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For wireless comms professionals in the Southern Asian region

COMMUNICATIONS

Q2 2017
Volume 10
Number 2

- Turning smart city dreams into reality
- Connecting the mining and oil & gas sectors
- How to get the best out of the latest satellites
- Network sharing: boosting performance for MNOs



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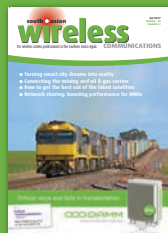
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For more on DAMM, turn to page 12

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SUBSCRIPTIONS:

South Asian Wireless Communications is a controlled circulation quarterly magazine. Register now for your free subscription at www.kadiumpublishing.com

Readers who do not qualify under the terms

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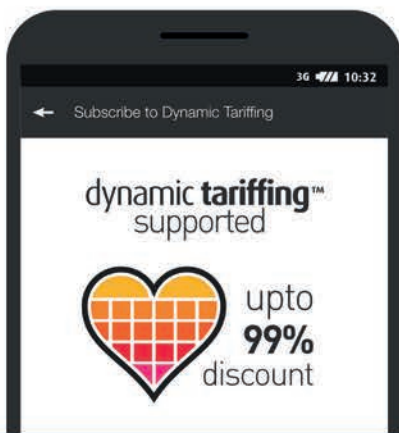
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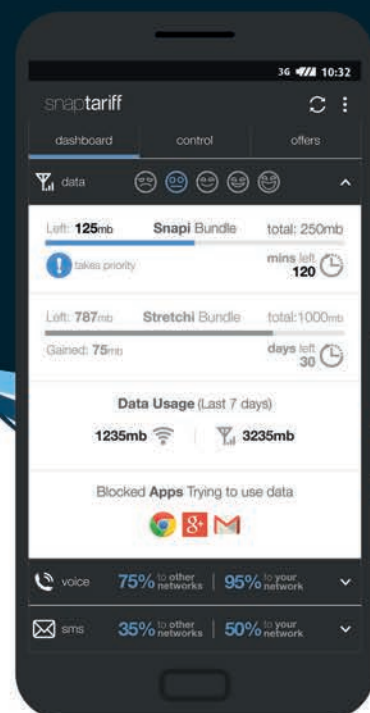
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Virtualisation plan to make Asian countries global economic leaders

Telkom Indonesia and Japan's Nippon Telegraph and Telephone Corporation (NTT) plan to create new network services in the region based on virtual infrastructure technologies.

Under the *APAC Telecom Innovation Initiative (ATII)*, the two companies will develop technical studies and proof of concepts (PoCs) regarding requirements for new network services in the virtualisation era going beyond 2020. They aim to expand the initiative together with various partners, including other service providers, who share the same goals.

According to two telcos, service providers in APAC currently face several common issues such as sustainability due to natural disasters (for example, earthquakes and typhoons), and unique traffic demands due to uneven population distributions such as those across the region's island nations.

ATII will propose new services and technologies for the region. It will attempt to accelerate innovation and create new markets using ICT to benefit society with a focus on sustainable development through collaboration and promotion with various partners. The

ultimate aim is to realise the vision of APAC service providers/countries to lead the world economy in the future.

Three projects have initially been established: high value-added network services; server platform virtualisation; and flexible access network virtualisation.

The operators will now start their joint technical studies and plan to publish white papers on the identified needs, specifications and PoC results. They will also share their findings with all relevant standards bodies and industry alliances.

Telecom Innovation Initiative
collaboration Agreement Signing Ceremony
Tokyo, Japan, April 17th, 2016



Arief Mustain, executive GM of Telkom's Digital Service Division (left) with Tadashi Ito, SVP and head of NTT Information Network Laboratory Group, at the signing ceremony to launch the *APAC Telecom Innovation Initiative*.

Jio must curb its free offers

Since launching mobile services in early September 2016, Reliance Jio Infocomm (Jio) says it added around seven new subscribers every second during its first 170 days, and now claims more than 100 million customers in India. The firm reckons that's faster than global technology giants such as Facebook and Skype.

Jio says it aims to make India the highest quality, most affordable data market in the world, and has created an ecosystem comprising network, devices, applications and affordable tariffs offers to support this. The celco's all-IP network supports VoLTE technology, and it says that it can be easily upgraded to support even more data as technologies advance to 5G, 6G, and beyond.

Jio attributes some of its early success to a quick and easy number

portability process, home-delivered SIMs, and paperless SIM activation using eKYC. But perhaps the operator's most attractive offer is the fact that subscribers can make free voice calls to any network across India.

However, the Telecom Regulatory Authority of India (TRAI) has now advised Jio to curb its promotional activities. At the end of March, the company was asked by the regulator to withdraw its *SUMMER SURPRISE* offer. As part of this, the celco's *PRIME* subscribers were given three months of complimentary services in addition to the benefits of their purchased plan following their first recharge payment of at least INR303.

Jio said it accepted TRAI's decision and planned to withdraw the offer "as soon as operationally feasible, over the next few days".

ZTE and VEON to partner on NFVI and vEPC

VEON – formerly known as VimpelCom – will work with ZTE on creating what the two companies describe as "a new era of cooperation in virtualisation technology innovation".

Russian telco VEON is headquartered in the Netherlands and runs mobile networks in various countries. In Asia, they include Mobilink in Pakistan (now part of Warid Telecom), Banglalink in Bangladesh, and Beeline in Laos.

Under a global framework deal announced in late April, the firm will work with ZTE to develop NFV infrastructure (NFVI) and virtual evolved packet core (vEPC). ZTE will become a supplier to the VEON

group for NFVI, and will deploy large scale NFVI as well as vEPC networks in several countries. The cooperation between the two parties will effectively promote VEON's NFV strategic planning and digitalisation initiative.

ZTE and VEON will continue to collaborate extensively in the field of virtualisation. ZTE says it will help the telco to achieve its digital transformation, and improve user experience through the use of innovative technology.

According to the vendor, virtualisation will make operators' resource management more efficient and more convenient to maintain, whilst also making their networks more flexible.

ITU meeting proposes priority areas for Asia-Pacific region



The ITU's Brahima Sanou (left) said the initiatives proposed at the Bali meeting will be "crucial drivers" for the region's sustainable development.

Participants at the ITU's Regional Preparatory Meeting (RPM) for the Asia-Pacific region have proposed five ICT development strategy initiatives for 2018-2021.

Among the proposals, delegates agreed that addressing the special needs of least developed countries, small island developing states (including Pacific island nations), and landlocked developing countries should be considered a priority. They said ICTs should be harnessed to support the

digital economy and an inclusive digital society, and that the development of infrastructure to enhance digital connectivity should be fostered.

At the three-day RPM held in Bali, Indonesia in March, participants also called for national administrations to create enabling policies and regulatory environments, and that all stakeholders should contribute to the development of a secure and resilient ICT ecosystem.

Brahima Sanou, director of the ITU's Telecommunication Development

Bureau, said that the initiatives proposed at the meeting will be "crucial drivers" to the attainment of sustainable development in the region.

The RPM was the fifth in a series of such meetings that are taking place globally to help identify priorities in each region in preparation for the next World Telecommunication Development Conference. WTDC-17 will be held in Argentina in October and will forge a global plan for telecom and ICT development over the next four years.

NuRAN to help Globe's rural expansion in Philippines

Globe Telecom will use equipment from NuRAN Wireless for the next phase of its ongoing rural connectivity programme in the Philippines.

Since the end of last year, Globe has been trialling the Canada-based company's mobile and broadband wireless systems at two sites. It has also partnered with the University of the Philippines and Facebook to validate the latter's *Community Cellular Manager (CCM)* platform. This is an open source software management and deployment suite enabling the operation of small-scale cellular networks.

NuRAN says the next phase of its collaboration with Globe is still a

A NuRAN/Globe Telecom rural site in the Philippines.



small-scale experiment. It consists of the deployment and live operation of 50 sites within various 'barangays' or villages in the country, all of which will be connected using a decentralised GSM network topology.

The 50 sites will use NuRAN's *LiteCell 1.5* base stations, along with the recently-announced *NuRAN Open*

Access (NOA) software suite, which includes Facebook's *CCM*.

According to the vendor, *NOA* and *CCM* create a new and innovative way of connecting the next billion. Globe will leverage the system to manage pre-paid charging while forging business partnerships with local and regional organisations to carry out on-ground operations.

This latest initiative is part of Globe's ultimate aim of connecting largely remote and unserved or underserved parts of the Philippines. Earlier in 2016, it worked with NuRAN on a successful trial using TVWS technology for backhaul.



Zong's customer service centres – such as this recently launched concept store in Karachi – aim to make customers more knowledgeable about technology.

Zong going all out for 4G in Pakistan

Zong, China Mobile's subsidiary in Pakistan, says it will upgrade all of its sites in the country to 4G by the end of 2017.

The operator claims it already has the largest number of 4G sites in Pakistan, and that these will reach a total of 10,600 by the end of the year. It also has the country's highest number of 4G subscribers, according to data published by the Pakistan Telecommunication Authority. As at March 2017 Zong had 3.37 million 4G users while its nearest rival, PMCL (created by the merger of Mobilink and Warid), recorded 799,519 subscribers, followed by Telenor with 323,823.

China Mobile has so far invested more than USD300m in Zong's 4G network, and the company reckons its business model is different to that of other operators.

"We are not just doing business, we are providing a platform to Pakistanis for them to advance in all sectors of their life," says Zong's corporate affairs director spokesperson Maham Dard. "In fact, we are the only operator who wants to invest in our customers, to make them knowledgeable on the latest technology available in the nation and how they can benefit from it for a better, improved and a connected lifestyle."

Dard says Zong has developed the "most innovative" customer service centres throughout Pakistan to showcase new solutions, products, applications and packages.

He adds that Zong will also play a key role in connecting the Pakistan-China business corridor.

BSNL to roll out 40,000 Wi-Fi hotspots

BSNL (Bharat Sanchar Nigam) is planning to deploy around 40,000 Wi-Fi hotspots in India during the current financial year.

To support the rollout of Wi-Fi services, the state-owned Indian telco has opened a network operations centre which hosts a network management system in Bangalore.

BSNL says hotspots will be provided in all states where such services are technically and

commercially viable. So far, the operator has not revealed further details about locations. But it has been reported that passengers at Chandigarh International Airport in Punjab are likely to see the first services.

This follows BSNL winning a contract from the Airports Authority of India to install Wi-Fi at the airport's new terminal building which, despite being inaugurated in 2015, currently lacks public Wi-Fi facilities.

Speaking to *Chandigarh Newline* in mid-April, J. S. Sahota, GM of BSNL's local telecom district, said that the process of installing Wi-Fi equipment at the airport had already started. He added that despite delays over receiving the equipment, BSNL was still expecting to go live with services for passengers before the end of the month. Sahota also said that users will be able to access the network free for the first 20 minutes.

Singapore to get cloud-based vEPC network

M1 claims it will launch Singapore's first cloud-based virtual Enhanced Packet Core (vEPC) network.

The cellco says this will boost its core network robustness and resiliency, enable dynamic and more efficient use of network resources to support wide-ranging 'Smart Nation' applications, and shorten the time to market in the deployment of new IoT services.

By harnessing the latest cloud-computing and NFV technologies, M1 reckons it will gain a fully distributed and agile packet core network. It will then be able to dynamically deploy core resources wherever they are needed, and provide flexibility to swiftly scale resources up or down based on customer demands.

Furthermore, with software functions separated from the underlying hardware



By harnessing the latest cloud-computing and NFV technologies, M1 aims to gain a fully distributed and agile packet core network.

platforms, it's claimed that the cloud-based virtualised core network allows faster 'in-service' software upgrades, as well as significantly reducing downtime for maintenance and testing of new services.

"The deployment of our agile cloud-based virtualised core network will strengthen our network resiliency and enable us to deploy our resources

more efficiently," says M1 CTO Denis Seek. "The highly scalable nature of the network will also enable us to meet the dynamic resources demands of new products, shorten the time-to-market innovative products, and enable us to reduce implementation and maintenance costs."

M1 is working with Huawei on the deployment.

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PTA sets base price for 1800MHz spectrum

Pakistan's regulator is planning to auction 10MHz of paired spectrum in the 1800MHz band for USD295m, according to local reports. The sale is expected to take place before the current financial year concludes at the end of June.

During the 3G and 4G auction held in 2014, the PTA (Pakistan Telecommunication Authority) was unable to find a buyer for the 1800MHz spectrum block it offered for sale. At the time, the authority said it included the frequencies to "promote" the early introduction of LTE services but failed to attract a buyer due to what was considered to be a high reserve price of USD210m (see *News, Q1 2014 issue*).

Despite this, the PTA has set a higher base price for the new auction. It says demand for spectrum has been growing as the mobile sector expands, and expects strong bidding in the sale which is open to both existing and new operators. The winner will receive a 15-year, technology neutral license for the spectrum.

The PTA had also failed to sell a block of 850MHz in the 2014 auction. This was sold separately to Telenor Pakistan last year which was the only bidder for the frequencies (see *News, Q3 2016 issue*).

MobiFone deploys 100G network in Vietnam

MobiFone will deploy a 100G optical transport network and DWDM regional network from Ho Chi Minh City to more than 10 provinces in southern Vietnam. The state-owned operator hopes this will enable it to provide innovative and high capacity services in these key economic zones which are home to a significant percentage of its 40 million subscribers.

MobiFone is Vietnam's market leader and has around 30,000 2G and 20,000 3G base stations nationwide. Nguyen Bao Long, the operator's deputy general director, says: "It is critical for us to upgrade the transport network to add capacity, meet rising data demand in this key economic region, and be in a position to deliver superior speed and quality of service. This is all the



more important as MobiFone gears up to launch 4G services early 2017."

Nokia will provide the 100G DWDM solution with L1 GMPLS (generalised multi-protocol label switching) transport to support increasing traffic in the regions. The firm says the new transport network will allow MobiFone to support increased traffic capacity of 300G

and system expansion up to 8Tbps in future. It also claims its *1830 Photonic Service Switch* will help maximise network capacity and efficiency, enabling faster deployment of services.

Long adds that the partnership with Nokia will enable MobiFone to differentiate itself and offer cloud-based mobile services to enterprises and retail customers.

Cable links South East Asia and Australia

AARNet, Google, Indosat Ooredoo, Singtel, SubPartners and Telstra will build a new international subsea cable system connecting Singapore, Indonesia and Australia.

Once completed, the *INDIGO* system (previously known as APX West and Central) promises to strengthen links between Australia and the fast-growing South East Asian markets, providing lower latency and enhanced reliability.

The consortium has contracted Alcatel Submarine Networks (ASN) to build the system. It will use a two-fibre pair 'open cable' design with spectrum sharing technology. Using today's coherent optical technology, the consortium says each of the two-fibre pairs will have a minimum capacity of 18Tbps, with the option to increase this capacity in the future. Members will have spectrum ownership providing the ability to independently take advantage

of technology advancements and future upgrades as required.

INDIGO will span around 9,000km and connect Singapore and Perth, and onwards to Sydney. Within the system, there will be two additional fibre pairs connecting Singapore and Jakarta via a branching unit. The new cable will land in existing facilities in Singapore, Australia, and Indonesia. Construction is expected to be completed by mid-2019.

Cash ties strengthened between Indonesia and Singapore

Singtel and Telkomsel have launched a real-time mobile remittance service to Indonesia. Offered by *SingCash* under the *Singtel Dash* brand, it allows customers in Singapore to send money to 4,500 post office cash-out points run by PT POS across Indonesia.

As part of future plans, the two telcos will also offer mobile remittance to Telkomsel's *TCash* mobile money service, offering a complete mobile wallet-to-mobile wallet experience.

They also expect to expand the number of pick-up points to Telkomsel's GraPARI service centres, as well as PT Bank BRI branches in the second half of this year.



