Q4 2015
Volume 8
Number 4

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Formed in 2008, Digitata is a privately-held multinational technology company with a strong mobile telecommunications and revenue management background.

Digitata provides solutions for mobile operators that enable them to achieve sustainable customer growth and profitable revenue generation in competitive environments, while enhancing the value of the mobile experience for their customers.

Digitata Limited is the creator of Dynamic Tariffing™, which, for over 7 years has provided mobile network operators with a unique platform to attract new customers, retain the existing customer base and retain profitable revenues, while protecting the quality of the mobile network.

Digitata recently acquired a controlling stake in long-time partner, Rorotika Technologies and thereby expanded its product range to include NetCM and NetSON for vendor agnostic network configuration management.

Digitata also incorporated Rorotika's Mobile Gaming with their own MeMe premium media service, to offer a unique USSD-based media and gaming service to reach and engage mobile subscribers.

For more information, contact info@digitata.com www.digitata.com

Turn to page 7 to find out more about Digitata

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KADIUM

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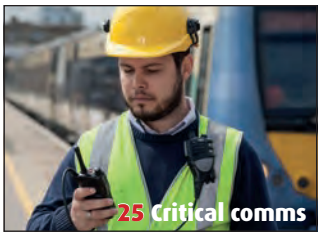

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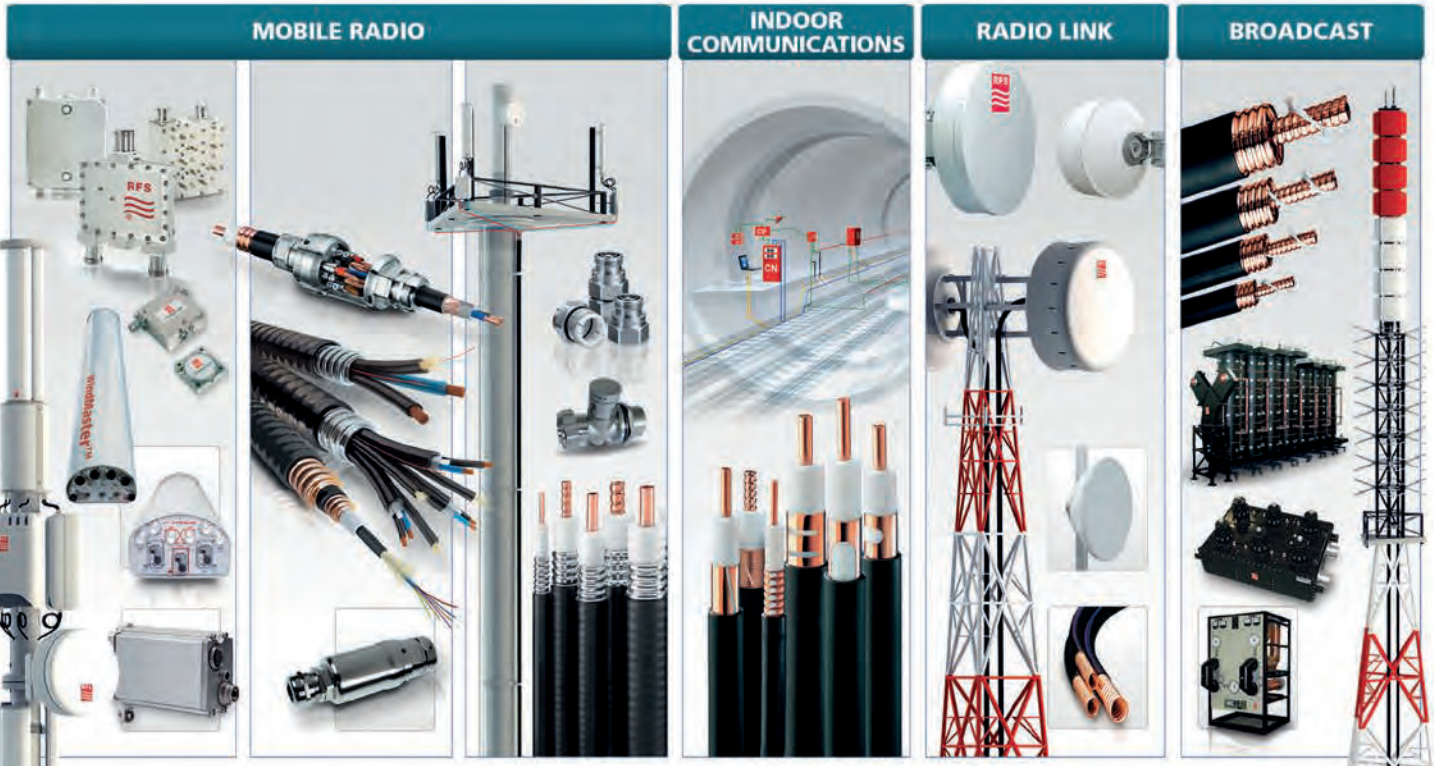
The **RFS** Product Portfolio



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Operators to test Google's Project Loon in Indonesia

Indonesia's three biggest mobile operators, Indosat, Telkomsel and XL Axiata, will begin testing Google's innovative balloon-powered internet system next year.

The search giant first announced *Project Loon* several years ago as a way of putting broadband within reach of more than 100 million currently unconnected people.

The project involves balloons that are said to act like floating mobile towers. These so-called "Loons" fly on stratospheric winds at altitudes twice as high as commercial planes, and beam an internet connection down to the ground. As one drifts out of range, another moves in to take its place. Each balloon measures 15 metres wide and 12 metres tall when fully inflated, and uses freely available ISM frequencies, specifically 2.4GHz and 5.8GHz.

A small box containing solar powered electronic equipment hangs underneath each one. This contains circuit boards that control the system, radio antennas for communications, and batteries to store solar power to enable operation at night.

Signals bounce from balloon to balloon, then to the internet back on Earth. Users connect to the network via a special antenna installed at their premises.

It's claimed each balloon can provide connectivity to an area of around 40km in diameter on the ground, and at connection speeds comparable to 3G.

Indosat, Telkomsel and XL Axiata will evaluate the technology as a way of connecting more people to the internet and stimulating Indonesia's digital economy.

Project Loon balloons travel around 20km above the Earth's surface in the stratosphere. By moving with the wind, Google says they can be arranged to form one large communications network.

Tata LPWAN 'paves way' for IoT in India

Tata Communications says it has successfully conducted trials of a new low power wide area network (LPWAN) for connected devices and Internet of Things applications in India.

The company says it will be the first in the country to use technology developed by LoRa – an open and non-profit alliance of industry members who aim to standardise LPWANs.

Tata plans to roll out its LoRa-based network across India, with full coverage starting in Mumbai, Delhi and Bangalore. The first phase targets to cover 400 million people across tier 1, 2, 3 and 4 cities.

The company says it will provide a "super low-power, secure, bi-directional, communication solution". It states that any organisation will be able to use the network to connect objects and applications simply and energy efficiently, overcoming high power consumption challenges with existing wireless solutions.

In addition to ultra-low power consumption – which allows the battery in the end device to last for more than a decade without replacement – Tata claims its LPWAN has "unprecedented reach", enabling communications in deep water and up to 50 metres underground.

"This makes it suitable for use in metro stations and car parks," says the company. "The signal of the network is extremely strong, cutting through up to seven walls inside buildings. It is also suitable for rural areas due to its 15km range."

Compared with 4G, Wi-Fi, ZigBee or Bluetooth solutions, Tata claims its LPWAN network is also more cost-effective for organisations to deploy.

Myanmar to support 4G rollouts

The Ministry of Communications and Information Technology (MCIT) in Myanmar has told local media it is prepared to support the country's three mobile operators' migration to LTE as soon as they are ready to launch the technology.

According to the *Myanmar Times*, deputy minister U Thaung Tin said the MCIT can provide the spectrum needed for 4G if local cellcos want to launch services.

Telenor was one of two foreign telcos to win a license in Myanmar in 2013 *(see News, Q3 2013)*. At the time, it said would build a "state-of-the-art" network using HSPA and LTE-ready technologies. But along with its rival Ooredoo, reports say it will only consider introducing LTE when enough users have migrated to 4G handsets.

Meanwhile, state-owned MPT has said it plans to offer LTE but is still waiting for 4G licenses to be issued.

A fourth operator is expected to enter the market next year *(see Wireless Business, Q3 2015)*. Seventeen local companies applied to join the consortium that will gain a license in partnership with a foreign firm that will own 49 per cent of the operation. Eleven local firms have now been short-listed.

Arianespace to launch Azercosmos satellite

Arianespace will launch the second satellite from Azerbaijan's state-owned operator Azercosmos.

Azerspace-2 is being developed in partnership with Intelsat which will brand the satellite as *Intelsat 38*. It is expected to be launched to 45°E by Arianespace in 2017, and will support growing demand for DTH, government, and network services in Europe, Central and South Asia, the Middle East and sub-Saharan Africa.

For Intelsat, the satellite will provide continuity of service for *Intelsat 12*. This is currently stationed at 45°E and hosts DTH platforms for Central and Eastern Europe as well as the Asia-Pacific region. *Intelsat 38* will also provide connectivity for corporate networks and government applications in Africa.

Azercosmos CEO Rashad Nabiyev (left) signs the launch contract with Jacques Breton (right), Arianespace's SVP of sales and customers.

In October, Space Systems/Loral announced it had beaten Airbus Defence and Space, China's Great Wall Industry Corporation, and Orbital Sciences Corporation (OSC) to win the contract to design and build *Azerspace-2/Intelsat 38*. The California-based manufacturer will use its *1300* platform which it says provides the "flexibility" for a broad range of applications and technology advances.

"This new satellite will provide Azercosmos with additional capacity for the increasing demand in the region, and will allow us to continue to bring the best service to our customers," said Rashad Nabiyev, chairman and CEO of Azercosmos.

Azerspace-2 will be Azercosmos' second telecoms satellite. It will expand on the services provided by *Azerspace-1* which was built by OSC and launched by Arianespace in 2013. *Azerspace-1* was developed in partnership with Malaysia's MEASAT which calls the spacecraft *AFRICASAT-1a*.

StarHub claims VoLTE first with Singapore hetnet

StarHub has deployed Nokia Networks' TD-LTE, FDD-LTE and outdoor small cells solution in a 4G heterogeneous network (hetnet) that covers Singapore's Marina Bay.

As part of the deployment, the two companies claim they achieved the industry's first TDD-FDD VoLTE handover for "unprecedented" HD voice coverage with zero call-drops.

They add that the hetnet has been proven to deliver 100 per cent service availability, even under heavy load during major events such as Singapore's Jubilee weekend held in October.

Nokia says it has integrated a variety of its solutions and services into a single, high-performance hetnet carrying "immense" amounts of voice and data traffic.

It includes LTE-A CA software to aggregate different spectrum bands for fast data transmission, *Flexi Zone* small cells installed at strategic traffic hotspots to handle peak-hour data demand, and *Flexi Multiradio 10* base stations with TD-LTE and FDD-LTE. The vendor's load balancing capabilities are also used to facilitate optimal utilisation of spectrum resources for delivering the highest quality service experience.

StarHub CTO Mock Pak Lum says: "[We have delivered] the world's fastest, future-ready 4G network that can address the ever-growing data traffic demands of our customers without compromising on the quality of service, paving the way for Singapore to build the world's first Smart Nation."

Nokia Networks' *Flexi Zone* small cells installed along the Marina Bay waterfront in Singapore.

Bharti Airtel unveils massive network expansion

Bharti Airtel plans to invest billions in its Indian networks over the next three years under expansion plans dubbed *Project Leap*.

The operator will spend INR600bn (around USD9bn) on doubling its base stations to 160,000, give 500,000 villages access to mobile broadband, and reach 250,000 small towns with fixed broadband. By the end of March next year, Bharti aims to deploy 70,000 BSTs which means more than half of its network will be mobile broadband enabled.

As part of *Project Leap*, Airtel also plans to cut its carbon footprint by up to 70 per cent over the next three years through the use of lower-power radios, investments in green technologies, and a reduced dependency on diesel. It says older BSTs will be replaced with smaller and more energy-efficient hardware that uses a single RAN to manage multiple frequencies.

Bharti Airtel is India's biggest mobile operator with a 23.5 per cent market share and 234 million subscribers.

Intelsat and JSAT to bring high throughput capacity to Asia Pacific

Intelsat and SKY Perfect JSAT will launch a new satellite with optimised C-band and high throughput Ku-band capacity to satisfy the growing mobility and broadband connectivity demands in Asia-Pacific.

Horizons 3e will be developed as part of a new, equally shared joint venture between the two companies. The satellite will be built over 30 months and will be based on *EpicNG*, Intelsat's high throughput platform.

When it is launched to 169°E during the second half of 2018, *Horizons 3e* will complete Intelsat's global footprint for *EpicNG*. The company claims it will feature the most advanced digital payload on a commercial communications satellite, as well as bandwidth flexibility and power portability.

Intelsat CEO Stephen Spengler said: "The scalability, power and flexibility of *EpicNG* will provide commercial and governmental aeronautical and maritime services with unprecedented seamless, contiguous broadband coverage over the most widely trafficked routes from the Atlantic to the Pacific.

"In addition, the higher performance and improved economics will enable fixed and mobile network operators to expand their networks and provide much needed broadband connectivity to the more remote communities of the region."

SKY Perfect JSAT is said to be Asia's largest satellite operator with a fleet of 16 spacecraft.

Horizons 3e is the fourth satellite it will jointly own with Intelsat, following *Horizons-1* which launched in 2003, *Horizons-2* (2007) and *Intelsat 15/JCSAT-85* (2009).

Operators sign Crisis Connectivity Charter

Seven of the world's leading satellite companies have agreed to work together to enhance connectivity during humanitarian emergencies.

Eutelsat, Hispasat, Inmarsat, Intelsat, SES, Thuraya and Yahsat signed the Crisis Connectivity Charter in mid-October under the umbrella of the EMEA Satellite Operators Association and the Global VSAT Forum (GVF). The UN Office for the Coordination of Humanitarian Affairs (OCHA) and the Emergency Telecommunications Cluster are also signatories.

The charter formalises terms and protocols designed to accelerate the ability of emergency response teams to access satcoms when local networks are affected, destroyed or overloaded after a disaster.

UN emergency relief coordinator Stephen O'Brien said satcoms is "immune to natural disasters".

It also includes increased coordination to prioritise access to bandwidth for humanitarian purposes during disaster operations, and pre-positioned satellite equipment and transmission capacity during disasters in 20 high-risk countries in Africa, the Middle East, Asia and Europe. Additionally, the signatories will support training and capacity building for the humanitarian community across all continents.

Stephen O'Brien, OCHA's under-secretary general and also the UN's emergency relief coordinator, said the agreement was a significant move for the humanitarian community, as well as a "step change" in the way it has worked with satellite operators in the past.

"The humanitarian community relies on satellite communication as it is the only technology that is immune to natural disasters and can be immediately deployed, regardless of constraints such as geography."

Digitata Limited Establishes a Regional Office in Kuala Lumpur, Malaysia

Digitata Limited is pleased to announce the establishment of a new regional office in Kuala Lumpur, Malaysia and the appointment of Mr Simon Pollack as Commercial Director, APAC in order to support our recent expansion into the Asia-Pacific region.

Digitata provides solutions for mobile operators that enable them to achieve sustainable customer growth and profitable revenue generation in competitive environments, while enhancing the value of the mobile experience for their customers.

