimmeridge in the UK county of Dorset can now access wireless broadband via the *Airwave* branded service deployed by VoIP Unlimited and its privately-owned IP network.

The internet telephony provider says its engineers laid fibre across the remote rural area to a licensed microwave link which spanned a bay to a newly installed mast. By over-engineering the project and adding two antennas on the mast, the company says the connection has dual resiliency.

Located on the Isle of Purbeck, Kimmeridge has around 90 residents and its coastline forms part of the Jurassic Coast, a World Heritage Site. With the land being protected, VoIP Unlimited says it had to overcome legislative challenges during the deployment. For instance, visual impact statements were mandatory, and an archaeologist was hired to oversee any excavation.

Securing the new mast with concrete was also another hurdle, as the mixing process had to be done at the top of the hill due to its gradient and mixed in one go. VoIP Unlimited says its teams therefore needed to ensure absolute accuracy as this could only be done once.

The village now benefits from 50-times faster connectivity, according to MD Mark Pillow. "To put that into perspective, the difference in internet speed means a customer using *Airwave* can now download a full TV episode in less than three minutes, rather than over 35 hours."

QuarkSe and Etisalat demonstrate eSIM-enabled supercar
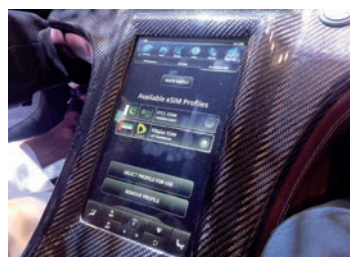
As the IoT accelerates towards universal adoption of the eSIM, the Rimac *Concept S* supercar is the first to show the application of the standard in vehicles.

The first eSIM solution from IoT application provider QuarkSe has been commercially launched. The new technology is central to enabling the electric car developed in partnership with Rimac and Etisalat in the UAE.

"Allowing our customers to connect their Rimac *Concept S* supercar for telematics and support with the best network at any location, and to use the mobile number they wish, is in line with our promise to deliver the best customer experience with state-of-the-art technology," says Mate Rimac, founder and CEO of Rimac Automobil. "QuarkSe is supplying a disruptive solution to the industry, and we are glad to have Etisalat as the first mobile operator to deliver eSIMs over the air to our cars."

eSIMs are designed to enable a quick and easy activation process for a much wider array of devices than before, such as wearables, smart metering, smart city elements and cars as well as mobile phones, laptops, and tablets. The GSM Association is promoting the universal adoption of the eSIM as the eventual replacement for physical SIM cards. It is expected that almost 90 per cent of devices will use the technology by 2020.

Rimac's supercar with the eSIM download and its activation process were demonstrated at GITEX 2016 that took place in Dubai in October. It represented the first time a super-car has been eSIM-enabled.

Taxi digital highway

With the deployment of Motorola Solutions digital radios, more than 60,000 residents of El Oro Province will benefit from a more efficient taxi service from the Zaruma Urcu Transportation Cooperative. The new radios are said to offer "superior" audio quality and also allow taxi drivers to share data in real time. For instance, Motorola says in heavy traffic or any emergency that a passenger could encounter, the driver can send an emergency signal to central administration. This then allows dispatchers to know the exact location of the vehicle and take appropriate action.

1,000 radios in Jordan

Sepura has been contracted to supply more than 1,000 radios to the security agencies that operate on Jordan's Special Communication Commission (SCC). Two models will be supplied: Sepura claims the *STP9000* hand-portable has long been the choice of public safety users due to its enhanced battery life, full-duplex audio and IP67-certified casing; while the *SRG3900* mobile offers 10W RF power which it says is the "greatest" operational range among TETRA terminals on the market today.

Hajj critical comms

With an estimated 1.8m pilgrims making it to Mecca for this year's Hajj in September, reliable communications was essential. After strict evaluation and testing, the Ministry of Hajj and Umrah selected Hytera's DMR solution to replace its legacy system. It includes digital handheld radios, mobile radios, fixed station, repeaters and Smart Dispatch system. Hytera says TDMA technology applied on its radios doubles the frequency efficiency and includes a number of other features, such as Arabic support for messaging.