The new service is an enhancement to the current *SingCash* facility that enables users to send money to Indonesian bank accounts. Telkomsel says the partnership with Singtel's remittance service is part of its efforts

The new service was launched earlier this year at a festival celebrating 50 years of bilateral ties between Singapore and Indonesia. From left: Indonesia's ambassador to Singapore, Ngurah Swajaya; Yuen Kuan Moon, CEO, consumer Singapore, Singtel; Telkomsel CEO Ririek Adriansyah; and Gilarsi Wahyu Setijono, president director, PT POS Indonesia.

to support the Indonesian government in promoting financial inclusion for local people, especially the unbanked.

"Foreign remittance enables them to improve their quality of life as well as provide an opportunity to begin

saving for the future," says Telkomsel CEO Ririek Adriansyah. "We believe every little effort to promote financial inclusion will also accelerate the growth of Indonesia's economy."

There are around 200,000 Indonesians living and working in Singapore and, according to the World Bank, outward remittances from Singapore to Indonesia total more than USD409m annually.

Since its re-launch in May 2016, the number of *Singtel Dash* customers are said to have grown to almost 500,000. The volume of monthly transactions has also doubled over the last six months.

Bharti Airtel doubles sites

Bharti Airtel claims it has built 180,000 mobile sites across the country since 2015, the same number it implemented during its first 20 years of operations.

In November 2015, the company launched *Project Leap*, its nationwide network transformation programme to build a future ready network. As part of this, it has committed to invest INR60,000cr over three years.

Airtel also claims to have doubled its transmission capacity and increased mobile backhaul capacity by eight times to roll out high-speed broadband with 4G and 3G coverage in all 22 telecom circles. The operator says this has been supported by the addition of more than 14,500km of fibre to its national backbone along with 3,666 new fibre POP nodes.

Airtel recorded more than 369 million customers across its operations at the end of February 2017.

Mobitel launches first Sri Lankan 'Smart Bus Halt'

Mobitel reckons it has taken a "pioneering" step forward towards transforming Colombo into a smart city with what it describes as a "state-of-the-art Smart Bus Halt".

Situated at the town hall, the bus stop is equipped with LTE and Wi-Fi to deliver what the operator says is "superior" service quality and an "exceptional" customer experience.

For example, it features an interactive touchscreen with integrated facial analytics. This supports the ability to customise on-screen content to suit the audience based on a multitude of characteristics such as age and gender. It also doubles as a self-service information portal with details about bus and train routes, timetables, local ATMs, etc.

The bus halt is also equipped with environment sensors which monitor a variety of factors such as temperature,



The bus stop features a smart vending machine, smart interactive displays, and wireless sensors to monitor the environment.

humidity, noise level and toxic gas concentrations. Mobitel says data gathered from these sensors will enable the monitoring of air quality on a routine basis.

Among the many other facilities accessible to commuters, the site will be equipped with a mobile charging station. There's also a cashless vending machine which can dispense beverages with a touch of

a mobile. For a limited period, the machine gave Mobitel customers a free bottle of chilled water following a simple SMS command.

Working together with the Ministry of Telecommunication and Digital Infrastructure, Mobitel says the Smart Bus Halt is the first step in a large scale deployment of similar ventures both in Colombo and across the island.

Building smart cities – feature pp18-20.

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"5G Island of Innovation"

 Sri Lanka's Ministry of Telecommunication and Digital Infrastructure, Mobitel and Ericsson have teamed up as part of their "5G Island of Innovation" agreement. Under a recently signed MoU, Ericsson will implement its 5G test bed technology in the Mobitel Innovation Centre in Colombo. The partners says this will create an environment for local ICT innovators to develop and test 5G IoT applications and services. Their ultimate aim is to generate new employment opportunities and reduce Sri Lanka's digital divide.

Thai 5G sale delayed

 Thailand's 5G spectrum auction is now likely to take place in 2018. The National Broadcasting and Telecommunications Commission (NBTC) had been aiming to auction 80MHz of bandwidth in the 2800MHz band in September. But in March, it told local press this would be delayed "due to a lack of well-designed frequency valuation principles". The authority added that the transition to a new telecoms regulatory body is also likely to have an impact on the process – current NBTC commissioners are due to end their working terms this October.

Telenor USF contract

 Telenor has been awarded the USF contract for the provision of telecom, digital and mobile internet services to the Kohistan district in northern Pakistan. The project aims to connect more than 800,000 unserved people in the region. According to Telenor, this is the largest USF contract awarded to any operator in Pakistan. The company adds that this is the sixth year that it has won such a contract, and will further its mission of "bringing the marginalised communities of the country within the digital and financial sphere".

"Tech breakthrough" for new submarine cable

The consortium behind the *SEA-ME-WE 5* submarine cable system claim it represents a "technological breakthrough which marks a global communications milestone".

The 20,000km *South East Asia–Middle East–Western Europe 5* system was completed at the end of February by organisations from 16 nations. It was built by a consortium of 19 companies which include, amongst others: The Bangladesh Submarine Cable Company; Myanmar Post and Telecom; Ooredoo; PT Telekomunikasi Indonesia; Singtel; Sparkle; Sri Lanka Telecom; Telekom Malaysia; and Trans World Associates Pakistan.

The system connects 16 countries across three continents. Unlike other submarine systems, the consortium says *SEA-ME-WE 5*'s main endpoints



are carrier-neutral/open POPs and not just cable landing stations.

The system is designed with a capacity of 24Tbps on three fibre pairs. It is said to be "fully capable" of accommodating future data demands, and uses 100Gbps technology which is expected to meet the quadrupling of bandwidth demand between Europe and Asia. It's also claimed

SEA-ME-WE 5 connects 16 countries across three continents. Uniquely, its main endpoints are carrier-neutral POPs – not just cable landing stations.

SEA-ME-WE 5 provide the lowest latency and further enhances network diversity and resilience to the heavily loaded Asia to Europe route.

Consortium chairperson Linette Lee said: "This system facilitates a new age of digital transformation and innovation, catalysing greater economic activities, trade and growth across three continents."

PLDT wants all subscribers in smart homes

As part of its 'Fibr City' programme, PLDT has introduced FTTH in General Santos City, making it the first metro on Mindanao (the second largest island in the Philippines) where residents can experience symmetrical internet speeds of up to 1Gbps.

The deployment was carried out in partnership with the city's government. PLDT says the rollout will benefit the growing connectivity needs of the entire region which comprises the provinces of South Cotabato, Cotabato, Sultan Kudarat and Sarangani.

Earlier this year, PLDT completed its first Fibr City project with the launch of FTTH in Toledo in Cebu. With around 2.8 million homes already passed as at the end of 2016, the firm plans to extend its fibre network with the addition of 1.9 million premises by the end of 2017.

To help accelerate its deployment programme, PLDT is using KT Corporation's *GiGa Wire* as well as Huawei's *G fast*. Both of these hybrid fibre technologies are designed to provide up to 600-700Mbps per user

over existing copper lines. They work by connecting premises with fibre and then use special equipment to enable internal copper wiring to deliver fibre-like speeds.

According to the operator, its vision is to have all subscribers in 'smart homes' by 2019. PLDT says it has invested PHP300bn (USD6bn) over the last 10 years in building its integrated fixed and wireless network, and in 2016 it set aside PHP48bn (USD1bn) for capex, a "significant portion" of which is said to be allocated for domestic fibre.

mHealth services connect via IMImobile

IMImobile is powering two mHealth services that have been rolled out in Himachal Pradesh, north-west India.

Launched by the government in January 2016, the *Kilkari* and *Mobile Academy* mobile health services aim to provide free education around maternal care and child health.

Once fully deployed, it's claimed the services will reach nearly 10 million families and one million community health workers in rural areas throughout the country who could otherwise have limited access to life-saving health information.

Kilkari (which indicates the sound of a baby's gurgle in Hindi) is targeted at families. The voice-based service delivers time-sensitive audio messages about maternal and child health to the mobile phones of women from the second trimester to the child's first birthday. The service is free to the end user, with call costs covered by the government.

Mobile Academy is an IVR mobile training course on reproductive, maternal, newborn and child health for community health workers.

Both services are powered by IMImobile's communication

technology platform, *IMImconnect*.

According to the software specialist, the IVR technology supported by its platform is the "best choice" for rural environments where mobiles tend to be feature phones or more basic.

It also claims that *IMImconnect* offers a further advantage in that it can convey information easily and instantly in areas where illiteracy is higher. Furthermore, *IMImobile* says the cloud-based platform and fully managed service that it offers are "well placed" to support deployments at this kind of scale.

Empowering female farmers

Telenor Pakistan and the Punjab Livestock and Dairy Development Board (PLDDB) are partnering in an effort to enhance the participation of women in the region's agriculture and farming sector.

Under the agreement, Telenor will launch a dedicated IVR helpline on its mobile agriculture service, *Khushaal Zamindar*, for female farmers. The free service will be initially launched in five districts of Punjab to gauge

the impact before being extended to other parts of the province.

Around 20 per cent of the 2.5 million people who use *Khushaal Zamindar* are females. Telenor and PLDDB aim to encourage further uptake through the female-centric helpline which will provide localised, contextualised and customised information about livestock, health and nutritional requirements. Users will just need to dial 7272-51 to access

the relevant information (the number 51 denotes the percentage of women in Pakistan's population).

"An overwhelming majority of women, about 72 per cent, is in one way or another associated with the agricultural sector whose contributions go unnoticed and unappreciated," said Irfan Wahab Khan, CEO, Telenor Pakistan. "We are collaborating with PLDDB to empower them so they can play a more significant and

impactful role in the larger economy."

The two partners plan to organise female-only events to create awareness about the usefulness of mobile technology in agriculture.

Besides improving yields, Telenor claims the use of its *Khushaal Zamindar* advisory services will help attain a daily increase of 0.5 litres of milk per animal for five million farmers across Punjab. It reckons this will add PKR250bn to the rural economy.

ABS shares its latest satellite with Mongolia

ABS has dedicated part of the payload on its *ABS-2A* satellite to provide new services throughout Mongolia.

Co-branded as *Mongolsat-1*, the payload will use 12 x 27MHz channel satellite capacity to launch free nationwide digital TV, telecoms and broadband services.

The co-branding deal is said to be the first of its type in Mongolia. At a launch ceremony held in April

and attended by the country's prime minister Erdenebat Jargaltulga, ABS CEO Tom Choi said the agreement will help Mongolia's rural development as well as address the digital divide. "Our goal is to deliver extremely affordable satellite services that benefit the entire society of Mongolia," he said.

Built by Boeing, *ABS-2A* is an all-electric satellite that was launched

last June and began commercial operations in January 2017. Designed with 48 transponders and five dedicated high powered Ku-band beams, it serves South Asia, South East Asia, Russia, Africa and MENA.

ABS CEO Thomas Choi (right) says the deal will help address Mongolia's digital divide. Also pictured is the country's prime minister, Erdenebat Jargaltulga.



www.intracom-telecom.com



Superb Home & Business Broadband Access in South East Asia!

The Point-to-Multipoint (PtMP) technology is becoming the preferred alternative to fibre and copper access solutions for deploying a broadband service, whether such demand comes from operators in Europe, Asia, USA, Africa, Latin America, Oceania or elsewhere in the world.

Intracom Telecom is a frontrunner developing and supplying wireless networks. Its WiBAS™ Multipoint product line has been widely deployed worldwide delivering internet

access not only in urban areas but in rural too, where the Digital Divide exists, thus bringing 5G speeds from Southern Europe to Asia and beyond.

The company's most recent South East Asia Multipoint projects include deployments with telecom operators and ISPs in Indonesia, Philippines and Sri Lanka, where Intracom Telecom has undertaken the supply of its lightweight Multipoint Radios that are ideal for Residential and Enterprise Broadband Access.

In Europe, WiBAS™ has been selected by Eolo SpA to enable the deployment of a wireless network, for several hundred thousand subscribers, consisting of base stations and CPEs operating in the 28 GHz

frequency band, providing ultra-high speeds to homes across Italy that cannot be reached by fiber and ADSL/VDSL.

By employing WiBAS™, a home or an enterprise can now get internet connection in less than 48 hours after submitting a connection request and enjoy speeds far exceeding those of VDSL. The WiBAS™ delivers state-of-the-art IP connectivity on demand at an aggregate rate reaching 1 Gbit/s per carrier at the hub site. It operates at the 10.5, 26 and 28 GHz frequency bands. The equipment is easily installed at base station sites and homes, just like any conventional TV dish. It delivers manifold of Mbit/s of data, which data can be anything from just internet browsing to digital HDTV and radio channels

broadcasting, telephony, video messaging, social networking, home security controlling and surveillance.

Intracom Telecom has been accumulating expertise for the past 40 years in providing innovative wireless access solutions, having successfully developed and deployed its PtMP systems with numerous operators worldwide, meeting the constantly growing demand for broadband access services.

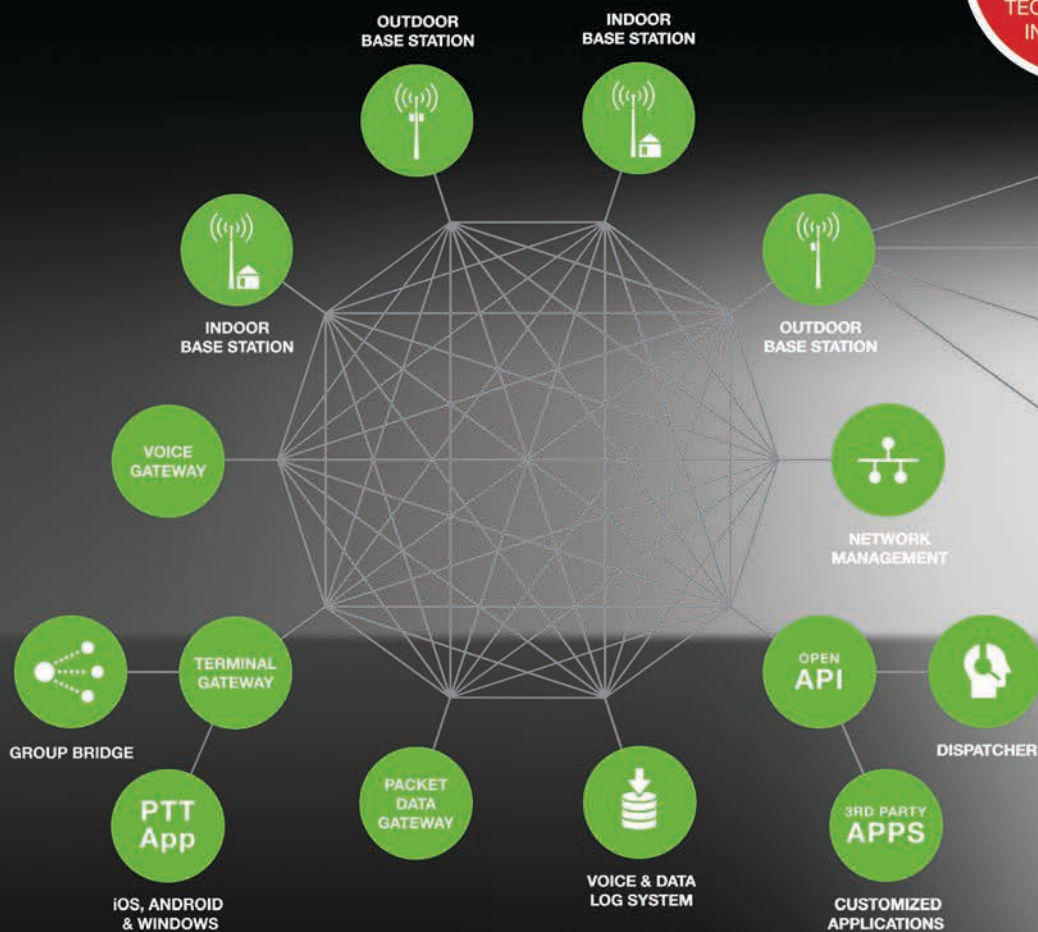
“With WiBAS™ PtMP radios an operator can provide faster than VDSL internet in less than 48 hours”

CommunicAsia2017
May 23-25, 2017, Singapore

Stand 1G4-01 (L1)

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4
TECHNOLOGIES
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Asia set to become world's biggest mobile user led by India and China

Mobile subscriber growth is “pivoting to Asia”, according to the latest *Mobile Economy* report from the GSMA.