Digitata CMO, Conal Lewer-Allen said, *"These are exciting times for Digitata. Following the recent acquisition by Digitata of a controlling stake in long-time partner, Rorotika Technologies, the company has extended its product portfolio and has grown in size. Digitata has also been restructured so as to combine the products and service offerings into streams that will best meet the needs of our customers and enable aggressive expansion into new territories. These territories include, amongst others, Asia-Pacific and Latin America where we are greatly expanding our regional presence."*

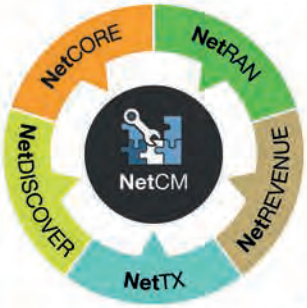
Digitata's new structure involves four distinct streams: Digitata Dynamic Tariffing™, Digitata Networks, Digitata Insights and Digitata Innovation.

digitata

dynamic tariffing™

Digitata's Dynamic Tariffing™, the established face of Digitata, with the first and leading dynamic tariffing™ solution for voice, SMS and data, allows mobile operators to dynamically change the price of calls, SMS and data depending on network elasticity, in order to offer subscribers better value and protect the network while maintaining or improving revenue.

Dynamic Tariffing™ is accompanied by a mobile app, SnapTariff that allows subscribers improved visibility of the dynamic pricing as well as better control of their data spend.



Digitata Networks provides a sophisticated, vendor-agnostic network configuration management (NetCM) and self-organising networks (NetSON) solution to transparently manage and troubleshoot all major mobile technologies (2G, 3G, LTE, Wi-Fi) and multi-domains (Core, RAN, TX).

The Digitata Networks solution offers operators cost savings through improved efficiencies gained by automating auditing, planning, optimising, configuration and operational activities.

Digitata Insights, the fun face of the company, provides innovative mobile solutions focusing on mobile engagement mechanisms, which incorporate gamification and content strategies to create extended, emotional and valuable customer engagements.

Digitata Insight's MeMe provides an innovative premier media channel and content solution that geo tags and enriches existing mobile messages based on a subscriber's location, allowing subscribers to discover new content and engage with new services.

Digitata Innovation is our "dream stream" that develops new innovations, and handles prototypes, related patents etc. Current products being incubated and developed in the Digitata Innovation wing include Glovent's GloPortal, SnapTariff, and extensive work is being done in the area of "Big Data".

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RCOM and ZTE to build 100G in India

Reliance Communications (RCOM) will work with ZTE on a new 100G optical transportation network in India.

The vendor will provide OTN design, engineering, installation, operations and maintenance services to RCOM in Pune and Hyderabad during the next three years. The firm says it will also supply its *ZXONE* series of equipment to satisfy the operator's requirements for multi-service access and high integration.

According to ZTE, RCOM chose its OTN platform because of its low total costs of ownership. It adds that the solution will enable the company to "quickly develop" 100G metro area transmissions in Pune and Hyderabad, and greatly relieve LTE bandwidth pressures.

RCOM is said to be India's fourth largest operator. As it begins to introduce LTE, ZTE says the telco's SDH (synchronous digital hierarchy) system was unable to meet growing data communication demands.

The vendor claims its 100G OTN supports any access rate from E1/T1 to 100GE, 4-22 client port with smooth evolution, as well as dense and coarse wavelength in one platform. In addition, ZTE says OTN encapsulation supports complete overhead, optical and electrical layer monitoring, as well as unified network management facilitating failure location and service configuration. The firm reckons this "effectively improves" OAM efficiency.

SSTL and RCOM merge in India – Wireless Business, p13.

Fighting fraud in Afghanistan

Roshan will use a predictive analytic solutions to protect itself against mobile fraud and optimise its revenue flow in Afghanistan.

Under a multi-year agreement, the operator will implement fraud management and revenue assurance solutions based on Syniverse's *Risk Management* portfolio.

According to Syniverse, the fraud management component of its solution helps combat the full range of today's mobile fraud by using predictive analytic capabilities. It says this enables the best collection of data and use of it to respond to particular patterns.

In terms of its revenue assurance solution, the vendor claims it provides "clear and accurate" data on a telco's entire revenue flow, and identifies any problem areas in the end-to-end billing cycle that can be enhanced to help eliminate revenue loss.

"By working with Syniverse, Roshan will be able to use the strongest fraud protection tools available to optimise its revenue flow and better serve its 6.5m customers," says Roshan CEO Karim Khoja.

Citing a J. Gold Associates report, Syniverse says mobile fraud costs companies around the world an average of USD92m each year.

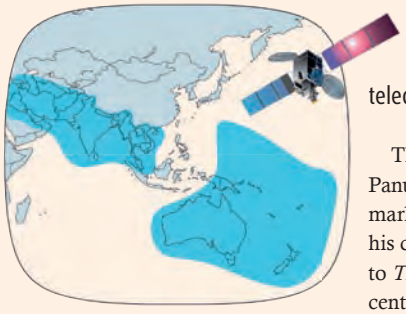
Joseph George, Syniverse's senior product management director, adds: "With the Communications Fraud Control Association reporting that mobile fraud is responsible for USD38bn in revenue loss globally, it's imperative that operators have a full-scale strategy for protecting themselves from this threat."

THAICOM 7 capacity sold out as GIL plans 'Headend-In-The-Sky' service

THAICOM 7 is now fully booked following an order for C-band transponders from Grant Investrade Ltd. (GIL) in India.

Part of the global Hinduja Group, GIL will use *THAICOM 7* to provide digital cable TV services through a 'Headend-In-The-Sky' (HITS) system. The firm says its service, branded *NXT DIGITAL*, will help the smooth transition to digital and allow customers to choose channels via a satellite multiplex across India.

"It is one of India's national missions to roll out digital addressable systems of broadcasting all over the country and we believe *NXT DIGITAL* is a significant step towards this goal," says GIL MD Tony D'Silva. "Thaicom has played a vital role in this initiative, and the substantial number of satellite transponders we have at the time of launch will continue to grow as we expand our portfolio."



THAICOM 7 was launched last year and covers the entertainment and telecom markets in Asia and Australia.

The technology programme manager for *NXT DIGITAL* is Castle Media. It has been tasked with the design-to-delivery of the HITS service, including a broadcast facility and a robust back-end platform for SMS, CRM, billing, CAS and other mission-critical components and services.

Thaicom's CEO Paiboon Panuwattanawong say this latest deal marks an important milestone for his company: "Not only in regards to *THAICOM 7* now being 100 per cent booked, but also in bringing our platform for content distribution to India which sets us in good stead for the launch of *THAICOM 8*."

THAICOM 7 went up to 120ºE in September 2014 and provides media and data services for the Asian and Australasian entertainment and telecom industries. *THAICOM 8* will be launched next year to expand Thaicom's servicing capacity and footprint in the region.

Indosat Ooredoo aims to add five million 4G subscribers per month in 2016

Indosat Ooredoo has launched *4Gplus* throughout Indonesia. The high-speed LTE service is currently available in 21 cities, with another 14 to be added by the end of 2015.

Citing independent tests, Ooredoo says *4Gplus* offers download speeds of up to 185Mbps. Over the next few weeks, it will available in 35 cities, bringing access for 40 million citizens at the same price as the operator's existing 3G services. Ooredoo says it is committed to adding another five million users each month in 2016.

4Gplus customers receive a free data quota of up to 10GB which they can use on the LTE network. Indosat Ooredoo president and CEO Alexander Rusli says the service aims to give users the "best digital experience possible", and offers more than just raw data high-speed and bandwidth.

Indosat Ooredoo president Alexander Rusli (centre) wants to remove the digital "pain-points" for consumers .

"We want to remove the pain-points and worries that we know customers experience and help them to enjoy and get the most out of the service available to them. We want to go the extra mile for our customers and make our service affordable, accessible and easy for people to understand how it can improve their everyday lives."

Indosat Ooredoo says it has successfully invested in modernising its network over the past two years. It claims the overhaul has enabled it to double existing network speeds and offer the fastest 3G speeds available in Indonesia.

The launch of *4Gplus* complements the recent expansion of the company's store footprint where it has doubled its number of retail outlets. It has also signed a deal with local mobile phone distributor EraJaya to further expand this to 350 stores in the coming years.

Bangla Trac supports growth with Orchid

Bangladeshi telecom service provider and international gateway operator Bangla Trac Communications will use Cataleya's *Orchid One* system to streamline traffic management and QoS.

Bangladesh has around 20 international gateway operators which have to terminate through seven selected aggregators who manage all international traffic. Bangla Trac has been chosen as one of these, and as a result it needed to scale its switching capacity.

According to Cataleya, *Orchid One* is a network session and application manager that enables a high performance switching environment while leveraging end-to-end visibility and Big Data analytics.

It says the platform will enable Bangla Trac to scale to serve potential demand from Bangladesh's 129 million mobile subscribers. As well as high performance switching capacity and traffic management, the vendor claims *Orchid One* offers near real-time analytics and reporting, guaranteed QoS end-to-end, a wide variety of codecs, and built-in transcoding.

"Our business has changed dramatically over the past few months and we needed a solution that could scale to serve rapid growth in our network traffic," says Md. Zainal Abedin, director and CIO at Bangla Trac. "*Orchid One* is a solution that is built to deliver quality at scale, and that is the future of our business."

Eutelsat debuts IP Easy broadband service in Asia

A new satellite broadband service is being launched across Myanmar in an effort to bridge the country's digital divide.

Local telecoms operator Bluewave will use the *IP Easy* solution provided by Eutelsat Communications to offer broadband speeds of up to 12Mbps to unserved and underserved users, remote communities and enterprises.

The service is currently being commercialised and will be operational from the first quarter of 2016 using capacity on *EUTELSAT 70B* which provides nationwide coverage of Myanmar. It uses Newtec's *Sat3Play* VSAT broadband platform which includes terminals, the *MDM2200* IP satellite modem, antennas and interactive LNBs.

Eutelsat says all equipment can be installed directly by end-users thanks to a 'point and play' system. It adds that the hardware is compact with antennas that are similar in size to ones used for satellite TV.

Bluewave MD and operations director Clement Larroque says: "The solution enables us to provide best-in-class, global connectivity services at a critical time of rapid economic and social development in Myanmar, with high-quality services especially tailored to enable all communities to fully seize opportunities to contribute to the long-term prosperity of the country."

Eutelsat's system uses Newtec's *MDM2200* IP satellite modem, antennas and interactive LNBs.

Michel Azibert, Eutelsat's commercial and development director, says this is the first time *IP Easy* has been deployed in Asia. He adds: "This new step reflects Eutelsat's strategy to develop satellite broadband in the Asia-Pacific region on ground, at sea, and in-flight."

Digital commerce, access and payments crucial for financial growth in Pakistan

Mobile operators, financial firms and governmental agencies in Pakistan have to work more closely together in order to harness the full potential of digital commerce, according to the GSM Association.

In its recently published *Building Digital Societies in Asia: Making Commerce Smarter* report, it said each of these stakeholders has a "crucial" role to play in enabling digital commerce, digital access and digital payments.

"By 2020, 3G coverage is expected to reach 90 per cent of the country's population, and mobile broadband is expected to reach 40 per cent," said Alasdair Grant, the GSMA's head of Asia. "With connectivity becoming less of an issue, the challenge now lies in increasing the number of digital commerce accounts and promoting digital payments in order to realise the full potential of digital commerce in Pakistan."

With around half of the country's adult population (60 million people) having access to a mobile phone but not a bank account, mobile money plays an important role, says the GSMA. It adds that mobile operators have already started to invest to increase branch-less banking account adoption and usage, fostering the development of a digital ecosystem.

According to the association, areas of opportunity for Pakistan's digital growth include the digitisation of government payments, and greater support for remote and proximity merchant payments.

But it points out that the country's development as a digital economy still faces many challenges such as weak legal and regulatory frameworks, digital illiteracy, and a lack of awareness of what digital commerce is and how to access it.

Telkomsel optimises network in 30 cities across Indonesia

Telkomsel is testing and optimising its networks in 30 Indonesian cities. The operator's aim is to improve the QoS of its *True Broadband Experience (TrueBEx)* mobile broadband service that was launched at the beginning of 2015.

Telkomsel has been carrying out various tests to assess the coverage, capacity and quality of its service in the 30 cities. The tests are based on broadband speed measurements in different clusters, including 1,000 "points of interest" such as transport hubs, hospitals, malls, etc.

The company says the results of the measurements that have been carried out so far have showed that an increase in network quality leads to a greater use of data services by customers.

The operator has spent much of 2015 on testing its mobile broadband network.

The operator has also deployed DC-HSDPA and HSPA+ to enable throughput speeds to reach 42Mbps. In addition, it has rolled out LTE in Jakarta, Medan, Bandung, Surabaya, Bali, Lombok, Makassar, Manado, Batam and Yogyakarta. It now has more than 1,300 4G BSTs and over 1.8m 4G users.

M1 gains "holistic" view of users with BSS upgrade

Singapore's M1 has completed a major upgrade of its billing and customer care system. The enhanced platform is said to have improved the operational efficiency at the telco's retail outlets and service provisioning by up to 35 per cent.

In addition, by capturing all customer transactions and consolidating this data into a single system, it's claimed M1 is able to serve its customers more effectively, and use data analytics to determine and address their preferences.

The new convergent billing platform features solutions from Oracle and Comverse. The latter was acquired by Amdocs earlier this year. The firm says its technology provides M1's post-paid billing with a wide range of capabilities, including improved flexibility in tariff, contract configuration and batch payment processing.

Alan Goh, M1's CIO, says the new consolidated system has resulted in increased productivity.

M1 worked with Accenture on the project. The technology consultant and system integrator provided program management, design, development and testing, data migration and deployment services for the Oracle and Comverse solutions implemented. It then integrated the systems with Microsoft's *.NET* framework.

M1 CIO Alan Goh said Accenture consolidated multiple legacy systems, and has given the company a holistic view and better understanding of its customer base. "We are seeing improved call rating and billing performance as a result of our new system, and that means increased productivity," he said.

M1 launched in 1997 and now provides mobile and fixed services to more than two million customers in Singapore. It was the country's first operator to introduce nationwide 4G as well as ultra high-speed broadband services on the Next Generation Nationwide Broadband Network.

Spectrum refarmed

Vinaphone will refarm GSM-designated spectrum to help provide and optimise UMTS services, as well as facilitate future network planning in central Vietnam. The cellco will use ZTE's solutions to re-allocate frequencies in the 900MHz band and expand capacity in 2100MHz. It will uses ZTE's distributed software defined radio base stations, unified *MicroTCA* platform, plus new RRUs, a unified hardware platform, and management system. The project is due to be completed in 2016, and involves networks covering about 20m users.

GX flight connections

Singapore Airlines will use Inmarsat's *GX Aviation* system to deliver high-speed connectivity services for passengers on board its long-haul fleet. The first installation is scheduled for the second half of 2016. The services will be powered by Honeywell's *JetWave* satcoms hardware connected to Inmarsat's *Global Xpress (GX)* constellation. Following initial delays, the third *GX* satellite was launched successfully in August 2015, putting Inmarsat back on track for the introduction of its global commercial service by the end of the year.

TRC threat to licenses

The Telecom Regulator of Cambodia (TRC) has reportedly asked 34 ISPs and VoIP providers to provide business reports stating that they are in compliance with the terms of their licenses. The TRC says failure to do so will result in license cancellations. The move follows an investigation by the regulator which found that some operators aren't fully complying with their license agreements. According to local reports, the TRC believes the cancellation of inactive licenses will help bring "greater clarity" to Cambodia's telecom sector.

Robi Axiata manages Bangladesh devices

Robi Axiata has implemented a new system in Bangladesh that will enable it to automatically detect and configure new devices on its network, allowing subscribers to enjoy a smooth transition when they change handsets.

