- **Rural connectivity: overcoming the MNO's greatest challenge**
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While telecom operators in the region continue to look for new revenue streams, network vendors of the likes of Ericsson have got to play a significant role in the enablement of this transformation.
Read the full interview with
Rafiah Ibrahim, Head of Ericsson MEA,
on pages 18 & 19.

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While telecom operators in the region continue to look for new revenue streams, network vendors of the likes of Ericsson have got to play a significant role in enablement of this transformation.

Rafiah Ibrahim, Head of Ericsson Middle East and Africa: "Ericsson's portfolio of solutions and services supports operators in their attempts to transform the telecom core and operations."

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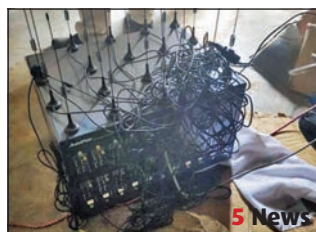
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Sudatel poised to be African leader

Sudatel will be the first company in Sudan to benefit from the US recently lifting a trade embargo that had been in place for more than a decade.

Sanctions were imposed by the UN Security Council following conflict in the country in 2004. The US also considered Sudan to be among nations sponsoring terrorism.

But on 12 October 2017, the Office of Foreign Assets Control (OFAC) of the US Department of the Treasury announced that a number of Sudanese companies have now been dropped from the trade ban list. The most prominent of these is part state-owned Sudatel Telecommunications

After returning from the US as part of an official Sudanese trade delegation, STG CEO Tariq Hamza told reporters that talks had been held with various organisations including Apple, Boeing, ExxonMobil, and Ford.

Group (STG). The operator had been blacklisted since 2004, and observers expect that the lifting of sanctions will enable it to create new companies and lead the region.

Within days of OFAC's revocation, STG signed an agreement to host a US delegation to visit Khartoum in early December. It will represent the initial trade mission and include investors and US firms working in energy, agriculture, technology, etc., in addition to researchers and economic specialists.

After flying back from the US together with Sudanese ministers, STG CEO Tariq Hamza told reporters that they had held talks with representatives from the US Chamber of Commerce, the Board of Companies for Africa, Apple, Boeing, ExxonMobil and Ford. They also met with representatives from the British and German governments, as well as the IMF. He added that the next phase for Sudatel will see partnerships with major international communications companies.

According to Hamza, US officials now consider Sudan to be an important gateway to Africa, and that they are "well aware" that the Chinese were achieving successes in the country.

Djezzy covering 10 million people with 4G in Algeria

Algeria's Djezzy says it has extended its 4G network to four new 'wilayas' or provinces. They include Annaba, Tamanrasset, Mascara and Adrar.

With these new extensions, the cellco says its LTE network has now reached a total of 24 provinces and 25 per cent of the population or 10 million people since beginning its network rollouts in October.

At the time, Djezzy promised it would eventually cover 16 million people with what it claimed would be Algeria's largest 4G network *(News, Oct-Nov 2016)*. The operator says this latest extension is the "concrete result" of that ambition. At the same time, it is also reinforcing its 3G

coverage especially in urban areas and upgrading its 2G network.

Djezzy is 51 per cent owned by the National Investment Fund, while the rest is held by Global Telecom Holding and Veon (formerly VimpelCom). The company regards itself as Algerian and says it therefore aims to contribute to the nation's economic and social development, as well as its infrastructure.

Djezzy adds that on top of its "massive technological investments", it also invests in human capital. With the support of Veon, it is looking to fill "hundreds" of new roles such as 'Big Data' scientists, IT architects, value base network expert, etc.

Avanti delays *HYLAS 4* launch but saves time

Avanti Communications now plans to launch *HYLAS 4* next year. It has agreed a launch slot for its next African satellite with Arianespace beginning 1 March 2018.

Built by Orbital Science, the new Ka-band hybrid propulsion satellite features part traditional chemical orbit raising, part electric orbit raising, and electric station keeping.

The previously announced launch slot of 4Q17 would have required around 100 days of electric orbit raising for it to reach geostationary orbit, therefore on station by early April 2018. However, Avanti says the intended launch configuration of the new slot means extra chemical fuel

can be loaded on *HYLAS 4* as it will now be paired with a lighter partner spacecraft than originally planned. This enables chemical-only propulsion to be employed whereby the satellite reaches geostationary orbit in just 10 days, saving approximately 90 days of electric orbit raising.

As a result, *HYLAS 4* can reach its on station location by the middle of March 2018, and Avanti says revenues are expected to flow from July 2018 as previously planned.

It adds that the launch configuration also provides sufficient fuel on board to support *HYLAS 4* for up to 19 years in orbit, an increase of 27 per cent over previous expectations.

ARPCE cracks down on SIM box fraud in Congo

In mid-October, Congolese regulator ARPCE (Agency for the Regulation of Posts and Electronic Communications) announced that its technical teams had dismantled an illegal mobile network in Pointe-Noire, the country's economic capital.

Working closely with the police, they discovered a SIM box with a capacity for 80 cards, 16 pre-activated Airtel SIMs, recharge cards worth nearly CDF50,000 (around USD32), and an electric generator. Two people were arrested, and they had been operating the network for some time from a wooden hut.

This latest dismantling comes just a few weeks after another fraudulent network was found in Brazzaville.

Sandé Ndé, ARPCE's director of networks and electronic communications services, says it is the mobile operators who are the biggest victims: "This kind of fraud causes them to lose profits which amount to millions of francs. One minute of international calling amounts to 170 francs, and sometimes these fraudsters total up to thousands of minutes of calling."

Augustin Ngoma, head of the ARPCE departmental antenna in

Pointe-Noire, also points out that the lack of verifying a customer's identity before he or she is sold a SIM is a major contributor to mobile fraud.

"We recovered 16 activated but unidentified SIM cards from these fraudsters. They were smart enough because they bought all of these from street vendors. Otherwise, they would have been apprehended long before."

Ngoma adds that as from the beginning of 2018, no SIMs will be sold by street vendors in the country. Instead, they will have to be purchased through resellers authorised by the operators.

The regulator's technical teams and police discovered a SIM box with a capacity for 80 cards.

New faces at NIGCOMSAT

Nigeria's Federal Government has appointed three executive directors to its satellite operation, NIGCOMSAT. All are described as "seasoned professionals". They include: Samson Osagie in marketing and business development; Alhaji Abubakar Muhammad in finance and administration; and Kazeem Raji in engineering services. The government says the appointments are part of a strategic plan to reposition NIGCOMSAT to commercialise services on its *NigComSat-1R* communications satellite, and generate revenue from DTH and broadband services across the country.

Consumers Compensated

Guinea's Authority for Posts and Telecommunications (ARPT) says the local Consumer Union has sued Orange Guinea for compensation following the operator's redesign of its internet passes. The union alleged damage to consumers who had already purchased packages. After several months of discussions mediated by the ARPT, Orange Guinea agreed to compensate customers who had purchased passes when the new packages were put into service with online credit.

Penetration up in Ghana

Mobile voice subscriptions in Ghana increased 1.75 per cent from 35.8 million in the first quarter of 2017 to 36.4 million in the second quarter, according to the National Communications Authority. However, in its *Statistical Bulletin* for the period released earlier this year, it said year-on-year subscription decreased by 0.56 per cent from 36.6 million in 2Q16 to 36.4 million at the end of 2Q17. Penetration rate at the end of the quarter rose from 126.6 per cent in the previous quarter to 128 per cent.

Mobile QoS "deteriorating day by day" in Benin

Benin's regulator says the quality of service provided by the country's cellcos is "deteriorating day by day".

In early September, ARCEP (Authority for the Regulation of Electronic Communications and the Post office) met with Glo Mobile, MOOV and MTN to discuss the reasons for the "general degradation" of the quality of service found in their networks. It said that the aim of the meeting was to find the appropriate solutions to satisfy subscribers' expectations.

According to ARCEP, the blocking rate as well as the rate of call termination is "abnormally high" across all networks. The three operators acknowledged that their service quality had deteriorated but said there were a number of factors to blame.

Among other things, these included: the need for network optimisation; the on-availability of energy commercialisation; the sizing of chain cores at the level of their networks; greater network security to combat SIM box fraud; and the extension of networks to ensure complete nationwide coverage.

President of the Regulatory Board, Flavien Bachabi, said the problems listed by the operators did not exempt them from the quality of service they are obliged to provide to consumers.

He added that while the operators had already been sanctioned for their poor services, such penalties were not the ultimate target.

"The aim is the quality of service for all consumers. For the state, what is important is not the taxes levied on operators, but to ensure operators contribute effectively to the development of the country," said Bachabi.
■ ARCEP has begun a mobile number portability project. As part of this, its Mobile Number Portability Steering Group has launched an international competitive bidding notice for the recruitment of a firm to establish and operate a centralised system in Benin.

Sensors to improve comms in Liberia

The Liberian Telecommunications Authority (LTA) has deployed sensor-based monitoring stations from LS telcom, the spectrum management and monitoring specialist headquartered in Germany.

The purchase of the company's *LS OBSERVER* systems was facilitated through NGO NetHope as part of a larger USAID recovery package for Liberia. Following the Ebola crisis in 2014-2015, improvement in communications was identified as a top priority for the country. Working together with USAID, NetHope selected LS telcom as the best technology solution for LTA's requirements.

LS OBSERVER provides the authority with monitoring capabilities including identification of spectrum conflicts, identification of free spectrum, isolation of dead zones in coverage, and locating rogue networks.

Available in fixed and portable versions, LS telcom claims its monitoring system is "ideal" for regulators to monitor, establish and maintain a spectrum inventory or support spectrum inventory activities, and enforce spectrum usage policies and procedures.

The company adds that as the value of spectrum continues to increase, *LS OBSERVER* can also be used to identify areas of unused spectrum that can be reallocated and licensed for future use.

Henry W. Benson, the LTA's commissioner for engineering and technology, says the system is a key part of the authority's mission to improve communications in the country. He says: "As I consider radio frequency a scarce resource for Liberia, the *LS OBSERVER* monitoring stations will allow our team to fully optimise spectrum policy and increase the enforcement capability at LTA."

Liberia's authority is using LS telcom's transportable monitoring unit.

Safaricom starts FTTH regional rollouts

Early October saw Safaricom begin its ambitious home broadband project.

Earlier this year, the operator announced that it would be entering Kenya's home broadband market with rapid roll outs of fibre-to-the-home (FTTH) (*see News, Aug-Sep 2017*).

The company says it currently has 95,000 homes connected to its fibre infrastructure. During the first phase of its new *Home Fibre* project, it will start with Kitengela town and its environs, targeting 14,000 homes with a plan to reach 40 per cent penetration within the next three months. Other towns that will be covered during this phase include Athi River, Buruburu, Ngong Road, Runda, Ruaka and Karen.

According to Safaricom, customers will have a choice of internet packages starting from "as low" as KE2,500 (around USD24) per month for speeds of 5Mbps, to KED9,999 (around USD97) per month for 40Mbps. It adds that after registering for the service, subscribers will be given a router and access to credentials that will enable them to have both wireless and LAN access, with no installation charges.

Safaricom's Home Fibre teams are initially targeting 14,000 homes in the Kitengela town area.

Subah offers mobile money monitor

Subah reckons it's come up with a new way to provide regulators with the full visibility needed to monitor all mobile money transactions initiated or completed in their country.

According to the Accra-headquartered IT solutions specialist, its *Mobile Money Monitoring Suite (M3)* protects consumers against fraud and identity theft, and tackles tax evasion, money laundering and revenue leakage.

"The ability to receive and send money from our mobiles is a truly life-changing development," says the Subah CEO Birendra Sasma. "However, its success poses multiple regulatory, taxation and compliance issues for regulators, tax administrators and banks across the world. *M3* gives them the tools to tackle all of these issues."

M3 is standalone software that is installed at the operator's NOC. Subah says it has been designed to capture, analyse and record all mobile money transactions, including information about the sender, receiver and operator. It is said to feature automatic reporting of high-value and repeat transfers to individuals and businesses, and provides a summary of mobile money service charges applied by all operators.

The platform is also claimed to offer extensive web-based reporting features to enable "sophisticated" tracking and measurement of all transactions. Subah adds that it is compatible with all existing mobile money platforms, and "fully customisable" for different m-banking regulatory frameworks.

Ecobank and Visa partner for QR-code banking

Ecobank and Visa have joined forces to launch Ecobank's *Scan+Pay* system with *mVisa* solutions to customers across 33 African countries.

According to the partners, their strategic tie-up signals interoperability on a cross-border level. It will enable consumers to use their mobiles to directly access their bank funds for person-to-merchant or person-to-person transactions.

It's claimed *Ecobank Scan+Pay* with *mVisa* delivers instant and secure cashless payment for goods and services. Customers use the service by scanning a QR code with a smartphone, or entering a unique merchant identifying code into either a feature phone or smartphone. The payment goes straight from the customer's bank account into the merchant's account, and provides real-time notification to both parties.

Ecobank believes that the new service will accelerate digital commerce and overcome some of the challenges merchants have faced using traditional point of sale systems, such as the cost of installation and the need for electricity and internet connectivity.

Ecobank *mVisa* solutions also enable users to send money instantly to any Visa cardholder worldwide. The companies reckon this is a "major innovation" that serves the need of Africans in the diaspora by enabling them to send money home quickly and securely.

Ericsson aiming to get bigger foothold in Nigerian market

From left to right: Sunday Dare, executive commissioner stakeholder management, NCC; Ericsson's head of government and industry relations, Shiletsi Makhofane; and Peter Olusoji, director Ericsson Nigeria.

Ericsson has been studying the Nigerian market and has concluded that its "vast potentials" have yet to be fully harnessed. That's according to Shiletsi Makhofane, the company's head of government and industry relations, who recently led a management team visit to the Nigerian Communications Commission (NCC).

Speaking to Sunday Dare, the NCC's executive commissioner for stakeholder management, Makhofane and his team said that Ericsson was interested in the deployment of broadband to unserved and underserved areas in the country. The company said it planned on deploying the latest technology for this, with availability, accessibility and affordability in mind in order to meet the regulator's broadband agenda.

While at the NCC, the team also sought clarifications on licensing requirements for a couple of its businesses. These included: type approval procedures for IoT and 5G equipment; Big Data management; and cyber security solutions to enable network interoperability and traceability to check the use of cloned devices.

However, the company expressed concern about the lack of forex in Nigeria, and its implications for the development of the country's telecoms market. The NCC says that Dare assured Makhofane and his colleagues that the commission will continue to do what is right to attract FDI for the development and growth of the industry.

He added that the interests and concerns of the team would be passed on to NCC EVC and CEO, Prof. Umar Danbatta, for high level consideration and necessary action.

Rwanda calls in Microsoft and WISeKey to help with Blockchain project

Microsoft 4Afrika CTO Dr. Ashraf Abdelwahab hopes the project will "fundamentally change" the way data will be shared across industries.

The Rwandan government is working with Microsoft and WISeKey International as part of its aim to make the country more digitised.

It is incorporating identity management systems from Switzerland-based WISeKey with *Microsoft Azure* Blockchain capabilities. It's hoped this will enable secure transactions, digital authentication and legally binding signatures that are all aligned to the government's Blockchain project.