The study revealed that by the end of 2016, two thirds of the world's population had a mobile subscription – a total of 4.8 billion unique users. 860 million new customers are expected globally by the end of the decade, and the GSMA forecasts that 66 per cent of these will be in the APAC region.

It said that 10 countries will account for 72 per cent of growth in new mobile subscribers worldwide. India, already the world's second-largest mobile market, will be the primary driver of this growth, with 310 million new and unique subscribers expected in the period to 2020. This is being helped by improving affordability, falling device prices and better network coverage.

India is followed by China and other fast-growth Asian markets (see chart below).

There were 3.8 billion smartphone connections at the end of 2016, accounting for half of total

connections (excluding M2M) worldwide. As with subscriber growth, the GSMA said developing markets and particularly Asia are driving the current phase of increased smartphone adoption. It said that in developing markets, smartphone connections reached 47 per cent of the total base at the end of 2016 and forecasts them to reach 62 per cent by 2020.

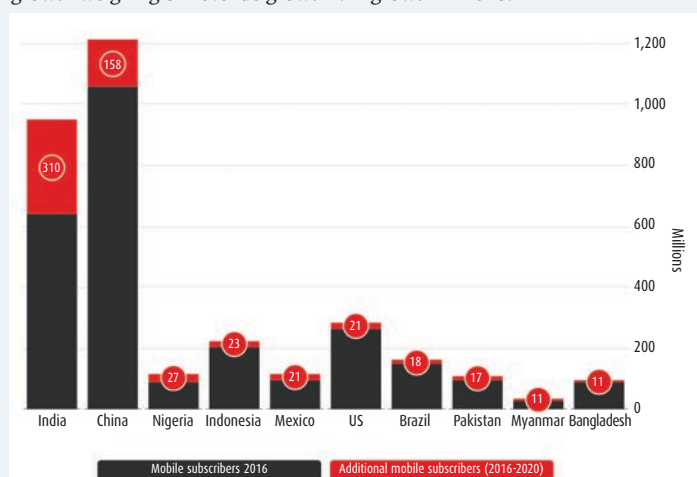
Overall, the report stated that APAC will account for half of the 1.9 billion new smartphone connections forecast globally by 2020. India overtook the US to become the second largest market in 2016, with 347 million smartphone connections. The GSMA said India will account for just under one fifth of new smartphone connections globally in the four years to 2020, and that its smartphone base will double to 686 million by the end of the decade.

The report also found that total worldwide mobile revenues reached USD1.05 trillion in 2016, up 2.2 per cent on 2015, marking the second consecutive year of rising revenue

growth. The GSMA said developing markets saw a notable improvement in growth rates as the macroeconomic headwinds eased and key markets such as China and India posted encouraging growth rates.

But it went on to warn that the future outlook remains mixed, “with increasing competition, regulatory intervention and slowing subscriber growth weighing on revenue growth”.

According to the association, mobile network operators have invested USD1.2 trillion in capital expenditure since 2010. Global mobile capex levels actually peaked in 2015 and last year therefore saw a six per cent fall here. Over the medium term, the GSMA said capex levels will continue to decline but at a slower rate, before returning to growth in 2020.



Top 10 countries by projected new subscribers.

SOURCE: GSMA INTELLIGENCE

Spectrum winners in Singapore

Singapore's Info-communications Media Development Authority (IMDA) has concluded the first stage of its general spectrum auction.

A total of 175MHz in the 700MHz, 900MHz and 2.5GHz bands was made available for the provision of high-speed mobile broadband services. This included spectrum re-farmed from 2G networks which have now been retired in Singapore (see *Wireless Business*, Q416 issue).

IMDA proceeded with the first stage of the GSA after receiving a total request for 225MHz of spectrum in February 2017 from M1, Singtel, StarHub and TPG at the reserve prices set. This was 50MHz in excess of the spectrum available for allocation.

Singtel has been awarded 75MHz at a cost of SGD563.7m (USD402.12m), while StarHub will pay SGD349.6m for 60Hz, M1 SGD208m for 30MHz, and TPG SGD23.8m for its 10MHz.

IMDA chief executive Tan Kiat How

said: “Similar to past spectrum auction proceeds, IMDA plans to reinvest the monies received to help our infocomm media companies and workforce to develop their capabilities, strengthen digital infrastructure, and ready themselves for the digital economy.”

Winners will be granted their rights after they have paid all fees and completed the next stage of the GSA which will determine the specific bands to be allocated to each bidder. Spectrum rights in the 900MHz and 2.5GHz bands will commence on 1 July 2017, while those in the 700MHz band will start on 1 January 2018, at the earliest.

Motorola Solutions accuses Hytera of “patent infringement”

In a complaint filed with the US International Trade Commission (ITC) in late March, Motorola Solutions claims China's Hytera Communications is “unlawfully” importing and selling two-way

radio equipment and systems and related software and components that infringe its patents. It has called for an immediate investigation by the ITC, an exclusion order to halt the importation of what it says are “infringing products”, and a cease-and-desist order to stop the marketing and sale of these in the US.

In a statement issued during the International Wireless Communications Expo (IWCE) held in Las Vegas at the end of March, Hytera said it “embraces competition” and respects the intellectual property rights of others.

The statement said: “Motorola Solutions’ new action continues its pattern of legal manoeuvring instead of competing with Hytera in the marketplace. By waiting to file its ITC complaint on the first day of [IWCE] – the largest US trade show for PMR providers – Motorola Solutions is transparently using its legal filings to generate publicity.”

Hytera added that it will defend itself against the allegations and remained “fully confident” that it will prevail.

But Mark Hacker, general counsel and chief administrative officer of Motorola Solutions, said: “Hytera asserts that it embraces legitimate competition, but there is nothing legitimate about the illegal copying and misappropriation in which it has engaged. We are committed to vigorously defending our valuable intellectual property as we continue to drive innovation for our customers across the globe.”

Bharti Airtel to acquire Tikona Networks’ 4G business

Bharti Airtel has agreed to buy Tikona Digital Networks’ 4G business, which include its BWA spectrum and 350 sites in India. The value of the proposed deal has not been disclosed.

Tikona currently has 20MHz in the 2300MHz band in five telecom circles

in India: Gujarat; UP (East); UP (West); Rajasthan; and Himachal Pradesh.

Airtel plans to introduce 4G services on the newly acquired spectrum in the circles immediately after the closure of the transaction, which is subject to regulatory approvals.

The takeover means Airtel will be able to combine its capacities in TD-LTE and FD-LTE. It said that the proposed acquisition will enable it to fill BWA spectrum gaps in the 2300MHz band in Rajasthan, UP (East) and UP (West), thereby securing a pan-Indian footprint in this band. Airtel added that the deal will also "significantly" bolster its spectrum position in Gujarat and Himachal Pradesh, taking its overall BWA spectrum holding to 30MHz in each of these circles.

Under the terms of the agreement, the acquisition of Tikona's business in Gujarat, UP (East), UP (West) and Himachal Pradesh will be undertaken by Airtel. In the Rajasthan circle, it will be accomplished through Airtel's subsidiary, Bharti Hexacom Ltd.

Telenor to sell additional shares in VEON

Telenor is selling 70 million of its common shares in VEON (formerly VimpelCom). The public offer is in the form of common shares listed in Euronext Amsterdam and American Depositary Shares (ADSs) on NASDAQ. Each ADS represents one VEON common share.

Telenor currently owns approximately 416.7 million ADSs, which represents 23.7 per cent of VEON's total outstanding common shares. Underwriters have agreed a public offering price of USD3.75 per ADS/share, resulting in net proceeds to Telenor of USD259m. These will be included in Telenor's cash flow statement for 2Q17.

This latest transaction follows Telenor's earlier sell-down of around 164 million VEON ADSs in September 2016.

Following the sale, VEON will no longer be treated as an associated company in Telenor's financial reporting. All of the previously recognised currency translation differences, amounting to an accounting loss of NOK7.5bn including tax effects related to the hedging instruments, will be reclassified to the income statement. Telenor points out that the effects of reclassification do not impact its total equity. The effect will be recognised in the second quarter 2017.

Elhage quits following changes at Nokia

Nokia has announced changes to its organisation and group leadership team.

As part of the restructure, the company has split its Mobile Networks business group into two organisations: one will focus on products and solutions, while the other on global services. This has led to the resignation of Samih Elhage who was appointed president of Mobile Networks in 2016 (see *Wireless Business*, 1Q16 issue). It has been reportedly suggested that Elhage did not support the separation of the division, although Nokia's official line is that "with the integration of Alcatel-Lucent largely complete", Elhage has decided to leave to "pursue new opportunities".



Samih Elhage walked away from Nokia after the firm restructured its Mobile Networks division.

Nokia president and CEO Rajeev Suri described Elhage as a close friend and advisor through times both good and bad: "From helping lead the transformation at Nokia Siemens Networks and creating a disciplined operating model that remains a competitive advantage, to being one of the driving forces behind the acquisition of Alcatel-Lucent and its fast and successful integration, Samih's contributions to Nokia have been remarkable."

Marc Rouanne, currently chief innovation and operating officer (CIOO), will become president of the Mobile Networks business group. Igor Leprince, currently EVP of Global Services, has been appointed president of the new Global Services division.

In addition, Nokia will also split its CIOO organisation. Its current operating activities will be moved to a newly appointed COO organisation, innovation activities to the CTO, and incubation to a chief strategy officer.

Other personnel changes announced by the company include: Monika Maurer, current COO of Fixed Networks, assumes the position of group COO; Kathrin Buvac, chief strategy officer, gains additional responsibilities for incubation of select new business opportunities; and CMO Barry French has been given additional responsibilities for health, safety, security and environment.

All of the changes became effective from 1 April 2017.

Indian smart meters get smarter with CyanConnode

CyanConnode has received a purchase order for around USD150,000 from Innologix Consulting in India for its smart metering software solution. Innologix will integrate CyanConnode's

software into its own cloud-based energy management solutions to create a platform to capture and store meter data to assure utilities are charging correctly. Its smart meters will use CyanConnode's communications module and data concentrator units. These will be sourced from one of the company's existing local partners.

The purchase order is for CyanConnode's *Head End Server* software licenses and includes an annual maintenance contract. The vendor says these will both provide a recurring revenue stream following successful installation of the software on Innologix's cloud platform.

Innologix Consulting CEO and co-founder Atul Agrawal claims the contract for software licenses together with smart grid hardware will provide customers with a cost-effective, end-to-end solution.

He added: "When we established Innologix, we were clear that we would focus on providing a cloud computing service, delivering the latest energy management technology without the investment in infrastructure or the running costs required to host and manage a system in-house."

CyanConnode executive chairman John Cronin reckons this latest deal demonstrates the success of his company's "scalable" business model as well as the strength of its smart metering ecosystem in India.

"Through our collaborative approach, and commitment to transferring skills and experience to our partners in-country, CyanConnode's communication platform is an enabling technology that delivers cost-effective solutions designed for the utility sector in India," he said. *Building smart cities in Asia* – feature pp18-20.

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
28/2/17	Ali Faramawy	Microsoft	Head of Emerging Markets Digital Transformation Organisation	Microsoft	Corporate VP
13/3/17	Béatrice Beau	Eutelsat	EVP, global broadband services	Nc+	Member of supervisory board
20/3/17	Ilan Tevet	RAD	VP of marketing & business development	RAD	Head of service provider line of business
5/4/17	Zeng Xuezhong	-	-	ZTE Corporation	EVP – resigned due to "personal reasons"
10/4/17	Selim Bouri	Airbus Secure Land Communications	Head of sales & programme delivery for Middle East & APAC	Kapsch CarrierCom	Director, head of MEA & Turkey/emerging markets
11/4/17	Chun-Yuan Gu	ABB	President, AMEA	ABB China	MD
23/3/17	Dato' Sri Shazalli Ramly	Telekom Malaysia	MD/Group CEO	Axiata Group	Corporate EVP & regional CEO for ASEAN
24/3/17	Chong Siew Loong	StarHub	Head of network engineering division	StarHub	CTO
4/4/17	Nalin Perera	Mobitel	CEO	COO	Mobitel

Multimillion euro network expansion deal in Bangladesh

Under a deal worth EUR30m, Teletalk has contracted Nokia to help expand and upgrade its networks in Bangladesh. The operator's aim is to improve its coverage in rural areas not currently included in its 2G and 3G networks, and enhance the quality of services in urban areas.

Teletalk will deploy the vendor's Single RAN platform, extending its service offerings in parts of Dhaka and five divisions including Rajshahi, Mymensingh, Sylhet, Khulna and Barisal. The deployment covers 70 per cent of Bangladesh.

Nokia's technology will allow 2G, 3G and 4G technologies to run from a single platform. The vendor claims it will also help Teletalk to "significantly reduce" energy costs and bring down CO2 emissions.

The company will also support the modernisation of the operator's core and optics network, and provide

professional services for network planning and implementation for the deployment over the next two years.

Teletalk MD Gias Uddin Ahmed said: "With this initiative, we are confident that we will raise the bar for superior and consistent quality of service for our subscribers."

Pakistan government income boosted by telecoms

Telecoms contributed PKR157.8bn (USD1.5bn) to government revenues during the 2015-16 fiscal year, according to the Pakistan Telecommunication Authority (PTA).

In its annual report issued earlier this year, the authority said this was an increase from the PKR126.3bn (USD1.2bn) contributed to the national exchequer in 2014-15. It also pointed out that there was "unprecedented collection" during the 2013-14 period, mainly due to extraordinary deposits made by the PTA as a result of the 3G and 4G spectrum auction.

The report said: "If we compare the growth in telecom revenue versus telecom contribution to [the] national exchequer over the last fiscal year, it becomes clear that the government collections have actually increased by 25 per cent whereas telecom revenues have increased by only 1.47 per cent."

The PTA added that during 2015-16, the country's telecom sector continued to grow in terms of subscription, revenues and teledensity.

It said broadband penetration has increased to 18.3 per cent from just two per cent in 2014, and that ICT solutions offered on mobile broadband are making a "big difference" in every walk of life.

According to the association, hundreds of billions of rupees are being sent and received over mobile money channels in Pakistan. It said that during the 2015-16 financial year, the amount transacted through mobile banking was PKR1,492bn.

"Due to such high demand for mobile

broadband services, Telenor Pakistan acquired 4G spectrum for USD395m during 2015-16," said the PTA.

While the authority anticipates government collections to further increase from other sectors of the economy due to broadband and ICT proliferation, one area that has seen a decline is GST (general sales tax).

It believes there could be a number of factors behind this: For example, the PTA said that the Federal Government and the Government of Punjab have exempted GST on internet/data services, whereas the Government of Sindh is charging reduced rate on internet/data services.

"[As a result], the share of tax-exempted data revenue in total telecom revenues increased to 29 per cent in 2015-16 as compared to 19.3 per cent in 2013-14. However, the trade-off between GST collection and internet/broadband development turned out to be a wise decision by the Federal, Punjab and Sindh governments."

INVESTMENTS, MERGERS & ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
9/2/17	Hytera	Sepura	Company	NA	Sepura's shareholders have reached a majority decision (97%) in favour of Hytera's acquisition offer. At the time of writing, the companies were liaising with the competition authorities in Spain & Germany to gain their approvals.
17/2/17	VimpelCom Holdings (VEON)	Various international banks	Multi-currency term & revolving facilities agreement (TL/RCF)	Up to USD2.25bn	New agreement replaces existing USD1.8bn revolving credit facility signed in 2014. Several international banks have committed to the TL/RCF in an aggregate amount of USD2.108bn. The TL/RCF includes option to increase amount up to the full USD2.25bn, which would consist of a term facility of USD562,500,000 & a revolving credit facility of USD 1,687,500,000.
12/2/17	Various	Actility	USD75m raised as part of Series D funding round	NA	The IoT LPWAN specialist's new investors include Creadev, Bosch & Inmarsat. They now join existing investors such as Iinvest, Bpifrance, Ginko Ventures, KPN, Orange Digital Ventures, Swisscom & Foxconn. A second closing later in April will see additional investors join in support of what Actility said was an "over-subscribed" capital raise which was achieved without involving banks.