The mobile operator, which is said to be the country's second biggest in revenue terms, has deployed Gemalto's *LinqUs* device management platform. This is designed to deliver over-the-air data settings such as MMS, internet and email to the end-user's handset. It also provides marketing analysis of the installed devices for targeted promotional campaigns.

Gemalto claims its platform provides the industry's largest device repository with a knowledge base identifying more than 100,000 smartphones, tablets and 4G-ready handsets. The vendor adds that the database is constantly updated to include the latest models, enabling Robi to recognise almost all kinds of devices on its network.

Bangladesh has reportedly experienced a sharp increase in smartphone penetration in recent times. According to A.K.M Morshed, Robi Axiata's CTO, customers change their devices frequently as they can buy affordable data-enabled phones, and they expect instant access to their favourite services. "With Gemalto's solution, users can activate their device instantly by simply accepting all updates," he says.

Michael Au, the vendor's president for South Asia and Japan, adds: "[Our] robust, future-proof solution helps Robi Axiata to remotely manage the entire life cycle of the devices, and therefore significantly reduce customer care costs. The device-centric approach can also improve data uptake and generate additional revenue through value-added services."

Hanoi Telecom selects Infinera for metro network in Vietnam

Vietnam's Hanoi Telecom Corporation (HTC) is building a metro network that will connect Ho Chi Minh City to Vung Tau. It will use Infinera's *TM-Series* system for the delivery of multi-service transport services with low power, high density and scalability.

HTC offers carrier and wholesale services, focusing mainly on wireless, fixed internet and VoIP services. The firm also operates a mobile network under the Vietnamobile brand which has more than 13 million subscribers.

The *TM-Series* was developed by Transmode which Infinera acquired earlier this year. It says the packet-optical platform provides multi-service capabilities, such as Ethernet/CE2.0, MPLS-TP and OTN aggregation, which are well suited for mobile fronthaul, backhaul and metro aggregation applications.

HTC is already using Infinera's *DTN* and *ATN* platforms in its network. The *TM-Series* is said to solve the operator's new requirement for an optimised 10G transport solution upgradeable to 100G, including 1+1 protection, high density, low power and space savings.

This is the first project that combines Infinera's solutions with the *TM-Series* that was formerly provided by Transmode.

ITU preserves spectrum for satellite use

Delegates at WRC-15 acknowledged the global importance of satellite services. Around 3,300 participants, representing 162 out of the ITU's 193 member states, attended the month-long conference held in Geneva in November. © ITU/D. WOLDU

C-band threat averted as delegates at WRC-15 agree satellite technology is central to the future of worldwide connectivity.

The satellite industry has breathed a sigh of relief as delegates at the ITU's World Radiocommunication Conference 2015 (WRC-15) have agreed to preserve spectrum that is primarily used for satcoms.

Held every three to four years, WRC reviews the international regulatory framework for radio communications and revises it as needed. The most controversial item on the agenda this year was the possible re-assignment of C-band spectrum. Terrestrial wireless operators had been lobbying for additional frequencies in C-band that include the 3.4GHz to 4.2GHz spectrum used for satellite receive/downlinks.

Naturally, the satellite industry opposed this. In rallying its supporters earlier this year, the Global VSAT Forum (GVF) said operation of IMT in the C-band could cause "excessive" levels of interference, and might preclude future use by broadcasters and many other industries that depend on satellite services supported by C-band.

At WRC-15 which was held in Geneva during November, representatives from the world's governments overwhelmingly agreed that satellite provides vital and irreplaceable services.

Among the key decisions made during the conference, delegates reconfirmed the need to protect critical fixed-satellite service (FSS) services throughout the world using C-band. But the lower 200MHz of the C-band downlink frequencies (3400-3600MHz) were identified for IMT in ITU Region 1 (EMEA) and Region 2 (Americas). In Region 3 (APAC), some countries will sign a footnote allowing potential IMT use of 200MHz, although the vast majority of the region will continue using this band for satellite.

Anywhere that IMT is deployed, it will be subject to adherence to strict protection requirements with neighbouring countries. WRC-15 declined to consider a proposal for IMT systems in the C-band uplink frequencies (5925-6425MHz).

Other bands

In order to address an apparent imbalance in Ku-band spectrum, WRC-15 identified additional frequencies for FSS systems between 10-17GHz. A downlink allocation in 13.4-13.65GHz in Region 1 was approved, while an allocation in 14.5-14.8GHz was agreed in several countries around the world.

Conference delegates avoided identification of L-band spectrum – which is used by mobile satellite service (MSS) operators around the world – for IMT. Instead, they identified 1427-1518MHz for IMT, and asked the ITU-R to determine the technical measures to ensure compatibility with MSS operations in the adjacent band (1518-1559MHz).

Several agenda items were adopted for future conferences that will spur growth in the satellite industry. This includes discussions at the next WRC to be held in 2019 for additional FSS spectrum in 51.4-52.4GHz, and additional satellite spectrum in 37.5-39.5GHz which will be addressed at WRC-23. It was also decided that no globally harmonised bands for FSS, MSS and broadcast satellite service in C-, Ku- or Ka-bands would be included as an agenda item at WRC-19.

In a joint statement, a coalition of associations representing the satellite industry said: "WRC-15 has been a turning point in the global recognition of the value of satellite services for the future… These decisions provide the stability necessary for the entire satellite industry to fully leverage its strengths in support of the vision expressed by the WRC delegates."

Despite campaigning for the use of C-band spectrum for terrestrial mobile broadband, the GSM Association welcomed the decisions taken at the conference. John Giusti, the association's chief regulatory officer, believes global harmonisation of spectrum bands through the WRC process is key to driving the economies of scale needed to deliver low-cost, ubiquitous mobile broadband around the world.

"The GSMA applauds the strong support from governments in all regions for the global harmonisation of 200MHz of the C-band to meet capacity requirements in urban areas," said Giusti. "We are also pleased by the decision to globally harmonise the L-band [which] provides an ideal blend of coverage and capacity capabilities."

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Mobilink and Warid combine in Pakistan's first mobile merger

Mobilink and Warid Telecom will merge in a bid to become Pakistan's largest high-speed mobile network provider. In what's said to be the first merger in the country's mobile market, the combined company will serve more than 45 million mobile customers.

Mobilink (Pakistan Mobile Communication Ltd.) is owned by VimpelCom and Global Telecom Holding (GTH). According to September 2015 figures from the Pakistan Telecommunications Authority, it has more than 35 million subscribers and leads the country's mobile market of five operators. Warid Telecom was launched by the (Abu) Dhabi Group in May 2005 and trails its rivals with around 10.3 million users.

Pakistan's other cellcos include Telenor, China Mobile's Zong and Ufone. The latter was started by the Pakistan Telecommunication Company Ltd. in 2001 but became a part of Etisalat following PTCL's privatisation in 2006.

Financial details of the merger were not disclosed. But as part of the transaction, Mobilink will first acquire 100 per cent of Warid's shares in consideration for Dhabi Group shareholders acquiring around 15 per cent of Mobilink shares. The deal is expected to close around mid-2016, subject to the usual approvals and customary conditions.

In a joint press statement, the two companies said their merger is expected to create capex and opex synergies with a current net value of around USD500m. They added that their combined revenues for the 12 months to September 2015 was USD1.4bn.

The merged entity's board will consist of seven directors: six will be nominated by VimpelCom and GTH, and one by Dhabi Group shareholders. Mobilink CEO Jeffrey Hedberg will become the CEO of the merged business while Mobilink CFO Andrew Kemp will become its CFO.

Dhabi Group chairman Sheikh Nahyan Mubarak Al Nahyan says the deal is a "significant milestone" for Pakistan.

Together with their continued investments, Mobilink and Warid claim their combination will accelerate the availability of high-speed, "best-in-class" mobile telecoms to consumers and businesses. They say they will be able to offer more competitively priced services and wider access to enablement facilities such as mobile financial services.

"Creating the largest operator in Pakistan is a significant milestone for Mobilink and Warid but also for Pakistan as a whole," said Dhabi Group chairman Sheikh Nahyan Mubarak Al Nahyan. "Both parties bring their unique strengths to this merger. Warid, with its strong post-paid base and high quality 4G/LTE network, will complement Mobilink's position in the market."

For VimpelCom, this latest deal follows a number of strategic milestones, including its recent joint venture announcement with WIND and 3 Italia in Italy, and the agreement to sell its operations in Zimbabwe.

Telenor Group to divest shares in VimpelCom

Telenor Group plans to divest its 33 per cent shareholding in VimpelCom. The company says the disposal is in the "best interests" of its shareholders, and in accordance with a long-term strategic focus on creating value in its core operations

Telenor has extensive operations in South Asia including Myanmar, India and Pakistan, as well as tie-ups with Grameenphone in Bangladesh, DiGi in Malaysia and dtac in Thailand.

According to the Norwegian telco, VimpelCom has gradually contributed less to the value of its group. It has invested NOK15bn in VimpelCom, received NOK20bn in dividends, and says the current market value of the ownership stake is around NOK20bn.

Telenor says the divestment process is likely to take some time. It adds that it will not convert its VimpelCom preferred shares into common shares.

As a result of the announcement, VimpelCom's stock declined in 3Q15 and ended at USD4.11 per share versus its book value of USD5.64 per share.

In a separate development in early November, VimpelCom has made a provision of USD900m in its 3Q financial statements. This is for a resolution of the investigations currently being carried out by US and Dutch authorities into its dealings with Takilant in Uzbekistan.

Telenor Group criticised the announcement and said it "significantly" increased its concerns in relation to the potential outcome of the still ongoing investigations.

Frank Dangeard, Telenor Group's interim board chairman, said: "Although it is VimpelCom that is under investigation, and Telenor is cooperating with the investigating authorities as a witness, questions have been raised about what information the Telenor Group had about the alleged corruption in VimpelCom."

VimpelCom defended its actions in a statement which said: "The discussions with the authorities are ongoing and, until concluded, there can be no certainty as to the final cost to [VimpelCom] of any such resolution or the nature, likelihood or timing of a definitive resolution. At this time, [we] will make no further comments on the ongoing discussions."

Following the news, Jon Fredrik Baksaas immediately resigned from Telenor. Baksaas had previously served as the group's CEO but stepped down after 13 years in August 2015. Since then, he had been working as a strategic consultant to the board of directors. He said: "The recent developments in the ongoing investigations of VimpelCom make my role as strategic advisor to the board in Telenor challenging."

At the end of October, group chairman Svein Aaser also decided to quit. As well as blaming the company's strategic review, he said the VimpelCom case had been going on for some time and had proved "demanding and complex to manage".

Headquartered in Amsterdam, Russian telco VimpelCom is one of the world's largest telcos and has around 213m mobile users across 14 countries. In South Asia, they include Bangladesh, Laos and Pakistan.

SSTL and RCOM agree merger

Following on from their exclusive talks which began earlier this year *(see Wireless Business, Q3)*, Sistema Shyam Teleservices Ltd. (SSTL) and Reliance Communications (RCOM) have agreed to merge.

SSTL is the Indian telecoms subsidiary of Sistema JSFC, a publicly-traded diversified holding company in Russia and the CIS. At the start of November it announced the signing of binding documents that provide for the de-merger of SSTL and its merger with RCOM based on a scheme to be approved by the Indian courts. As a result of the deal, SSTL will acquire and hold a 10 per cent equity stake in RCOM.

The closing of the transaction, which is expected in the second quarter of 2016, is subject to the usual conditions and approvals. Once agreed, minority shareholders will be given an option to exchange their SSTL shares with the pro-rata RCOM shares held by Sistema.

"The combination of our wireless businesses will generate significant capex and opex synergies for mutual benefit," said Gurdeep Singh, president and CEO of RCOM's consumer business. "The addition of SSTL's valuable spectrum holdings in the 800 to 850MHz band will strengthen RCOM's spectrum portfolio, and extend our ability to provide world class 4G LTE services to our customers in eight important circles in the country until 2033."

Following completion, RCOM will take responsibility for the payment of SSTL's licensing fees to India's Department of Telecommunications. Sistema says an appropriate earn-out mechanism has also been agreed in

relation to disputed spectrum contiguity charges claimed by the department.

Mikhail Shamolin, Sistema president and CEO, believes the closing of the deal will serve as an example of growing business ties between Russia and India, and encourage other investments between the two countries.

BlackBerry 'forced out' of Pakistan

BlackBerry will no longer operate in Pakistan after 30 December 2015. The Canada-based phone-maker says it was left with "no choice" but to exit the market after refusing to comply with a government directive to monitor all *BlackBerry Enterprise Service (BES)* traffic in the country.

Earlier this year in July, the Pakistan Telecommunications Authority (PTA) notified the country's mobile operators that *BES* servers would no longer be allowed to operate in the country because of "security" reasons. Originally, the PTA ordered a shutdown of *BES* servers on 30 November but this has since been extended to 30 December.

Writing in a blog, COO Marty Beard said while BlackBerry was "more than happy" to assist law enforcement agencies in investigations of criminal activity, Pakistan's demand was not a question of public safety. He said the company has never permitted wholesale access to its *BES* servers, and claimed the government was essentially demanding "unfettered" access to all *BES* customer information. This included the ability to monitor every BlackBerry email and message sent via the *BlackBerry Messenger* service.

"The privacy of our customers is paramount to BlackBerry and we will not compromise that principle," said Beard. "As we have said many times, we do not support 'back doors' granting open access to our customers' information and have never done this anywhere in the world."

Beard said that while the company regrets leaving Pakistan, remaining in the country would have meant forfeiting its commitment to protect its users' privacy. "Pakistan's demand for open access to monitor a significant swath of our customers' communications within its borders left us no choice but to exit the country entirely."

ATC acquires controlling interest in Viom Networks

American Tower Corporation (ATC) will acquire a 51 per cent controlling interest in Viom Networks following an agreement with Tata Teleservices, SREI Infrastructure Finance, and several other minority holders. The total cash consideration will be INR76bn.

Viom currently owns and operates around 42,200 wireless communications towers and 200 indoor distributed antenna systems across India. Tata Group and ATC jointly own more than 56,000 towers in the country.

At closing, Tata Teleservices will retain a part of its holding, with Macquarie SBI Infrastructure Investments, SBI Macquarie Infrastructure Trust and IDFC Private Equity Fund III retaining certain interests. Under the agreement, ATC may acquire or be required to acquire all or a portion of the remaining 49 per cent ownership stake in Viom.

The parties have also agreed that post-closing, ATC's existing Indian portfolio of around 14,000 towers will be merged with Viom, resulting in certain ownership adjustments.

Sunil Kanoria, chairman and MD of Viom and vice chairman of SREI Infrastructure Finance, said the divestment of Viom will have a multi-fold impact for SREI, improving profitability and accretive for both shareholders and SREI.

"We have built one of the best assets in the telecom tower space with robust cash flow stream, the highest tenancy ratio in the industry and a well-diversified tenant mix," said Kanoria. "[We] believe that ATC is well positioned to continue to optimise these assets given its proven track record of success."

ATC said it intends to finance the deal in a manner consistent with maintaining its investment grade credit rating. The transaction is subject to customary closing conditions and regulatory approval, and is expected to close in mid-2016.

During the quarter ended 30 June 2015 Viom reported rental and management revenues of around INR50bn, and approximately INR21bn in gross margin.

Cisco and Ericsson partner for the networks of the future

Cisco and Ericsson have announced a global business and technology partnership to create what they describe as "the networks of the future".

They say their multi-faceted relationship will offer customers the best of both companies: routing, data centre, networking, cloud, mobility, management and control, and global services capabilities.