The Rwandan project was established earlier this year in partnership with WISeKey's Blockchain Centre of Excellence. This aims to position the country as a key player in digital transformation by providing citizens and businesses access to policy, technical and business expertise which ultimately aims to facilitate growth in the country.

In the first phase, the Rwanda Land Registry will be digitised to ensure control of authenticity. Using WISeKey's *WiseID* suite of mobile applications, the system will digitally store necessary data to enable authenticity of identification and the validation of assets. It's claimed applying *Azure*'s capabilities will ensure that all personal data is protected and secured.

Microsoft believes becoming a technology partner with WISeKey will enable it to be a part of a solution that will ultimately facilitate private and public collaboration in Rwanda.

Microsoft 4Afrika CTO Dr. Ashraf Abdelwahab says: "We trust this solution will bring the Rwandan government and its private sector closer to realising the benefits of digital transformation with a more open, transparent, and publicly verifiable system that will fundamentally change the way value-exchange, assets, enforcement of contracts, and sharing of data across industries will be experienced."

IDC describes Blockchain as an immutable database of a history of transactions and assets that have been executed. These transactions are spread across a network of computers using high level cryptography and only viewed by users with right of access. Once the transactions or data is committed to the network, the distributed database is prevented from being altered or manipulated by unscrupulous third parties.

Originally developed for cryptocurrencies, IDC says telcos and other industries such as the financial sector have now realised the major benefits and gains Blockchain technologies can offer.

Mobile driving internet in Morocco

Morocco's internet growth continues to be driven by mobile, according to the country's National Telecommunications Regulatory Agency (ANRT).

In its report for 2Q17, the agency says the number of internet subscribers in the country was more than 19.2 million as at June 2017, an annual increase of 29 per cent. Internet penetration is more than 55 per cent of the population with

the growth of the segment continuing to be driven mainly by 3G and 4G. As a result, the ANRT says the number of mobile internet subscribers is almost 18 million, with 2Q17 recording a growth of 5.7 per cent compared to 1Q17, and 965,000 new subscriptions added during the period.

The total number of mobile subscribers shared between Maroc

Telecom (Etisalat), Orange and Inwi at the end of June 2017 was recorded as 42.05 million, an increase of 0.64 per cent from the previous quarter. Of these, 4.7 million were 4G users, a 37 per cent rise from 1Q17.

The ANRT says that the second quarter of the year confirmed the growing post-paid trend seen during previous quarters. Here, the number

of mobile users reached almost 3.2 million, an annual increase of nearly 11 per cent. The pre-paid subscriber base was 38.86 million, a quarterly increase of 0.44 per cent.

The regulator adds that compared to the same time during the previous year, ARPU was "virtually stagnant" for June 2017 and reached MAD0.23 (USD0.02) per minute.

Orange certified for gender equality

Orange says it has become the first operator in Tunisia to gain Gender Equality European International Standard (GEEIS) certification.

As part of its CSR initiatives and HR policy, the company says it has made gender equality one of its strategic priorities. Last year, it signed the UN's Women's Empowerment Principles (Weps) agreement and says it is improving this with gender equality initiatives based on four main principles. These include: promoting a balanced representation of women in all occupations, especially technical ones; increasing women's access to positions of responsibility; ensuring equal pay; and preserving work-life balance.

Orange was awarded the GEEIS certification by Bureau Veritas following a documentary review and on-site audit. Among some of the eight points highlighted during the audit, Veritas found that the operator's "feminisation rate" was close to international standards with 38 per cent of the total workforce and 44 per cent of women on the executive committee.

Orange was also recognised for its deployment of programmes aimed at the empowerment of women, as well as its support to the UN Women in Tunisia campaigns to raise awareness of the fight against violence against women and girls.

Viettel eyes Nigeria

Viettel Global is planning to launch operations in Nigeria. At its AGM earlier this year, the Vietnam military-owned telco said investments in the country along with a new operation in Indonesia would create conditions for it to continue to grow its interests elsewhere. It is aiming to begin in 1Q18. Viettel reported a 21 per cent YoY decline in revenues last year, with its networks in Mozambique and Burundi particularly suffering due to forex issues. But it did see earnings growth in Tanzania, Cameroon and Mozambique.

Intelsat 37e launched

Following a delay of more than three weeks, *Intelsat 37e* has been launched. It blasted off from Arianespace's launch site in French Guyana on 29 September and is now aiming to begin commercial services in 1Q18 after all in-orbit tests are successfully completed. The satellite will cover Africa from 342ºE and is the fifth to use Intelsat's high throughput *EpicNG* platform. It was originally scheduled for launch on 5 September but this was aborted due to a technical fault *(see News, Aug-Sep 2017)*.

ABS set to expand VSAT

ABS will expand its VSAT technology using equipment from UHP Networks. Over the last five years, the satellite operator has rolled out several UHP-based networks across Africa and APAC providing internet and VSAT connectivity. It now plans to deploy new services in the Middle East. It will use multiple high-density redundant *UHP-HTS* hubs and *UHP-100* remote routers for the expansion. It's claimed the technology will provide a high-availability, bandwidth-efficient and cost-effective service to ABS customers.

Hybrid environments blueprint published

TM Forum has launched a blueprint aimed at helping CSPs address the problem of managing hybrid network environments.

According to the forum, its *Implementation and Deployment Blueprints for Hybrid Environments* provides a standardised and interoperable approach to solving the fragmentation between traditional and virtualised infrastructures and systems. It claims the guidance provides CSPs with measured ways to manage the migration, creating a smoother digital transformation.

The TM Forum is a global association of more than 850 member companies who work together in order to maximise

TM Forum CEO Nik Willetts says the blueprint helps CSPs to "navigate what is a complex and lengthy digital transformation".

the business success of communication and digital service providers.

Its CEO Nik Willetts says: "As the telecoms industry rapidly transforms, it is essential that enabling technology and standards are put in place to allow existing infrastructures and systems to communicate with new and future architectures."

The blueprint was developed by members as part of the forum's *Zero-touch Orchestration, Operations and Management (ZOOM)* project. They say it offers a complete implementation and deployment blueprint for managing a multi-vendor, hybrid/NFV infrastructure. This includes open APIs, information models, best practices and deployment guides.

It is also said to provide a number of management capabilities not currently available together in a standardised package. These include: resource function activation and configuration; inventory management; catalogue management; and assurance.

Dell to donate millions to STEM education

As a part of ongoing efforts to invest in a more diverse technology workforce, Dell Inc. expects to contribute USD14m in grants and technology donations to support future generations of STEM workers, during its current financial year which ends February 2018.

The computer company says current donations made across its 71 youth learning partners globally are expected to bring technology education to more than 1.5 million underserved youth. Dell adds that with the expected contributions,

a total of four million children will be impacted through its CSR programmes since 2014.

Dell has dedicated funds, technology and expertise globally to further empower and enable interested youth from around the world to explore STEM fields.

One of the organisations that it helped this year with a grant of USD650,000 is Camara Education. The Ireland-based charity provides educational institutions with technology and support to help them improve educational outcomes. In

Africa, Camara delivers its services through a network of local hubs in Ethiopia, Kenya, Lesotho, Tanzania and Zambia. This year, Dell donated a grant of USD650,000, benefiting more than 250,000 youth and 2,000 educators in 240 locations.

Dell has also recently opened two new Solar Powered Learning Labs in South Africa this month, with more planned. These bring technology and connectivity to students, teachers and communities using solar power and thin client workstations from Wyse.

Samsung helps girls learn ICT skills in Ghana

In early October, 40 employees from Samsung's headquarters in South Korea gathered in Ghana to take part in the company's annual employee volunteer programme.

As part of the week-long initiative, staff members shared their skills and expertise with girls through the handover of a new Samsung-funded ICT Centre at the Accra Bishop Girls Junior High School.

The school has a total of 760 students, and has historically relied on textbooks because of its lack of ICT facilities. But with the new facility, pupils now have the opportunity to acquire and enhance technological skills vital to the digital economy.

A Samsung team of 40 volunteers carried out IT training for pupils and staff at the Accra Bishop Girls School.

Samsung says this is particularly important when it comes to future generations of women, and citing the World Economic Forum's *Global Gender Gap* report, it says that there is still a 47 per cent global gender gap when it comes to STEM graduates at tertiary level.

"It's important for our people to be actively involved with the education

initiatives we are rolling out across Africa," says Eungjin Nahm, Samsung Electronics West Africa – Ghana. "Not only are they able to impart considerable value through their time and expertise, but it also provides them with the opportunity to witness first-hand the difference their combined involvement in Samsung is making to the lives of others."

Orange to bridge SL's digital divide

Orange officially launched its brand in Sierra Leone in mid-September. This follows the company's acquisition of Airtel Sierra Leone together with its Senegal-based partner Sonatel which was finalised in July 2016.

With a population of seven million people, Orange reckons Sierra Leone offers "significant" potential for growth in mobile services. Sekou Drame, CEO, Orange Sierra Leone, says: "We remain committed to taking our network and services deeper into the country, right up to the doorsteps of each and every Sierra Leonean, with the aim of bridging the digital divide within the country. With the support of Orange and Sonatel we can truly deliver on this."

Earlier this year, the operator announced a USD33m modernisation and expansion plan to enhance the quality of its network, voice and data services in the country. As of mid-October, it says most of this investment has already been realised with 30 new radio sites on air and more than half of the entire mobile network upgraded.

■ In a separate announcement, Dubai-based Topaz Energy and Marine (TEZ) has signed an agreement with Orange Business Services to connect its fleet at sea and support the corporate network.

Dubai-based TEZ runs a fleet of more than 110 offshore support vessels providing marine solutions to the global energy industry. Its primary focus is on West African, Middle Eastern, Caspian, and subsea operations.

Under a three-year agreement, Orange is initially connecting 39 vessels but by the end of 2018 it plans to cover TEZ's entire fleet with its Maritime Connect platform. This incorporates multiple connections including VSAT, L-band terminals, 3G/4G and Wi-Fi.

According to Orange, the platform routes traffic depending on the availability of the link and with the appropriate quality of service. It says that this will enable Topaz to integrate its fleet into the corporate network as 'offices at sea' and roll out business-critical applications.

The company adds that *Maritime Connect* also manages voice, video and data in limited bandwidth and challenging weather conditions.

Avanti has "positive outlook" for new financial year

In its trading update for the financial year ended 30 June 2017, Avanti Communications Group said revenues for the fourth quarter rose to in excess of USD16m resulting in total sales for the year of around USD62m. In its 3Q statement announced at the end of May, the company reported that a number of projects to sell spectrum were "progressing well" but that they did not close in time to impact the final quarter.

In July, Avanti announced the award of a new three-year contract worth up to USD21m to deploy several hundred services to government sites across Africa with an existing unnamed government customer. It says this, in addition to recent announcements of mobility, 5G and broadband orders along with a strengthened balance sheet, creates a "positive outlook" for the new financial year.

In July 2016, the group said it was open to a takeover to address its funding requirements *(Wireless Business, Aug-Sep 2016 issue)*. But at the end of last year, Avanti announced that it had completed its strategic review which included termination of the formal sale process and end of offer period.

The company proposed a refinancing scheme that will fully fund it through the creation of USD242m of additional liquidity through USD130m of new cash funding and up to USD112m of potential interest deferrals up to April 2018. Avanti said this will give it "significant" working capital to launch *HYLAS 4* and grow into its capital structure. The satellite was planned for launch in 4Q17 but this is now expected in March 2018.

Satellite market pricing set for further falls

Satellite pricing is expected to further decline, according to NSR's latest Satellite Capacity Pricing Index.

With operators and service providers focusing on volume business in data and mobility verticals, the analyst says pricing has plummeted over the past couple of years from a high of USD3,000-4,000 per MHz per month, to below USD1,500.

According to the index, there are several factors contributing to the decline. In total, it says 13 factors can exert influence over pricing depending on a company's growth strategy and sales positioning, consolidation in its value chain vertical (operator, service provider or anchor client), customer relationships and deal contracts.

NSR analyst Gagan Agrawal says that while the factors shown in the chart below represent satellite leasing contracts historically, other influences, such as SLA ("premium versus frugal" maritime customers), regional oversupply and HTS fill rates below 40 per cent, and high spectral efficiency leading to low per Mbps pricing and bargaining power, are all becoming more important leading to large retail/wholesale discounts.

He notes that data/backhaul deals have consistently come in at prices under USD500 per Mbps per month during this year. "Some of the most prominent examples of the deals include backhaul capacity leased at sub USD400/Mbps/month in Western Europe and Africa, aero capacity leased at sub USD700/Mbps/month in Southeast Asia, and video capacity at sub USD2,000/MHz/month in North America."

NSR expects mobility and data pricing to drop between five to 15 per cent and 10 to 30 per cent globally in the next year. For a leasing economy to maintain/grow top line revenues, it says operators would need anchor customers in the aero, backhaul and broadband businesses for their upcoming satellites and, in addition, fight off competition from new entrants to maintain the relevance of their "ageing" FSS fleets. Given these price drops, Agrawal reckons a wholesale business with a pseudo-lease or mixed lease-service model could be one of the winning strategies for operators to adopt.

He continues by saying that a mixed lease-service business on the operator's end or upstream vertical integration on the service provider side has potential to grow top line revenues for either of the players in the value chain.

"Ultimately, the companies which pivot early based on efficient fleet consolidation and customer matching, stand a chance in winning the pricing battle," concludes Agrawal.

BBC and Arabsat renew agreement

The British Broadcasting Corporation has renewed its longstanding agreement with Arabsat to broadcast its Arabic language service.

The service will continue to be offered via *BADR-4* satellite which covers the entire MENA region and most of Western Europe from 26ºE. Sam Farah,
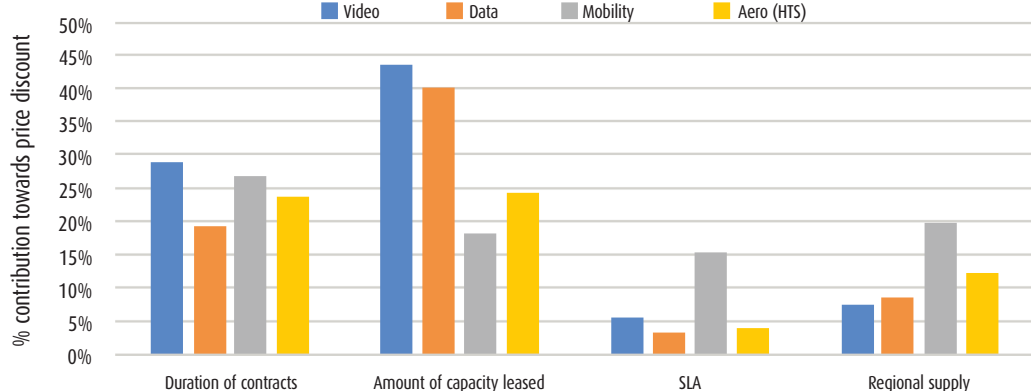
Some of the key factors influencing price reductions in the satellite market.   SOURCE: NSR

head of BBC Arabic, says Arabsat's satellite is a "key" means of reaching its audience across North Africa and in the Middle East. He adds: "This new contract will extend the partnership to 15 years of delivery of our free to air radio and television services."