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
2/2/17	Nokia	Finland	FY16	EUR	6 715	NA	0.22	YoY decline of 13%. Firm's Networks business saw 14% YoY net sales decrease in 4Q16 due to "challenging market conditions".
2/2/17	Thaicom	Thailand	FY16	THB	11,517	1,938	NA	Sales decreased 7.5% from THB12,453m for 2015, mainly contributed by revenue drop from both satellite & internet media businesses, together with increase of costs & expenses relating to <i>Thaicom 8</i> which was commercialised at the beginning of 3Q16.
1/3/17	Sri Lanka Telecom	Sri Lanka	FY16	LKR	4.8 (bn)	20.2 (bn)	NA	The group comprises a holding company & eight subsidiaries including Mobitel. Revenues increased 8.5% & profits rose by 28.6% compared to 2015; growth driven by increase in revenue of both fixed ICT and mobile segments reaching a total of LKR73.8bn.
31/3/17	Huawei	China	FY16	CNY	521.6 (bn)	NA	NA	Net profits were CNY37.1bn (USD5.3bn), an increase of 0.4%. In 2016, YoY revenues in EMEA grew 22.5% from CNY127,719m to CNY 156,509m.
17/4/17	M1	Singapore	1Q17	SGD	201.5	NA	NA	Net profit increased 14.3% QoQ. 24,000 post-paid customers & 3,000 pre-paid customers added during the quarter to bring total mobile customer base to 2.05 million as at 31 March 2017. Monthly post-paid churn remained stable at 1.0%.
18/4/17	ZTE	China	1Q17	RMB	25.75 (bn)			27.8% rise in first-quarter profit due to increased sales of carrier network solutions & smartphones.

Cataleya launches virtualised session border controller



Cataleya has launched a virtualised software version of its session border controller. The Singapore-based vendor says *vOrchid One* provides all of the

functionality of the hardware version of its *Orchid One* appliance (pictured), combining Big Data, real-time network analytics and machine learning to guarantee IP network performance.

vOrchid One is designed to deliver end-to-end visibility into network performance from transport to application layers. It's claimed service providers benefit from "comprehensive" visibility via near real-time and trending analytics reporting.

Cataleya says the platform enables users to deliver up to 2,250 concurrent sessions per core with a QoS analysis engine that allows the system to detect and predict voice performance. It offers full WebRTC to SIP interoperability as well as support for VoWiFi.

The firm adds that the software's integrated intelligent firewall and built-in fraud management services enables service providers to protect against voice fraud.

vOrchid One works with *vCenter* for VMware, Openstack for KVM, and is said to support multiple API standards and protocols.

According to Cataleya, the platform enables operators of all sizes to deploy intelligent networks. It reckons the platform delivers an immediate competitive advantage with faster monetisation of intelligent networks and the ability to deliver higher QoS and QoE for customers.

MANUFACTURER: Cataleya

PRODUCT: vOrchid One

MORE INFORMATION:
www.cataleya.com

Small cell radio platform aims to be alternative to SDR

ip.access has come up with a new band- and RAT-flexible small cell designed specifically for the needs of specialist integrators.

Despite the proliferation of software defined radio hardware, ip.access believes integrators struggle with inherent performance and reliability, as well as the need for extensive integration of the software necessary to run the device, the components for which often have to be sourced from multiple vendors.

In contrast, the firm claims its new *S60z* provides integrators with a complete 'cellular engine' that offers a carrier-proven alternative to SDR

approaches. By combining the new hardware platform with its "operator-proven" UMTS and LTE software stacks, ip.access says the *S60z* removes the software integration burden (while still offering low-level access), and enables integrators to achieve the RAT and band flexibility they need.

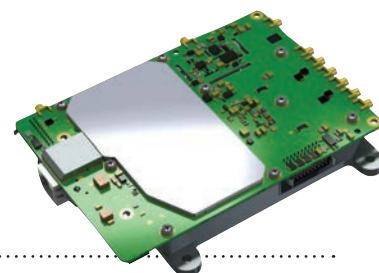
The *S60z* platform has been designed to support all UMTS and LTE bands (both FDD and TDD) in frequencies ranging from 500MHz to 3.6GHz.

It also supports ip.access' *SUMO* multi-operator technology which is said to further reduce the capex challenges in cost-sensitive deployments such as rural networks.

MANUFACTURER:
 ip.access

PRODUCT: S60z

MORE INFORMATION:
www.ipaccess.com



High capacity 24GHz point-to-point link from Proxim

Proxim Wireless has introduced a high capacity, 24GHz, point-to-point (PTP) radio. It is license-exempt and said to be ideal for providing a trunking backbone for the firm's 5GHz portfolio.



as licensing approval is required. Because its new *Tsunami GX-824* operates in a license-exempt band similar to 5GHz, the vendor says customers and carriers can proceed with their deployments without any regulatory delay.

It's claimed the *GX-824* delivers almost 1Gbps in a full duplex system, totalling just under 2Gbps of actual throughput. Proxim says moving almost 2Gbps of backbone capacity to the license-exempt 24GHz band frees-up 5GHz spectrum for last-mile access links using some of its other *Tsunami* products.

The *GX-824* is said to be rugged and offers support for either GbE or fibre as the interface. It is managed by the vendor's *ProximVision Advanced* hybrid controller.

While 6, 11, 15, 18 or 23GHz have long been used as backbones for lower capacity point-to-multipoint base stations, Proxim believes this approach often results in delays and extra cost

MANUFACTURER:
 Proxim Wireless

PRODUCT: Tsunami GX-824

MORE INFORMATION:
www.proxim.com

Scalable LTE test solution to help operators prepare for 5G

IxLoad LTE XAir2 has been designed to emulate mobile subscribers at scale in order to validate the performance and functionality of 4.5G- (LTE-A Pro) and 5G-related products and services.

Developed by network testing, visibility and security specialist Ixia, the new RAN test product combines scale and performance testing with realistic subscriber emulation and QoE validation. It can also be used for testing LTE on unlicensed spectrum.

The vendor says *IxLoad LTE XAir2* facilitates the realistic emulation of massive amounts of subscribers with multi-Gigabit OTT traffic via the internet, to help customers' future-proof their networks and devices.

The platform features Ixia's *XAir2* load module. It claims this provides LTE user equipment emulation that enables a "powerful" eNodeB Layer 1 to 7 test solution. By using its *IxLoad*

test system's real-world subscriber modelling, Ixia says users do not need to be protocol experts to develop test realism. From a single tool, it says they can perform capacity tests, detail a cell throughput, measure voice and video quality, and model a wide variety of mobility scenarios.

The firm adds that 5G presents unique technical challenges in terms of Wi-Fi and LTE-unlicensed spectrum. It says *IxLoad LTE XAir2* has been developed to address complex scenarios involving features like Carrier Aggregation, 4x4 MIMO and 256 QAM.

MANUFACTURER: Ixia

PRODUCT: IxLoad LTE XAir2

MORE INFORMATION:
www.ixia.com

New service targets SIM-swap fraud

Myriad Connect has launched a service to counter the growing threat of 'SIM-swap' fraud.

When a customer lets their operator know that their SIM card is damaged, lost or stolen, the current module is deactivated and a new one is issued.

MANUFACTURER:
Myriad Connect

PRODUCT: Anti SIM-Swap fraud service

MORE INFORMATION:
connect.myriadgroup.com

But according to Myriad, criminal groups and insiders at financial organisations and network operators work together to gather personal data and then pose as contract owners to secure a new SIM. Once activated by the fraudster, he or she is able to access bank accounts and other sensitive data authenticated through the SIM.

The threat from SIM-swap is said to be the greatest in regions where mobile banking penetration is highest. The firm believes its new service can help reduce this by providing a real-time check on the card. It adds that this cannot be



tampered with via compromised third parties within an operator or bank.

The service uses SSD authentication and no persistent data is held with any third party. Myriad reckons this provides a more secure service than current two factor authentication services which, for example, use SMS to store data and are therefore vulnerable to being intercepted.

It adds that a clear audit trail is also established, where the user's identity is verified by a party external to the transaction. The company reckons this results in a technology that will "greatly enhance" the security of transactions vulnerable to SIM-swap fraud.

Satellite QoE 'revolutionised' with dynamic network access platform

Comtech EF Data has unveiled its *Heights Dynamic Network Access (H-DNA)* technology with the claim that it offers a "step change" in satellite network performance as well as a vehicle to provide "exceptional" end user QoE.

H-DNA is designed for the return

MANUFACTURER:
Comtech EF Data

PRODUCT: Heights Dynamic Network Access

MORE INFORMATION:
www.comtechefdata.com

links in Comtech's *Heights Networking Platform*. The firm says it instantly assigns capacity based on network-wide demand and intelligently utilises total network bandwidth at all times.

It also allocates all available bandwidth per user demand and configured SLAs, ensuring that all capacity is used at all times. Comtech says *H-DNA* can provide sub-second reaction time to changing user demand and link conditions without introducing the excessive jitter and latency normally associated with any comparable technology.

The technology leverages the *VersaFEC-2* high-performance LDPC waveform, as recently announced as an option for Comtech's *CDM-570A/L-IP* satellite modems (pictured). It also uses ACM, dynamic power control, IP optimisation, low framing overhead, multi-tier QoS and WAN optimisation. As a result, Comtech claims *H-DNA* offers the "most robust reliability" and delivers the most user IP bits per Hertz compared to any other solution in its class.



System could help reduce rising capex

TEOCO's *SMART Capacity Management Solution* aims to help CSPs optimise current network capacity and plan ideal capex investments for traffic growth. The analytics, assurance and optimisation specialist claims

MANUFACTURER: TEOCO

PRODUCT: SMART Capacity Management Solution

MORE INFORMATION:
www.teoco.com

initial deployments of its solution with customers have demonstrated the potential of reducing upgrade spend by 10 per cent or more.

TEOCO says the platform does this by identifying the four most common areas of capex waste as it relates to capacity. These include: delays in re-purposing older infrastructure; failure to promptly re-farm spectrum; leaving 'default' settings across sites; and ineffective management of software licenses.

SMART is said to offer a way to plug capex leakage in these four areas, using

network event data in combination with subscriber behaviour.

As data demand grows exponentially and LTE and VoLTE networks are increasingly rolled out, TEOCO says capacity management will be more continuous in nature with the demand on 'what-ifs' and 'next best actions'.

The firm reckons its data and algorithm driven *SMART* solution can evaluate network traffic and its provisioning while identify potential cost savings through 'what-if' models centred around customer behaviour.

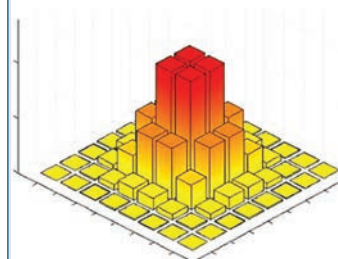
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Optical DSP boosts fibre capacity

Nokia and Facebook have tested new optical digital signal processing technologies over a live 5,500km transatlantic submarine link. It's claimed the test showed an increase of almost 2.5x more capacity than the stated optical transmission capacity of the system.

The partners trialled new 'probabilistic constellation shaping' (PCS) technology from Bell Labs. This uses 'shaped' QAM formats to flexibly adjust transmission capacity to near the physical limits of a given fibre link. In the first experiment for an installed submarine link, Nokia and Facebook used PCS based on 64 QAM, combined with digital non-linearity compensation and low-linewidth lasers. They say they achieved a record spectral efficiency of 7.46bps per Hz, indicating the potential to upgrade the cable to 32Tbps per fibre in the future.

Nokia adds that tests based on its commercially available *Photonic Service Engine 2* validated the successful transmission of 8 QAM wavelengths running at 200Gbps and 16 QAM wavelengths running at 250 Gbps. In addition, the firm says 200G 8 QAM wavelengths supported a spectral efficiency of 4bps per Hz while exhibiting sufficient performance margin to support reliable, commercial operation.



This graphic shows a genuine 'probabilistically shaped' 64 QAM constellation, with the height of the bars representing the 'probability' of transmitting a given constellation point. Nokia draws attention to how it is 'shaped' – in existing hardware it would look like a flat square with all points equally probable.

City of dreams



Several countries across the region are in the global vanguard when it comes to developing smart cities. DR. NICOLA DAVIES discusses what's needed to turn the dreams into reality.

The race to turn urban spaces into so-called 'smart cities' has become one of the top priorities for many countries. Projected to be worth USD1.565 trillion by 2020, more than 26 international cities are predicted to be 'smart' by the start of the next decade, with greater than half of these located in Europe and North America. However, the rapidly growing South Asian region is expected to be a vital part of this development as well.

For instance, in our previous issue we reported that Thailand's state-owned CAT Telecom will work with South Korea Telecom, one of the world's most advanced MNOs, on the deployment of IoT networks in Phuket and Bangkok (*see News, Q1 2017 issue*). Other nations across the region, including India, the Philippines, Singapore and Thailand, are also determined to upgrade their local facilities, enabling local government units to address the needs of their respective constituents in more technology-driven ways.

The concept of a smart city covers a wide range of areas concerning the public sector. Steve Foster, MD of fibre specialist Emtelle's Asia Pacific region and also chair of the Smart Cities Committee of FTTH Council APAC, describes it as: "An innovative urban area with sustainable economic development that enables a high quality of life, and is equipped with modern infrastructure. It shall contain a fibre-rich network, which provides a strong foundation to support many other city utilities and to empower the use of ICT for betterment and improvement of well-being for its citizens."

To further understand the concept of smart communities, it is useful to identify the many groups that make them possible. Andrew Brown, executive director of enterprise and IoT research, global wireless practice at Strategy Analytics, cites the following as the stakeholders of smart cities:

Citizens: One of the many goals of smart cities is to improve the lives of local citizens, and this is why it is important to fully understand the needs of people residing in the community. According to Brown, there are different models of citizen involvement: "In some communities, they are very engaged and empowered, in others less so."

Whatever the degree of participation required, adequately informing and getting buy-in from local citizens is important to the success of any smart city initiative.

ICT suppliers: These businesses include service providers, enterprise software makers, hardware companies, and even 'low-tech' firms that make objects such as traffic lights and lamp posts which are also needed to create smart cities.

Government: As well as central and local government units, this also includes city councils and mayoral offices that perform the daily functions necessary to keep a community running.

Educational institutions: The academic community, such as university researchers, contributes a large amount of innovation to smart cities and often works closely with private companies to develop new solutions.

So why are smart cities important? With people migrating to urban centres for work, education, or other opportunities, the operation of essential government services becomes more complex as metropolitan populations grow denser over the years. The challenge for the stakeholders is to find newer and more efficient methods for citizens to carry out even the most ordinary tasks, such as using public transportation or accessing proper care from the local hospital.

In addition, local government organisations often only have limited resources at their disposal to deliver community services. Public sector issues such as housing, healthcare, sanitation, and traffic

management must be prioritised in terms of policy and government funding. However, within a smart city, some aspects of these multi-dimensional urban problems can be alleviated when digital technology is incorporated into previously strictly 'analogue' methods.

Brown cites the examples of electricity, water consumption and transportation as just some of the many urban functions that can be greatly improved by technology.

"With connected utilities, you could reduce people's bills and handle demand management more effectively, so you can actually buy energy at a different rate. You could also start to give users more choice, which improves customer service and, in theory, should improve the fractured relationship between users and utility providers."

Smart utilities could also mean better management of a city's water supply, allowing real-time tracking of leaks and other causes of wastage, as UROS is doing in Finland (*see World News, p34*).

Another example provided by Brown is the idea of smart transportation, where, for instance, the monitoring of public vehicles within a grid helps agencies anticipate delays and keep passengers informed on how long they will need to wait for a bus or train.

Making the connections

The idea of two objects communicating remotely is nothing new. For instance, we are all familiar with M2M (machine-to-machine) technology which can be used by devices to send and receive information from each other through a closed network without any human intervention. The evolution of M2M comes from the Internet of Things, wherein physical objects interact with other devices, and even human beings, through the internet.