Ericsson is aiming to bolster its IP strategy, according to president Hans Vestberg (left). Cisco's CEO Chuck Robbins (right) says the partnership will drive "incredible innovation".

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
10/9/15	Steve Richeso	Advantech Wireless	SVP, global sales & business development	Harris Corporation	Senior director, business development
15/9/15	Dr. Stephen Collins	VimpelCom	Group chief corporate & regulatory affairs officer	Microsoft EMEA	VP of corporate affairs
22/9/15	Raymond de Graaf	Cambium Networks	SVP worldwide operations	Ixia	SVP operations
28/9/15	Santosh Desai	MEASAT	Sales director – Africa	Bharti Airtel	Business head – IBS
8/10/15	Richard Swardh	Comtech EF Data	VP, market development	Ericsson	Business development director
12/10/15	Ruza Sabanovic	Telenor Group	EVP & CTO	Telenor Group	SVP technology & industrialised projects
12/10/15	Vivek Sood	Telenor Group	EVP & CMO	Telenor India	CEO
12/10/15	Pål Wien Espen	Telenor Group	EVP & head of partner relations Asia	Telenor Group	General legal counsel
12/10/15	Sharad Mehrotra	Telenor India	CEO	Telenor Myanmar	CMO
14/10/15	Matthew M. O'Connell	OneWeb	CEO	GeoEye	President & CEO
19/10/15	Michel de Rosen	–	–	Eutelsat	CEO – steps down March 2016
19/10/15	Rodolphe Belmer	Eutelsat	CEO	Groupe Canal	CEO
19/10/15	Michael McDonnell	NA	NA	Intelsat	CFO – resigned
20/10/15	Carsten Brinkschulte	Core Networks Dynamics	CEO	BlackBerry	SVP enhanced network services
20/10/15	Andreas Hipp	–	–	Epsilon Global Communication & Cataleya	CEO & co-founder – stepped down
20/10/15	Jerzy Szlosarek	Epsilon Global Communication	CEO	Epsilon Global Communication	COO
20/10/15	Jay Jayasimha	Cataleya	CEO	Epsilon Global Communication	CIO

Under the agreement, the two companies plan to offer service provider customers an end-to-end product and services portfolio along with joint innovation that accelerates new business models. They claim they will create the "mobile enterprise experience of the future" through a highly secure technology architecture for seamless indoor and outdoor networks.

Cisco and Ericsson also plan to channel their combined scale and innovation to accelerate the platforms and services needed to digitise countries and create the IoT.

The partnership will be supported by multiple agreements which include: commitments to network transformation through reference architectures and joint development; systems-based management and control; a broad reseller agreement; and collaboration in key emerging areas.

Teams from both organisations will also begin working on a joint initiative focused on SDN/NFV and network management and control.

In addition, the parties have agreed to discuss fair, reasonable, and non-discriminatory (FRAND) policies and enter a licensing agreement for their respective patent portfolios. They say this will enable "unfettered" joint innovation and provide certainty for their customers. As part of this agreement, Ericsson will receive license fees from Cisco.

Between them, the two networking giants have more than 56,000 patents, investments of USD11 billion in research and development, and over 76,000 services professionals across more than 180 countries.

They say their strategic partnership will be a key driver of growth and value for the next decade, with each company benefiting from incremental revenue in 2016 which is expected to rise to USD1 billion or more for each by 2018.

Hans Vestberg, president and CEO of Ericsson, said the agreement with Cisco will initially focus on service providers. It will then move onto opportunities for the enterprise segment and accelerate the scale and adoption of IoT services.

He added: "This partnership also fortifies the IP strategy we have developed over the past several years, and is a key move forward in our own transformation."

Cisco CEO Chuck Robbins believes that given the pace at which the market is moving, the successful companies will be those who build the right strategic partnerships to accelerate innovation, growth, and customer value.

Network operators such as Vodafone have welcomed news of the agreement. Its group chief executive Vittorio Colao said: "We believe [their partnership] will accelerate the pace of innovation across the communications industry as ultrafast networks, cloud services, and the Internet of Things become increasingly central to our customers' needs."

High throughout satellites to "heat-up" in Asia over next decade

High throughput satellites (HTS) will play a pivotal role in growth across Asia, according to the latest report from Northern Skies Research (NSR).

It says that the continent's increasingly connected population, the so-called 'Asia Pivot' by government and military operations, and targeted satellite programmes are driving new and innovative approaches for HTS capacity.

"An enormous demand for connectivity is emerging in Asia, with a distinct role for satellite," says Blaine Curcio, senior analyst and co-author of NSR's *Global Satellite Capacity Supply and Demand 12th Edition* report. "When all summed up, we will see nearly USD900m in revenues by 2024. That's nearly five per cent of all global capacity leasing revenues in 2024 – just for data and just in Asia."

According to Curcio, the region's need for connectivity will increase exponentially over the next decade, and satellite's role will be vital to this expansion. Applications such as backhaul and enterprise data will propel future growth, with demand for the latter expected to increase to almost 50Gbps of GEO-HTS capacity, on top of an additional 375 TPEs of FSS capacity demand by 2024.

In terms of supply, NSR forecasts that GEO-HTS projects together will bring about 300Gbps of high throughput capacity to Asia by 2020.

Senior analyst and report co-author Prashant Butani says although O3b and Thaicom's *IPSTAR* are the only HTS supply alternatives currently over Asia, they are targeting very different markets and other big names will enter in the coming decade.

He says Intelsat, SES, Eutelsat, ABS, and Kacific have all announced GEO missions for a region that has been slow to adopt HTS thus far. "What is unique about Asian HTS supply is that Ku-band is attracting interest given the precedent set by *IPSTAR*. Those that have the spectrum will use it for HTS, as well as widebeam FSS depending on the target market."

NSR reckons countries such as China and India will look to follow in the footsteps of Australia's NBN satellites, making HTS the next 'pride sat' for Asia. However, it also notes that sub-regions like the Pacific Ocean and South East Asia will best be served by commercial projects providing diverse coverage for tailored applications.

Michel de Rosen to step down as Eutelsat CEO

After six years as Eutelsat's CEO, Michel de Rosen will step down from the position in March 2016. He will remain in the role of non-executive chairman of the board until the end of his current mandate in November 2016. After that, de Rosen's tenure will be submitted to the annual shareholders' meeting for renewal.

Rodolphe Belmer has been elected as de Rosen's successor. He will take up the position as from 1 March 2016 but joined Eutelsat as deputy CEO on 1 December 2015 as part of the transition process. Belmer is working alongside Michel Azibert, Eutelsat's current deputy CEO and chief commercial and development officer.

Belmer's previous employers include Groupe Canal which he joined in 2001 and where he was appointed CEO in 2012. Born in 1969, he is a French national, and after graduating from HEC in 1992 he began his career in the marketing department of Procter and Gamble France before moving onto McKinsey in 1998.

Rodolphe Belmer joins Eutelsat from Groupe Canal where he was CEO.

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INVESTMENTS, MERGERS & ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
17/9/15	IMImobile	Archer Digital	Company	$5.6m	Johannesburg-based Archer specialises in mobile engagement solutions for banking & government customers across South Africa.
30/9/15	Sterlite Technologies	Elitecore Technologies	Company	NA	Part of the Vedanta Group, Sterlite says the acquisition enables it to offer software solutions for OSS, BSS & revenue management.
22/10/15	Ruckus Wireless	Cloudpath Networks	Company	NA	US firm Cloudpath specialises in certificate-based Wi-Fi security & has developed automated self-service software.
3/11/15	Neural Technologies	Enterest	Company	NA	Neural says Germany-based Enterest specialises in user data software that will complement the risk management & OSS/BSS functions of its *Optimus* platform.
10/11/15	DeClout	Telstra	Pacnet Internet	$4.4m	Following its acquisition of Pacnet in April, Telstra also acquired the company's ISP assets in Singapore & Thailand. Singaporean cloud & data centre operator DeClout will have to wait until mid-January for the transaction to be approved.
24/11/15	National Integrated Circuit Industry Investment Fund Corporation	ZTE Microelectronics	24% shareholding	RMB 2.4 bn	ZTE's semiconductor subsidiary will use the investment to enhance its R&D, strengthen its technologies, & broaden its marketing & distribution channels in China & abroad.

IN BRIEF...

The Dialog Group has entered into agreements with Sri Lanka's Board of Investment for an additional USD175m (LKR24.6bn) to fund the country's ICT Infrastructure. The operator plans to use the investment to expand its 3G and 4G network services, further develop its fibre transmission and international telecoms networks, and grow its digital satellite television infrastructure. The group will also direct investments towards the expansion of its digital services portfolio which includes ventures and initiatives in payment, commerce, education and health.

Vodafone has to pay INR20bn to merge six of its business units in India, according to the country's Supreme Court. The company is currently planning to issue an IPO, but according to reports it has been told to deposit the sum with the Department of Telecommunications in return for a merger license. Vodafone's final liability will be settled by various cases currently in the lower courts.

Axiata's tower subsidiary Edotco Group has acquired a majority stake in the Myanmar Tower Company (MTC) for around USD125m. Edotco currently operates around 14,00 towers in Malaysia, Sri Lanka, Bangladesh, Cambodia and Pakistan. MTC was set up by Digicel Asian Holdings (DAH) after it failed to win a mobile license in Myanmar in 2013. Since then, it has built and leased 1,250 towers to Ooredoo Myanmar. Jamaica-based Digicel held a 75 per cent stake in DAH but has now sold the holding.

Following the introduction of new government rules allowing for the sharing and trading of spectrum, Reliance Communications (RCOM) is reportedly holding talks about a deal to enable its customers to access Reliance Jio Infocomm's LTE network. In an arrangement that includes a reciprocal roaming agreement, Jio will be able to use RCOM's network to provide circuit-switched voice services, while RCOM will be able to leverage the investments Reliance Jio has made to introduce 4G across India.

Ismail Rasheed has been named as Dhiraagu's new MD and CEO following the retirement of Ismail Waheed. Having been with Dhiraagu since its inception in 1988, Rasheed has held key positions within the company including chief executive since 2007. He studied in the UK and holds an MBA from the University of Reading (UK) and a BEng in Telecommunications Systems Management and Design from the Anglia Polytechnic University.

AsiaInfo International and Reliance Corporate IT Park plan to create and develop new services for businesses in India and beyond. Their new joint venture will be headquartered in Mumbai, and will initially recruit staff from both companies as well as seeking to attract talent both locally and internationally, growing to a few hundred people by early 2016. They will aim to develop innovative service offers and new business collaborations for Reliance-owned companies as well as other enterprises in India before expanding internationally across the sub-continent and further afield.

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
13/10/15	IDT Corporation	US	4Q15	USD	405.8	12.4	0.05	4Q15 revenue down compared to $420.7m in 4Q14. Fabrix, which was sold in 1Q15, contributed $5.9m during the quarter. Core businesses performed to overall expectations, according to CEO Shmuel Jonas.
23/10/15	Ericsson	Sweden	3Q15	SEK	59.2	NA	0.94	Sales growth in South East Asia & Oceania primarily driven by continued mobile broadband coverage projects. Important mobile broadband agreements announced in Indonesia during the quarter. Managed services business developed favourably as operators focus on network optimisation & efficiency.
27/10/15	Tata Communications	India	2Q16	INR	51,301	7,720	NA	Core business reported its strongest quarterly performance in terms of normalised operating profitability.
28/10/15	Telenor Group	Norway	3Q15	NOK	31,836	11,848	NA	Organic revenue up 4% but intense competition in Thailand & Malaysia; turnaround continues in Thailand; Malaysia affected by currency headwinds & price pressure. "Promising" growth trends continue in Bangladesh, Myanmar & Pakistan.
28/10/15	Eutelsat	France	1Q16	EUR	387.7	NA	NA	Earnings up 2.0% at constant currency. On track to achieve target of revenue growth of 2-3% for FY 2015-16 at constant currency, excluding non-recurring revenues.
29/10/15	Intelsat	Luxembourg	3Q15	USD	580.8	452.0	0.66	CEO Stephen Spengler: "Results are in line with our overall expectations for 2015." Firm now has high hopes for launch of next-generation *Epic* satellites which is just months away.
29/10/15	Alcatel-Lucent	France	3Q15	EUR	3,429	NA	(0.07)	Group revenues, excluding managed services & at constant perimeter, grew 7% y-o-y. At constant exchange rates, revenues down 5%. Proposed merger with Nokia now in its final stages.
30/10/15	SES	Luxembourg	3Q15	EUR	493.5	366.5	NA	International revenues year to date were EUR439.7m – up 11.1% but 7.3% lower in constant forex terms. This was partially offset by growth from new agreements, notably with StarTimes in sub-Saharan Africa and *YahLive* venture.
6/11/15	Globe Telecom	Philippines	3Q15	PHP	83.4 (bn)	34,678	NA	Record service revenues are 15% higher than the PHP72.7bn reported a year ago. Strong data growth across all segments & consolidation of Bayan Telecommunications during the quarter.
2/11/15	Rohde & Schwarz	Germany	FY15	EUR	1.83 (bn)	NA	NA	Largest contributor to the group's increased results was the wireless communications test & measurement sector, despite consolidation in 3G & 4G market.
18/11/15	Gilat Satellite Networks	Israel	3Q15	USD	40.3	3.4	NA	Revenues continue to slide. Reiterated management objectives for 2015: revenues of between $210m to $220m, & EBITDA of between $6m to $8m.
26/11/15	Telekom Malaysia Berhad	Malaysia	3Q15	MYR	2.92 (bn)	449.0	NA	Group revenues grew 2.9% q-o-q on the back of higher voice & data earnings – despite forex issues & what group CEO Tan Sri Zamzamzairani Mohd Isa said was a "challenging environment".

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Block upconverters feature built-in testing

AnaCom has created a new XKu-band block upconverter (BUC) in the 12.75-13.25GHz spectrum. The new *ELSAT* BUCs are available in transmitter output levels up to 100W, and in single or redundant configurations.

MANUFACTURER: AnaCom

PRODUCT: ELSAT

MORE INFORMATION: www.anacominc.com

AnaCom says the units are rugged for continuous outdoor duty in all types of environments, and are particularly suitable for SCPC, MCPC and DAMA applications.

The upconverter, power amp, monitor, control and power supply are included in a single enclosure, and AnaCom says the only cabling required to indoor equipment are IF connectors.

The firm adds that an 'ovenised' high stability crystal oscillator is used to lock the TX synthesiser. Additional temperature and aging compensation are provided by an onboard microprocessor.

The BUC features a monitor and control (M&C) system that can be used in combination with its internal metering function to monitor operational parameters. The M&C system also enables users to monitor and control the converter on the same M&C bus as most indoor equipment, such as modems and multiplexers.

The *ELSAT*s have built-in test facilities for improved maintenance and reduced dependence of external test equipment. To improve and simplify maintenance routines, they can be connected to an external computer to monitor critical parameters such as transmitter power output and IF levels, power supply and TX synthesiser voltages, alarm details, and internal temperature.

Other features include remote configuration and access via Ethernet and serial protocols, and a flash memory so that the BUC can be restarted with the same settings.

CommScope first with "intelligent" RRU power supply

CommScope reckons *PowerShift* is the first intelligent, plug-and-play DC power supply solution for RRUs at macro and micro cell sites.

MANUFACTURER: CommScope

PRODUCT: PowerShift

MORE INFORMATION: www.commscope.com

With increasingly more powerful RRUs being distanced from the power distribution points, the company says delivering power efficiently becomes challenging and costly.

PowerShift aims to help operators re-utilise existing power cable infrastructure, eliminate the need for deploying higher gauge conductors when installing new cabling, and increase the usable length for cables by over four times. CommScope says it can also extend RF battery uptime by up to 35 per cent by taking full advantage of the existing battery backup system.