As well as the BBC's regional services, Arabsat says *BADR-4* also offers a platform to other major broadcasters whose channels can be received throughout the Middle East, North Africa and Europe using a "minimum" sized dish. Neighbouring news channels include France 24, CNBC Arabia, Sky News Arabia, Africa 24 and RTI.

Digitata becomes part of 'Industry 4.0'
4Sight Holdings has acquired Digitata Mauritius on a share for share basis in June 2017. Financial terms of the transaction have not been disclosed.

Digitata Group CEO Tinus Neethling says: "With a shared vision and synergistic values and focus, this partnership with 4Sight Holdings is a natural next step on our journey as a forward-looking technology company."

He adds that Digitata retains its operational autonomy, and that its management, 150 staff and product offerings remain unchanged.

The acquisition brings 97 per cent of 4Sight's revenue in dollar-based income, with South Africa revenue contributing the remaining three per cent.

Incorporated in Mauritius, 4Sight is an international technology holding company. The firm earns its income through its subsidiaries, mainly from licensing intelligent algorithms in an SaaS annuity revenue model.

In October 2017, 4Sight began to be listed on the JSE's Alternative Exchange (AltX). The company says this will offer South Africans the opportunity to invest in a "pure data" technology company.

4Sight seeks to raise up to ZAR300m which will be used for acquisitions and the incubation of new products in sectors such as retail and healthcare. It says the next round of strategic acquisitions will be concluded before December 2017, enabling it to offer mining and manufacturing customers the ability to optimise value chains and plant operations in real-time. This includes new AI technology which, it's claimed, can predict physical asset failures up to eight weeks in advance, providing customers with the means to reduce operations downtime.

4Sight says it focuses on investing in companies that are part of the fourth industry revolution, or 'Industry 4.0'.

While the first three revolutions brought mechanical innovations, mass production, and computers and the internet, it's claimed Industry 4.0 will lead to system-wide innovations that are being driven by the continued digitalisation of networked societies.

"We foresee a growth in demand for real-time decision solutions in the fourth industrial revolution," says 4Sight CEO and co-founder, Professor Antonie van Rensburg. "The underlying power to unlock economic value lies in the use of scientific and engineering skills applied cross-functionally with disciplines such as econometrics, medical sciences, bio-informatics, and astrophysics."

Vivacom to use Eutelsat C-band
Vivacom has signed a multi-year contract with Eutelsat for C-band capacity in order to expand its video business in Africa. The Bulgarian telecoms services provider's aim is to provide contribution services for international channels seeking carriage by major African pay-TV operators.

The first six channels are already being uplinked to *EUTELSAT 8 West B* via Vivacom's Plana teleport in Bulgaria. Plana is also one of Eutelsat's partner teleports, and is certified by the World Teleport Association.

Vladimir Rangelov, senior manager of broadcasting services at Vivacom, says: "Through our Plana teleport, we offer channels end-to-end solutions for signal acquisition, encoding,

encryption, uplink and downlink via satellite with excellent quality and reliability. This contract adds new value for our customers by giving them access to the African market."

Orbiting at 8°W, *EUTELSAT 8 West B* was launched in August 2015 and is equipped with Ku- and C-band transponders, as well as 10 physical C-band transponders connected to footprints covering Africa and reaching South America.

Meanwhile in October, Eutelsat announced that it had acquired Middle Eastern satellite service provider NOORSAT from Bahrain's Orbit Holding Group in a USD75m, debt- and cash-free deal. It says the acquisition will add upwards of USD15m to

its consolidated revenues on an annualised basis after the elimination of the capacity leased by NOORSAT from Eutelsat. The company adds that the "slightly dilutive" impact on its EBITDA margin will be absorbed within the current margin objectives.

Established in 2004, NOORSAT is the premier distributor of Eutelsat capacity in the Middle East, providing services for more than 300 TV channels almost exclusively from Eutelsat's Middle East and North Africa neighbourhoods at 7/8°W and 25.5°E.

Eutelsat says the acquisition is part of its broader strategy of streamlining distribution within selected core video neighbourhoods where it can create value.

SEACOM acquires MacroLan to extend fibre reach

In early August, SEACOM announced that it had acquired South African ISP and managed services provider MacroLan for an undisclosed sum.

MacroLan manages an expanding fibre network that is said to serve a growing number of enterprise users in Cape Town.

It also owns and manages fibre infrastructure and access at numerous commercial buildings, offering clients access to a range of business broadband services as well as value-added services.

SEACOM said that the deal is in line with its strategy to extend its fibre

network reach to more metropolitan areas across South Africa, as well as to bolster its managed services capability for enterprise customers.

MacroLan will become SEACOM's Cape Town regional office and will lead the operator's expansion in the Western Cape market for fibre internet access to business-customer premises.

"This transaction gives us the backing of a major pan-African telecom partner, in turn offering us access to the resources and muscle we need to grow our business," said Paul Johnson, CEO, MacroLan. "Our network will now integrate directly into SEACOM's African networks and submarine cable investments."

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
1/6/17	Dr. Lih Shyng (Rick) Tsai	MediaTek	Co-CEO	Chunghwa Telecom	Chairman
11/7/17	Khaled Zeidan	Coriant	MD MEA	IneoQuest Technologies	Regional sales director, MENA
23/8/17	Troy Mattern	Motorola Solutions	Head of cyber security for products & services	Zurich Insurance Company	VP of cyber security
24/8/17	Reza Ghaffari	Coriant	EVP global services & operational excellence	Coriant	SVP global services
19/9/17	Jürgen Walter	Kathrein Group	COO	Kathrein Group	Head of solutions business unit
19/9/17	Colin Sabol	Xylem	SVP & president of Sensus & Analytics	Xylem Analytics	President
2/10/17	Alam Ali	Motorola Solutions	VP, records & evidence systems, Software Enterprise	Tersai Corporation	Founder & SVP of product & operations
2/10/17	Iain McDonald	Motorola Solutions	VP, software deployment & integration, Software Enterprise	Microsoft	GM & partner engineering manager
3/10/17	Dr. Graeme Milligan	CyanConnode	Global head of integration	UK Smart Metering Implementation Programme	Consultant
3/10/17	Brad Surak	Hitachi Vantara	Chief product & strategy officer	GE Digital	COO
3/10/17	John Murphy	Hitachi Vantara	VP, offerings management	IBM	VP, *Watson* data platform
6/10/17	Ebenezer Asante	MTN Group	VP, Southern & East Africa & Ghana region (SEAGHA)	MTN Ghana	CEO
9/10/17	Ronnie Leten	Ericsson	Chairman	Atlas Copco	President & CEO
17/10/17	Fadhel Kraiem	Tunisie Telecom	Chairman & CEO	Monoprix	MD
19/10/17	Samir Marwaha	Sandvine	CMO	Netscout	VP & GM of new markets business

INVESTMENTS, MERGERS & ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
6/9/17	Shareholders	Redknee Solutions	Rights offering	CAD0.63 per share	Under the Rights Offering, an aggregate of 108,519,936 subordinate voting shares were issued for gross proceeds to Redknee of around CAD68m. Net proceeds will be used to fund a restructuring of the business to further a previously announced strategic plan.
3/10/17	ARRIS International	Broadcom Limited	Ruckus Wireless & Brocade's *ICX* switch business	USD800m + extra cost of unvested employee stock awards	ARRIS originally announced its agreement to acquire both Ruckus Wireless & Brocade's *ICX* switch business from Broadcom in March 2017. In October, ARRIS said it remained committed to the agreement but said it was contingent on Broadcom closing its acquisition of Brocade Communication Systems, the current owner of Ruckus Wireless.
4/10/17	Ekinops	OneAccess	Company acquisition	EUR60m (estimated)	It's claimed the combination creates a "major player" in transport, Ethernet & corporate routing solutions for telecoms networks. Merged entity generates combined revenues of approximately EUR76m & EBITDA margin of 6.3%. Market capitalisation of the new group amounts to around EUR119m (as of 29 September 2017).
5/10/17	TIBCO Software	Cisco	Data virtualisation business (formerly Composite Software)	NA	The acquisition specifically includes Cisco's Information Server for enterprise-scale virtualisation & associated consulting & support services. TIBCO says the move strengthens its portfolio of analytics products, & claims it will enable businesses to get analytic solutions into production faster than alternatives, while continuing to adapt as data sources change from traditional databases and Big Data to cloud & IoT.
16/10/17	CITIC Telecom CPC	Linx Telecoms	Company acquisition	NA	The Hong Kong telco says the completion of its acquisition of Europe-based Linx's telecoms business gives it 140 points of presence in 130 countries across the so-called 'Digital Silk Road' that links Asia, Europe & Africa. Merged company is named CITIC Telecom CPC Europe.
19/10/17	ENGIE	Fenix International	Company acquisition	NA	Founded in 2009, Fenix offers solar home systems in Africa. Its main activities are in Uganda where it has more than 140,000 customers. It recently expanded into Zambia & plans further rollouts in other countries across Africa. ENGIE says the investment will contribute to its goal of providing 20 million people around the world with access to "de-carbonised, decentralised" energy by 2020.

OT-Morpho becomes IDEMIA

The OT-Morpho group now wants to be known as 'IDEMIA'. The name change is the result of the merger between Oberthur Technologies and Safran Identity and Security (Morpho) completed on 31 May 2017.

According to the identification and authentication specialist, IDEMIA is a reference to identity, idea and the Latin word idem. The company adds that its ambition is to "empower citizens and consumers to interact, pay, connect, travel and even vote securely while taking advantage of the opportunities of an increasingly connected world".

It is supported by a workforce of 14,000 employees from all over the world, including 2,000 in R&D.

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
3/8/17	VEON	Amsterdam	2Q17	USD	2,417	977	0.11	Total revenue increased 12.3% YoY & 3.7% organically. Mobile service revenue grew 4.3% in organic terms, with data increasing by 30.5% YoY. Fixed-line service revenue declined by 11.5%.
20/10/17	Ericsson	Sweden	3Q17	SEK	47.8 (bn)	NA	-1.43	Reported sales decreased by 6% YoY. In MEA, sales were flat YoY, negatively impacted by currency movements & declining sales in Africa. CEO & president Börje Ekholm said: "As communicated in the Q2 report we have identified an increased risk of further market & customer project adjustments, considering the current market environment & our focused strategy. In total, the negative impact on results was then estimated to be SEK3 to 5bn until mid-2018.
24/10/17	Millicom	Luxembourg	3Q17	USD	1,509	556	0.31	Total revenue increased 1.6% YoY from USD1,486m in 3Q16. On an organic basis, to reflect local currency & at a constant perimeter, growth was 1.3%. All financials now exclude Senegal & Ghana which are discontinued operations.
26/10/17	Intelsat	US	3Q17	USD	538.8	420.5	0.26	Net loss of USD30.4m reported for three months ended 30 September 2017. CEO Stephen Spengler said revenues & adjusted EBITDA "reflect the ongoing transition of our business". Company now expects to come in at the bottom of the previously disclosed revenue guidance range of USD2.150bn to USD2.180bn for 2017.
26/10/17	Nokia Corp.	Finland	3Q17	EUR	5.5 (bn)	NA	-0.03	Reported net sales during quarter represent 7% YoY decrease (4% decrease on a constant currency basis). Networks division saw 9% YoY net sales decrease (6% decrease on a constant currency basis), primarily due to ultra broadband networks, reflecting challenges related to market conditions & certain projects in mobile networks, mainly in North America & Greater China.

Niagara claims first with high-density, multi-speed visibility solution

Niagara Networks has launched what's claimed to be the industry's first modular 100Gb product that supports bypass, TAP and network

MANUFACTURER:
Niagara Networks

PRODUCT: Niagara 284x

MORE INFORMATION:
https://niagaranetworks.com

packet broker functionality. The *284x* products are designed for a mobile operator's LTE infrastructure needs, hyperscale data centres, and massive IoT networks.

Niagara is a spin-off company from network equipment supplier Interface Masters Technologies. It believes that as security tools and appliances' speeds increase, there is a critical need for high-speed network packet brokers.

The company says its new modular *284x* products can be customised

to enable network engineers to efficiently secure their networks by sending the right traffic to the right tool. The hardware now shipping includes the 2U form factor *Niagara 2847* and 1U *Niagara 2845*. Each can be customised using 1, 10, 40 and 100Gb modules for network packet broker functionality, TAP and bypass. The latter supports
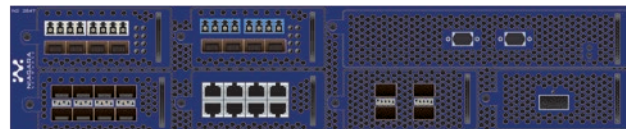
bypass fail open or fail close with customisable heartbeat configurations, and bypass on link loss.

The hardware also features up to 64 1Gb/10Gb ports, 16 40Gb ports or eight 100Gb ports, and hot-swappable redundant power supplies for what Niagara says is "maximum reliability".

Smart cellular modems combine features for IoT

Digi International's new lineup of *XBee* embedded cellular modems include designs to support LTE–M

MANUFACTURER:
Digi International

PRODUCT: XBee

MORE INFORMATION:
www.digi.com

and NB–IoT connectivity. Billed as smart devices, local intelligence can be programmed on the modem itself. Digi says rules engines and application logic can transform data, control local I/O, connect to Bluetooth sensors, actively manage utilisation of the cellular link and optimise cellular data plans.
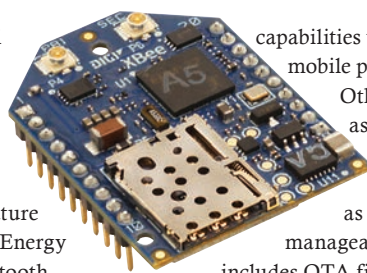
Each modem is said to support a wide range of applications, from basic to more complex LINUX-based

systems, as well as direct USB communication for apps with native control requirements.

They also feature Bluetooth Low Energy (BTL) and Bluetooth Mesh connectivity. Digi says this allows simple and quick local setup, provisioning and troubleshooting

capabilities using modern mobile phones and tablets.

Other features are listed as *Digi TrustFence* for security, and what's described as "advanced manageability". The latter includes OTA firmware upgrades, Digi's XCTU RF management and configuration tool, and remote management.

Hytera adds new radio to entry-level DMR range

Hytera is expanding its DMR product range with the new *PD485* handheld radio.

Thanks to what's described as its "robust housing and versatile functionality", it's claimed the *PD485* is the optimal radio for a very wide range of application areas.

It features a Bluetooth interface which means it can be used with audio accessories while kept hidden from view, says Hytera. It adds that data exchange and convenient programming is also supported via Bluetooth.

The *PD485* also has an integrated GPS module and GPS

antenna which enables real-time positioning of subscribers using various AVL applications.

Alongside a wide range of communication options, Hytera says the radio offers a full-sized keypad that also allows simplified programming. For instance, settings such as current frequency, time slot or colour code can be quickly and easily changed via the keypad without needing to connect the unit to CPS.

The *PD485* weighs 308g and measures 117 x 55 x 37mm.