The IoT is already transforming digital technology, and for smart cities it will dramatically expand the possibilities of what communities can do. For instance, if maintaining street safety at night is a concern, Brown suggests that a city may turn regular lamp posts into smart ones that can sense the presence of pedestrians and automatically turn on. This can be done through retro-fitting sensors and connecting devices into existing lamp posts.

But of course, connectivity across entire communities must be underpinned by the appropriate infrastructure. Depending on the coverage of a project, smart city initiatives may use networks such as Wi-Fi, 4G (and eventually 5G), fibre, or low-power, long-range wireless networks (LPWANs). This last group of technologies can be further subdivided into varied protocols.

'Weightless' is the open source standard developed by the Weightless Special Interest Group (SIG), a non-profit organisation that comprises companies such as ARM and Neul whose main goal is to power the IoT. There are three types of Weightless Open Standards: Weightless-N (for one-way communication and lower cost); Weightless-P (for two-way communication and high performance); and Weightless-W (which utilises TV white space spectrum).

Another standard for LPWANs was developed by the LoRa Alliance, a separate non-profit composed of large ICT solution providers including IBM, Orange, ZTE, and others.

The group's proprietary LoRaWAN network architecture is described as a 'star-of-stars' topology where messages are sent to and from end-devices and a central network server, through a transparent bridge serving as the gateways. Standard IP connections connect these gateways to the network server, while end-devices connect to one or more gateways using single-hop wireless communication. End-point communication is normally bi-directional, but multicast is supported, allowing over-the-air software upgrades as well as other mass message distribution, to decrease the 'on air' communication time.

Sigfox is another eponymously named protocol developed by a French wireless company. It utilises Ultra Narrow Band (UNB) technology and claims to offer the lowest cost as well as the longest battery life, crucial for powering IoT objects constantly on standby.

All these LPWAN protocols are currently competing to become the ruling standard for IoT networks globally. But their lack of interoperability could slow down the development of smart cities worldwide. There is rarely a 'one-size-fits-all' solution, because newer technology must be made to work with existing capabilities. The needs of large cities are varied and complex, and this likely means that different areas within one community may need to use different wireless networks. On top of this, it is almost impossible to ensure that changes and upgrades all happen at the same pace.

Interoperability among different network standards is therefore crucial, and to contribute to

the sustainable growth of smart cities, competing IoT standards need to develop ways to communicate with each other. As Brown explains, it is essential to use existing systems more effectively rather than just to constantly expand, rip and replace. "Sustainability of cities goes beyond the rate at which technology evolves or changes," he says.

Getting smart in South Asia

South Asia is composed of many emerging nations with diverse needs and growth curves. But while each may prioritise issues differently, they are all using technology to improve the lives of their citizens through various initiatives.

Singapore: Smart Nation

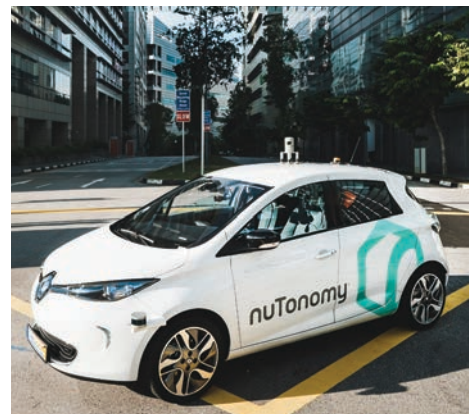
In 2015, Singapore's Infocomm Media Development Authority (IMDA), which regulates the country's information communications and media sectors, presented Infocomm Media 2025, outlining the steps to take towards achieving its vision of becoming a "Smart Nation". It is an impressively coherent, strategic 10-year plan ensuring that Singapore will be the most advanced country in the region.

According to the IMDA, Media 2025's goal is to create a more innovative information communications and media ecosystem that is able to produce solutions to help the country "face national challenges with greater confidence". Some of these challenges are high-skilled job generation, productivity growth improvement, supporting elderly citizens, and maintaining an interconnected society against the backdrop of globalisation.

The plan identifies three broad strategic thrusts. The first one is aimed at enhancing the country's economic competitiveness by capitalising on data, advanced communications and computational technologies. The second involves maintaining an ecosystem that rewards risk-taking and continuous experimentation resulting in effective Singapore-made content, products, and services. The third intends to enhance citizens' quality of life and promote a stronger national identity by binding communities through ICT technologies.

The sophisticated plan guides all Smart Nation-related initiatives toward the same direction. One of these was a smart transportation programme conducted on a limited trial basis in late 2016. It enabled commuters to hail driver-less taxis using only their mobiles. The trial was carried out in partnership with Singapore's Land Transport Authority and nuTonomy, a US-based robotics and intelligent vehicle technology specialist setup by experts from MIT. The early experiment looked at how autonomous vehicles could be integrated into the existing network.

The partners plans to expand and accelerate Singapore's progress towards the launch of a commercial autonomous vehicle service in 2018. The ultimate aim here is to address the problem of how people can travel more easily from their house or workplace to the nearest train station. The initiative also aims to improve the country's already efficient public transportation scheme.



Working with intelligent vehicle technology specialist nuTonomy, Singapore's Land Transport Authority is aiming to launch a commercial driver-less vehicle service in 2018.

Another initiative is the creation of an app named *MyResponder* which crowdsources lifesavers and dispatches them to any person in need of medical attention. Doctors, emergency medical technicians, nurses, or anyone with medical experience can volunteer as a lifesaver. When a person in distress calls for emergency services, the Singapore Civil Defence Force sends out a notification to all volunteers with the *MyResponder* app within a 400 metre radius of the said person. The volunteers can then confirm through the app that they are on their way to the patient's location.

Philippines: Project NOAH

In common with many developing markets, there is a great need for high-speed internet access in the Philippines. But the government must update the country's telecoms infrastructure to meet the demand.

Wireless subscriptions account for 80 per cent of all broadband subscriptions in the Philippines, and it is a nation of highly engaged social media and smartphone users. Many Filipinos depend on their devices for everything, including being kept updated on the status of typhoons.

The Department of Science and Technology's (DOST) Nationwide Operational Assessment of Hazards, or Project NOAH, is an award-winning smart city initiative that improves disaster response by empowering local government agencies and citizens to be more proactive in preparing for such events. Created in 2012, Project NOAH uses mapping technology and weather information to simulate the possible scenarios in many parts of the country, down to the 'barangay' (local village) unit, given any storm's hazard level. It provides warnings to affected communities, so that local governments can properly plan and execute evacuation protocols and get their citizens to safety.

In addition to a website, the project also has apps (compatible with both *Android* and *iOS* smartphones) through which users can receive real-time updates on rainfall and other urgent weather information.

In an archipelago of more than 7,000 islands, where eight or nine storms make landfall every year, Project NOAH improves disaster response by

empowering local government units and citizens to be more proactive in preparing for such events. But unfortunately, since its launch five years ago, government funding for Project NOAH has steadily decreased, and at the time of writing the programme was shut down at the end of February.

India: 109 Smart Cities

A few years ago, Indian prime minister Narendra Modi announced that his government would be converting 100 communities (later increased to 109) into smart cities. Bloomberg Philanthropies indicates that the government has allocated approximately USD7.5bn to the initiative, and large telcos such as Airtel are interested in becoming state partners in upgrading the nominated cities.

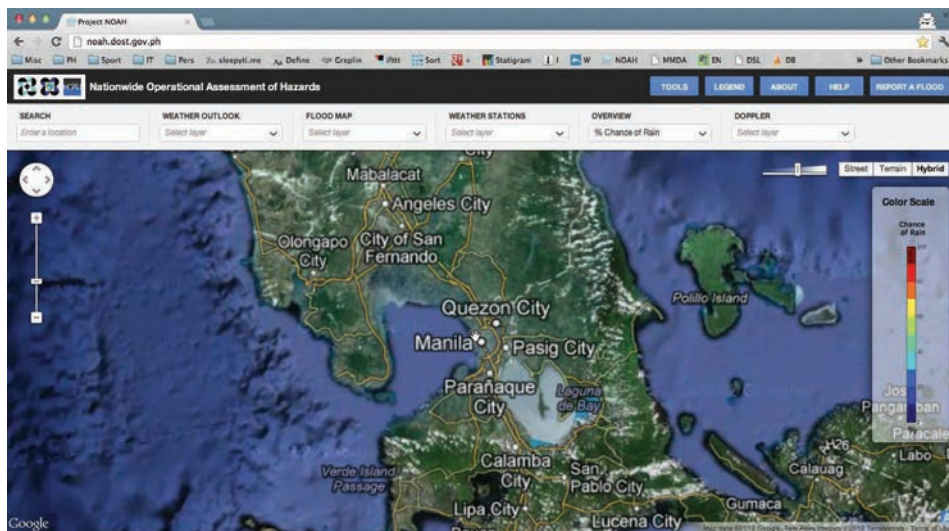
Indeed, a country of 1.2 billion people (the second-largest population in the world after China), with a landmass of 3.2 million square kilometres and a high-growth economy, is set to benefit greatly from the development of more innovative cities to better serve its citizens' needs.

One public sector issue that could be addressed by these smart cities is road safety. According to the World Health Organisation, more than 231,000 people are killed every year in traffic accidents in India. About 50 per cent of the victims are vulnerable road users such as cyclists, motorcyclists and pedestrians. Smarter traffic management and vehicles may help address this problem.

For example earlier this year, Unlimit showed off the 'connected rickshaw', the first project it has developed as part of an agreement with Cumulocity to use its open, IoT application enablement platform (see *News, Q1 2017*). The rickshaw is fitted with a GPS tracker as well as a 'panic' button for passengers to use in the event of an emergency. Activating this triggers an SMS, email and/or voice call to security personnel. By being connected to Cumulocity's IoT platform, the location of the rickshaw (actual and historic) can be tracked and details about its owner as well as their contact details are displayed.



Unlimit's connected rickshaw uses Cumulocity's IoT platform. It's fitted with a GPS tracker as well as a 'panic button' for passengers to use in emergencies.



In the Philippines, Project NOAH used mapping technology and weather data to simulate the possible hazards from storms down to village level. But lack of funding led to the programme being shut down earlier this year.

The firm adds that if a larger amount of rickshaws are connected, this could lead to a wide range of other use cases, such as theft-protection, mobile ordering of nearby rickshaws, and also e-payments for rides based on actual distance or time travelled.

Another issue that could be addressed as part of India's initiative is waste management. Highly populated areas produce large amounts of waste, and automated disposal may make processing it more efficient. For example, all bins could be equipped with low cost, energy efficient sensors as used in LPWAN devices, that detect when a bin needs to be emptied. These sensors could then communicate with council-operated cloud platforms to alert garbage disposal vehicles, that could perhaps even be autonomous, to collect the waste.

However, unless planned carefully and with the unique needs of each community in mind, the Indian Government's ambitious urban development project may actually backfire. There is a risk of developing high-tech solutions that do not even address the most pressing issues that a city is facing. For instance, spending on the installation of CCTV in the streets would be inappropriate if the most urgent problem facing a particular community is how to regularly access clean water.

And while it is admirable that the national government has prioritised smart cities, will local government departments be consulted? For instance, the staff at the local mayor's office know the daily ins and outs of their community, and insights from the people operating at this level of government are essential to the successful implementation of smart city initiatives.

Avoiding a 'dumb city'

According to oneM2M, smart city deployments need to "become smarter" if they are to deliver on the promise of a connected society and provide true value to authorities, businesses and citizens.

oneM2M is a global standards initiative that covers requirements, architecture, API specifications, security solutions and

interoperability for M2M and IoT technologies.

Formed in 2012, it consists of eight global standards development bodies as well as various industry fora and more than 200 member organisations.

In its *Smart Cities Done Smarter* white paper published earlier this year, oneM2M sets out what it describes as a "global blueprint" which includes key deployment requirements such as a "horizontal platform for new deployments, open standards to avoid vendor lock-in, adaptors for vertical deployments, and open and semantically-enriched data".

According to the organisation, this horizontal platform consists of a common service layer to allow every component to communicate as one system. Unlike vertical deployments which do not scale, it believes an open horizontal platform can leverage existing networks, enable the sharing of software across different applications, and allow devices with multiple uses.

oneM2M says implementing a horizontal platform will also enable existing legacy IoT installations to be incorporated into new smart city deployments through the use of "adaptors", while open standards will allow city managers to mix and match vendors according to their needs, leading to what's claimed to be a greater control of total cost of ownership.

Ultimately, oneM2M points out that transforming 'dumb' data – numbers without meaning – into enriched, coherent information could be one of the biggest value-adds of all, bringing increased efficiency and reduced opex to smart city architectures.

Roland Hechwartner of Deutsche Telekom and technical plenary vice chair of oneM2M, says: "Smart cities that fully exploit data assets will undoubtedly be the most successful as they will be able to create and make use of applications based on the data produced. An important part of this is semantic interoperability which allows different apps to share 'meaningful' data with one another, enabling multi-purpose use of information in a cost-efficient way." ■

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Unearthing a solution



Creating a comms network on a mining site where the topography is constantly changing is one challenge InfiNet Wireless had to overcome in Indonesia.

With remote operations, often in harsh climates and difficult terrain, companies in the mining and oil & gas sectors present unique challenges for communication network specialists.

Moxa specialises in products for industrial networking, computing and automation. The US-based company claims it has connected more than 30 million devices for customers in more than 70 countries across the world, covering a wide range of applications in industries such as smart transportation, mining, oil and gas, amongst others.

Moxa's Ethernet devices played a crucial part in Singapore when one of the country's leading engineering and system integration providers needed a solution for a challenging gas pipeline application.

With experience in assembling systems for many different vertical markets, the system integrator (which has not been named) knew that monitoring a gas pipeline tunnel's temperature is crucial for safe operations. In such a confined space, temperatures rise easily and overheating could cause pipeline fractures that could lead to gas leaks or even explosions. Additionally, a tunnel's inherently long and narrow dimensions

mean that more home run cables have to be installed to link all temperature gauge data acquisition I/O devices back to the pipeline's SCADA system, thereby increasing cabling costs.

While Moxa's solution was based on Ethernet, the firm points out that its data acquisition system used "efficient, cost-effective" wiring. At the heart of the platform was the vendor's *ioLogik E1240* I/O device. It features a two-port Ethernet switch that can be used to daisy-chain one *E1240* to another, reducing wiring costs by up to 15 per cent, according to Moxa.

What's more, the device supports the firm's *Active OPC Server* which is said to enable real-time temperature updates to the SCADA system. Moxa claims that by utilising push technologies, the server not only "significantly" reduces bandwidth consumption but also increases system response time. Compared with traditional polling architectures that place extra demands on the network and SCADA CPU, the company says

active push-based tags that update the *Active OPC Server* automatically save up to 80 per cent in bandwidth and greatly reduce the demands on the system. It adds that the *E1240*'s auto tag generation features deliver additional efficiency gains to SCADA builders by simplifying the creation of up to eight analogue tags at a press of a button.

Over in India, Moxa has helped the Oil and Natural Gas Corporation (ONGC) to monitor and manage its oil drilling platforms. Based in Dehradun, the state-owned company is the largest producer of crude oil and natural gas in the country, contributing around 70 per cent of domestic production. It owns and operates more than 11,000km of pipelines of which 3,200km are undersea, and has active exploration projects in 26 sedimentary basins throughout India.

In 2006, ONGC awarded a USD95m contract to industrial technology specialist ABB for an enterprise wide SCADA system. As part of this, ABB's subsidiary in Bangalore is also

providing services that include site survey, system design, engineering, supply, installation and maintenance for 45 offshore and onshore drilling stations. The project involves creating systems that integrate real-time information from production facilities with asset data, and then transmitting the information to ONGC's corporate data centre to manage the performance of the drilling stations. ABB Bangalore achieved this by integrating different SCADA systems into an enterprise-wide SCADA network for managing drilling platforms.