The solution is designed to automatically deliver the most efficient voltage to the RRU, leveraging technology developed with General Electric. CommScope adds that no manual calibration is required when managing power supply.

PowerShift also enables the use of smaller diameter power cables, resulting in reduced capex as well as less weight and wind load on towers.

Other advantages are said to include decreased opex due to lower overall power consumption, more efficient inventorying, standardised installation, and lower shipping costs.

Sepura enhances TETRA picture messaging solution

Sepura has launched *IMAGE 3.0*, an enhanced version of its critical comms application that allows the transfer of pictures from a control room to field personnel using TETRA mobiles.

IMAGE now has a new modern interface that is said to be intuitive to use and includes drag and drop functionality. Sepura says this reduces training time, and crucially increases the speed at which an operator can react in an emergency.

MANUFACTURER: Sepura

PRODUCT: IMAGE 3.0

MORE INFORMATION: www.sepura.com

The application also supports a wide range of languages via a custom import process which can be easily managed by the user.

According to the company, the app is scalable for use in any sized network, and can be accessed simultaneously by multiple client apps and multiple users in different geographic locations.

IMAGE 3.0 can be used from a client app provided by Sepura, or integrated into existing command and control systems via an API.

xStats correlates LTE metrics from third-party OSS

SevOne has unveiled six new *xStats* adapters for use with third-party OSS platforms. The digital infrastructure performance monitoring specialist says its technology incorporates any time-stamped metrics into the *SevOne Performance Monitoring Cluster*. These can then be automatically correlated with other metric, flow and log data at scale.

As a result, the company says operators gain vital end-to-end visibility into the performance and availability of LTE and IMS networks and services from access to core.

SevOne offers a number of ways to incorporate third-party data, processing that information with the same analytics applied to out-of-the-box data sources. For standard and custom data sources, the firm says it automatically establishes baselines of normal performance, generates alerts when actual performance deviates from those baselines, and then feeds the data into reporting analytics.

The six new *xStats* adapters can be used with platforms from Accedian, Alcatel-Lucent, Cisco, Ericsson, Mitel, and Nokia. Each adapter offers various functions depending on which vendor's platform it is used with.

MANUFACTURER: SevOne

PRODUCT: xStats

MORE INFORMATION: www.sevone.com

Centralised power system allows faster network rollouts

Eltek has unveiled its *High Voltage DC (HVDC)* for powering remote broadband telecoms equipment.

The firm says high bandwidth applications such as streaming video are driving a need for service providers to install many new remote broadband equipment cabinets. The *HVDC* aims to offers these service providers an alternative power feed solution that allows faster rollout and reduced TCO.

MANUFACTURER: Eltek

PRODUCT: High Voltage DC

MORE INFORMATION: www.eltek.com

The solution begins with the existing 48VDC power system and battery at the central site. The *HVDC* system then converts this mains DC power to 380/400VDC. Eltek says these voltage levels can be transmitted across long distances with very low losses.

The power is converted through the vendor's *Flatpack2* HE DC/DC converters *(pictured)* and then passes through a distribution box providing the necessary protection and safety functions, before being distributed to the load in the remote location. Here, a second voltage conversion

takes place as the DC/DC converters transform the 380VDC/400VDC back down to 54VDC /48VDC for the telecoms equipment.

Depending on the number of remote locations connected to each 380VDC/400 cable and their individual power consumption needs, Eltek says the distance between the central and remote sites can be up to five kilometres.

Lightening the load for body-worn cams

Motorola Solutions has launched a three-in-one body-worn video camera, radio speaker and microphone to reduce the amount of equipment safety personnel need to carry.

The end-to-end solution includes the *Smart Interface Si500* and *Si300 Video Speaker Microphone (VSM)*. The compact *Si500* integrates voice communications, real-time video, still images and emergency alerting. It extends the mission-critical performance of Motorola's *APX* radios and is said to include a number of innovative features to meet the needs of first responders.

MANUFACTURER: Motorola Solutions

PRODUCT: Video Speaker Microphone

MORE INFORMATION: www.motorolasolutions.com

For example, the device is equipped with a 210º motion camera lens that has been designed to provide optimal field of view and flexible wearing positions. Users can wear the *VSM* with the display facing in or out.

There's also a full-screen tempered-glass display that presents only vital information within three panels. Users have the ability to control radio channels and talk groups, view recorded video and photos, tag videos and listen to audio recordings.

The *Si500* also has Motorola's new adaptive audio engine that automatically adjusts audio settings based on the user's wearing position and environment. Other features include five integrated microphones, a 0.5W speaker, and Wi-Fi connectivity.

More critical comms kit – feature pp25-26

Ka-band antenna aims to flatten costs

C-COM Satellite Systems says its *iNetVu inMotion* flat panel antenna leverages the broadband speeds offered by high throughput satellites (HTS) in Ka-band to provide low-cost, always-on connectivity into a moving vehicle.

The Canada-based firm says COTM (comms-on-the-move) antennas are traditionally "expensive, elaborate and difficult to support". It says most are available mainly in Ku-band, and are equipped with pricey, high-powered transmitters that deliver limited amounts of bandwidth.

MANUFACTURER: C-COM

PRODUCT: iNetVu inMotion

MORE INFORMATION: www.c-comsat.com

C-COM hopes its new antenna will open up land-based COTM markets such as buses, trains, military vehicles and many others that require broadband internet via satellite while on the move.

The *iNetVu inMotion* will use next-generation HTS which are capable of delivering significant amounts of bandwidth at a fraction

of the price. C-COM claims it will cost significantly less than a Ku-band COTM antenna and deliver significantly more bandwidth to users such as governments, broadcasters, oil and gas companies, first responders, etc.

Full production of the *iNetVu inMotion* antenna system is expected to begin in 2Q16 following type approvals on Ka-band services for use of the system across the globe.

ALSO LOOK OUT FOR

DMR standard is enhanced

The European Telecommunications Standardisation Institute has released a new version of the Digital Mobile Radio (DMR) standard.

The DMR Association (DMRA) says *v.1.7.1 of the Tier III Trunking Part TS102 361-4* standard has major additions requested by users.

These include dynamic group number assignment (DGNA), MS to MS duplex for voice and data, transmit interrupt routines, and an additional mode for application data over an IP bearer service.

DGNA, talk group subscription and talk group attachment handling over the air interface were added to increase the flexibility of one of the key advantages of narrowband PMR, namely efficient group call communication. The DMRA says 'one-to-many' communication is imperative, and DGNA therefore improves the flexibility of group call modes offered by DMR Tier III.

MS (mobile station) to MS duplex for voice and data required the introduction of additional timing modes for the trunked system control channel (TSCC), specifically when used on single RF carrier base stations.

According to the DMRA, the addition of the duplex speeds up data transmissions, and increases convenience for users, allowing them to exploit the deployed infrastructure in lower traffic areas more efficiently without losing functionality.

The addition of transmitting application data over a defined IP bearer service enables DMR system users to integrate their wireless infrastructure more tightly into IT infrastructure. It also offers manufacturers the possibility to provide a bearer service for customer specific data.

DMRA chairman Mario Micheli says the new standard is a "true sign" of widespread adoption of DMR technology. He says: "Users are asking for more capabilities, because they wish to use DMR in their business critical applications in a wider variety of use cases."

Next generation testing

Commercial LTE services have been launched in several countries across South Asia. They include Smartfren in Indonesia (left), and Dtac in Thailand (right) who both began their 4G rollouts earlier this year. Some operators – such as U Mobile in Malaysia and Singtel in Singapore – are even in the global vanguard when it comes to developing 5G.

Testing and optimising LTE networks often presents a number of unique challenges to operators. So what are the issues and how can they be addressed? RAHIEL NASIR finds out.

What's the most critical factor for mobile engineers to look out for when they need to test and optimise their LTE networks? While the test and measurement specialists we spoke to identified various issues, there was one particular area many of them agreed upon: Quality of Experience.

For instance, Rohde and Schwarz (R&S) believes a key challenge for MNOs is to ensure continuing QoE for subscribers in a dynamic market that is characterised by evolving demand, the use of new network services (especially video), and the adoption of new features of the 3GPP standard including VoLTE. Jeremy Carpenter, the firm's marketing manager for mobile network testing, adds: "There is an ongoing need [for MNOs] to be aware of the performance of their own network and to differentiate themselves from their competition."

Many experts agree, saying that given the highly competitive markets cellcos operate in, it's critical for them to have an objective view of the performance of their LTE services and devices – and not just compared to local rivals but even benchmarked against successful operators elsewhere. Bruno Poisson, regional director for Anite's network testing division, believes this is vital for them to gain customers and increase ARPU.

"MNOs should conduct a regular and repeatable programme of competitive testing and analysis in order to understand their relative user experience ranking in the market, particularly as the number of subscribers connecting to their services increases, and capacity issues that may not be immediately apparent start to emerge. Failure to do so, will mean that the MNO may not be aware of potentially significant degradations in overall service performance and user experience relative to key competitors."

Poisson says some operators still use solely FTP testing to assess the performance of 4G data services. While this makes sense for throughput testing, he says other tests to ensure QoE need to be performed. "For example, close to 40 per cent of mobile data traffic comes from streaming video, notably *YouTube*. Network testing solutions should enable operators to fully assess the performance of *YouTube* as well as other social media services."

What needs to be tested?

Many commentators point out that LTE increases complexity across the mobile communications ecosystem. For example, Paul Gowans, director of marketing, RAN solutions, for Viavi Solutions (formerly JDSU), says: "Although LTE has a flatter architecture, it also has more inherent complexity – new frequencies to deal with, interference, more complexity in the eNodeB with hand-offs handled locally, MIMO, etc."

Carpenter says that because of the complexity of the LTE wireless interface, testing the performance of the RAN is critical to ensuring optimum operation of the network. For example, engineers should drive- or walk-test network coverage using parameters such as voice and video MOS, throughput, call completion rate and handover success rate.

"These results can be used to make strategic adjustments and enhancements to the network, optimise the coverage benchmark performance against competitors, and ensure compliance with regulatory obligations," says Carpenter.

Gowans believes operators should also be aware that there is no such thing as a 'typical' 4G customer: "It all depends on what network coverage is available, plus phones are moving from one network to the other all the time. It is this that defines the customer experience. So solutions are needed that can cover all technologies – 2G, 3G and 4G."

Clearly, there is complexity associated with ensuring interoperability between LTE and legacy 2G and 3G, as well as increasing complexity

associated with ensuring the quality of, and interoperability between, a whole host of new and legacy devices. It is therefore vital to ensure that all elements of the network, including the radio/air interface and backhaul, devices, services and applications work together effectively.

According to Carpenter, there is a need to design a network that ensures performance in an efficient way, thereby balancing QoS against financial objectives. "Correct testing of LTE devices, network infrastructure and the wireless channel during the planning phase increases the predictability of the network from planning to deployment, avoiding expensive design changes. During deployment, fast installation and commissioning of network infrastructure reduces costs and shortens the time when revenue streams start to generate income."

Keysight Technologies adds to this by saying the challenges of optimising LTE networks become much more intensive from the outset. "Multiple types of cells – such as macro, micro, pico and even femto – will co-exist in such networks, so an increasing number of parameters need to be taken into account in network optimisation," says Mayca Avila, the vendor's EMEA field market development manager for mobile broadband operation.

She also says many operators are realising too late that the transport backhaul is a critical consideration in 4G: "It is very important to deploy a core network solution that is flexible enough to offer smooth migration from centralised (longer backhaul) to distributed (shorter backhaul) core network nodes."

Having said that, Avila believes the operator's main goal must be to look for strategies and solutions that will improve its existing 2G/3G networks without requiring a complete equipment upgrade as they deploy their 4G networks.

"The solutions that are already deployed in the market might include many of the elements required of the 4G network, such as: integrated intelligence; simplified network architecture; high bandwidth performance capabilities with on-demand scalability; and enhanced mobility."

Nokia Networks supports this when it says the basic challenges of testing 4G networks remain the same as 2G/3G. However, when it comes to LTE specifically, the company says it is very important to optimise network coverage and reduce interference for the best user experience and optimal usage of radio resources.


Jeremy Carpenter, Marketing manager for mobile network testing, Rohde & Schwarz

"Correct testing of LTE devices, network infrastructure and the wireless increases predictability of the network."

Mounir El Aichaoui, the firm's head of market unit North Africa, reckons LTE network optimisation is more inclined towards a capacity driven quality improvement approach. "Initial optimisation is basically about taking care that L1 (antenna azimuths and downtilts) are adequate. In the case of LTE, this only becomes visible as interference and reduces spectral efficiency under higher loading."

He advises operators to ensure that their L1 design is right from the outset, and that they should not just "blindly use" what already exists such as their GSM1800 antennas, for example.

"Across the globe, LTE is currently handled like 'business as usual'. Rules such as monitoring of traffic load and end-user experience, and preparation for mass events also apply to LTE rollouts as they did with 3G rollouts. Many operators are operating on multiple LTE frequencies – load balancing and equalisation therefore play a very critical role."

El Aichaoui adds that new services such as VoLTE should be thoroughly tested before being introduced across the network. "Operators are recommended to prepare and optimise the radio network at least one year prior to the launch of a VoLTE service. By doing so, they will be able to ensure the optimum user experience once it is launched."

Anite's Poisson is in agreement here, and says that before VoLTE is introduced, operators should optimise the quality of their voice service paying particular attention to circuit switched fall-back (CSFB) performance. "In practice, early LTE deployments often led to poor CSFB performance (6-10 seconds typically). Optimisation work is needed to ensure that this is brought as close as possible to three seconds, or even less."

For data testing, Poisson reiterates that MNOs need to abandon legacy systems such as FTP. Instead, he says they should use smartphones to test widely used social media services and focus their optimisation efforts on enhancing customer experience based on real usage patterns. He also advises cellcos to ensure services are maintained when on the move: "This means not only performing drive tests but also on-train and in-building measurements."

How to test

R&S says some 2G and 3G test tools can be reused for LTE. But because of the technology's increased bandwidth, higher data rates and frequency channels, test tools often need to be upgraded. "This becomes more prevalent when complex RAN features need to be tested such as MIMO and Carrier Aggregation," says Carpenter.

For Keysight, physical layer testing is essential as this seeks to determine conformance with the vital parameters essential for the successful transmission of a signal over the air. Avila says transmit power, the quality of the TX waveform, and the accuracy of the TX frequency, are all key to a mobile station's performance. For transmission quality, she says the emphasis should generally be on the maximum power measurements since these typically present the biggest challenge for high power circuits.


Paul Gowan, Director of marketing, RAN solutions, Viavi Solutions

"Interoperability between vendors' equipment is needed more in LTE, so ensuring services run end-to-end is a fundamental requirement."

"On the receive side, the ability of the mobile to successfully decode the signal at the lowest and highest signal levels defines its successful operation in the network. Also, a mobile responding linearly to power control commands is critical to network performance."

Avila continues by saying that since it is known that most distortions will be at their worst at high power, the emphasis will be on high power testing with probably only a single sample from the mid and low power settings. "The most complex modulation rate will be the most sensitive to distortion. We also recognise that maximum modulation will be used when the mobile is closest to the base station, so max rate modulation is suitable for testing at the low power setting."

Viavi believes operators should "never underestimate" the importance of testing in the lab prior to deployment, particularly emulating real world conditions. "Interoperability between vendors' equipment is needed more in LTE, so ensuring services run end-to-end is a fundamental requirement," says Gowans. "Also, more sites have fibre now in the fronthaul, so being able to test fibre and RF in one instrument to save time, cost and tower climbs will help the operators' business."