Budapest combats major incidents with TETRA

To combat major incidents, Budapest will have a nationwide Unified Digital Radio Communication System (UDRS) with sophisticated "self-healing" functions. From December 2016, Airbus Defence and Space (ADS) will equip the UDRS in Budapest with the latest IP-backed TETRA technology as part of the nationwide modernisation efforts.

The programme will be implemented step-by-step. ADS, mandated by network operator Pro-M Zrt, is currently upgrading the country's radio communications infrastructure. It's claimed this will further increase the high availability of the country's mission-critical network.

Hungary's existing UDRS network (also called 'EDR') was delivered by ADS in 2006. It covers approximately 99 per cent of the country, and is used by public security agencies such as the police, border guards, fire service, disaster prevention, ambulances, armed forces and the security services.

After the modernisation, it's claimed Hungary's secure TETRA network will be one of the most reliable emergency communications systems in Europe. ADS says the upgraded network enables communications to remain operational in the event of disruptions or failures caused by sabotage. The network will leverage new software that will automatically re-route the

Budapest's emergency services will benefit from the new Unified Digital Radio Communication System rolling out across the city.

communications of a base station in the event of the primary connection being broken.

Intelsat sees "unprecedented performance" using small airborne flat-panel antenna

Intelsat General has announced what's described as "unprecedented performance" in sending signals to and from one of its high-throughput *EpicNG* satellites using a small, flat-panel antenna designed for aeronautical applications by Gilat Satellite Networks (GSN).

GSN's terminal is designed for a new generation of small class III unmanned aircraft systems (UASs) that are coming into service for intelligence, surveillance and reconnaissance (ISR) operations,
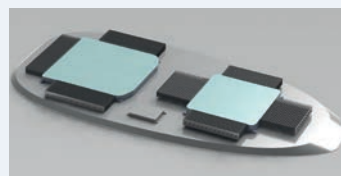
The flat panel array is part of GSN's terminal designed for a new generation of small drones that are coming into service for intelligence operations.

and other non-military government and commercial applications. A series of tests were performed

using the company's *BlackRay 71* airborne terminal which features a mechanically steered 6 x 6 inch flat panel array. Data was sent from the small antenna to the recently launched *Intelsat 29e* satellite at a rate of 3.9Mbps with an efficiency of 0.26 bits/Hz.

Intelsat says this compares to an uplink rate of about 1.8Mbps and efficiency of 0.09 bits/Hz achieved with a conventional Ku-band widebeam satellite. It adds that the link was effectively two times the rate and almost three times more efficient.

EC report finds insufficient 5G allocation

Europe risks not having sufficient spectrum for 5G service providers to deliver potential economic benefits of EUR141bn and 2.3 million jobs if the conventional dedicated spectrum allocations per operator continues to be followed.

This is the headline finding of recent analysis from a team that included independent experts Real Wireless and published as part of the European Commission's landmark 5G socio-economic report.

In its 'Identification and quantification of key socio-economic data to support strategic planning

for the introduction of 5G' study, the EC forecasts the benefits, impacts and technical requirements for the introduction of 5G in Europe. In particular, it investigates what the technology might actually mean for users, industries, operators and other stakeholders.

The study focused on four sectors that are most likely to take early advantage of 5G: automotive, healthcare, transport and utilities. In addition, four different environments where the impact of 5G can be tested were identified: smart cities, non-urban areas, smart

homes and smart workplaces. By 2025, it is expected that EUR62.5bn will arise from "first order" benefits in the four verticals examined. First order benefits focus on the more direct advantages for the producers of goods and services.

"The socio-economic value of 5G will be found in its applications for vertical industries to an extent that no wireless technology has before," says Mark Keenan, CEO, Real Wireless. "However, many of those applications identified under the 5G vision are highly demanding, with significant spectrum requirements."

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