MANUFACTURER:
Hytera Communications

PRODUCT: PD485

MORE INFORMATION:
www.hytera-mobilfunk.com

CableFree deals with network kit power spikes

CableFree has launched an inline Power over Ethernet surge protection device (SPD) to help protect outdoor wireless installations.

Ideal for use with the company's MIMO, microwave, MMW and LTE CPE radios, the device supports 48V PoE as well as other voltages.

CableFree claims its product uses high-quality components throughout and has been designed according to IEC61000-4-4 and IEEE802.3AT standards.

The firm says its SPD can protect networks from secondary surges that could be carried down the cables from rooftop equipment and cause damage to connected equipment in the comms room.

It adds that the device offers "excellent" performance discharge capability, which can prevent equipment damage caused by transient voltage differences between power supply, network, earth and other equipment (including both unpowered and Ethernet powered data network), as well as against damage caused by electrostatic discharges or lightning strikes.

CableFree also points out that its device has an "extremely quick" response time, large protection capacity, and long working life.

MANUFACTURER: CableFree

PRODUCT: PoE SPD

MORE INFORMATION:
www.cablefree.net

NEC Bluetooth device enables objects to 'talk' to users

NEC has developed acoustic augmented reality technology that gives a 'voice' to objects that can only be heard by users of specialised wireless earphones. The company says these advanced Bluetooth devices enable users to easily identify the

MANUFACTURER: NEC

PRODUCT: Acoustic AR technology

MORE INFORMATION:
www.nec.com

direction and location of the voices, making the technology "ideal" for marketing purposes or guide services.

According to NEC, the earphones create a "realistic" soundfield that virtually produces a three dimensional sense of direction and distance. There are nine axis motion sensors mounted on the device, and localisation fixes the position of a sound regardless of the user's facial orientation or direction of travel.

The company is aiming to commercialise the technology as an audio platform service that combines ear acoustic authentication

with indoor positioning, vital sensing and other technologies by the end of 2018. Going forward, NEC says it aims to continue proposing new approaches to computing that utilise auditory devices without the need for screens.

Airgain's miniaturised embedded LTE antennas for LPWAN applications

Airgain has introduced a new series of ultra wideband miniaturised antennas to provide LTE connectivity to smart home and LPWAN applications.

The *Profile Contour* embedded series is targeted at Industrial IoT applications (including CAT-M1,

MANUFACTURER: Airgain

PRODUCT: Profile Contour Embedded series

MORE INFORMATION:
www.airgain.com

LoRa and NB-IoT) as well as set-top box and gateway deployments.

Airgain claims the antennas utilise an efficient flexible polymer-based low profile design optimised for confined spaces and robust assembly variations. It says they require minimal incremental integration effort, minimising the cost and complexity typically associated with embedded antenna system integration.

This latest series of embedded antennas expands Airgain's existing *Profile Contour* product line and builds on its patented smart antenna technology. This features switching

algorithms that, according to the firm, can be applied to almost any type of antenna structure. Airgain says the algorithms power intelligent switching between elements in multi-element or single element antenna systems, whereby switching can be used to dynamically re-configure antenna patterns to maximise throughput and coverage for a given environment.

GL adds powerful features to GSM emulator

GL Communications has enhanced its *MAPS* GSM A over IP interface emulator.

The company describes the emulator as an advanced protocol simulator/tester that can exchange BSSMAP and DTAP messages and signalling specification as defined

MANUFACTURER:
GL Communications

PRODUCT: MAPS

MORE INFORMATION:
www.gl.com

by 3GPP. It has been designed to support testing of the MSC and BSC, error tracking, regression, conformance, load testing/and generation of high volumes of GSM traffic. GL adds that it supports simulation of different types of calls such as mobile originated voice, SMS, location updates, and more.

Some of the new enhancements highlighted by the company include support for handling handover management procedures. *MAPS* can now emulate the procedures involved when a subscriber travels across two different cell coverage areas and is handed from one

BSC to another via the MSC.

It also now supports CSV-based profiles in order to emulate bulk call generation. Here, GL claims it is possible to define up to 20,000 subscriber entries with unique called/calling numbers and other user related information.

All call handling scripts are assessed by *MAPS* to provide statistical information. GL says corresponding graphs can be generated for monitoring signalling and traffic performance.

ALSO LOOK OUT FOR

Using light bulbs to supplement Wi-Fi won't lead to the dark side

Transmitting digital data via LEDs at the same time as using them to generate light does not make the light dimmer or change its colour, nor does it make the LED more energy-hungry, according to new research.

The of idea of 'Li-Fi' – using off-the-shelf LEDs for super high-speed data transmission – initially came from research carried out at Edinburgh University around five years ago *(see Wireless Solutions, Feb-Mar 2012).*

However, concerns over Li-Fi's impact on an LED's lighting capabilities and a possible increase in power consumption have held back the technology's more widespread adoption.

But now, a University of Edinburgh team lead by Dr. Wasiu Popoola, say their research findings help eliminate key hurdles to using LEDs to help satisfy the increasing global thirst for wireless communications.

Focusing on LEDs producing 'warm white' and 'cool white' light, the team looked at two different data transmission techniques: on-off keying, where the LED works like Morse code, switching on and off extremely rapidly and imperceptibly to human eyes; and continuous signalling, where imperceptible changes in light intensity are used to achieve the same goal.

According to the researchers, neither technique was found to significantly reduce the light bulbs' brightness, life expectancy, or cause any significant change in the colour of the light.

They say that both techniques also produced only a negligible change in the heat generated by the LEDs – a key consideration as any temperature increase would indicate the LED using more electricity to produce light, making it less energy-efficient and less carbon-friendly.

Rafiah Ibrahim,
Head of Ericsson
Middle East and Africa

CONNECTING THE UNCONNECTED

While telecom operators in the Middle East and Africa region continue to look for new revenue streams, network vendors such as Ericsson are playing a significant role in enabling this transformation. Newer services require more efficient operational models, leaner business models, and faster, more intelligent networks.

Following a strategy refresh on a global level earlier this year, Ericsson's current business strategy in the MEA region is centred on securing its technology leadership.

"Ericsson is positioning itself as the right enabler of operator's next wave of digital transformation," says Rafiah Ibrahim, Ericsson's Head of Market Area Middle East & Africa.

"Our latest Mobility Report forecasts 29 billion connected devices by 2022, of which around 18 billion will be in Internet of Things (IoT). With this enormous market potential, first-mover operators around the world are positioning themselves to capitalise on this opportunity by deploying solutions that help enterprises rapidly offer innovative new services," she says.

Elaborating on the strategy of Ericsson in the Middle East and Africa market, Ibrahim says the idea is to work with the operators on primarily three areas: radio technology, telco core and managed services.

"As expectations of consumers continue to rise, the need for new services challenges mobile operators to deliver consistent high-performance application coverage to satisfy consumers and business customers," she says.

To allow operators to capitalise on these exciting opportunities, Ericsson has introduced the Ericsson Radio System, an end-to-end radio modular and scalable network portfolio of hardware and software that has been designed to fit all site types and traffic scenarios as networks grow in scale and complexity on the road to 5G. Going hand-in -and with this is the Ericsson Radio System Software, which brings together LTE FDD & TDD, WCDMA and GSM into a unified architecture.

The telecom core needs to be transformed to address all the new demands and opportunities of the digital age. Operators will need to reduce costs and increase the speed of innovation in order to achieve business and operational flexibility. Costs need to be reduced and speed of innovation increased. "Ericsson's portfolio of solutions and services supports operators in their attempts to transform the telecom core and operations," Ibrahim says.

For example, the Ericsson Enriched Communication solution enables operators to introduce new services like video calling, chat, group messaging and large file transfers using the mobile

phone number as identity. These new IP-based communication services can be used to define new attractive communication services bundles in order to stay competitive and attract new customers as well as reduce churn.

"In terms of managed services, our target is to focus on creating value for customers. Managed services enhance wireless and wireline operators' ability to meet their consumers' expectations by assuring performance, capacity and coverage of networks and services. Operators can achieve an average cost reduction of 20-25% with managed services," Ibrahim adds.

Road to 5G

In terms of technology, 5G continues to be a focus for Ericsson by making operators' transition seamless. To facilitate a rapid evolution of 5G access networks and the successful adoption of 5G services, Ericsson has already launched 5G plug-ins – software-driven solutions that bring essential 5G technology concepts to today's cellular networks.

In addition, Ericsson is working with partners in many different industries, as well as universities and research centres, on different use cases for 5G technology. "The requirements will vary per market, so by working on several use cases across industries, we try to present each operator partner with solutions that would be most relevant to them," she says.

"The true benefits of cellular IoT technologies evolving into 5G is that they set a solid foundation for massive IoT by reducing complexity, lowering power consumption, expanding coverage, and increasing device density.

"Ericsson's evolving experience stems from conceptualising intelligent transport solutions in Rwanda and Ghana, and helping strategic partners in Nigeria digitise the agricultural value chain. Our connectivity expertise also means we've already launching IoT trails with the leading operators to enhance the value of connectivity throughout the region," she adds.

Important to highlight is the importance of BSS, especially in light of

the digital transformation of operators.

"Ericsson already has an industry leading charging and billing portfolio, which has received a recent upgrade with the addition of Ericsson Revenue Manager. When crucial data is fragmented and exists in separate silos, services take months to launch, processes are duplicated and error prone, and operators lack the tools to collaborate with partners without massive IT systems customisation. The Revenue Manager is real-time, fully convergent and cloud-ready, and offers the next level of BSS that operators require," she says.

Ericsson is following a two-pronged approach to meet the market needs in the region – on one hand, the focus is to improve network performance, while the other focus is to enable operators to offer better and newer services.

Network readiness

In terms of network readiness, Ibrahim says mobile operators across Africa fall into two main categories. The first category comprises operators who still require a lot of rollout because deployment of 4G is lacking in several regions. Then there are operators who are still on 3G where voice remains important and, in some of the cases, data too. Depending on each operator's level of maturity, Ericsson supports what matters most to each.

New advanced services are all about high precision, ultra-low latency, and extremely high data speeds, all of which boil down to the requirement of extremely robust and reliable networks, and that's where Ericsson supports the operators.

Another area of high interest is smart cities. Ericsson sees the bigger picture where connectivity and technologies such as big data, cloud technology, smart grids, and the Internet of Things can enable the sustainable cities of the future, Ibrahim says. Towards achieving that objective, Ericsson is working closely with operators across the region, most of which are directly connected to governments.

In this space, Ericsson provides solutions for 5G (real time data analytics to manage and control the infrastructure), IoT

accelerator (to create a safer and more efficient urban life with connected assets and industry), and cloud (to provide robust connectivity for the evolving demands of cities).

As the market becomes more competitive, technology and services leadership is Ericsson's strength. "We believe in being best at what we do instead of spreading ourselves too thin and attempting system integration tasks. With 42,000 granted patents, Ericsson's global team of researchers is constantly working to develop innovative solutions.

"Going forward, we want to continue providing connectivity of high quality throughout the region. Another focus will be to provide cost-effective solutions to enable operators to launch new services with ease and manage them from a single pane as well.

"We are pro-active and prepared for the evolution to 5G. To ensure the developments are sustainable, we constantly need to refresh our talent pool by retraining existing resources, hiring fresh talent to bring new perspective to the table. A diverse workforce is the key to making workplaces more vibrant and to encouraging innovation," she says.

Master Power Technologies recently delivered a turnkey data centre to a telecoms company in Brazzaville. The facility comprised a set of modular, pre-engineered, pre-assembled, and pre-tested containers.

The power behind the data

Mobile operators continue to face challenges when powering their mobile sites. And as some of the bigger players also begin to launch data centres, the problems become greater. RAHIEL NASIR finds out how they can be solved.

t is generally accepted that Africa is a 'mobile-first' economy. The continent's mobile network operators are therefore often seen as the sole communication service providers, not only for consumers but for government and business users as well.

In terms of the latter, MNOs are keen to offer more enterprise-class services. As part of this, big name cellcos such as MTN and Vodacom are building their own data centres to add to the growing number of independent facilities that are beginning to sprout up across the continent. But whether they are expanding their wireless networks or building data centres, all operators across developing regions typically face the same issue: a lack of reliable and cost-effective power for running their sites. So what's the solution?

South African power solutions provider Master Power Technologies (MPT) says that when faced with the potential losses involved in load shedding or general electricity outages because of poorly maintained infrastructure, many businesses have made the investment in their own power management solutions. Central to these solutions is the backup diesel generator. But as Rory Reid, MPT's sales and marketing manager points out, power generation sets can be costly and buying one is not a simple decision.

"The problem with purchasing a generator is that it is a grudge purchase and the temptation is to keep costs to a minimum. In order to support customers so that they can run successful, power efficient operations, MPT has leveraged renewable energy by integrating technologies such as solar photovoltaic (PV) with generator, UPS and battery solutions in its modular data centres."

Simon Albury, CEO of UK-based DC generator technology specialist Controllis, agrees that solar equipment is now very cost effective with panels

costing less than USD0.50 per Watt peak. But while adding solar to an existing hybrid solution can have a payback of less than two years, Albury warns of pitfalls to avoid when looking to deploy a cost-effective solution for the long term.

"Although most of the operators we are dealing with have invested in renewables and found good savings, there are a number of issues that still persist.

"Firstly, solar panels are very useful for non-telecoms applications (although they are often subject to theft). Secondly, the dry climate in large parts of Africa can cause a lot of dust to build up requiring frequent cleaning."

Albury says these problems can be overcome by design and engagement with the local communities. But he then goes on to describe a third issue.

"Many early hybrid solar systems were designed with aggressive discharge of the battery bank and without consideration of the cooling needs of the battery. This has left some early adopter operators with batteries that have lasted only a couple of years, and the replacement costs have offset any fuel and maintenance savings. Other early hybrid systems did not properly condition the batteries with the result that the system's capacity degraded over time."

Energy plan

To overcome some of the issues identified above, Controllis has designed its DC generator products to be battery chargers from the outset.

"We have worked closely with battery manufacturers, designing a system that automatically takes care of the requirements of the battery whatever the conditions," says Albury. "We take great care in our hybrid system design to select the right sized battery and to operate a charging regime that ensures battery life is as long as possible."

Albury claims Controllis' solar hybrid systems have a battery life in excess of ten years. He says the company's "unique, very high efficiency" DC architecture has been developed from the ground up to be efficient in both hybrid and always-on modes for powering telecom sites.

"The combination of our *DCPrimePower* alternators and our remote system controllers provides a solution that delivers the right charge into the system at the right time, [thereby] maximising the input from renewable systems."

Controllis has been operating in Africa for more than four years now, and Albury says its hybrid systems in the field have typically shown a more than 60 per cent improvement in efficiency compared to what was previously in operation.

"Where sites are facing a higher load, running in hybrid mode often does not make sense in the longer term. For such sites, and if solar is not viable, we usually recommend dual DC generator configuration. These sites typically save around 25 to 35 per cent compared to AC generators. We have solar hybrid installations in South America and Asia where savings have been over 90 per cent compared to running an AC generator."

Turkish manufacturer Teksan Generator also provides hybrid power systems which it describes as "eco-friendly and fuel-efficient" solutions especially developed for the telecoms industry. Ihsan Ozkan, the company's hybrid product manager, says the solutions comprise a balanced combination of the "best quality" components with "cutting-edge" features and technologies.