Nokia has already pointed out that interference plays a more significant role in LTE networks, and controlling it can be more delicate due to frequency reuse. Gowans adds: "Identifying sources of interference can be a major headache, but with new spectrum for LTE and constant re-farming, efficiently hunting for interference will eliminate customer service issues and reduce opex."

Network infrastructure specialist CommScope says that because LTE is a high throughput technology spanning larger spectral bandwidths, it's susceptible to a number of issues. Dr. Mohamed Nadder Hamdy, the company's director of wireless network engineering, says

these can include sensitivity to RF path elements, sensitivity to SINR ratios, and degraded PIM performance.

Earlier this year, the vendor launched its *Optical PIM Tester* and claimed that for the first time ever, a single technician could now use a handheld device to connect directly to the base band unit at the bottom of the tower and perform a 'truly active' PIM test over the CPRI. CommScope says the tester utilises an interface that is not susceptible to creating PIM and thus prevents testing from becoming part of the problem. Using the CPRI, it injects signals into the downlink and looks for PIM products in the uplink, making it easier to identify interference.

While eliminating PIM addresses one aspect of LTE network testing, others argue that what's actually needed is for operators to completely re-think their approach to optimisation.

"LTE has enabled bandwidth hungry services and mass adoption of social media services on smartphones," says Poisson. "Investing more effort on enhancing the service performance is key. This is a profound paradigm shift that results in the deployment of different testing methodologies. Operators need to recognise this and implement the necessary updates so that this is fully understood and supported."

Given the fact that LTE is IP-based, does that facilitate testing solutions that offer greater functionality in terms of remote management capabilities and future scalability?

CommScope's Hamdy says LTE's all IP system has made the core network less complicated by eliminating the circuit switched part. "It has also simplified and improved the radio access by cancelling base station controllers and embedding their functionality in the base stations themselves for better latency. This has opened the door for NFV adoption in the EPC and cloud-RAN."

But here, R&S' Carpenter adds a warning: "With the migration of network architecture away from dedicated physical elements towards NFV, test tools deployed in the cloud must be compatible with operation in a virtual environment."

With so much emphasis on data services, Gowans believes solutions are needed today that can manage the scale of deployments. "Networks can very quickly run out of capacity and the operator must deal with the need to optimise the network to cope with customer demand."

Viavi reckons its *ariesoGEO* platform can help here. According to Gowans, this locates, stores and analyses data from billions of mobile connection events, and gives operators a "rich source of intelligence" to help boost network performance and "enrich" user experience. "This solution can provide intelligence on more than 130 million subscribers on a single network, and can be processing 35 billion events per day – that's eight times more than the number of Google searches in a day," he claims.

Keysight's Avila agrees that cellcos must address the challenge of integrating intelligence at the access edge: "As a greater variety of services and user types cross the mobile network, it is critical to increase network and subscriber intelligence."

Of course, the faster data rates enabled by LTE also mean cellcos are experiencing significantly greater competition from over-the-top players. It is therefore critical for them to be able to compare the performance of their new IP-based voice services against the OTT offerings.

But as Carpenter points out, a fully IP-based network also brings the possibility to monitor subscriber traffic in the core in near real-time. This not only makes awareness of issues such as congestion more immediate, but also opens up opportunities for MNOs to gain greater insight into traffic and subscriber profiles: "This can be used for intelligent management of the network and targeted marketing to protect revenue in the face of erosion by OTT players." ■

HARDWARE FOR TESTING & OPTIMISING LTE

Rohde & Schwarz (R&S) says it's reached a significant milestone in the commercial evolution of LTE-A. Working with load testing solutions specialist Prisma Telecom, it has successfully completed RF tests for LTE FDD four component carrier aggregation (4CC) in the downlink.

Their solution consists of two R&S *CMW500* wideband radio testers *(pictured below)*, the R&S *CMWC* controller, and Prisma's *UeSIM* multi-terminal simulator which features one eLSU and two SDRv3 units. Each *CMW500* generates two component carriers with 20MHz bandwidth and 2x2 MIMO, while the *UeSIM* terminates the traffic. R&S says the entire setup can provide downlink rates of 600Mbps – the performance required for testing 3GPP category 11 devices.

In a separate development, R&S claims it has successfully verified combining various frequency bands in TDD and FDD carrier aggregation (CA). During a test that once again featured the *CMW500*, the company simulated an LTE network and says data was successfully transferred to the device under test on multiple aggregated carriers in different duplex modes. R&S says this makes the *CMW500* the only platform to support RF and protocol tests for CA in line with 3GPP Release 12 for TDD/FDD joint operation.

Anite has enhanced its *Propsim F32* LTE-A MIMO radio channel emulator (*pictured right*), enabling users to test new 3GPP features (Release 13 and beyond) in multi-mode base stations and mobile devices Frequency range support has been extended up to 6GHz so that users can test mobile devices and network equipment for any LTE or LTE-U band, as well as for WLAN frequencies above 5GHz. *Propsim F32* also supports testing of all LTE-A CA schemes defined by 3GPP.

Anite reckons the unit offers the industry's highest RF output power levels and the widest RF signal dynamic range. It says this reduces the need for expensive and sizeable external RF power amplifiers in MIMO OTA anechoic and reverberation chamber installations.

Cobham Wireless' *TM500* range of testers now also support CoMP (coordinated multipoint) transmission/reception, a major feature of 3GPP LTE-A Release 11. The vendor says one of the primary reasons for operators seeing a degraded quality of service with hetnets is poor cell-edge performance due to lack of traffic coordination and interference management between small and macrocells.

The *TM500* already features eICIC to address cell edge interference issues. With the addition of CoMP, it can now coordinate transmission and reception between different cells through the use of load balancing, coordinated scheduling, and the management of signal power and interference.

In the downlink, it's claimed each terminal sees improved data throughput, especially near the cell edges, due to less interference and an increase in received power. For the uplink, RX signal quality and cell edge coverage is improved by simultaneous coordinated reception from different points on the network side.

Late last year, **Keysight Technologies** announced it had verified three component carrier (3CC) end-to-end IP data throughput with its *E7515A UXM* wireless test set (*pictured below*). The *UXM* supports multiple cells, downlink and uplink CA, MIMO up to 4x2, and integrated fading. Utilising three 20MHz component carriers in the downlink for a total aggregated bandwidth of 60MHz, the firm said it had successfully demonstrated 450Mbps downloads/50Mbps uploads (category 9) data rates.

Separately, Keysight's *Signal Studio* LTE software tools now support key features of 3GPP Release 12. The company says they include the latest generation of metrology-grade 256QAM reference signals needed to test physical downlink shared channel and physical multicast channel implementations.

The updates also support the downlink shared channel with limited data rate channel coding for the new category 0 UE as defined by Release 12.

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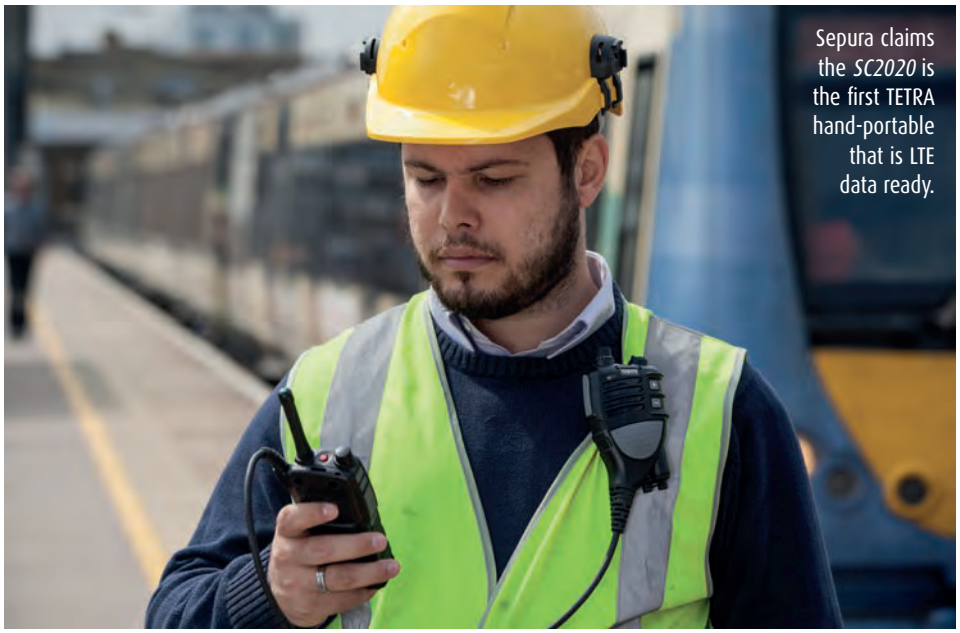
A fresh look at critical comms



Sepura claims the *SC2020* is the first TETRA hand-portable that is LTE data ready.

RAHIEL NASIR rounds up some of the latest products and solutions for professional mobile radio users.

Despite a high analogue installed base, digital narrowband technologies such as TETRA, P25 and cost optimised technologies (DMR, dPMR and PDT) are projected to achieve significant growth worldwide, according to research by IHS Technology.

"IHS forecasts less economically developed countries will adopt cost optimised digital technologies for public safety use, rather than build out nationwide networks based on high-end standards," says Elizabeth Mead, IHS' senior analyst for critical communications. "There is potential for an increase in DMR Tier III/ dPMR Mode 3 networks in the region, and for PDT [Professional Digital Trunking] orientated solutions from Chinese companies."

There has certainly been evidence of one particular Chinese vendor growing its presence across global markets in recent years. Hytera has been busy across many regions including South Asia where, for example, it worked with Disaster Tech Labs in the Philippines.

The non-profit organisation has had a team in the country since *Typhoon Haiyan* (known locally as *Typhoon Yolanda*) struck South East Asia in November 2014. Disaster Tech Labs found there were no communication channels available for the remote areas in which its personnel were operating in, as any pre-existing communication services had been disrupted. As a result, its teams were equipped with five of Hytera's *X1p* radios, an *RD965* and an *MCA10* multi-charger (*see News, Q2 2015 issue*).

Hytera could claim that innovation is helping it to gain a technical edge when it comes to winning new contracts, particularly with products such as the *XPT (Extended Pseudo Trunk)* that it introduced earlier this year. According to the firm, centralised trunking requires all activities to be coordinated via a dedicated control channel which may be difficult to obtain under some regulatory commissions. It claims the *XPT* solves this problem by using innovative distributed digital trunking technology.

XPT is designed to enable two-way radio users to use limited spectrum resources to double their channel capacity without using a dedicated control channel. Hytera says a single *XPT* system can support up to eight 12.5kHz repeaters at one site and provide up to 16 traffic channels, supporting up to 1,200 users. Each traffic channel can be customised to transmit voice or data. The firm explains that the repeaters broadcast the system's status information in each frequency via a beacon signal which informs the radio of available channel resource. The radio can then switch to an available channel and slot to communicate.

At the end of last year, Hytera also unveiled the *DS-6500*, a complete DMR dispatcher solution in one chassis. It comprises a computer with a multi-channel sound card that is used as the platform for Hytera's *SmartDispatch* software. This is used to adapt the company's radios to the users' environment (frequencies, call numbers, etc.), and all standard functions are immediately available, such as voice communication, GPS-based services, short messages and system-wide voice recording.

The standard version of the *DS-6500* includes two Hytera radios. One *MD785* is also available upon request, and up to two additional *MD785*s can be connected to the rear of the chassis to expand capacity by up to eight time slots.

Critical Communication World (CCW) held in May in Barcelona saw a number of clever products unveiled from several manufacturers, including the *BS422* outdoor base station from Damm Cellular Systems. The Denmark-based specialist says this unique cross-technology solution offers TETRA, DMR Tier III, TEDS and analogue technologies in one integrated system.

Damm is certainly no stranger to South Asia's markets with its TETRA systems being used by, for example, BUMA, Indonesia's second largest coal mining contractor (*see News, Q3 2015 issue*).

The vendor hopes the *BS422* could "potentially revolutionise" the way critical communications are deployed. It says the base station enables users to simply choose the technology to match their current needs and scale anytime – including migrating from analogue to digital – to meet changing voice and data demands with a simple click.

The unit uses *TetraFlex*, Damm's open and de-centralised architecture which it says is based on a "true" IP backbone making it easy to scale. "You can not only scale freely in coverage, but also in redundancy and number of carriers," states the firm.

It adds that users could even "go hybrid" and combine multiple technologies into one integrated system. The *BS422* enables them to run, for example, one carrier in TETRA, the second in DMR, and a third in TEDS. It is also possible to use different technologies at different sites and combine them into one network with a single, centralised subscriber register.

Hytera' says its *XPT* doubles 2-way radio channel capacity without using a dedicated control channel.

Motorola Solutions' *LEX L10* uses a unique version of *Android* to enhance safety for frontline officers.

The *BS422* outdoor base station from Damm offers TETRA, DMR Tier III, TEDS and analogue technologies in a single integrated system.

Sepura's *ULTRA CSM* is an IP67 rated all-weather controller speaker microphone. It can withstand 180ºC and is said to be highly durable thanks to its polycarbonate casing – the same material used for riot shields.

LTE in critical comms

IHS says the demand for data in critical comms is increasing in a number of regions as more users expect more sophisticated and high-bandwidth applications on their networks. Mead says: "In the short- to mid-term, LMR technologies including TEDS and P25 overlay systems, will gain traction, with options potentially created to move to private LTE at a later stage."

Many of the big name critical comms vendors are hoping to capitalise here. For example at *CCW*, Motorola Solutions launched the *LEX L10* LTE handheld which supports multiple LTE bands as well as 3G UMTS bands and quad band GSM (2G).

The device uses Motorola's *WAVE Work Group Communications* system and is said to provide instant voice interoperability with any broadband device or LMR system. While its operating system is based on *Android*, Motorola is keen to point out that its capabilities go far beyond consumer-grade smartphones. The firm says the *LEX L10*'s 'public safety experience' (PSX) "uniquely transforms" *Android* to enhance safety and efficiency for front-line officers.

Manuel Torres, Motorola Solutions' SVP for Europe, Africa, Latin America and the Caribbean, says: "With the combination of the *LEX L10* and PSX, we can harness the power of broadband mobile data, smartly adapting and streamlining information so that officers receive only information that is relevant to them in a critical moment."

The company adds that a growing number of specialised apps are also available for the *LEX 10*. For example, users can gain access to dynamic resource mapping via Motorola's *Intelligent Data Portal*, take remote control of a two-way radio, securely stream real-time video for situational awareness, fly a drone, and more.

Sepura also had LTE in mind with its *SC2020*. The firm says the "smart" handheld combines TETRA's mission critical advanced performance with an optional second high-speed data network such as Wi-Fi or LTE. It is equipped with the vendor's new Class 3 TETRA engine as well as a new receiver that is said to "surpass" the ETSI specification.

Featuring a 2.4-inch QVGA display, Sepura also claims the *SC2020* offers the largest high-resolution screen on the market today. It says this is viewable in all light conditions, including direct sunlight, and enables easier deployment of existing and future applications via high-speed data.

The firm adds that the radio's 2W audio capability is enhanced by unique water-porting technology, and remains clear even in continuous heavy rain. It has an IP67 environmental protection rating which means it is completely dust-proof and submersible in water.

Tait Communications has developed a patented approach to bridging land mobile radio and LTE networks. It says its *UnifyVoice* system integrates and provides the benefits of push-to-talk (PTT) over cellular and LMR, giving office and field staff the ability to communicate via either technology as well as Wi-Fi to fill blackspots, extend capacity, and improve resiliency.