ONGC's data centre includes several SCADA servers that form a terminal for the remote control and monitoring of the 45 platforms. A wireless comms network featuring TDMA radio links the enterprise-wide control room with the drilling stations for the purpose of collecting data remotely. Each drilling platform uses HART instruments connected to redundant remote terminal units (RTUs) to control drilling facilities in the field. These RTUs are equipped with Ethernet ports to transmit data over an Ethernet network formed by Moxa's *EDS-408A* series industrial managed switches. The company claims these are capable of high-bandwidth, real-time transmissions, which help ensure efficient communication between ONGC's field operation facilities and control station. The vendor adds that its managed Ethernet switches are ABB IIT, UL508, DNV, and Class 1, Div. 2/Zone 2 certified, making them a "natural fit" for offshore oil and gas applications.

Maximum uptime for Indonesian miners

PT Saptaindra Sejati (SIS) has been operating in Indonesia since 1991 and provides integrated mining services to a number of customers across the region. Its specialist services range from exploration and drilling, through to contract mining, shipment and logistical support.

In 2008, SIS became a wholly owned subsidiary of PT Adaro Energy, said to be the largest coal producer in the southern hemisphere. As a result, the firm is now one of the top three mining contractors in Indonesia, employing more than 6,000 people. Its mine located in Tanjung Tabalong in the South Borneo region of Indonesia is one of the most significant coal mining sites in the area and a major economic contributor to the region.

As part of its ongoing process to introduce the most efficient technology and practices into its operations, SIS identified the need to broaden and upgrade communications links between the operational, logistics and administrative areas of the mine. Provision of high bandwidth links were key to supporting the operational and IT infrastructure that covered an increasing number of locations across the facility.

Mining locations can often be positioned in difficult-to-reach locations, and even the top of the mines themselves can introduce significant technical challenges in laying and maintaining an ICT infrastructure network. Furthermore,



Moxa's *ioLogik E1240* I/O device (right) is being used to monitor gas pipeline temperatures in Singapore. The company's *EDS-408A* series industrial managed switches (left) helped ensure efficient communication between ONGC's field operation facilities and control station in India.

a mine's topography and working areas change regularly. As a result, the obvious choice to ensure ongoing flexibility as well as reliability was to introduce a network solution based around wireless technology.

SIS approached its preferred local integration partner Wirakom System to recommend, design and support a suitable network. It opted to use equipment from InfiNet Wireless because of its support of wireless communications across unlicensed spectrum, and its reliability and ability to cope with difficult terrain, geography and weather conditions. In addition, InfiNet says its capability of providing high-capacity links that are both scalable and flexible, further strengthens its equipment's ability to cope with the mine's changing geography and increasing throughput needs.

Saptaindra Adaro's wireless network needed to link together more than 20 key operational areas across the site, from logistics and transport depots, through to centralised operations and administration, and out to the operations at the coalface itself. Extending across an area of more than 75km in distance, Wirakom designed a network around six tower hubs. Each was linked to its neighbouring tower to act as a high transmission backbone to the network. Capacities varied from 40Mbps up to more than 100Mbps across link distances of up to 29km for each single span.

The integrator used InfiNet's *InfiLINK* point-to-point and *InfiMAN* point-to-multipoint range of equipment. *InfiMAN 2x2 R5000-Smnb* base station sectors acted as multi-location aggregators to positions only needing low- or medium-capacity links, typically up to 40Mbps per link. *InfiLINK 2x2 PRO R5000-Mmx* units, capable of up to 240Mbps net throughput of distances over 30km, were used to provide the core backbone transportation links.

InfiNet says another key factor in choosing its solutions centred around their 'Greenfield' mode feature. SIS believes this has brought additional stability to the wireless communications links, particularly in times when atmospheric interference is at a high.

The vendor describes Greenfield as a special, 'overhead-less' RF mode that allows a significant throughput boost of around 10 per cent across all channel sizes, modulations or packet lengths, regardless of the distances covered. Combined with additional recently introduced features, such as *Instant DFS*, it claims capacities as high as 200Mbps real throughput and across distances in excess of 70km can be reached. This translates into bringing additional stability enhancements to shorter distance links.

In addition to standard data communication services, key low-latency and high bandwidth services such as CCTV and voice are now running seamlessly across SIS' wireless network. Furthermore, ongoing technical maintenance and network support can be undertaken remotely by engineers from both SIS and Wirakom.

"The goal of this technology investment programme is ultimately to elevate the level of service offered to our user base in terms of speed, stability and reliability of the total network," says SIS IT superintendent Suhardanisworo. "We have now replaced all of our other wireless equipment brands with InfiNet Wireless, and the overall availability of our network has easily surpassed our 99.5 per cent goal."

Monitoring remote jet pumps in Pakistan

United Energy Pakistan (UEP) is one of Pakistan's largest oil companies and operates a network of jet pumps scattered across its concession area. This includes an onshore footprint of more than 10,000 square kilometres, and the largest offshore acreage given to any single exploration and production company in the country.

Focusing primarily on exploration and production, UEP operates in eight districts within the Sindh province in south-east Pakistan. Its jet pumps work around the clock as artificial lift mechanisms for producing oil in mature fields.

Most of these pumps are located at unmanned sites, with an average travel time of about an hour from base operations. Real-time status of the remote jet pumps was not accessible to UEP's production team, which is centrally located at the company's base in Karachi.

Operators therefore had to routinely travel to the many sites in order to carry out system health checks locally. Not only was the travel time-consuming and expensive in terms of human resources, but it also delayed identification and restoration of any failed pumps.

Furthermore, if a visiting operator noticed a problem with an installation, he needed to alert an initial response team to come to the remote site to troubleshoot the issue. Once a cause for jet pump shutdown was determined, the appropriate maintenance team was then dispatched from base operations.

This manual process could take hours or even days – time in which oil was not being produced and both revenue and productivity was lost.

UEP therefore realised that it needed to implement real-time monitoring and management of its jet pump network in order to more quickly and accurately identify and remedy any failures, and eliminate downtime.

The company turned to Sierra Wireless partner Mazik Global to develop a monitoring solution. This was based on an instrument equipped with a solar panel, battery, intelligent charge controller, and IP66-rated enclosure interfacing with a fault annunciator. The solar panel is used to power the system, and has a self-monitoring feature to report voltage status as well as the temperature of the enclosure. The system includes a Sierra Wireless' *AirLink* intelligent gateway which is said to have a small footprint for easy installation and a rugged design that enables it to withstand extreme temperature changes, humidity, shock and vibration. It is certified for hazardous environments (Class I, Div 2).

The jet pump real-time monitoring and management solution features customised software to provide the necessary information for monitoring and analysis. It covers parameters such as engine pressure, pump vibration, and more. The instrument collects data and communicates with the *AirLink* via RS232. The data are then relayed to the main server at base operations via the always-on cellular connection provided by the gateway. UEP is able to check the status of its jet pumps every 10 minutes and, in case of an event, the system immediately triggers an alert to relevant maintenance staff through SMS and email.

Sierra Wireless' gateway is managed through the *AirLink Management Service*. According to the company, this allows users to remotely configure, deploy, and monitor the gateways over-the-air, and makes managing a thousand devices as easy as managing ten.

It adds that the gateways' over-the-air configuration capabilities enable pre-defined authorisation access for full data security. Custom alerts can also be set up for notification when devices go offline, resulting in faster issue identification, less downtime, and fewer field trips – exactly what UEP was looking for.



Shapadu's maintenance workers who visit oil and gas rigs in the South China Sea use Thuraya's *IP+* satellite broadband modem (left) and *XT* satphone (right) for reliable communications with land-based colleagues.



United Energy Pakistan is one of the largest oil companies in the country and operates a network of jet pumps scattered across an area of more than 10,000km². These are remotely monitored by Sierra Wireless' gateways.

Satellite fuels comms on Malaysian oil platforms

Malaysia has hydrocarbon reserves equivalent to 20.6 billion barrels, making it the biggest oil and gas producer in the region.

The task of keeping the platforms that dot the South China Sea operating safely and efficiently falls to construction and maintenance experts such as Shapadu Energy and Engineering of Kuala Lumpur. An oil and gas contractor licensed by Petronas, Malaysia's national oil and gas corporation, Shapadu is said to be fully-equipped for the unique demands of working on platforms located 100 miles or more offshore.

"A typical platform in the South China Sea lies well beyond the range of shore-based GSM networks and short wave radio," says group managing director and chief executive Shafiz Shahrani. "The rig crews might use a fixed VSAT installation or handheld satphones to communicate with shore or be connected via marine optical fibre or microwave links."

But for Shapadu's teams who visit platforms for a few days or weeks, establishing reliable communications is more complicated. For instance, it may not be convenient for them to use the platform's VSAT or satphones, and access can be restricted. This presented a problem, as

Shahrani explains: "It's essential we have our own communications equipment because we have to be able to contact shore at any time. We sometimes need to check technical issues with our colleagues in Kuala Lumpur, and we can't afford to delay the work while we wait for a satphone to be available."

As a result, Shafiz purchased a pair of Thuraya's *XTs* from Radian Teknologi of Port Klang near Kuala Lumpur. It's claimed that the *XT* is the world's toughest and smallest satellite phone, and meets the most demanding standards for shock-proofing, splash- and dust-resistance. According to Thuraya, this makes it ideal for the harsh environment of an offshore platform in a region well known for its monsoon climate and summer typhoons.

The vendor adds that battery life is also important because the opportunities to recharge the *XT* are limited by the demands of the working day. It says the handset provides six hours of talk time and up to 80 hours on standby.

Furthermore, Thuraya says the phone's omnidirectional antenna ensures an uninterrupted signal during non-stationary calls. "That means I don't have to stand still with the antenna pointing at the satellite and can move around while talking," says Shahrani.

For its broadband data communication needs, Shapadu invested in Thuraya's *IP+* terminal. This compact satellite broadband modem is said to offer streaming speeds of up to 384Kbps and shared speeds of up to 444Kbps from a portable unit not much bigger than an A5 book. Shahrani and his team use the device for checking and sending emails while working on the platforms, and can easily connect to the company VPN or access web pages from a laptop. "If we want to send a technical video from the platform to our engineers on shore we just set up a streaming link with the *IP+*," he says.

When working offshore, Shahrani says he uses the terminal to keep in touch with his family during long assignments. He also always takes the *XT* with him when indulging his personal passion – exploring the natural environment of his native Malaysia. As well as enabling him to remain in contact in locations where traditional GSM signals are unavailable, the handset also features a programmable SOS button which can reach a nominated number in an emergency. ■



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As users in the region begin to leverage the latest satellite platforms, they will need the ground infrastructure and services – such as BICS' and Eutelsat's new backup system – to match.

Next-generation high-throughput satellites continue to connect developing regions, but what on Earth can be used to get the very best out of them? SARA FREWEN finds out.

Asia is set to become the world's biggest mobile user (see *Wireless Business*, p13). And as the most populous region, Asia Pacific also has the largest share of mobile data traffic, according to Ericsson's *Mobility Report* published last November. It said this is likely to continue into 2022, with a rapid growth in mobile broadband subscriptions expected. China alone is set to add 440 million mobile broadband subscriptions between the end of 2016 and 2022.

But despite all this, billions across the region still lack access to mobile phones and the internet. Ericsson's report added that the level of mobile broadband maturity still varies greatly between countries in Asia Pacific. For instance, it states that South Korea and Japan deployed LTE early with fast uptake, and markets like Singapore and Hong Kong are highly advanced. But in less developed countries, GSM is still the dominant technology, and "insufficient" network quality and the cost of data subscriptions remain barriers to higher mobile data consumption.

Satellite technology, and especially the new generation of high-throughput satellites (HTS) offered by the likes of ABS, Intelsat, YahSat, and

others, will play a major role in both delivering content to mobile subscribers and connecting consumers who don't yet have service. The latest breed of spacecraft which leverage HTS technology promise higher performance, better economics, and new hardware and services that enable simple access to connectivity. Some claim they will enable mobile operators to deliver a fibre-like experience, driving both market expansion and increased data use per customer.

Jean Philippe Gillet, Intelsat's EMEA VP of sales, says increased demand has put extra pressure on operators to extend their networks as well as make them more robust to accommodate added demand from existing customers.

He identifies four factors that operators will need to face these challenges: flexibility to quickly adapt to new requirements; a network with performance that will improve over time and stay ahead of user needs without requiring technology replacement; economics that provide a winning business case for the user and the VSAT operator; and simplified access which reduces the technical skill and mechanics of deploying satellite solutions.

"We believe that not only do we need to provide cost-effective options to extend networks, but the operators should also focus on making their networks future-proof so they can react quickly to changing end-user demand," says Gillet.

He goes on to state that this was the driving force behind the design of *EpicNG*, Intelsat's HTS platform. "The open architecture and backward compatible design allows operators to seamlessly migrate their existing network onto the platform and realise service improvements with their existing terminals. By delivering more data at lower cost per megabit, *EpicNG* improves the economics of providing bandwidth and cellular backhaul to telecom providers."

With high-throughput satellites offering three to five times the efficiency of earlier platforms, Intelsat reckons that not only do users gain the assurance of meeting booming demand, but they also see the cost of ownership go down.

As a result, the company believes service providers will be able to stay ahead of user demand and even expand their networks into new areas where demand for bandwidth has not been met.

Linking space and Earth

There is no point in developing better satellite hardware if you don't have the equipment on the ground that can take advantage of all the technology that they offer. And perhaps one of the unsung heroes here is the antenna – the key link between space and Earth.

For example, the ASC Signal division of Communications and Power Industries (CPI) has developed a high-wind version of its 2.5 metre *Nomadic* antenna. The trailer mountable, carbon-fibre antenna is said to be ideal for use in remote field deployment applications, and is capable of operation at L-, X-, C-, Ku-, Ka-, Q- and V-bands.

ASC Signal says the 2.5m system combines an “innovative” antenna design with its “state-of-the-art” *Next Generation Controller (NGC)* to provide the industry's highest level of acquisition, tracking accuracy and performance from antenna systems of this size.

Company president Keith Buckley claims that as mobility continues to be a prominent and dominant requirement for remote applications, his firm continues to deliver Earth station antennas that “seamlessly” integrate fixed and mobile systems into the same network architecture. “What is unique about our approach is that we are able to utilise the same antenna controller systems, regardless of the antenna platform, thereby reducing costs to customers and providing uniform operation across the entire network.”

Meanwhile late last year, Canada-based C-COM Satellite Systems revealed it had come up with new Ka-band in-motion antenna technology. Developed in partnership with the University of Waterloo, the company said that the patent-pending calibration method is expected to be used in low-profile two-way phased-array antenna (PAA) systems for land-mobile satcoms.

Speaking at the time, Dr. Safieddin Safavi-Naeini, a professor at the university's department of electrical and computer engineering, said: “The main advantage of this method is that it significantly reduces the calibration time and enhances its accuracy. The entire calibration can be performed during system initialisation in the field.”

PAAs are a growing area of development with companies such as Phasor, Gilat, Boeing and others developing new systems. But so far, they have been more widely used in the military market or within scientific research such as radio astronomy, rather than the commercial sector. Safavi-Naeini says this is largely because of their complexity which has made them cost prohibitive and difficult for private companies to use.

C-COM is working with the University of Waterloo on what it describes as a design that uses a “very advanced” software algorithm to control low-cost modules and calibrate them to work together. Each module will be small and simple, and while thousands will be needed for a single antenna, C-COM reckons scaled production should streamline the cost of development.

The antenna will use a beam-forming calibration algorithm invented by the university, and a beam-forming computer that identifies the whole system, characteristics of each module and records data. “We are not using any exotic technologies,” said Safavi-Naeini. “We use very low-cost microwave technology, low-cost packaging technology and low-cost materials. Because of this, the modules may deviate from their normal ideal parameters, but then we have the beam-forming computer that tracks these modules and also identifies any errors. If a module fails, the central beam-forming computer detects that immediately and redistributes the radiation task to other modules.”

In land mobility, C-COM plans to target HTS services in Ka-band, including those of ViaSat, Hughes, O3b Networks, Inmarsat and others. It says the PAAs could also see use in 5G systems as well as with multibeam radar.