He adds that the ultimate goal is to deliver higher energy efficiency and lower opex through the design of customised systems that utilise renewable energy sources at optimal levels.

"We recently installed a hybrid genset to replace a diesel genset powering an off-grid cell site in Hartum [Khartoum], Sudan," says Ozkan. "By switching the power source from diesel to hybrid, the operator realised a 50 per cent saving in fuel consumption and a 75 per cent reduction in maintenance costs.

"The most important point in this project was to provide savings through high efficiency delivered by our tailor-made product. This might conceivably generate higher saving rates when the hybrid system is integrated with renewable energy sources.

"Furthermore, when the engine of the hybrid genset operates, both sound, carbon and particle emissions are reduced by more than 75 per cent."

Compared to a data centre, a cell site's power requirements are much smaller and, as a result, Albury says many of them can be operated in a battery charging hybrid mode which saves significant fuel and maintenance costs.

"When coupled with solar or other renewable systems, savings can be up to 90 per cent compared to conventional always on diesel generator solutions."

He continues by saying that because a data centre's power requirements will always be much higher than a cell site's, this puts data centres within the efficient operating range of a wide number of diesel powered AC solutions. As a result he believes that, apart from integrating some solar power solutions, it makes "little economic sense" to have a hybrid power solution for a data centre.

But Reid reckons the integration of solar power systems in MPT's turnkey energy centres has not only enabled customers to hedge against future increases in electricity tariffs, but also facilitates long-term growth strategies with stable and affordable emission-free power.

He advises operators planning a data centre to know their power density in advance. "If you design the centre with too little density, you will need to do an upgrade and this is quite expensive. If everything is built, and then you discover that you need more power, this is really expensive.

"If you go the other way and design a data centre for too much power density, you can't run it efficiently. To measure the efficiency of a data centre, you can use KPIs like PUE (power usage effectiveness); this is the relation between the total power consumed and the power you need for the IT itself."

While PUE is a good indicator to monitor any improvements made over the years, Reid points out that PUE will also depend on an individual operator's business model and on different cooling designs for a data centre. For example, a facility using outside fresh air for cooling in a colder climate will save more power than one that operates in the hotter regions of Africa or Asia, for example.

According to Reid, MPT has successfully introduced modular and mobile plug-and-play

Main photo: MPT's NewLife Centre in South Africa monitors all secure power critical equipment for its customers in real-time. Inset: data from the company's intelligent *Universal Controller* can be accessed and displayed on touchscreens mounted in strategic locations.

data and energy centres that are scalable and can be customised, and have enabled industries such as telecoms to leapfrog traditional infrastructure and expand their services to remote areas.

He explains that the company's in-house technicians have designed steel modules measuring 4.5m x 3.6m x 12m in which an entire data centre can be hosted, along with all the necessary accessories, such as air conditioning, backup power, fire alarm, security, etc.

MPT has recently delivered a turnkey modular data centre solution to a telecommunications company in Brazzaville, Republic of Congo. "The plug-and-play solution comprised a set of modular, pre-engineered, pre-assembled, and pre-tested containers," says Reid. "These house the latest ICT infrastructure as well as energy components which ensure that the data centre is self-sufficient."

MPT's turnkey solutions include UPS, gensets, battery and energy management systems. They're also supported by an automated, round the clock, remote monitoring platform housed at the company's NewLife Centre in Randburg, Gauteng. Reid says this real-time monitoring facility has been upgraded for all secure power critical equipment, and features the *Universal Controller (UC)* which MPT designed to replace traditional SCADA and PLCs in the monitoring and control environment.

The *UC* consists of a central board for control and monitoring, and field interface boards using PoE to communicate with secure power and environmental equipment. For local access to the information, multiple on-site touchscreens can be mounted in strategic locations to provide relevant data to the right people.

"The *UC* can be used for a wide variety of functions including battery management, building management, generator control, UPS control, PDU monitoring, etc.," says Reid. "When the controller detects an issue – which can be anything from a mains failure to a battery failure in a UPS installation – it raises an alarm, and the operators at the NewLife Centre follow standard operating procedures (agreed with the

client beforehand) to deal with the problem."

Since the *UC* monitors the situation in real-time, a constant log is kept of the performance of all electronic equipment under observation. Reid says this provides the customer with a "clear understanding" of their system's performance. The controller also allows for mobile monitoring via a tablet or *Android* app.

The future of power

When it comes to product evolution, what areas are the specialist power manufacturers focusing on in order to improve their offerings?

France-based SDMO Industries is part of the US-based Kohler group. It describes itself as the world's third-largest manufacturer of gensets and power generation plants, and distributes its products throughout the world, including Africa, under the KOHLER and KOHLER/SDMO brands. The company recently introduced its *KD Series* of gensets powered by an entirely new line of Kohler *G-Drive* engines in nodes between 800kVA and 4200kVA.

SDMO boasts that the new generators will help telecoms and data centre users (amongst others) to find cost savings through "superior fuel efficiency, extended service intervals, and space-saving footprint". It says the *KD Series* is designed to meet global emissions regulations, and features gensets that are "highly customisable". Multiple alternator options are available along with a variety of other options and accessories to ensure what the vendor claims is "optimal" performance for the most demanding applications.

Among the features is the *APM802* digital controller. This is said to offer comprehensive system monitoring and diagnostics via a 12-inch touchscreen. KOHLER-SDMO adds that fast and secure remote access to key system details is available through mobile devices.

The generators also include a high-ambient cooling system. This has been developed for extreme operating conditions and utilises segmented radiator core sections. According to the company, this can help save "considerable" time and money by allowing for single-section replacement rather than the entire core.

KOHLER-SDMO has also developed two new units specifically for telecoms and remote applications. The *J22 Long Running* and *J33 Long Running* are each equipped with a John Deere engine to deliver 22KVA and 33KVA respectively in standby applications, and 20KVA and 30KVA in continuous applications. In addition, the products have a 1,000 hour maintenance interval, 600/1000/2000 litre fuel tanks together with optimised fuel and oil filtration, and fuel autonomy ranging from 120, 200 and 400 hours.

Meanwhile, Controllis is about to launch its IonLiFe lithium ion phosphate batteries into the telecoms market. The company says it chose this chemical composition as it offers a combination of "very high cycle life and very safe" operating parameters in a relatively compact form factor.

Teksan recently installed one of its hybrid gensets to power an off-grid cell site in Sudan and claims the operator saved 50 per cent in fuel consumption.

"There are some horror stories from early adopters of other lithium ion chemistries where large numbers of BSTs caught fire," says Albury. "Lithium ion phosphate is a very safe chemistry that won't suffer from these type of issues.

"We have developed the battery management system in-house, and the complete products will be assembled and tested in the UK. The battery integrates seamlessly into our remote management and monitoring architecture."

For MPT, the focus remains on its *Universal Controller*. Reid says through many years of tried and tested applications running critical solutions in the field, the company has developed specialised software modules for the *UC* that can be loaded for specific applications. Some of these applications include: generator control, fuel management, triple changeover between power supply sources, battery monitoring down to individual blocks, amongst others.

"Load testing your emergency standby generator system as well as your UPS system should be part of a standard planned maintenance programme for all systems to ensure minimal downtime for customers," advises Reid.

He adds that to ensure customers receive the major benefits from their installed power solutions, Master Power Technologies has invested in a training centre to upskill their technical staff as well as those of their customers.

"The training courses will emulate the customer's site and provide simulated fault situations with step-by-step visual instructions on how to switch sections of the system. These switching operations in the training centre can be repeatedly carried out without any risk of incorrect switching at a live site."

Finally for Teksan, Ozkan says the company's continued aim is to reduce opex and initial capex for end users, as well as to provide eco-friendly and practical solutions. He perhaps sums up the end user's ultimate requirements when he says: "Our R&D team has been conducting comprehensive feasibility and optimisation studies to innovate with distinguished products that have a lower carbon footprint and reasonable initial investment costs." ■

SDMO's *J22* and *J33* power generation sets have been developed specifically for telecoms and remote applications.

Challenged by the bush

Much of the 700km *Absa Cape Epic* cycling race takes place in remote locations and wildlife reserves without any comms infrastructure.

From recreation to media creation, the continent's remote and harsh terrains present tough challenges for wireless network providers to overcome.

Since 2002, the Discover Africa Group has been helping travellers to experience Africa's beauty and diverse wildlife. In an effort to attract new tourists it has developed *HerdTracker*, a web app that allows users to see the spectacular great wildebeest migration that take place across the Serengeti plain. They can witness the event unfold in real-time on a Google map, and keep up with a *Twitter*-style timeline.

After seeing the app, Kenya's tourism authorities realised that it could help encourage holidaymakers to choose the country as a holiday destination. They then approached Discover Africa and gave the company a brief to use *HerdTracker* as the centrepiece of a 'good news' story to promote Kenyan tourism.

In its response to brief, Discover Africa wanted to do something different. Rather than simply publishing content on the app, the tour operator wanted to provide an insight into some of the unique experiences Kenya has to offer. It wanted to create a world first and share with potential holidaymakers the awe-inspiring 'great migration' that takes place when more than two million animals travel from the Serengeti National Park in Tanzania to the greener pastures of the Masai Mara National Reserve in Kenya during July through to October.

The annual wildebeest migration is described as one of the world's most breathtaking and

spectacular sights, filled with chaotic scenes of the animals thundering through the bush – this was the spirit that Discover Africa wanted to capture. As the migration has been filmed, photographed and documented many times over, the company came up with an idea that would bring the migration to people, wherever they are located, by streaming live footage of the event.

While 3G coverage in the Masai Mara National Reserve is surprisingly good, it is patchy and doesn't offer the reliable bandwidth needed to stream live video. Discover Africa turned to the idea of satcoms and approached Applied Satellite Technology, South Africa (AST SA) and its local reseller Sat4Rent, to understand if there was a dependable connectivity solution to stream live footage.

In what was claimed to be a world first, Discover Africa filmed the great migration of wildebeest, and shared it online with the world in real-time.

Discover Africa chose Inmarsat's global *BGAN HDR* service. As well as offering a diverse range of streaming options, the company says that the asymmetric half-channel rate accessed through a *SATCOM EXPLORER 710* portable satellite streaming terminal offered the optimum balance of image quality.

AST SA's technical support team showed Discover Africa how easy it was to set up a streaming connection in minutes, using a terminal which is the size of a laptop. The film crew was then ready to set out for the wilderness to capture the migration live and in real-time for the world to see. When the wildebeest made their move, for a week period, viewers were taken on journey to experience the thrill of the migration with two daily live broadcasts. Discover Africa's team used *BGAN HDR* to live stream the event to *YouTube*, and Periscope to upload footage to the *HerdTracker* website. *Periscope* is a streaming app that can be accessed and controlled via a smartphone. Satellite connectivity enabled viewers to ask rangers in the vehicles on the Masai Mara questions in real-time.

Discover Africa successfully completed the world's first live streaming of the migration. The tourist authorities were satisfied that the live satellite feeds helped increase awareness of what Kenya has to offer. As well as attracting global media attention from the likes of the BBC, CNN, Time, etc., the pre-event promotional campaign

is said to have reached 1.7 million people with 140,000 engaged via social media channels; there were 58 live web broadcasts on *Periscope* totalling more than 8.5 hours of streaming video with an average of 200 viewers per broadcast, and more than 25,000 views on *YouTube*.

Up close and personal with big cats

Freelance journalist and award-winning National Geographic explorer Martin Edström is on a mission to re-invent the way animals are filmed in the wild. While conventional film makers merely aim to get in close, his pioneering technique aims to put viewers at the heart of the action. One of his more recent videos, *Lions 360*, presents a cat's-eye view of life in a Zambian pride. It clocked up three million hits within three weeks of going live on Facebook for National Geographic.

This kind of immersive storytelling is said to result from meticulous planning and expert use of technology in extremely challenging conditions which have to be overcome before filming can even begin.

Working with National Geographic for the video shoot in Zambia in November 2016, Edström needed a broadband data device that would enable him to send photos and post to social media every day while deep in the bush. He chose the Thuraya *IP+* satellite data terminal.

Most days, the team set out before dawn to look for lions in Zambia's South Luangwa National Park. They stopped to rest in the shade during the hottest hours from 11am to 3pm, and set up the Thuraya on the roof of the vehicle, using it to upload images and video captured in the morning to the team back at base camp. Edström says it was very quick and easy to get the terminal up and running. He says: "It was our mobile office in the bush and made it possible to work even in this very remote place. We used the *IP+* to coordinate our daily activities with our hosts, the Zambian Carnivore Programme, and to stay in touch with our colleagues and families in Sweden."

Finding lions to film was only the first step. The next challenge was to get close to the predators without endangering either people or equipment. The secret was a video camera mounted on a large remote-controlled car that was armoured.

It took the team about one week to get the lions to accept the car and camera. After that, it was a matter of keeping out of the way and remaining patient as the stunning footage rolled in.

Edström and his team also carried Thuraya's rugged *XT-PRO* satphone for voice calls and messaging. Its value as an essential item of safety equipment in dangerous environments was proved on the day that, according to Edström, "everything went wrong".

First the team forgot to take enough food and water. Then their Land Rover became stuck in a dried-up riverbed and an axle broke as they tried to drive out. Finally, as they laboured in 45º heat and blazing sunshine to patch it up, they spotted a pride of lions taking an interest in what they were doing. It could have been a nasty moment but Edström and his companions were on top of the situation.

"We were relieved to have the *XT-PRO* with us because you cannot always rely on radio in the bush. "We had already used it to tell our colleagues at the Zambian Carnivore Programme what had happened and to get advice. They helped us plan a route home that our damaged vehicle could handle."

As for the lions, they were no threat as long as they kept their distance. "They were feeling the heat too and weren't in the mood to bother us," says Edström. "We were actually very pleased to see them because one was a large male we had been trying to locate for a long time."

The male, named Pala by the team, went on to become one of the stars of the video.

On another occasion, the vehicle broke down in the bush late in the day. The crew couldn't get the radio to work, so they used the *XT-PRO* to call base and get advice from a mechanic, who got them home before dark. "The *XT-PRO* has great battery life, so it was always charged and available if we needed it," says Edström.

Going forward, Thuraya says it is evolving its data offering for those who continually operate on the fringes of reliable coverage. The company has recently launched its *WE* service that allows users to switch automatically between satellite and GSM networks with a click of a button using a mobile app and web interface. The company says it also allows users to connect up to 10 smart devices wirelessly and share internet within a range of about 100 feet.

The *Rallye Aïcha des Gazelles* is a women-only rally that sees competitors race across 2,500km across the Western Sahara. PHOTO: MAIENGA

Supporting desert racers

Marlink – Airbus Defence and Space's re-branded commercial satellite communication division – is supporting the *Rallye Aïcha des Gazelles*, a 100 per cent women-only off-road rally which attracts more than 120 teams from 30 countries.

Organised by French event company Maienga, the rally takes place in March every year, and sees the competitors cover 2,500km in six legs across the Western Sahara. Given the remoteness of the region, reliable satellite and radio communication services are a top priority for both logistics and safety.