Tait partnered with PTT over cellular specialist SLA to power the client software for *UnifyVoice* using the *ESChat* SDK. It says the operational benefits of unifying critical comms start with providing access to real-time, accurate information to provide a number of advantages such as agency interoperability, simplified ICT, cost reductions, improved situational awareness, and more. ■

CREATING 'BUBBLES' OF LTE COVERAGE

Quortus has developed a field-ready 4G tactical cellular solution for public safety organisations. Combining an embedded 3GPP compliant EPC, the UK-based firm claims *ECX Tactical* operates with any LTE radio access technology.

The solution is based on Quortus' *EdgeCentrix* technology which implements core network functions in software that can be run anywhere in the network. In the case of *ECX Tactical*, the company says the core is embedded directly on an LTE radio system-on-chip from any of its partners, supporting x86, ARM and MIPS64 CPU architectures. It is tightly coupled with 4G or Wi-Fi for backhaul and cell-to-cell communication.

According to Quortus, this combination delivers the advanced features required in the tactical market, such as localised VoLTE calling, multicast/broadcast communication, ad-hoc node meshing, and traffic relaying between vehicle nodes.

The company reckons the small footprint of *ECX Tactical* makes it ideal for deployment in next-generation emergency service requirements in vehicles, unmanned drones, or even in a backpack.

"It allows the creation of 'bubbles' of 4G coverage, with each bubble able to move and 'mesh' with adjacent nodes, creating larger, resilient and sanitised private communications networks for key personnel, exactly where and when they are needed," states Quortus.

It adds that the system supports localised services such as command and control information, video surveillance, and access to local voice services or PBX features 'at the node'. This is said to include in-session continuity during user mobility to ensure integrity of sensitive user data.

The platform is designed so that nodes can be meshed or autonomous, and each one can effectively function as its own private 4G network, even in the absence of a backhaul connection.

In addition to special features provided for the tactical communications market, Quortus says *ECX Tactical* also makes use of many of the benefits of mainstream cellular technology, such as allowing first response teams to use standard handsets, and support for SMS.

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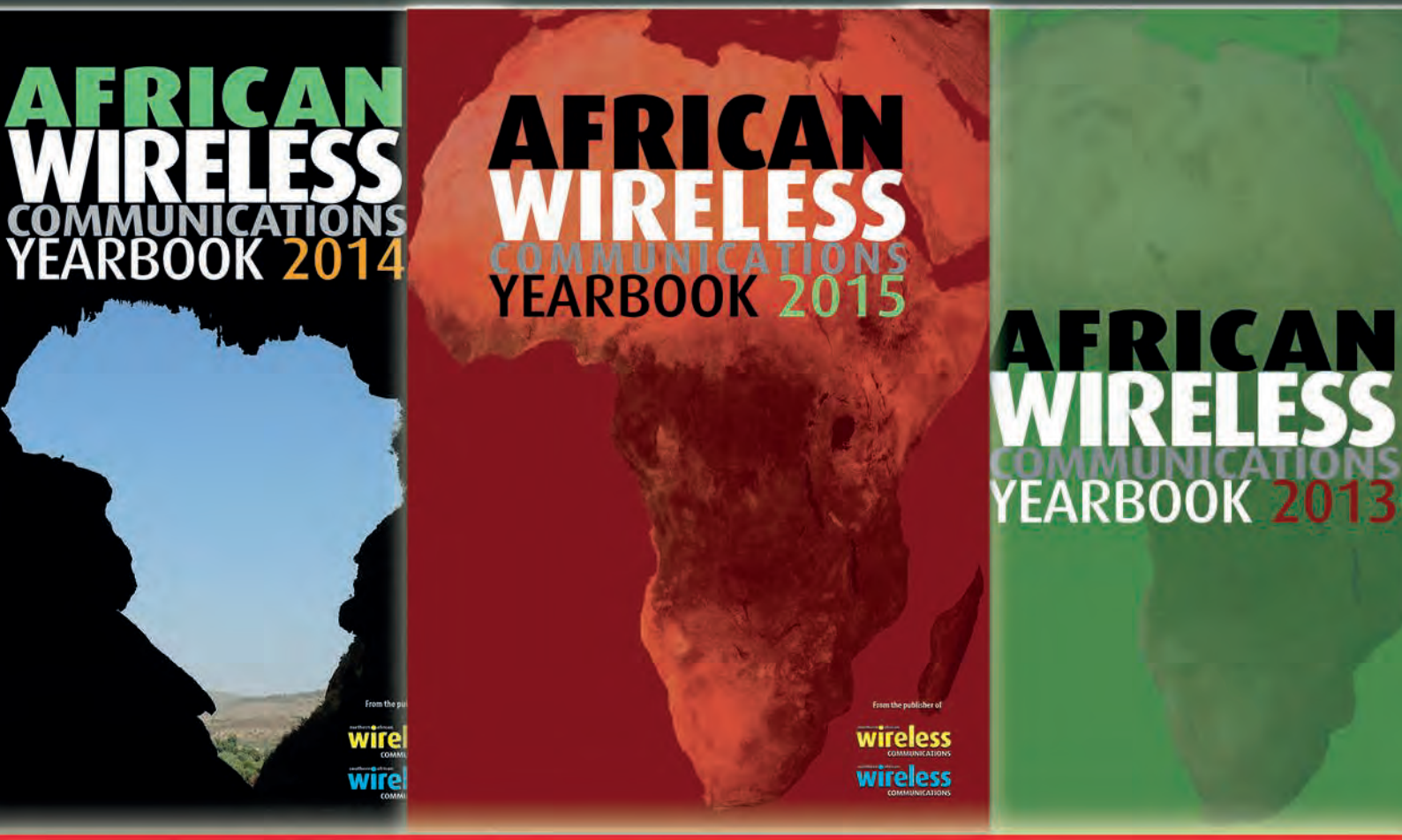

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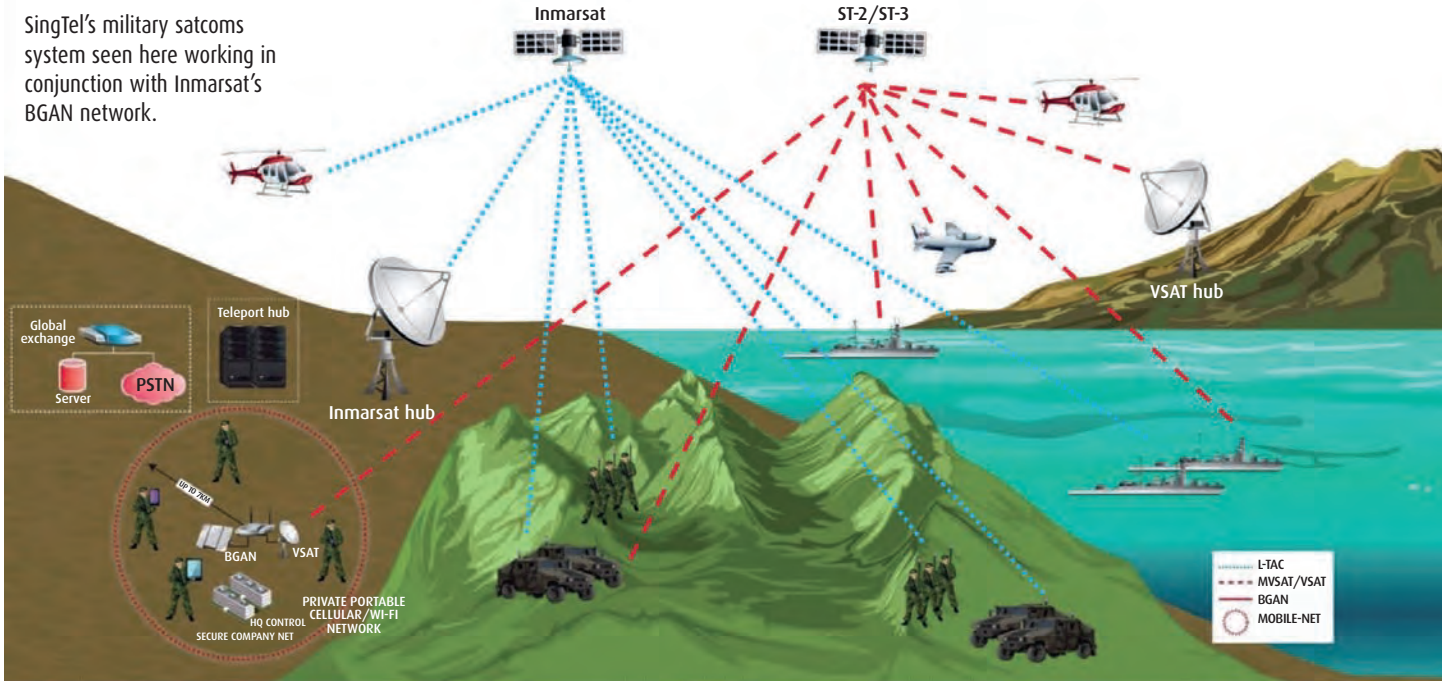


SingTel's military satcoms system seen here working in conjunction with Inmarsat's BGAN network.

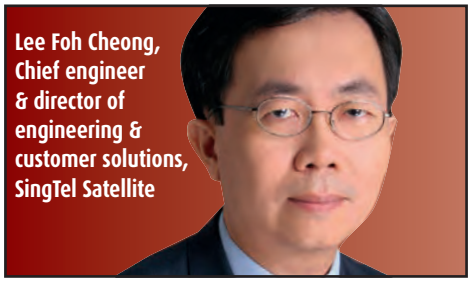
A new force in military communications

LEE FOH CHEONG describes an innovative way for military users to extend the range of multiband, multimode radio communications in L-band satellite systems.

The military in general, and troops in the land environment in particular, rely on robust, portable radio terminals to provide all-informed communications for command, control and coordination of dispersed teams.

However, when operational distances extend beyond line of sight, their normal workhorse VHF terminals face range limitations and are unable to meet the capability requirement without the use of re-broadcast (or relay) stations. This can often lead to teams being isolated which can compromise the safety and lives of personnel.

To work around this, the alternative is Communications on the Pause (COTP) using tactical satellite (TACSAT) which is conventionally provided in the UHF band on military-owned satellites. But the demand for these channels exceeds supply, and as a result nations are often unable to lease or gain access to them. In addition, governments that use VHF radios cannot use this system. Therefore, radio interoperability cannot be achieved in a single radio network.



Lee Foh Cheong, Chief engineer & director of engineering & customer solutions, SingTel Satellite

Overcoming RF limitations

Most military radios require a small narrow bandwidth of 25kHz to establish voice communications. However, radio frequency transmission ranges are often prohibited by environmental obstacles, electrical power, and the performance of radio wave propagation due to ground reflection characteristics.

Existing solutions to address the limitations of radio transmission range are often evolved around developing an IP radio gateway with a VSAT solution. This is used for backhauling IP traffic in an effort to overcome the problem of beyond line of sight (BLOS) communications.

But such complex integration design involves large financial investment that can incur high maintenance costs in the long run, as well as logistical challenges that could hinder fast response deployment.

A new, highly innovative solution has been designed to convert existing VHF/UHF radio signals to L-band to access a global satellite network such as Inmarsat's *BGAN*. This directly cuts back the required RF power amplifier needed in VHF/UHF to operate a narrowband channel of 25kHz in the L-band frequency range.

Existing sovereign encryption can be used and is transparent over the L-band network which covers the globe, in a secure broadcast mode over the satellite.

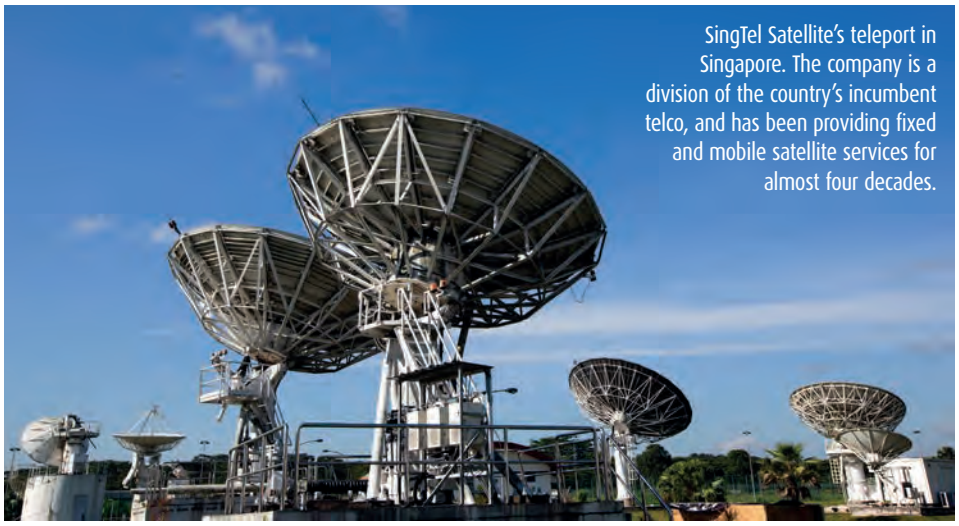
Security and mobility

The risk of direct RF interference from terrestrial UHF can be mitigated when the military UHF signal is converted to commercial L-band frequencies. This will also indirectly reduce the potential exposure from intruders using military jammers to sabotage mission-critical, rescue, and covert operations.

In addition, any combination of UHF and VHF radios can share a single channel, making the conversion system ideal for rapidly establishing a single interoperable network for multiple agencies or even multiple nations.

Owing to the small form factor of the frequency converter and antenna, operational deployment time is improved significantly without the need to integrate to a VSAT.

The system itself is designed to run on low power consumption and can operate using existing battery and power sources. This directly advances the flexibility to install the system on a completely mobile man portable system and fast moving platforms such as Communications on the Move (COTM) on land and, for example, speed boats for coastal patrolling operations.



SingTel Satellite's teleport in Singapore. The company is a division of the country's incumbent telco, and has been providing fixed and mobile satellite services for almost four decades.

Because there is no requirement for additional infrastructure, cost is kept to a minimum. So instead of investing in a high radio tower to extend radio coverage, the costs of owning the ground space, electricity and high power radio towers are eliminated.

Furthermore, with no repeaters, relays or cells, there are fewer targets for hostile forces attempting to disable command and control.

SingTel's innovative tactical area radio network integration system provides government and military users with the capability to rapidly deploy a cost-effective, simple and secure comms system. Extending existing military radio range can therefore be enabled today without investing in an expensive GEO satellite UHF payload. ■

Lee Foh Cheong is the chief engineer and director of engineering and customer solutions at SingTel Satellite. In 2007, he developed the world's first 1.5m C-band stabilised antenna which has since been successfully deployed by various naval operations, off-shore supply vessels, and rig platforms. Before joining SingTel, he worked for Singapore's Ministry of Defence.

World's first 5G "network slicing" technology demonstrated

South Korea Telecom (SKT) and Ericsson say they have succeeded in creating different virtual network slices optimised for various applications in 5G networks.

At a demonstration carried out at the operator's R&D centre in Bundang in mid-October, the two companies showed how 5G network slicing technology could be used for super multi-view and augmented/virtual services, "massive" IoT services, and enterprise solutions.

SKT and Ericsson say they were able to completely isolate and protect these virtual network slices from one another, thus successfully resolving one of the biggest challenges that can arise when multiple virtual networks share one physical network.

5G network slicing enables a single physical network to be partitioned into multiple virtual mobile networks, allowing operators to provide optimal support for a variety of 5G applications on an 'as-a-service' basis.

SKT hopes it will enable it to secure a "strong edge in the 5G era" through enhanced network operational efficiency and reduced time-to-market for new services.