More bang for your BUCs

The block upconverter (BUC) is used in the transmission of signals and represents another vital part of the satcoms ground infrastructure chain. Here, VSAT equipment specialists such as AnaCom come into their own, and one of the latest products it has added to its range is an XKu-band BUC which operates at 12.75-13.25GHz frequencies.



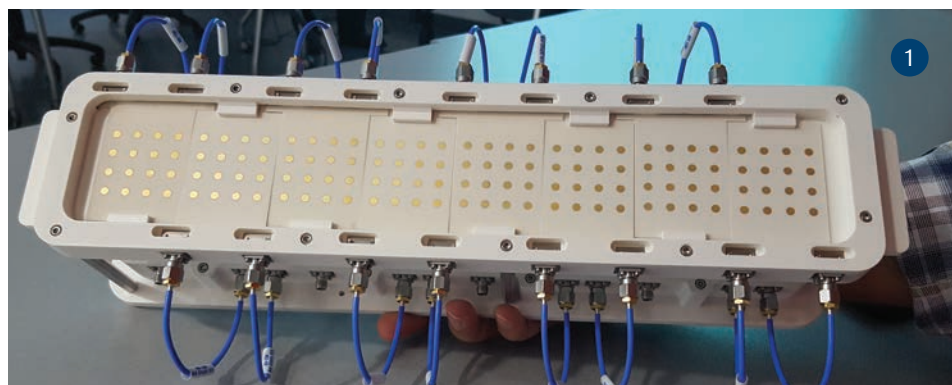
AnaCom's *ELSAT* BUC features an upconverter, power amp, monitor, control and power supply in a single enclosure.

The US-based vendor's *ELSAT* is available in transmitter output levels up to 100W and in single or redundant configurations. The upconverter, power amp, monitor, control and power supply are included in a single enclosure. AnaCom says the only cabling required to indoor equipment are IF connectors.

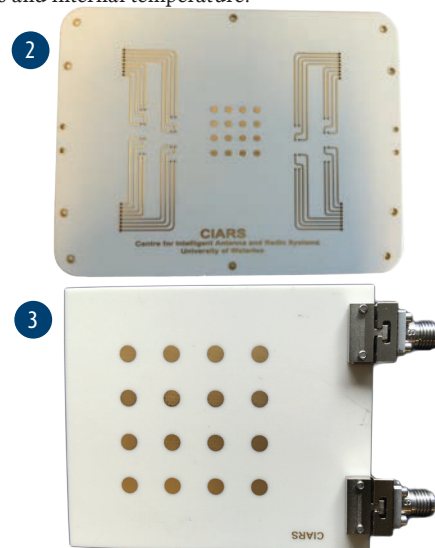
It adds that the units have a rugged construction for continuous outdoor duty in all types of environments, and claims they are particularly suitable for SCPC, MCPC and DAMA applications. An ‘ovenised’ high stability crystal oscillator is used to lock the TX synthesiser, and additional temperature and ageing compensation are provided by an onboard microprocessor.

The BUC features a monitor and control (M&C) system that can be used in combination with the unit's internal metering function to monitor operational parameters. The 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.

Furthermore, AnaCom says the *ELSAT* includes built-in test facilities for improved maintenance and reduced dependence of external test equipment. To improve and simplify maintenance routines, it says the units 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.



C-COM is working with the University of Waterloo on a phased array antenna design that uses a “very advanced” software algorithm to control low-cost modules and calibrate them to work together. Picture 1 above shows an RX array panel prototype (eight modules of 4 x 4); picture 2 (top, right) a single RX 4 x 4 module; picture 3 (below, right) a single TX 4 x 4 array module.



Other features include remote configuration and access via Ethernet and serial protocols, together with a flash memory so that the BUC always starts up with the same operating conditions it had before it was powered off.

Advantech Wireless is another satellite equipment specialist that includes BUCs in its portfolio. It recently released 125W to 200W Ka-band *UltraLinear* solid state power amplifier (SSPA)/BUC products based on second generation Gallium Nitride (GaN) technology. GaN is a semiconductor compound that makes miniaturised, high-power, wireless transmitters possible. Cristi Damian, Advantech's VP business development, says: "GaN technology allows us to reach power levels that were not possible before, and to serve customers that are looking for solutions in this fast growing market segment."

With weatherproof IP67 rated enclosures, the new *SSPB-4010Ka* series of products have been designed for Ka-band LEO and GEO satellite uplink applications. Advantech claims these latest systems are the "most advanced" GaN based Ka-band units in the market, providing higher power and higher reliability. They convert L- and Ka-Band signals from 27.5GHz to 31GHz (in bands), while the integrated amplifier delivers an output power of 100W to 200W. The integrated units come complete with detachable power supply, phase-locked oscillator, mixer, filter and proprietary cooling mechanism.

Other attributes are said to include high linearity, support for remote monitoring and control, and protection against overdrive, thermal runaway and out-of-lock conditions.

Advantech has also used second generation GaN technology in its *SapphireBlu* SSPA/power block which is designed to service new satellites operating in the 12.75 to 13.25GHz band. The small form factor SSPA is designed to be hub mounted very close to the antenna's flange input, eliminating losses through a waveguide. As a result, the company claims it is now possible to use just a relatively small SSPA on its own to transmit the signal. It adds that because of this efficiency, air conditioned shelters for a Klystron or indoor mounted HPA can be eliminated. Furthermore, instead of needing multiple antennas at a teleport, operators can reduce their number, simplifying operations.

The *SapphireBlu* units have a built-in L-band interface backup converter without separate upconverters. Advantech says they operate as 1:1 redundant or 1+1 phase combined to provide additional power when traffic demands. It claims they are very power efficient, reducing opex for power consumption, and capex from reducing the need for uninterruptible power sizing.

Breaking new ground

Newtec is a well-established vendor of ground infrastructure in the satellite market, and in 2016 it launched what was claimed to be the first DVB-S2X VSAT modem.

Describing the *MDM5000* as its most advanced VSAT modem to date, the company says it is capable of receiving forward carriers of up to 140MHz and processing more than 200Mbps of throughput. With forward symbol rates from 1 to 133 Mbaud and coding up to 256APSK, it's claimed the *MDM5000* will boost efficiency and performance on legacy satellites while "fully unleashing" the potential of next-generation HTS. On the return channel, Newtec says the device supports SCPC, TDMA, and offers its proprietary *Mx-DMA* technology for up to 75Mbps.

The modem is designed to handle a wide range of services, including internet access, VoIP and backhauling, along with video contribution and multicasting. As with Newtec's previous *Dialog* modems, the *MDM5000* incorporates Layer 3 routing, advanced QoS, TCP acceleration, pre-fetching, compression and encryption. It also supports a new Layer 2 mode, facilitating integration with various networking topologies and routing protocols such as MPLS and BGP. Dual demodulators for "seamless" beam switching on future HTS networks are also included.

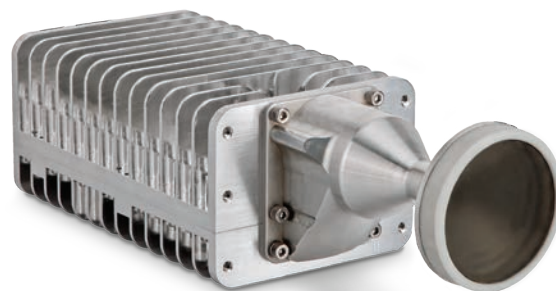
Meanwhile, Gilat Satellite Networks (GSN) has added the *Scorpio* "VSAT-in-a-box" to its range. The company reckons the outdoor terminal incorporates "breakthrough technology", lowering the cost barrier for ubiquitous broadband deployment.

According to GSN, *Scorpio's* innovative design increases system reliability due to the complete integration of the indoor and outdoor units into a single weatherproof box. It says the solution addresses the cost efficiencies required for residential customers and small businesses worldwide.

The compact and lightweight system has been designed to allow rapid self-installation and easy roof mounting. *Scorpio* connects to the home network with a single Ethernet cable, thus providing, according to GSN, a "simple demarcation point for improved network diagnostics and increased customer satisfaction".

Hagay Katz, head of the VSAT line of business at the company, says: "With our VSAT-in-a-box, ISPs will be able to save in installation and maintenance expenses while internet users will enjoy rapid self-installation and activation, in addition to low power consumption."

Scorpio is part of GSN's complete *SkyEdge II-c* VSAT ground system. This includes the company's *TotalNMS* network management



Gilat Satellite Networks claims its *Scorpio* "VSAT-in-a-box" lowers the cost barrier for ubiquitous broadband deployment.

system and is designed to facilitate service management via an electronic B2B interface. GSN says it enables ISPs to manage their services totally independent of the satellite network operator, providing a complete management suite. It includes real-time viewing of the service status, events, alarms and statistics, as well as historic/trend analysis of the service over longer periods. *TotalNMS* is also said to provide ISPs with an automated and easy-to-use interface for simple creation, activation and management of end-to-end services with a high level of flexibility.

Earlier this year, Hughes Network Systems introduced the next evolution of its *JUPITER System* technology. It says this includes advanced LTE acceleration to support requirements for mobile operators and VSAT service providers as they expand their cellular services into areas without suitable terrestrial backhaul.

The system comprises the company's *HT2500* terminal which offers speeds of 200Mbps and can be used to accelerate LTE protocols. With support for more than 7,500 simultaneous TCP sessions, Hughes claims the unit is able to deliver boosted performance for many devices connected simultaneously to the LTE eNodeB.

The *HT2500* comes in a one-rack unit package and can work either 24V or 48V DC power which, according to the firm, makes it "well suited" to be integrated into a remote cellular site. The initial version of the product supports return channel transmission of 8PSK up to 12Msps. As a result, Hughes says it enables the use of much faster return channels. Additional enhancements to the return channel will be released later this year.

The company has also launched the *HG220* gateway which is aimed at cost effectively addressing smaller networks. It is designed to support up to five networks running over up to five satellites, and is said to offer extensive QoS, IP features and bandwidth management options to provide an effective solution for satellite cellular backhaul links.

Both devices utilise the *JUPITER System's* wideband DVB-S2X forward channel, with support for five per cent channel roll off as well as 64APSK modulation. Hughes reckons that with LTE acceleration, the platform enables mobile operators worldwide to expand their networks with high-performance satellite backhaul links that are 40 to 60 per cent more efficient than those previously available. ■



Newtec describes the *MDM5000* as the world's first DVB-S2X VSAT modem.

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Passive infrastructure sharing is a common practice around the world and is a regulatory mandate in some markets. The shared assets can include tower space, equipment cabinets, buildings at the base of the tower, etc.

Getting on top of towering costs

DR. MOHAMED NADDER HAMDY explains how operators can deliver high-quality network service through site sharing.

The practice of network sharing has been a topic of interest since it was introduced in the early 2000s. The first network sharing agreements, introduced in Germany, Australia, the Netherlands and the UK, were conceived as a way to help wireless operators offset the high cost of launching 3G service in hard-to-cover areas.

But despite the potential for capex and opex savings, the initial surge in network sharing quickly declined as most operators opted to build their own 3G networks instead. As more equipment is developed to support active and

passive network sharing, the options available to operators grow, thus increasing the complexity of the decision. This is especially true regarding the base station antenna which is somewhat unique in that it can play a role in either passive or active network sharing arrangements.

The major driver of network sharing continues to be the potential for cost savings. The amount an operator can save depends upon the depth of the sharing arrangement. Options range from passive forms, such as site sharing, to active forms in which a common RAN, spectrum

resources and core networks may be shared among MNOs. The potential cost savings and benefits increase as the depth of the sharing increases – but so do the risks. An overview of the most common network sharing models is illustrated in the table overleaf.

Passive sharing

This model refers to the sharing of passive non-electronic infrastructure and facilities. Shared assets can include the real estate on which a cell

site is located, tower space, equipment cabinets or buildings at the base of the tower, as well as power, lighting and air conditioning systems that support the equipment.

Passive infrastructure sharing is a common practice around the world and, in some markets, has become a regulatory mandate, depending on the specific site location. More on that later.

But whether voluntary or mandatory, passive sharing can save MNOs up to five per cent on capex and as much as 10 per cent on opex over a five-year span. In South Asia, specialist firms such as American Tower Corp., Bharti Infratel, Irrawaddy Green Towers, and others have invested billions of dollars to acquire passive infrastructure from operators in the hopes of brokering passive sharing agreements with cellcos.

Active sharing

Active RAN sharing is likely to be the next significant evolutionary step in infrastructure sharing, unlocking even greater capex and opex efficiencies than passive RAN sharing.

It refers to the sharing of active electronic infrastructure and radio spectrum. Within active sharing, there are a number of models involving elements in the RF path: antennas, base station equipment, transmission lines, base station operations and maintenance, and radio design and planning.

There are also sharing strategies that take the partnership between MNOs deeper. In these models, operators can share radio spectrum, core network, infrastructure management systems, content platforms, and administrative resources like billing systems and even customer service platforms.

In the past, active infrastructure sharing has been less commonly supported, but is becoming more widely considered – especially because of its potential benefits for rural broadband. The high cost to deploy LTE is also expected to increase the number of active RAN sharing joint ventures between operators.

Ultimately, network sharing is driven by the need to maximise enterprise value. The major benefit from network sharing is a net reduction in network capex and opex, usually in the range from 10 to 40 per cent of the in-scope costs, depending on the sharing option.

National roaming

National roaming agreements between operators inside the same country can reduce investments

by geographically dividing the cost of the necessary infrastructure between cellcos.

It can also allow new MVNOs without physical radio access infrastructure to completely roam on other operators' existing networks. Guest operators can then provide services in new markets without having to deploy additional equipment.

While national roaming is the easiest and least costly model of network sharing, it provides the least amount of control and flexibility for the guest operator. It also consolidates the overall number of mobile networks and homogenises retail offerings and quality of service, making it harder for an operator within a market to differentiate itself from the competition.

In addition, price competition may be restricted, since the retail tariffs charged by the roaming operator will be based, to a large extent, on the wholesale charges paid to the visited operator.

Potential challenges and a solution

Sometimes, on sites with space limitations or because of health and safety regulations, operators are forced to share the same antenna.

Alternatively, to reduce power usage, emissions and aesthetic impact, many countries like Brazil, Canada and Jordan are stipulating that operators seeking to deploy new services must be willing to share passive and/or active elements within the networks, including antennas.

Developing regions such as Asia are among the fastest-growing wireless markets in the world. But with explosive growth comes significant challenges, including overloaded towers and rooftops, and few available options for new sites.

There are two basic solutions to antenna sharing: use of multipoint antennas or deployment of low-loss combiners. For example, CommScope recently worked in Tunisia to meet the increased connectivity demanded by one operator's rapid network deployment.

Tunisiana was founded in 2002 as Tunisia's first privately-owned telecoms company. Over the years, Qatari telco Ooredoo has increased its stake in the operator culminating in 100 per cent ownership in 2010. Four years later, it re-branded the operation as Ooredoo Tunisia.

Today, the cellco continues to be the country's largest mobile operator. Each day, it claims to deliver a range of pre-paid and post-paid voice and data services to more than five million individuals and businesses across what Ooredoo describes as a "truly national" network. In recent years, Ooredoo has been forced to implement site-

Dr. Mohamed Nadder Hamdy,
Director mobility network engineering, CommScope



sharing strategies with other carriers, requiring adding new antennas on rooftops or towers. Most of the time, they are facing situations where rooftops are already full of antennas or towers are already overloaded, with serious stability and wind-load issues.

In 2015, the company needed to implement site-sharing strategies with other carriers, requiring adding new antennas on overloaded rooftops and towers. One solution is a same-band combiner – a unit that combines two base stations on the same band (GSM900 and UMTS900 or GSM Op1 and GSM Op2) into a common port to reduce the number of antennas required.

But introducing a passive unit in the RF path usually leads to an insertion loss that reduces the power available for coverage and capacity. To minimise this loss, CommScope has developed a new type of in-band combiner designed to deliver only 0.5dB of insertion loss – that's compared to traditional 'one size fits all' hybrid combiners that lose 3dB and essentially waste most of the power available.