Marlink has provided communication services for the *Rallye Aïcha des Gazelles* for 25 years. According to the global business critical communication solutions specialist, its responsibility as the turnkey communications provider is far-reaching.

The firm's satellite links are used to enable internet access for the organisers and media working in the camps. The satellite connectivity is also used to provide VoIP services at the rally control centre and to offer recreational services to the competitors, enabling them to call home.

Marlink also provides airborne radio networks for audio communications between field staff and the local control centre. Two helicopters cover each leg transmitting duplex radio communications to fixed terrestrial relay stations. Organisational vehicles used by medical teams and assistance vehicles, for example, are equipped with radio receivers so that they can communicate with the HQ and be dispatched for prompt assistance to injured or stranded competitors.

Tracking and safety services are provided by Marlink's satellite-based *Iritrack* system, and distress beacons are mandatory equipment for all racers. In addition to real-time tracking of competitors, *Iritrack* enables them to send alarms to HQ in case of emergencies or make hands-free calls via integrated voice capabilities.

Marlink says its field engineers ensure the smooth functioning of all communication services deployed in the field. They are responsible for the technical maintenance of the fleet of tracking devices, and assist safety and security staff to monitor the rally from the control centre.

Left: Martin Edström and his team used Thuraya's *IP+* satellite data terminal and *XT-PRO* satphone – the latter proved crucial during one fateful day when "everything went wrong". **Right:** a video camera mounted on an armoured remote-controlled car was used to capture close-up footage.

Connecting the world's toughest mountain bike race

When the *Absa Cape Epic* was launched in 2004, founder Kevin Vermaak wanted to create a mountain biking stage race that would capture the world's imagination. He created several unique aspects, including making it the world's first team endurance event, with riders – who could be amateurs as well as pros – having to race in pairs.

However, the most visible differentiator is having much of the eight-day event take place in remote locations and wildlife reserves that are often subject to extreme weather conditions. Most of the 700km race therefore fell into terrain without infrastructure. An innovative solution was therefore needed to enable riders, organisers, the venue operating centre, caterers, medical personnel and media to communicate with one another and the outside world.

Dimension Data was called in to design a solution and then deploy and manage it. Working with its subsidiaries, Internet Solutions and Britehouse, as well as with Cisco, it implemented a secure LAN and WLAN based on an enterprise class 10G fibre backbone, capable of supporting location-based services and collaboration tools.

By supplying strategic hotspots with high-speed, high-performance connectivity, Dimension Data says Wi-Fi 'bubbles' along the route enable live streaming that has enhanced both broadcast and social media coverage. For instance, the thousands of riders participating in each event can now use their smartphones and *GoPro* cameras to communicate their race experiences with their own audiences.

The company adds that the network connects everyone involved in the race in real-time. For example, the mobile race hospital is connected to the Mediclinic national hospital network, enabling field triage and aftercare treatment.

Logistics vehicles and riders are also tracked. Fans can see where their riders are on the route, where they finish, and what their ranking is. Competitors can upload their own stats to assess their performance on the go.

Dimension Data says it continues to develop the network for each tournament. For instance in 2015, it included live video conferencing with UK commentator Rob Warner at the course hotspots; in 2016 it expanded with live coverage from the route and on-screen data snippets; and for this year's competition, a race centre app was deployed along with Microsoft's *Power BI* tool for real-time analytics. This enabled the display of the professional riders' heart rates and power data on the race website.

Satellites will look after the safety of riders during next year's *Absa Cape Epic* following a new partnership between the organisers and Globalstar Satellite Africa. It will provide each of the 680 teams with a lightweight *SPOT Gen3* device. *SPOT Trace* devices will also be supplied to 60 support vehicles and two helicopters.

The agreement with Globalstar is part of a

Working with Cisco, Internet Solutions and Britehouse, Dimension Data implemented a secure LAN and WLAN based on an enterprise class 10G fibre backbone.

three-year investment that sees the race migrate from a GSM-based cellular tracking system to one that uses satellite.

The company says that given the remote, rugged nature of the Western Cape, some sections of the route have little or no cellular coverage. For instance in the past, it says riders would sometimes disappear from the race website tracking for long periods on the GSM network.

Globalstar says satellite technology will allow fans, friends and family to follow the progress of the teams on the race website and via an activation at the race village. It says the use of its devices will ensure continuous connectivity and enable the organisers to keep tabs on all teams from start to finish during each stage. Should a rider need assistance, he or she can simply push the S.O.S. button on the *SPOT Gen3* to alert the organisers to set in motion emergency support if needed.

The event organisers has also developed the *Epic Command* platform that will manage the flow of the data from the tracking units and ensure that all of the relevant parties receive the required feed.

SPOT to the rescue during Saharan marathon

Since being founded in 2007, Globalstar has become no stranger to supporting extreme recreational events around the world including Africa.

For example in 2016, its *SPOT* devices were used to safeguard the Gin South African Nationals, the biggest paragliding event of its kind on the continent. Over seven days in December, more than 100 competitors averaged 70km to 90km per day as they raced across the remote Cederberg and Winterhoek mountain ranges, Swartland, Berg River and Breede valleys, all the way to the border of the Northern Cape.

The devices are also used during the *Titan Desert* race that takes place every April and sees 400 extreme cyclists ride more than 660km across

Morocco's cold Middle Atlas mountains followed by the vast expanses and searing heat of the Sahara.

In another deployment, 18 athletes were rescued thanks to the *SPOT Gen3* during the 2015 *Marathon Des Sables*.

During what's said to be the world's "most extreme running race", 1,330 competitors faced the most extreme terrain as they raced 250km across the sands of Morocco in temperatures as high as 50ºC.

As with the previous year's event, all race marshals carried Globalstar's devices, and they were also outfitted on security vehicles, medical vehicles and helicopters. In addition, customised software was provided by athletic gear and tracking specialist WAA Tracking, Globalstar's partner based in France. Thanks to this interface, sponsors, friends and families of participants were able to search for and locate the positions of individuals and teams.

During the race, organisers were able to precisely locate 18 competitors in distress and quickly dispatch rescue personnel. For example, when one Japanese competitor digressed from the normal route, WAA's geo-fencing software, *MDS_PC Course*, raised an alarm that alerted race headquarters instantly. The participant was moving away from the official route in an area that was particularly difficult to access, even for the rescue team's experienced 4x4 drivers, so one of the race organiser's two helicopters landed close by. The doctor on board checked the athlete's health and declared him able to continue the race. The crew advised the athlete how to get back on course since any competitor who is transported is automatically disqualified.

Commenting at the time, *Marathon Des Sables* CEO Patrick Bauer said: "With sand in their eyes and no other athletes nearby, competitors can easily miss the markers and stray off course. Thanks to *SPOT Gen3*, we can ensure more athletes complete the race by quickly spotting anyone wandering off route as well as getting immediate assistance to anyone who presses the SOS button." ∎

During what's said to be the world's "most extreme running race", more than 1,000 competitors race 250km across the desert sands of Morocco in temperatures as high as 50ºC.

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There are plenty of technological solutions to cost-effectively connect the unconnected, including Google's ambitious *Project Loon* that has attracted much interest in some parts of the developing world.

Flights of fancy

Billions of people around the world have yet to make their first phone call, let alone access the internet. Connecting them is going to prove to be industry's toughest challenge yet, as RAHIEL NASIR discovers.

Five billion people across the world are now mobile subscribers. That milestone was reached earlier this year and, according to the GSM Association (GSMA), a further 620 million users will be added by 2020 to reach almost three quarters of the global population. Asia will drive the growth and account for 60 per cent of new subscribers globally. Sub-Saharan Africa will represent 16 per cent (99 million additional users) while MENA is forecast to account for seven per cent (41 million additional users).

But in its *Global Mobile Trends 2017* report published in September, the GSMA warns that the rate of growth is slowing. It says that while it took four years to move from four billion global subscribers to five billion, reaching the next

billion will take longer and will be the "toughest challenge" yet.

And with 50 per cent of the world's population still not online, the report says: "The digital divide is greatest in India and sub-Saharan Africa which account for 42 per cent of the world's unconnected, with more than 60 per cent of their respective populations not yet on the internet."

At current rates of progression, Ericsson predicts that mobile broadband will provide network coverage to around 95 per cent of the world's population by 2022. So will that be sufficient for wireless service providers? With dwindling ARPUs continuing to afflict mobile operators everywhere, what incentives do they have to invest in rolling out their networks to remote and rural areas?

Sort your costs out

Canada-based NuRAN Wireless has developed cost-effective mobile network infrastructure to enable rural connectivity in emerging markets. Bradley Shaw, the company's MEA regional manager, believes that there are profits to be made in such low ARPU environments, as long as operators make the right equipment choices. "You just have to be efficient with the capex and the opex. Operators had no interest in expanding service into remote rural areas with traditional infrastructure because it meant operating at a loss. We now see operators rolling out sites based on NuRAN, and soon-to-come *OpenCellular*, for less than USD30,000, and paying back the investment

in less than 18 months. Some low-traffic sites even get built for USD10,000, all inclusive. The efficiency in terms of spend is critical when you're working in low ARPU environments."

OpenCellular is one of the initiatives being developed by the Telecom Infra Project (TIP). Established in 2016, TIP describes itself as an "engineering-focused" collaboration between operators, suppliers, developers, integrators and startups. Their aim is to come up with fresh technologies, examine new business models, and drive investments into telecoms. Its *OpenCellular* project group focuses on the development of wireless access platforms and is co-lead by experts from NuRAN Wireless, Facebook, Keysight, amongst others.

Earlier this year in June, NuRAN presented details of its new *OpenCellular* product, the *OC-2G* to TIP members. The company said that the base station will be integrated with its proprietary software stack and base station controller in order to form a complete RAN solution for carriers looking to expand their footprint to communities of 400 to 1,500 inhabitants.

But, as has been well documented in the industry and as Shaw goes on to reiterate, it's not just a question of deploying mobile infrastructure in remote and rural areas. For example, he says: "Voice traffic, as we all know, is declining and data services are increasing. The use of data and

the increase of ARPU through data services is largely device-driven, but in rural areas you have very low penetration of smartphones."

Of course that is likely to change moving forwards with the GSMA pointing out that, like subscriber growth, smartphone uptake is also being driven by developing markets. In its *Global Mobile Trends 2017* report, the association said that Nigeria is one of five markets forecasted

Bradley Shaw, Regional manager MEA, NuRAN Wireless

"The use of data and the increase of ARPU through data services is largely device-driven, but in rural areas you have very low penetration of smartphones."

to account for more than 40 per cent of the 1.6 billion new smartphone connections by 2020 (the others are India, China, Indonesia and Pakistan).

The power to succeed

However, the challenges of remote and rural connectivity cannot simply be solved by building low capex and low-cost networks and making affordable handsets available. From Africa to Asia, another basic problem in many emerging markets is a lack of grid power. (*Also see News, Aug-Sep 2017.*)

"We are seeing sites that are being closed down because they are not profitable," says Shaw. "Why is that the case? The operator is running a diesel generator which is, say, five hours from the closest urban environment. So the cost of purchasing the diesel on top of the cost of shipping it makes that site unsustainable. Whereas if the operator had put in a solar, low-powered base station, the returns from that site might be marginal but at least it would still be breaking even."

NuRAN itself offers several products here, including the *LiteCell 1.5* which it claims is the world's "most affordable, lowest power consumption, and easiest to deploy GSM base station". Specifically designed to reach the next billion subscribers, it is said to only consume

SOURCE: ERICSSON MOBILITY REPORT, JUNE 2017

20-80km possible call range extension (depending on area and base station height)

Hotspot small cell

GSM and LTE site

Cell range (R) = 10-40km (depending on area and base station height)

Remote, isolated village

Example of solutions for providing mobile broadband coverage in remote rural areas.
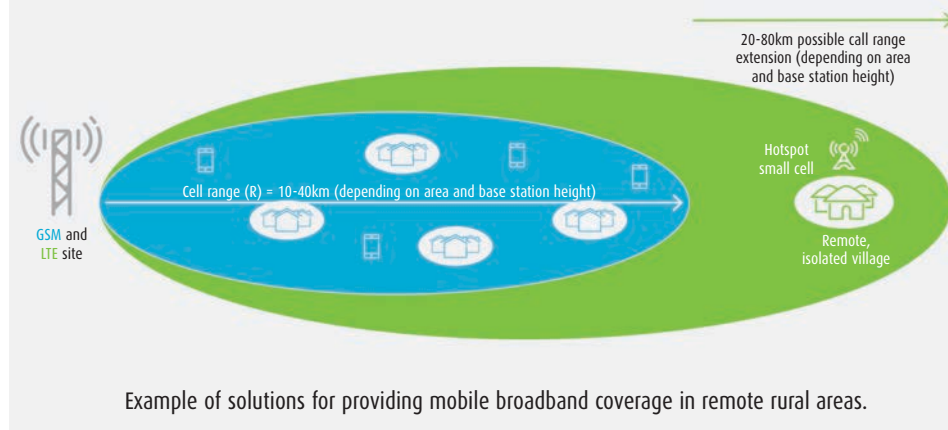
65W, thereby minimising the capex associated with solar panels and batteries, or opex in the case of diesel-powered sites.

The firm adds that the hand-carried, tower-mounted *LiteCell*, does not require any machinery to install, nor any kind of shelter to protect it. Antennas connect directly to the unit, while an all-IP interface makes it easy to connect to any IP-based terrestrial or satellite backhaul.

Earlier this year in May, wholesale operator Raeanna Group announced that it would use NuRAN's system for more than 1,000 sites in Nigeria over the next five years. This followed a separate deal with Global Communications Extension Services which will also use the vendor's platform as part of an initial deployment for an unnamed Tier 1 MNO in Nigeria.

Of course, NuRAN is not the only company to make specialised infrastructure for remote and rural mobile sites. Since 2004, India's Vihaan Networks Limited (VNL) has been developing and offering low-powered base stations that can be run using solar energy as part of its *WorldGSM* system. The company, which is part of the Shyam Group, says its systems have since been deployed to rural areas in Kenya, Uganda and Ghana, as well as many other Asian countries.

Another innovative infrastructure specialist that made its debut in the telecoms market a few years ago is Range Networks, the US company that claims it developed the industry's first commercial open source cellular system. Range says its software runs on off-the-shelf hardware that is typically less than 20 per cent of the cost of custom hardware to deliver full-featured mobile services. It reckons this allows the operator to make a profit while charging a price that "almost any" subscriber can afford.

Range has designed its system to support different radio interface protocols. It says the system can run as virtual machines on the same standard *Linux*-based server hardware while sharing the same 'IP core'. The same software is utilised for microcell to macrocell coverage, with the operator or systems integrator mixing-and-matching COTS hardware for the most appropriate, complete coverage solution. The solution provider can either virtualise network functions or implement

a self-contained *Linux* OS base station.

"This means that a greenfield carrier can start with a simple 2G network and, over time, develop a mixed 2G-3G-4G system, using whatever technology is best adapted to particular sites," states the firm. "Core network upgrades are just capacity upgrades, replacing existing servers with more cores or faster processors as the traffic volume increases, or by adding incremental software upgrades to provide new features, such as MMS, as they become available."