"Network slicing is one of the key enabling technologies for [our] all-IT based 5G architecture," said SKT CTO Alex Jinsung Choi. "The successful demonstration is a significant step forward to achieve the world's first deployment and commercialisation of the 5G network system."

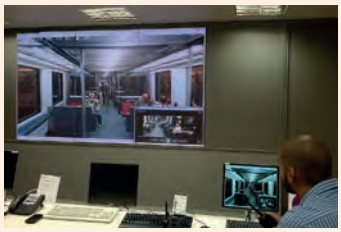
As part of their ongoing collaboration, Ericsson and SKT are also working on building the world's first cloud-based, hyper-scale data centre system for 5G early next year.

Public safety LTE added to Bilbao Metro communications network

Teltronic has completed the latest phase of its security-boosting communications network for the Bilbao Metro which is being deployed in conjunction with ITELAZPI, the operator of the Basque Country's regional communications network.

Bilbao Metro's highly advanced security infrastructure is also used by public safety agencies and transportation entities such as Euskotren and ETS. In May 2014, city authorities decided to use the network to pilot LTE technology based on Teltronic's *Nebula* platform.

The LTE system provides uninterrupted, highly available video monitoring. Used in combination with the mission-critical capabilities of the existing TETRA network, it's hoped it can significantly boost security in the rail network, and help facilitate a coordinated response in an emergency situation.



The fully integrated TETRA-LTE system provides real-time video between the control centre in Bilbao and personnel on board trains and in stations.

Encompassing voice and data, the fully integrated TETRA-LTE system provides real-time video transmission between trains, 41 stations and the control centre in Bilbao, as well as from portable devices carried by security staff. Real-time video from cameras at stations can also be displayed.

Ricardo Lizundia, TETRA systems manager at ITELAZPI, says: "This is an excellent platform on which we can easily build our professional broadband services. It is also a cost-effective solution since we are able to layer LTE technology onto the existing network, alongside existing PMR voice and narrowband data services."

He adds that LTE opens up a range of possibilities for the network and promises "significant improvements" in the public service communications within the Basque Country.

Eutelsat and Facebook partner for satcoms

Eutelsat Communications and Facebook have joined forces on a new initiative to connect more people in Africa to broadband. Under a multi-year agreement with Spacecom, the two companies will utilise the entire broadband payload on the future *AMOS-6* satellite. They will build a dedicated system comprising satellite capacity, gateways and terminals to accelerate data connectivity in sub-Saharan Africa.

Scheduled to start service in the second half of 2016, *AMOS-6*'s high throughput satellite architecture is expected to contribute to additional gains in cost efficiency. Spacecom says the satellite's Ka-band payload is configured with high gain spot beams covering large parts of West, East and Southern Africa, and is said to be optimised for community and direct-to-user internet access using affordable, off-the-shelf customer equipment.

Under their agreement, Eutelsat and Facebook will share the capacity and will each deploy internet services designed to relieve pent-up demand for connectivity from the many users in Africa beyond the range of fixed and mobile terrestrial networks.

Eutelsat says the capacity will enable it to step up its broadband activity in the region that was initiated using Ku-band satellites to serve professional users. The operator is establishing a new company based in London that will steer its African broadband vision and business. It will be led by Laurent Grimaldi, founder and former CEO of Tiscali International Network, and will focus on serving premium consumer and professional segments.

For Facebook, the initiative is a continuation of its *Internet.org* project that aims to address the barriers that are keeping people from getting online. It plans to work with local partners across Africa to utilise satellite and terrestrial capacity to deliver services to rural areas.

Facebook adds that the partnership with Eutelsat will also enable it to investigate new ways to use satellites to connect people in remote locations.

Charging mobiles via clothing

Researchers at the UK's Brunel University claim to have solved two of the major challenges which prevent everyday items of clothing being turned into power sources for mobile devices.

While technology to produce supercapacitor thread capable of being made into cloth has been around for some time, scientists have been unable to make it provide sufficient voltage for most devices, or devise a method to produce it economically outside the lab.

The team at Brunel has now developed a multi-layered structure with two sequential capacitive layers capable of producing up to 2V. Professor David Harrison from the research team says: "Breaking the 1V threshold is important as in the real world we work on the voltage of common batteries – 1.5V.

"We also wanted to address mass production issues so developed a process to semi-automatically coat stainless steel wire the thickness of a human hair with eight separate layers."

Brunel's work is part of the European Union's EUR4m *Powerweave* project. The aim here is to develop a fabric that can generate and store power using photovoltaic fibres and a thin film battery or supercapacitor. The fibres are combined by weaving or knitting into a textile, and charged wirelessly. Garments that use the technology could be available by 2018.

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Highest ever C-band transmissions

Long distance fibre links records have been broken as part of two separate field trials that took place earlier this year.

In France, engineers from Orange, Coriant, Ekinops, Keopsys and Socionext say they successfully demonstrated the highest ever C-band transmission capacity using various modulation techniques ranging from 24Tbps and DP-16 QAM, to 32 x 1.2Tbps (38.4Tbps) and DP-64 QAM.

The record was achieved in a live environment across the Lyon-Marseille-Lyon fibre optic link in Orange's transport network. It covered a distance of 762km which is said to be more than twice that of any previous field records for 32 QAM, and the first ever regional transmission for 64 QAM.

The transmitters and receivers used to establish the record were based on ultra high speed digital-to-analogue and analogue-to-digital converters developed by Socionext Network using standard 28nm CMOS technology.

The converters cover a broad sampling range with a maximum rate of 92GSa/s. Socionext says their high effective resolution and analogue bandwidth characteristics greater than 20GHz makes scalable architectures for multiple wavelengths and high modulation formats on a single device possible.

Meanwhile in China, optical networking specialist Xtera Communications worked with State Grid Information and Telecommunication of China to demonstrate 100G and 10G transmissions over 627km and 645km respectively, with no active equipment between the end points of the links.

The record unrepeatered transmission distances were achieved by combining Xtera's *Wise Raman* optical amplification and Corning's *Vascade EX2000* optical fibre.

Xtera says ultra-long, low-capacity unrepeatered transmission systems provide a cost-effective and simpler solution over repeatered solutions for many applications. These include subsea links connecting sparsely populated islands, as well as communication links to offshore oil and gas platforms, and over power utility grids to remote areas.

First mobile 4G network in Rwanda

Tigo has become the first mobile operator to launch 4G services in Rwanda using the wholesale LTE network built by Olleh Rwanda Networks (ORN).

The operator says it has so far invested in excess of USD310m in the country where it now has more than 2.9 million customers.

In the run-up to the launch in November, Tigo said it was "first in line" to introduce mobile 4G services tailored specifically to post-paid users using the Samsung *J1 Ace* which it had unveiled in Rwanda during the preceding weeks. The company's subscribers with 4G-enabled smartphones are now able to upgrade their SIMs for RWF1,000 (USD1.34).

ORN is the only 4G infrastructure company in Rwanda. It was setup by the government with backing from Korea Telecom for the exclusive and wholesale provision of a universal broadband network using LTE technology.

Han-Sung Yoon, CEO of ORN, said that since the network went live with the launch of commercial LTE services last year, its mission has been to grow.

"The 4G network is expanding towards our target coverage of 95 per cent of the country by 2017. This is on track with partnerships such as with Tigo Rwanda."

The country's other mobile operators include Airtel and MTN.

Vodafone deploys mini 4G network

Vodafone New Zealand has developed what is literally a mobile network in its quest to connect remote locations.

The operator says its network covers 98 per cent of the country's 4.5 million people, but only reaches around 55 per cent of its geography. "Telecoms operators in every country are wrestling with how to connect the remotest areas with mobile coverage," says Tony Baird, technology director for Vodafone New Zealand. "This is perhaps even more challenging in my country where we have more remote area than many other places."

Baird says Vodafone been working for a number of years on how to make its network more portable so that it can quickly deliver reliable temporary connections to any area, particularly during emergency situations. As a result, it has developed a working prototype of a mobile network on wheels dubbed the *Z-Car*. The name is from a 1970s British TV series in which mobile police units provided help to new communities.

The *Z-Car* has a 4G small cell built into its boot which provides mobile coverage even in motion.

Baird says the *Z-Car* has a 4G small cell built into its boot which provides coverage over a two kilometre radius, even as the vehicle is in motion. A low profile satellite antenna on the roof connects the vehicle to Vodafone's global network, enabling download/upload speeds of 10Mbps/2Mbps.

The *Z-Car* can also communicate with the digital trunked radio systems used by New Zealand's emergency services. It can therefore be used as a comms hub to help first response teams rapidly establish 4G connectivity within minutes of arriving on-site, or provide temporary remote coverage.

Baird says more testing will be done with the *Z-Car*, and adds *Z-Boats* and *Z-Planes* are also potential possibilities.

Verizon helps boost U.S. networks from rural counties to an urban icon

In mid-October, U.S. telco Verizon announced that all the participants in its *LTE in Rural America* (*LRA*) programme have now fully met their original goal of deploying LTE technology across rural counties.

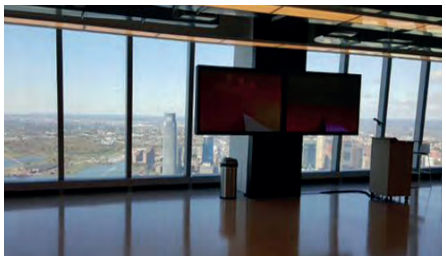
The operator launched the *LRA* initiative around five years ago with the aim of helping rural wireless companies across the US drive innovation through advanced 4G technology.

225,000 square miles of Verizon's spectrum is now leased by *LRA* participants across 169 rural counties in 15 states. The company says more than 1,000 LTE cell sites have been activated, covering 2.7 million people across an area larger than Colorado.

In a separate development, Verizon says it has built a new distributed antenna system (DAS) in the One World Trade Center, offering what's claimed to be fast and reliable speeds to tenants, visitors and tourists.

The operator is so far the first and only carrier with activated service in the building, and worked with the developer to design the DAS.

New York City is said to be one of the most challenging wireless markets in the world, with a diverse urban landscape featuring skyscrapers and subways, as well as high density areas such as Times Square and Yankee Stadium. Verizon reckons it has been able to overcome these challenges and consistently looks to enhance its wireless networks, investing more than USD830m in the New York-New Jersey region in 2014.



Verizon users can now upload selfies from the 104th floor at New York's One World Trade Center.

Smart City networks go live using Weightless

Nwave Technologies has rolled out Denmark's first Smart City networks across Copenhagen and in the southern port city of Esbjerg using the *Weightless-N* open standard.

Nwave specialises in hardware and software for the IoT and M2M communications. Its network solutions are based around an ultra narrow-band communications protocol operating in license-exempt ISM sub-1GHz spectrum. The company claims its *NWave* platform allows long-range, low-power, low-cost communications, and enables the penetration of the IoT into areas poorly served by traditional cellular or short-range technologies.

Nwave worked with accelerator organisations Accelerace Management and Next Step City for the deployments in Denmark. "*Nwave*'s open standard approach is of critical importance to both commercial and municipal adopters," says Christian Hvashøj Schaarup from Accelerace Management. "The Weightless open standard model provides reassurance to users that the technology will not lock them into dependence on a single vendor."

The Weightless Special Interest Group (SIG) published *Weightless-N* earlier this year *(see Wireless Solutions, May-Jun)*. It claims the standard offers "best-in-class" signal propagation characteristics leading to a range of several kilometres, even in urban areas. According to the SIG, *Weightless-N* is designed around a differential binary phase shift keying digital modulation scheme to transmit within narrow frequency bands using a frequency hopping algorithm for interference mitigation and enhanced security.

It says the technology supports mobility with the network automatically routing terminal messages to the correct destination. "Multiple networks, typically operated by different companies, are enabled and can be co-located. Each base station queries a central database to determine which network the terminal is registered to in order to decode and route data accordingly," states the SIG.

Caribbean microwave

Advantech Wireless has revealed that it has been successfully operating a 95km point-to-point microwave link over the Caribbean Sea for the last two years without any interruption or degradation. The vendor's *Transcend 800* system is carrying native SDH (STM-1) and native IP traffic simultaneously. The link is operating in 6GHz and in a space diversity configuration with Advantech's 1.8m high performance microwave antennas.

Argentina IoT services

Telecom Personal, Argentina's largest MNO, has launched an Internet of Things platform with the help of Jasper. It's claimed the operator can now offer a turnkey solution for customers in any vertical industry, which can be easily configured for the unique needs of their specific business models. Jasper says users will benefit from real-time control and visibility of their connected devices, in addition to the mobile service management, support diagnostics and flexible billing required to grow a successful connected services business.

AMOS-5 goes offline

On 21 November, Spacecom announced that it had lost all communications and signals from its *AMOS-5* satellite. At the time of writing, the operator said it was working around the clock and employing all of its capabilities and those of its partners to try and re-establish links. Spacecom added that it did not know the cause of the anomaly. *AMOS-5* was launched to 17°E in 2011 and features a fixed C-band beam and three steerable Ku-beams, all covering Africa with connectivity to Europe and the Middle East. It is used for DTH, VSAT, data trunking, broadband, telephony and backhaul services.

Indigo project boosts Euro satellite industry

New technologies to help fully exploit the capabilities of the next generation of high-throughput satellites (HTS) will be developed under a public–private partnership between the European Space Agency (ESA) and Intelsat.

The *Indigo* project will develop new ground segment innovations that maximise the capabilities offered by Intelsat's *EpicNG* satellites. It aims to maximise the throughput delivered to customers and offer the flexibility to adapt to advances in satellite technology and services.

The project partners believe these benefits will improve the quality of service and lower the total cost to customers, pave the way to markets not economically previously viable, and enable new services across multiple sectors.

ESA says *Indigo* will give all partners and subsystem suppliers the opportunity to expand their product and service portfolios, and capture a greater share of a highly competitive market. "[The project] is an excellent example of how ESA can help boost innovation and strengthen Europe's position in the global market," says Magali Vaissiere, ESA's director of telecommunications and integrated applications.

Intelsat has chosen Newtec's *Dialog* platform to deliver numerous services on its *EpicNG* HTS system and *IntelsatOne* terrestrial network. With ESA's backing, *Indigo* partners will be able to further improve their Newtec modems, hubs and network management system to exploit the capabilities offered by Intelsat's HTS which are expected to enter full commercial services by early 2018.

TVWS used to broadcast live biking event

TV white space (TVWS) technology was used to enhance the spectator experience at the Enduro World Series (EWS) mountain biking event held in Glentress Forest, Scotland earlier this year.

The network was designed by wide area infrastructure specialist Boston Networks which worked in partnership with Scottish Enterprise, Microsoft, IndigoVision and a consortium of technology leaders.

Their aim was to trial TVWS technology at various points throughout Glentress Forest to allow live footage of the riders to be transmitted to spectators at the venue's headquarters in the nearby town of Peebles.

Hardware from ADAPTRAN and InfinetWireless was used for the white space network in Glentress Forest.

Boston deployed ADAPTRAN's radios for the TVWS system. IndigoVision's Ultra 2K cameras with *SMART.core* technology were used to stream full HD video over the network to a large screen at Peebles Green.

The firm believes the success of the trial will raise the profile of Glentress as a venue for future events. It adds that TVWS technology has significant potential to not only transform the outdoor sports and events market, where access to broadband can be challenging, but to boost the wider tourism industry and bring long-term economic benefits to rural communities.

Boston Networks' chief executive Scott McEwan said: "Glentress is fairly remote and mountainous, so designing and delivering a system to enhance the visitor's experience, and that could have a transformational effect for both the event and the local area, was an exciting opportunity for us."

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