CommScope's low-loss combiners (LLC) can be tailored to the client's spectrum, and offer high spectrum efficiency, with a minimal guard band of 0.6MHz for LLC 900 and 0.7MHz for LLC 1800. Because of their flexibility, they are well suited for site sharing applications where the antenna, jumpers and feeder cables are shared between two or three operators to open up new capacity on existing sites.

Ooredoo Tunisia executed a successful trial replacing a hybrid 3dB combiner with a CommScope 900MHz low-loss combiner for site sharing with another carrier. Drive tests and analysis indicated that traffic was increased by 50 per cent and received total wideband power was reduced by 20 per cent after the installation. Site revenue was also increased by 50 per cent and improved network performance and quality of experience, while delivering cost reductions due to cost sharing between two operators. The trial was so successful that Ooredoo is planning to use the LLC solution with a 12-port antenna for a three-operator shared site.

The benefits of CommScope's LLC solution include: cost savings from sharing the full RF path as well as the tower structure with associated rent decreases; reduction in tower loading; faster deployment due to easier installation (no need for an additional antenna and feeders for the added sharing operator); faster network rollout by avoiding the lengthy, complicated and often uncertain site acquisition and build phase of deployment. ■

Passive sharing	Site sharing	Civil infrastructure
	Transport	Backhaul
Active sharing	RAN sharing,	Base station
	Multi-operator core network,	Antennas
	Multi-operator RAN	Controllers
		Spectrum
	Gateway core network	Core network

EU Parliament approves 'digital dividend' for mobile broadband

 The European Parliament has approved the use of 700MHz spectrum for mobile broadband. It will be allocated in 2020, while any European Union member states that need to delay (for certain technical or financial reasons) will be able to do so until 2022.

In a press announcement published in mid-March, the parliament said coordinating the release of the spectrum in EU member states is crucial to allow innovative mobile services, such as remote healthcare, smart cities and connected cars, to work across the union.

It added that member states



TCCA CEO Phil Kidner said his members will continue to lobby for reserved spectrum in the 700MHz band.

will ensure the availability for broadcasting services in the sub-700MHz band until 2030, and may also compensate end-users for any direct costs caused by migration or the reallocation of spectrum.

The TCCA, which represents the global critical communications industry, welcomed the news. It said binding technical provisions

were published in 2016 to establish harmonised technical conditions in the 700MHz band for public protection and disaster relief (PPDR) mobile broadband services.

With the European Parliament now having approved the use of the spectrum, the TCCA said EU members can now start preparing for the implementation of mobile broadband services for mission-critical communication applications.

However, the association's CEO Phil Kidner said his members will continue to lobby governments to reserve dedicated spectrum within the 700MHz band to prevent mission-

critical services having to compete with consumer services for bandwidth.

"France is currently the only member state that has allocated dedicated spectrum for PPDR in the 700MHz band," said Kidner. "We are following closely the progress of the Swedish PPDR stakeholders' recommendation to hold one of the three 700MHz allocations as a national asset for a future nationwide mission-critical mobile broadband network."

"There are also positive developments in Norway, where a report to the national regulator clearly recommends taking the needs of PPDR onboard in the licensing conditions."

Chile sees Latin America's first NarrowBand IoT project



A water utility company in Chile has successfully tested a telemetry solution for residential water meters using NarrowBand IoT technology (NB-IoT).

The system used real data from meters installed with residential customers. It will enable them to know their exact daily water usage, and means that the unnamed

water company will be able to bill for actual, rather than estimated, consumption. Telemetry will also allow the supplier to detect leaks and unaccounted water flows.

The experimental deployment was led by Spanish telco Telefónica. It worked with Danish vendor Kamstrup, which provided the smart meters, and Huawei, which carried

out the update to the NB-IoT network.

The pilot in Chile is claimed to be the first time NB-IoT technology has been used in Latin America. The partners plan to expand the project in the near future and include more than 300 residential water meters by reusing the 700MHz LTE network.

NB-IoT offers low-power

wide-area network (LPWAN) connectivity focused on adapting devices to the needs of the Internet of Things market. It is therefore said to enable increased battery life, appropriate use-specific cost, wide coverage and indoor penetration. At the same time, the technology aims to allow for great scalability and comprehensive security.

Wi-Fi optimised at botanic research institute



The Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) has optimised its Wi-Fi network using what's claimed to be a "unique" system.

IPK is a non-profit and internationally renowned botanic genome institution in Germany, and needed to provide comprehensive coverage and reliable connectivity for its researchers. To meet this objective, IPK upgraded its legacy Wi-Fi network to a solution based on the latest 802.11ac standard, and

used the WHG series WLAN gateway-controllers from wireless specialist 4ipnet. According to the Taiwan-based vendor, its controllers are "unique" because they integrate user authentication, role-based access policy enforcement, and centralised AP management into the same box.

Furthermore, 4ipnet says WHG's Service Zone feature allows a single gateway to simulate multiple independent virtual networks, each with their own user roles, access policies, and customised login pages.

With two WHG405s deployed, IPK is able to offer Wi-Fi service tailored for individual user groups. Guests are assigned to the first service zone and authenticated via the built-in local user-database with accounts generated using 4ipnet's WTG keypad-based ticket printer solution.

The second service zone is configured for visiting researchers. Here, users are authenticated by 802.1x directly with their home institution's 'eduroam' account. The third service zone, 'ipk', is exclusively reserved for the institute's employees.

4ipnet's EAP757, EAP76, and OWL630 APs were deployed to accommodate the various research labs, lecture halls, libraries, guesthouses and outdoor facilities.

The Leibniz Institute's new Wi-Fi network features several AP from 4ipnet including the OWL630 (inset).

Wi-Fi out in Windhoek



Windhoek's Police Dept. has replaced the Wi-Fi used for transmission in its CCTV systems with wireless video surveillance.

Namibia aims to be the safest African country by 2020. As part of that ambition, RADWIN's point-to-point and point-to-multipoint (PtMP) systems were installed in dozens of crime hotspots throughout the capital.

The systems are said to transmit high-quality video from the cameras directly to police headquarters, enabling on-the-spot detection and response to events.

"Now that we are using RADWIN's systems, we're getting the highest video transmission quality with zero video pixellation and low jitter, which is vital for our mission critical operations," said police spokesperson Cillie Auala.



Tablet Comunitário brings the internet to remote communities



The solar powered *Community Tablet* is quite literally a mobile device. It is built on a trailer so that it can be towed (top), and features touchscreen displays (bottom) and virtual keyboards to provide internet access to people in underserved areas.



Mozambican tech startup Kamaleon has developed what it believes is an “innovative and engaging” way of promoting digital literacy through a shared platform.

The *Tablet Comunitário* (*Community Tablet*) is a solar powered mobile computer. Built on a trailer to provide internet access to remote areas, it features touchscreen displays and virtual keyboards. Kamaleon is also offering training on how to use the internet to members of the community and the local workforce.

The company’s ultimate aim is for the *Community Tablet* to promote digital inclusion and a knowledge-based society in Africa.

It began last November by launching in Mozambique where 24 million people reportedly lack an internet connection. Kamaleon said the system will be used to support

campaigns on various education and health initiatives in partnership with governmental and private organisations. The *Community Tablet* will be used to spread up-to-date messages and interactive lessons that showcase symptoms, prevention and treatment options, thereby replacing the need for leaflet distributions to convey life saving information.

Kamaleon founder and CEO Dayn Amade said: “A few years ago, anyone who could not read and write was considered illiterate. But today, this concept goes further, encompassing people who do not know how to use ICT.

“Health organisations and schools in Africa often face a unique set of obstacles, including a lack of access to much-needed health education and counselling platforms. The *Community Tablet* was created to help solve these problems.”

Kenyans reap rewards from 10 years of mobile money



Safaricom has marked 10 years since it launched Africa’s first mobile money platform.

In early March 2017, the Kenyan mobile operator published the findings of a study carried out by KPMG which revealed that the ‘social value’ generated by its *M-PESA* system grew from KES83m (USD802,709) in 2007 to KES184bn (USD1.7bn) by the end of March 2016.

KPMG performed the social value evaluation using ‘Social Return on Investment’ principles (SROI). According to the findings of its *True Earnings* study, *M-PESA* customers were the biggest beneficiaries of this social value, receiving a return worth KES160bn (USD1.55bn) as a stakeholder group during the financial year ending 2016.

Neil Morris, climate change and

sustainability director at KPMG South Africa, said: “Although Safaricom earns growing revenues from the *M-PESA* product, the social value it has generated for customers continues to exceed the financial benefits to Safaricom in each of the years since its inception.”

The study found that when the platform was first introduced in March 2007, it attracted 20,000

customers. By March 2016 the service had more than 16 million users, while the value of transactions rose from KES10.3m to KES5.2tr over the same period.

Safaricom said KPMG’s report complements recent findings by economists from MIT and Georgetown University who found that *M-PESA* has lifted 194,000 Kenyan households out of extreme poverty.

‘Not-spots’ eliminated at Sky



As part of consolidating its operations, UK-based satellite broadcaster and communication services provider Sky has extensively redeveloped its offices. But with multiple floors and the use of dense materials at its site in west London, wireless signals were heavily affected.

The biggest area of concern involved the second phase of the development, Sky Central. Set over three floors, this has a total combined area of around 46,000m² encompassing office space, a studio, production facilities, and R&D zones. It was vital for Sky to be able

to provide a consistent, strong signal source so that employees could use their mobile devices, connect to the internet and communicate wirelessly wherever they were on campus.

While the company had installed a single operator DAS in existing buildings at its site, it wanted multi-operator coverage to cope with user volumes throughout the much larger Sky Central area.

Martin Eddleston, planning and delivery manager for network implementation at Sky, said: “With the number of colleagues occupying our new building and the importance of mobile communications, it was



Set over three floors, Sky Central has a total combined area of around 46,000m².

imperative that a scalable, high performing and future-proof solution was selected.”

Systems integrator Herbert In-Building Wireless recommended Zinwave’s *UNiActivity* system because of its ability to support multiple operators, services, as well as public

safety access services. It delivered an end-to-end all fibre solution on a single converged system within the building.

Zinwave adds that the platform supports any frequency from 150MHz to 2700MHz, and claims it is only solution that can provide consistent mobile coverage inside metal lifts.

First LTE-R network



SK Telecom and the Busan Transportation Corporation (BTC) claim to have deployed the world's first LTE-R network. LTE-R is a standard for next-generation railway comms systems. The two partners first signed a contract for the deployment of LTE-R in August 2015. Since then, SK Telecom has built the network for the 40.48km long Busan Subway Line 1 using 10MHz bandwidth in the 700MHz frequency band. In February 2017, SK Telecom and BTC piloted the LTE-R network and plan to commercialise it in April 2017.

Big fibre in Hong Kong



Prysmian Group, the Italy-based energy and telecom cable systems specialist, is claiming a world record after delivering the densest and highest fibre count underwater optical cable ever made. The firm said its *FlexTube* cable containing 1,728 optical fibres was successfully deployed by Australian telco Superloop for its TKO Express project. This provides broadband connection between Siu Sai Wan on Hong Kong Island and the data centre hub of Tseung Kwan O (TKO) on the mainland. Prysmian says the previous record was set in 2014 with a *FlexTube* cable with 720 fibres.

IoT for Honda



Honda is using IoT to deliver the *MyHonda Connected Car* system. Using Bright Box's telematics solutions – which are powered by the Cisco Jasper Control Center automated IoT connectivity management platform – Honda will deliver a variety of connected services across Europe. They include vehicle data and diagnostics, alerts and scheduling of maintenance, and GPS tracking. Cisco Jasper says that its partnerships with 50 service providers in more than 100 countries will enable the car-maker to expand its services globally as needed.

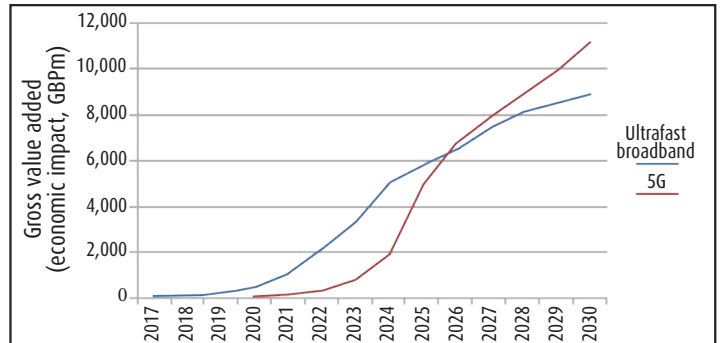
5G to deliver benefits 'twice as fast as fibre'



5G infrastructure will outstrip the economic benefits of fixed fibre broadband in the UK by 2026, according to a report by Telefónica-owned mobile operator O2.

It states that 5G will introduce entirely new industries, platforms and services. In addition to GBP7bn of direct economic value through businesses using the technology, the report says the 'ripple effect' through the supply chain will also see 5G indirectly boost UK productivity by an extra GBP3bn a year.

O2 also believes that the added value of 5G to the economy will become apparent almost twice as quickly as fibre broadband (see graph, right). Despite fibre broadband rollouts already taking place in the country and 5G not scheduled for launch until 2020, the latter is forecast to achieve the same



economic benefits as fibre by 2026.

Citing data from UK regulator Ofcom, O2 says more than four in every five adults in the UK now owns a smartphone and nearly three quarters use a mobile device to access the internet on the go. It says the combined value of 4G and 5G connectivity will add GBP18.5bn to the economy in less than a decade, compared to

GBP17.5bn for broadband overall.

"Mobile is the invisible infrastructure that can drive the economy of post-Brexit Britain," says O2 CEO Mark Evans. "The future of 5G promises a much quicker return on investment than fibre broadband, and a range of unprecedented benefits: from telehealth applications to smarter cities and more seamless public services."

UROS connects smart water grid with IoT



Roaming specialist UROS (Uni-fi Roaming Solutions) is working with Finland's Jyväskylä Energy to create smart management solutions for national water operation systems around the globe.

UROS offers worldwide roaming and IoT solutions for mobile operators, enterprises and consumers. The company says its "bill shock-free" services – which include smartphones, apps and Goodspeed 4G mobile Wi-Fi – are provisioned

by a unique M2M platform providing global connectivity via the eSIM ecosystem.

Jyväskylä Energy will use this M2M platform to connect its water management platform initiative called 'Pisara'. This is said to offer preventive maintenance solutions aimed at avoiding water supply crises and at guaranteeing high-quality water for consumers.

Sakari Laitinen, development manager at Pisara Water Business,

says: "The world's smartest digital water solutions combined with global connectivity and security enable water management to enter a new era in which water will be distributed via intelligent water networks and in which water quality will be controlled using AI and smart sensors."

Laitinen adds that people in communities around the world will soon be able to monitor, in real-time, the quality of their most valuable asset – clean water.

Viasat improves driver safety with Orange



Orange Business Services (OBS) has signed a multi-million dollar three-year contract with Viasat Group for a global IoT roaming service for up to 350,000 SIM cards. It will allow Viasat to provide global coverage across a number of markets for services that include insurance, fleet security and safety, and telematics.

Italy-headquartered Viasat specialises in satellite-based security systems, which it says incorporate the very latest telematics information technologies to guarantee absolute security for the vehicle and its occupants.



The Viasat Group's remote telematics boxes will be able to remotely send and receive data via the IoT.

OBS will provide the IoT connectivity to enable the company's telematics boxes to remotely send and receive data, texts and voice. It says the SIMs are reinforced to withstand vibration and high

temperatures, and roaming-enabled which provides global coverage.

OBS also provides an IoT management platform that will allow Viasat customers to manage and update their own SIMs. It says the platform can be integrated with the customer's back-end system to provide detailed reports and retrieve billing information.

In addition, it's claimed IoT connectivity will also allow customers to improve the quality of their driving which translates into increased safety for passengers as well as vehicles. This will ultimately help to lower the average costs of insurance premiums.

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