In 2013, working in collaboration with the University of California Santa Barbara, Range installed a two-tower cellular extension in rural Zambia to expand coverage of an existing cellular network. The village is home to more than 130,000 people but is spread out over an extremely large area. Many large sections of it are without cellular service.

A water tower and school building were used to mount two new systems running Range Networks' software. Working in tandem they added approximately 35km² of new coverage for the residents. It's claimed that it took just two days to establish this new infrastructure.

One project that has been garnering headlines over the last few years is *Project Loon*. The initiative is being developed by Google as a way of putting broadband within reach of millions of currently unconnected people. It involves 12-metre tall balloons that act like floating mobile towers. They fly on stratospheric winds at altitudes twice as high as commercial planes, and are fitted with low-powered electronics to beam an internet connection down to the ground. As one *Loon* drifts out of range, another moves in to take its place.

The project has undergone trials in many countries, notably in South Asia. For instance in Indonesia, it has been tested by the country's three biggest cellcos, while in Sri Lanka the government has bought a 25 per cent stake in a joint-venture setup with Google in return for the spectrum that will be allocated for the project. But in February 2017, it was widely reported that the ITU blocked Google from using the same frequency as Sri Lanka's public broadcasters over fears of interference.

Faster than fibre – the new space race

When it comes to connecting remote and rural users, satellite technology comes into its own in terms of its speed of deployment and ubiquitous coverage.

But at the same time, critics often point out the high price of satellite capacity which, it would seem, is at odds with the idea of MNOs drawing a profit by investing in building networks to low ARPU outposts.

The satellite industry is countering by talking about decreasing satellite prices, particularly in terms of the cost per megabit rather than cost per megahertz. And if the analysts are to be believed (*see Wireless Business, p12*), the market looks set for further price falls as the latest generation of smart and efficient high throughput satellites from the likes of ABS, Intelsat, Yahsat, *et al*, find their way into space.

But the real game-changer is likely to come with the launch of the low-Earth orbit satellites (LEO) that have been much talked about over the last few years. Even the GSMA in its *Global Mobile Trends 2017* report believes that satellite "has re-emerged from the ashes of failed attempts in the early 2000s" as an alternative connectivity option. It said the technology could provide an alternative backhaul option in reaching rural unconnected areas in emerging markets and serve as a complement to mobile networks, offering capacity wholesale to operators.

One of the companies that has attracted some big name backers for its LEO mission is OneWeb. With directors from major players such as Airbus, Bharti, Coca-Cola, Intelsat, Virgin and others on its board, the company's aim is to fully bridge the digital divide by 2027.

OneWeb says its small satellites will feature fewer components and weigh less than 150kg, thus making them easier to produce at scale and cheaper to launch. Once in space, they will create a 'mesh' style network by intelligently interlocking with each other to create a planet-wide footprint.

Working with manufacturer Airbus and its launch partner Virgin Galactic, OneWeb plans to send its first 10 satellites into space early next year. Assuming these successfully pass all in-orbit tests, the full launch campaign will begin six months later with services going live in 2019.

OneWeb will ultimately use a constellation of 648 satellites orbiting the Earth at an altitude of around 1,100km. The company reckons this closer position will result in much better web performance, and is targeting latency of around 30 milliseconds – that's much lower than the 240ms delay geostationary satellites suffer from as they circle the planet at an altitude of approximately 35,786km above the equator.

US-based LeoSat is aiming to go even better with its constellation of around 78 to 108 high-power Ka-band satellites that are planned for launch in 2019. They will use polar orbits to provide full global coverage, and each one will be interconnected using unique laser links. Once uplinked to the constellation, LeoSat says data

will travel from satellite to satellite until it reaches its downlink destination – there is no need to interconnect with any third-party network or any satellite gateway infrastructure to carry data.

According to the company, all this effectively creates an optical backbone in space which is about 1.5 times faster than terrestrial fibre backbones. It promises an average latency of below 120ms, which would make it better than terrestrial fibre. LeoSat's website explains that it is all down to physics: "Light travels faster in free space than it does in a fibre optic cable once that cable reaches a certain length. Our services will start making up the extra distance [light] has to travel back and forth to the spacecraft (at 1,400km), and then get ahead of fibre. That critical cable length is about 5,000-5,500km, subject to the type and age of cable, the amount of switching panels on the route, the latitude of the begin and endpoints of the connection, to name a few variables."

2G, 3G, 4G or 'white elephant'?

When building networks in greenfield sites today, MNOs may face a dilemma: should they invest in basic but higher margin 2G networks, or enable first-time users in remote and rural areas to 'leapfrog' technologies and benefit from faster but pricier next-generation infrastructure?

"You have got to look at the device penetration in these areas," advises Shaw. "The way that operators can do that with 100 per cent certainty is to put up a 2G network, cover everywhere, and then see what devices are registering on their network. Where they find there are pockets of high-penetration 3G devices, build 3G networks. And if by some chance they find pockets of very high 4G-enabled devices, they should put up a full LTE base station."

Ericsson agrees here. In its *Mobility Report* published in June, the vendor offers detailed advice about how operators should go about choosing the right generation mobile technology.

For instance, in areas already covered by 2G, it says factors such as demand for connectivity, availability of device types, cost sensitivity among mobile subscribers and operator business case will influence whether upgrading to 3G or 4G coverage will be preferred as an initial solution.

One of the ways operators can decide which sites to upgrade from 2G to 3G and/or 4G is by using CDRs associated with the existing network. Ericsson says the data here can determine which 2G sites have the highest number of expected mobile broadband-capable users.

Another useful exercise for MNOs is to see how their spectrum assets match the capabilities of their subscribers' device capabilities. "Existing spectrum assets, spectrum re-farming opportunities and device penetration (supported technology and bands) influence the revenue potential of 3G and 4G deployments," states the report.

But the GSMA is keen to point out that operators should avoid a 'if you build it, they will come' type mentality. Despite the fact that

most advanced countries now have national 4G networks, its says take-up patterns are mixed. It even describes India as an anomaly: "Coverage is out of sync with consumer demand. With operators only able to reduce pricing so much in an already competitive market, the risk is that 4G becomes a 'white elephant'."

So what about delivering mobile broadband to areas where there is no coverage, 2G or otherwise? Here, Ericsson says that any villages that are within 2G coverage zones, can be upgraded with 3G or 4G. Villages outside these zones can then install an outdoor high-gain antenna that can be used to provide fixed wireless broadband access to important hotspot sites within the community.

"This solution requires low investment and the 4G site can serve a hotspot that is located 20-80km outside the 2G coverage range," says the report. "In this scenario, the school or hospital is equipped with a roof-top antenna which, as an example, would get 3Mbps downlink speed (wireless indoor coverage and LTE modem connected to, for example, a Wi-Fi router) at a distance of 100km away from the 4G-upgraded base station site using 2x10MHz of spectrum."

Making the connection

Clearly, connecting the next billion people requires a monumental effort, and the responsibility does not lie solely with the operator. An entire ecosystem of vendors, developers, regulators, governments, etc., has to be mobilised in order to make it happen.

The GSMA has developed a *Mobile Connectivity Index* that measures and quantifies the barriers to mobile internet access across four key enablers: infrastructure; affordability; consumer readiness; and content. The index is built up through 39 specific indicators, such as mobile tariffs, handset prices, spectrum, local incomes, etc., to ultimately give each country an aggregated score from 0-100 for each of the four enablers.

According to the index for 2016, Australia topped the rankings of 150 member countries with an overall score of 87.3. It was followed by Norway (85.5), New Zealand (85.2), Finland (83.9) and Singapore (83.4).

The first African country to appear is Mauritius which ranks 76th with an overall score of 62.71. South Africa comes in next in 84th place with 59.97, followed by Tunisia at 89 with a score of 57.42 *(see GSMA Mobile Connectivity Index table, right)*.

African countries go on to dominate the lower end of the table. Niger is at the bottom with an overall score of 17.2. It was only slightly outperformed by the DRC (17.7), followed by Chad (20.2), Guinea (20.3) and Afghanistan (23.1).

Thus, mobile coverage is not the only barrier according to the association's *Global Mobile Trends 2017* report. It states: "The largely rural populations and lack of fixed line infrastructure make extending coverage a long-standing challenge for many developing countries. Of the 3.7 billion not yet on the internet, around a third (1.2 billion) live outside a 3G or 4G signal and so

could be considered excluded because they don't have fast enough coverage.

"The corollary is equally important: for two thirds of the unconnected, coverage is not the problem. Affordability, content relevance, literacy skills and gender factors are all part of the discussion." ∎

GLOBAL POSITION 2016	COUNTRY	OVERALL SCORE 2016	OVERALL SCORE 2015	OVERALL SCORE 2014
75	Mauritius	62.71	60.96	57.07
84	South Africa	59.97	57.40	54.26
89	Tunisia	57.42	53.31	51.35
95	Morocco	55.14	51.76	47.44
96	Egypt	54.95	54.94	53.11
99	Algeria	52.72	48.50	45.47
102	Botswana	51.16	48.17	45.48
103	Namibia	50.21	48.60	46.87
106	Ghana	48.73	44.96	44.02
110	Angola	48.23	45.23	40.99
114	Gabon	46.40	41.90	39.52
116	Swaziland	43.86	39.63	37.10
117	Nigeria	42.02	39.25	36.02
118	Kenya	41.66	38.07	35.12
120	Lesotho	39.69	37.13	33.36
121	Sudan	39.16	37.34	34.35
122	Ethiopia	38.67	31.20	26.48
124	Zimbabwe	37.99	34.72	32.01
125	Cameroon	37.92	32.95	31.27
127	Congo	37.45	35.64	32.88
128	Tanzania	37.29	29.83	27.20
130	Rwanda	35.63	34.35	30.07
131	Côte d'Ivoire	35.52	31.43	28.93
132	Senegal	35.26	32.52	30.31
133	Zambia	34.99	32.10	30.95
134	Mozambique	34.16	32.20	29.21
135	Sierra Leone	34.14	30.26	27.05
136	Gambia	33.90	31.29	29.90
137	Mauritania	33.05	29.13	25.19
138	Liberia	32.94	29.03	25.25
139	Madagascar	32.16	31.25	25.53
140	Uganda	31.58	27.03	23.93
141	Benin	31.23	28.71	26.88
142	Togo	29.93	27.42	24.07
143	Mali	28.91	26.36	25.59
144	Burkina Faso	28.59	26.06	22.69
145	Malawi	23.06	26.49	24.62
147	Guinea	20.31	19.78	14.13
148	Chad	20.21	17.03	17.55
149	DRC	17.66	15.85	14.43
150	Niger	17.22	16.20	15.26

Extrapolated data for African countries from the GSMA's *Mobile Connectivity Index*.

SOURCE: GSMA INTELLIGENCE

Engineers and experts supported Bravo to monitor and operate the secure radio infrastructure and applications.
PHOTO © BRAVO CRITICAL COMMUNICATIONS

Bravo helps secure Hajj pilgrims with Airbus TETRA

Bravo and Airbus provided local and independent critical communication radio networks during this year's Hajj pilgrimage.

Public telecoms company Bravo is the only licensed operator in the Kingdom of Saudi Arabia providing the government, industrial and commercial sectors with services and solutions to address instant collective wireless communications.

As part of this year's Hajj event, the operator supported a governmental client in the western part of Saudi Arabia from 30 August to 4 September. It supplied Airbus' TETRA infrastructure technology, such as its *DXT* switches, base stations and devices. Bravo's client and other governmental entities used the latest network from Airbus, while engineers and experts supported Bravo to monitor and operate the secure radio infrastructure and the applications successfully.

As well as working with Bravo, Airbus says it also successfully contributed to the smooth running of this year's pilgrimage to Mecca with resilient radio communications technology.

The Hajj is one of the largest gatherings in the world, and its organisation entails growing logistical challenges as the number of pilgrims has increased in recent years. This has led the Saudi government to arrange new security measures to protect the faithful. This year, more than two million Muslims gathered in Mecca.

SE Asia's first commercial NB-IoT network goes live

Singapore's M1 says it has launched Southeast Asia's first commercial nationwide NarrowBand-IoT network.

M1 now joins a select group of operators globally who have commercially launched NB-IoT networks. According to an update from the GSA (Global mobile Supplier's Association) issued in July, they include Telus Canada, T-Mobile, Telia Norway, Vodafone Spain, Deutsche Telekom and Vodacom South Africa.

In Singapore, M1 says solution providers and businesses can now develop and deploy new IoT-enabled solutions such as smart energy management for buildings, environmental monitoring, asset tracking and fleet management, to name but a few.

The company cites local utility firm Keppel Electric as an example. As part of a collaboration, Keppel is piloting the NB-IoT *Energy Management Meter* which is expected to enable it to deploy power and water meters to its customers' premises faster and more cost-effectively.

Keppel Electric GM Janice Bong says: "With the full liberalisation of the electricity market expected in 2018, the launch of M1's NB-IoT network is a timely development for us and our customers, who will get to enjoy easy access to useful real-time consumption data at a lower cost. We also see the potential of such implementations helping consumers to manage their electricity use more prudently."

According to M1, traditional network technologies are too expensive, inaccessible and unable to support the billions of devices that can be connected to the IoT. It says the advantages of the NB-IoT standard include low-bandwidth, robust indoor penetration and highly efficient power usage. The firm adds that these are complemented by the benefits of utilising licensed spectrum, such as data integrity, user confidentiality and security.

Atech to use ND SatCom control system

The Atech corporation is deploying a new command and control system from its Arkhe subsidiary using ND SatCom's *SKYWAN* satellite routers.

Known as a Brazilian "system house", Atech develops various systems for command and control, air traffic control, cyber security, amongst others, and is also certified as a Strategic Defense Company by the Brazilian government. The company is a subsidiary of the Embraer group which is headquartered in Brazil with local presences in several countries.

Arkhe's *C4I* command and control system is being deployed in an

ND Satcom says its *SKYWAN 5G* technology was selected because it was the "most competitive" offering.

unspecified country. The platform comprises a central hub, remote sites with fixed and transportable antennas. Phase one of the project installation is now under way, with the complete network expected to go live in early 2018.

Atech says the project gives it new opportunities for expanding its Arkhe solutions whenever satellite interconnection is needed. ND Satcom says its *SKYWAN 5G* technology was selected because it was the "most competitive" offering, and that the *SKYWAN 7000/1070* product family has a link encryption feature which was also a mandatory requirement.

"With *SKYWAN* and the secured transmission, we get a powerful technology to implement this sensitive network," says Jorge Peter dos Santos, engineering coordinator, Atech. "ND SatCom has installed VSAT technology extensively in other governmental networks that perfectly fits to new Arkhe command and control solutions."

Jazz offloads tower business in Pakistan

Pakistan's market-leading cellco Jazz (formerly Mobilink) has signed an agreement for the sale of its wholly owned towerco, Deodar, for PKR98,700m (around USD940m) subject to adjustments.

Deodar has a portfolio of approximately 13,000 towers. It is being sold to Tanzanite Tower which is owned by the Islamabad-based Dawood Hercules Corporation and Malaysia's Edotco Group. The latter is a wholly owned subsidiary of the Axiata Group which last year raised a record USD600m as part of a financing deal for Edotco.

Upon successful completion of the transaction – which is expected before the end of 2017 – Deodar will enter into a master services agreement with Jazz, whereby it will continue to provide tower services. The initial term of this agreement is twelve years and is renewable at Jazz's discretion for three consecutive periods of five years each.

The sale will be on a cash and debt-free basis. Its proceeds will be used for Jazz's general corporate purposes, the funding of LTE spectrum awarded earlier this year, and repayment of a proportion of its outstanding debt. PKR69,930m (around USD666m)
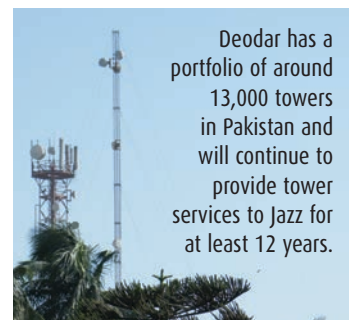
Deodar has a portfolio of around 13,000 towers in Pakistan and will continue to provide tower services to Jazz for at least 12 years.

of the PKR79,800m (USD760m) cash consideration is expected to be received at closing, while the remainder will be paid within 12 months thereafter.

IIC and oneM2M partner on Industrial IoT

The Industrial Internet Consortium (IIC) and IoT standards body oneM2M have agreed to work together to contribute to the creation and development of the "Industrial Internet".

The two organisations say they will promote the digital economy by harmonising various aspects and "preventing fragmentation" in the IIoT.

Their joint activities will include: collaboration, review and two-way feedback pertaining to IoT use cases, requirements and reference architectures; feedback to oneM2M standards from IIC testbeds and interoperability events; feedback from oneM2M to IIC reference architecture; and joint workshops, showcases and interoperability events.

"The Industrial IoT brings a whole new set of specific requirements in comparison to consumer IoT," says oneM2M's technical plenary chair Dr. Omar Elloumi. "Deriving those specific requirements from market-driven use cases as well as lessons learnt from operational driven testbeds, such as those developed by IIC, is the only viable option to develop the set of standards needed for IIoT."

IIC's agreement with oneM2M is one of a number made by its Liaison Working Group. The consortium says this group is its gateway for formal relationships with standards and open-source organisations, alliances, certification and testing bodies and government entities/agencies.

Group chair Wael William Diab says: "Horizontal technologies that enable scalability across a variety of industrial verticals are essential to the widespread adoption of IIoT."

oneM2M's Dr. Omar Elloumi says the Industrial IoT brings an entirely new set of specific requirements compared to consumer IoT.

'Roam Like At Home' not paying-off for EU cellcos

More than three quarters of European mobile operators do not believe there are enough revenues to make up for traffic increases since mobile roaming charges were abolished throughout the European Union earlier this year.

EU Regulation IV came into effect on 15 June 2017 and enables member state citizens to 'Roam Like At Home' (RLAH) when using their mobiles across the union.

After receiving 46 responses from an undisclosed number of operators across the EU, telecoms analytics specialist Mobileum found that 87 per cent reported a 'strong' or 'very strong' increase in data traffic, while 71 per cent highlighted an increase in voice traffic. Responses on SMS usage were split, with half of respondents saying there was no change.

According to Mobileum, the significant increase in data traffic aligns with how several plans are now being sold in EU countries.

But it adds that some operators have called for a potential increase in rates to compensate for the increased costs. Its research reveals that 76 per cent of those surveyed do not believe there is enough additional income to compensate for the extra traffic now being carried.

"The EU commission stated that domestic retail rates shouldn't rise to make up for this additional cost, but there are reports of this happening in some EU countries," says Mobileum's SVP of product and offering, Tim Moran. "The temptation for operators is to add the increased costs to their plans once EU Regulation IV has had further time to bed in."

He adds that it will be interesting to see if these costs have been moved to retail plans when the EU Commission publishes its interim report on the effects of the new roaming in December 2018.

Meeting the growing demand for IoT-SMS

Sparkle has teamed-up with Telarix to expand IoT-related SMS services with the launch of a new SMS management solution. The company, which is the international services arm of Italy's TIM Group, says Telarix's solution will reduce overhead and manage SMS-specific network complexities.

As an international voice carrier, Sparkle offers SMS as a retail service in addition to its wholesale business. Stefano Olivieri, the company's EVP voice and mobile business, says: "The new solution allows us to consolidate our entire SMS business onto one comprehensive platform that provides buying, selling, billing, auditing, alerting and reporting functions, plus the translation and application of routing commands to the SMSC or the SMS hub."

Telarix adds that there are some "inherent complexities" in SMS handling that its new solution addresses, and that it simplifies the end-to-end SMS management and automation.

Citing figures from the Mobile Ecosystem Forum, Sparkle says messaging traffic is expected to increase by more than 350 per cent over the next five years. It says A2P messaging is leading the growth and is set to become a fundamental delivery mechanism for IoT devices.

Telarix specialises in solutions that simplify, automate and optimise the way carriers do business together. The US-headquartered company claims it hosts the only industry-wide B2B portal offering carriers a secure and collaborative environment in which to conduct business.

Teltronic to provide TETRA for Philippines' metro line

Teltronic has been selected to provide a complete TETRA communications system for a metro rail line in Manila.

The Metro Rail Transit line 7 (MRT-7) project in the Philippines' capital is being developed by SMC Mass Rail Transit 7.

Connecting 14 stations, the 22.8km line will run northeast from an interchange with MRT-3 at North Avenue, serving Quezon City, Caloocan City and San Jose del Monte in Bulacan province. MRT-7 is set to serve around 350,000 passengers a day when operations begin in August 2019, potentially increasing to 800,000 per day upon completion of a series of planned upgrades.

Teltronic – which is now a part of Hytera Communications – was awarded the contract by rolling stock manufacturer and E&M turnkey provider Hyundai Rotem.

Under the agreement, Teltronic will provide its *NEBULA* TETRA infrastructure, *RTP-603* on-board equipment, *STP9000* hand-portable and *SRG3900* fixed radios, and a *CeCo-TRANS* control centre. The onboard equipment will be fully integrated with both the train

The new metro line could serve around 800,000 passengers a day after it begins operations in 2019.

control and management system, allowing remote vehicle monitoring from the control centre. It will also be integrated with the public address and intercom systems, providing communication between passengers and control in emergency situations.

Boosting 5G in Singapore

Singtel and Ericsson will jointly establish a Centre of Excellence (CoE) to facilitate 5G development and deployment in Singapore. Starting with an investment of SGD2m, the two partners say the centre will be based on four pillars: upskilling, demos, live field trials, and collaborations with tertiary institutions. It will also be open to Singtel's regional associates across Asia and Africa, as well as its Australian subsidiary Optus. Activities will begin with Ericsson providing its 5G expertise to equip Singtel engineers with critical competencies.

Ice connects the Arctic

Ice Wireless has worked with Parallel Wireless to expand broadband services to Canada's most remote Arctic communities. It has deployed a multi-technology macro solution based on Parallel's all IP virtualised RAN. The vendor claims its system makes implementing cellular networks "as easy and as cost-effective as Wi-Fi". Parallel says the self-configuring and self-optimising technology combines its *HetNet Gateway* with its *Converged Wireless System* base stations. The platform features SDR which has enabled Ice to incorporate both 3G and LTE into an integrated solution.

High flyaway antenna

C-COM's *iNetVu FLY-981* mobile antenna has been installed in the Andes mountains of southern Peru at an elevation of 14,900ft. The firm reckons this may be the highest altitude flyaway antenna unit currently in operation. The *FLY-981* is packaged in three transportable cases each weighing less than 28kg, and according to C-COM the antenna can be assembled in less than 10 minutes without any tools. It adds that the system automatically finds a satellite in under two minutes with just the press of a button.

HPE supercomputer sent to International Space Station

On 14 August 2017, SpaceX successfully launched its *Dragon* spacecraft to deliver critical cargo to and from the International Space Station (ISS) for NASA. Part of the *Dragon*'s payload was a supercomputer from Hewlett Packard Enterprise (HPE).

The *Spaceborne Computer* will be used to support a year-long experiment conducted by HPE and NASA to run a high performance commercial off-the-shelf computer system in space. This has never been done before, and the aim is for the system to operate seamlessly in the harsh conditions of space for one year – roughly the amount of

SpaceX's *Dragon* spacecraft is used to deliver cargo to the International Space Station for NASA.

time it will take to travel to Mars.

HPE says many of the calculations needed for space research projects are still done on Earth due to the limited computing systems available on board orbiting vessels. As well as creating a challenge when transceiving data, this approach only works when astronauts are in near real-time communication with Earth. Therefore, once they travel farther out and closer to Mars, they will experience longer latencies.

The *Spaceborne Computer* includes HPE's *Apollo 40* class systems with a high-speed HPC interconnect running an open-source Linux OS. Although there are no hardware modifications to these components, HPE says it created a "unique" water-cooled enclosure and developed purpose-built 'ruggedised' software to address the reliability requirements in space.

Worldwide ocean observation programme

Orange Marine is now providing technical resources to launch free-drifting oceanographic data collection floats along routes taken by its fleet of six cable ships. The firm, Orange's submarine telecoms division, has signed a partnership with Euro-Argo, the European branch of the Argo consortium.

Founded in 2000 by UNESCO and the World Meteorological Organisation, the Argo programme involves more than 30 countries. It is the first global network *in situ* for studying the state of the world's

oceans and better understand their influence on climate change. The network is gradually expanding and currently includes nearly 4,000 active floats, with an average of 1,000 deployed each year worldwide.

Argo's floats have an average lifespan of four years and gather data on ocean temperature and salinity from the surface down to a depth of 2,000m. These data are sent in real-time via satellite to a platform open to researchers from around the world.

The consortium aims to provide uniform network coverage across the

globe. Euro-Argo plans to develop the capacity to maintain a quarter of the worldwide network, which means deploying around 250 floats per year. Navigation in European waters is also needed for pilot research programmes.

In September, Orange's cable ship *Pierre de Fermat* launched the first float North off Cape Finisterre (Spain) during a maintenance operation in September. A second float was launched 500 nautical miles away in the Azores region, and in early October, the company said a third was still on board awaiting deployment.

ProRail turns to Intracom Telecom for security network

ProRail, the Dutch national railway infrastructure operator, is using Intracom Telecom's radios to backhaul its network of CCTV and security/surveillance systems.

Utrecht-based ProRail manages around 7,000km of track, 404 stations, 15 tunnels, and more than a thousand viaducts and bridges.

It claims the Netherlands has Europe's busiest rail network, and says more than 3.3 million journeys were made using the country's tracks in 2015.

As part of its commitment to provide secure transportation services while dealing with high passenger

flows, ProRail has installed what's described as an "advanced" CCTV solution incorporating Intracom Telecom's *StreetNode* wireless transmission equipment at 26GHz. The solution includes point-to-point/multipoint SDRs which are claimed to offer quick installation, high reliability, and "massive" capacity for HD video surveillance.

The first phase of the project has seen the deployment of 21 hubs and 78 terminals. These have been installed at 16 railway stations throughout the Netherlands, from Groningen to Maastricht.
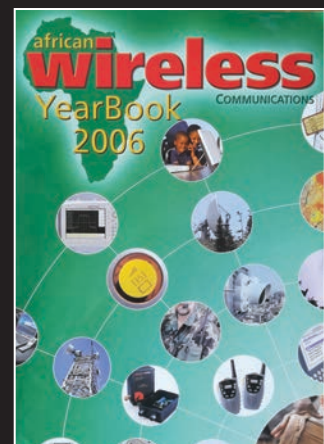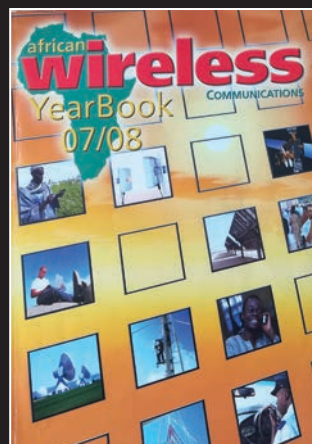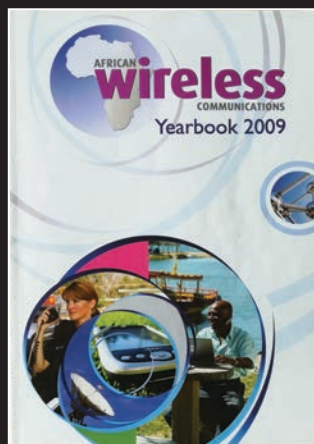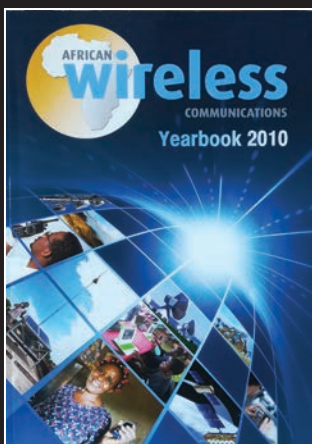
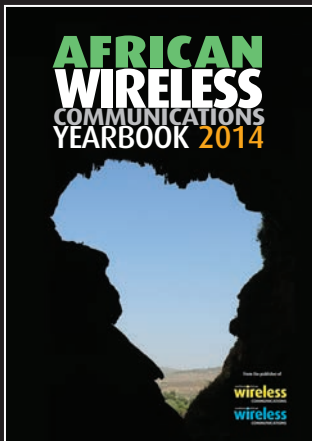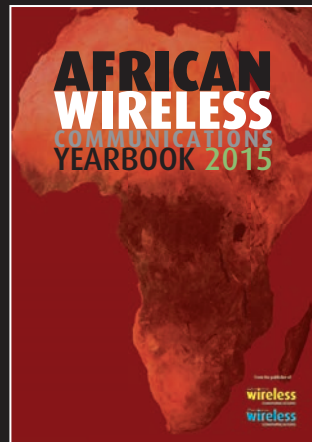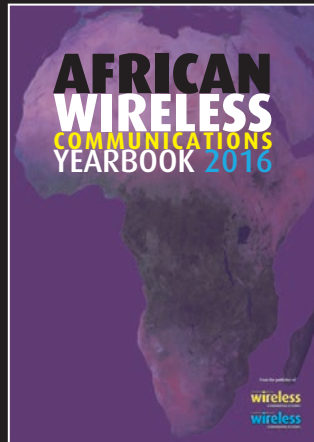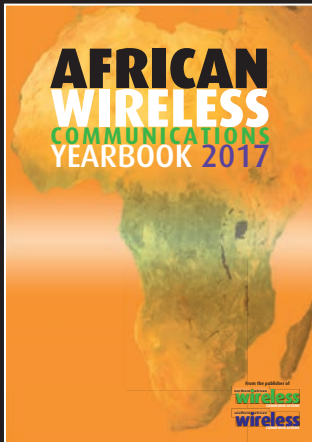ProRail is using wireless technology to connect hundreds of IP cameras at its railway stations.

ProRail is using the technology as the transmission infrastructure in and on the station platforms and surrounding areas as a complement to fibre. The system is used to connect hundreds of IP cameras. The units relay all the collected video, data and alarm signals from the CCTV cameras to each of the station control rooms while preserving HD picture quality at all times.