- **Is African broadband all about fibre?**
- **Connecting the education sector**
- **Time to face up to the IoT standards reality**

Angola Cables
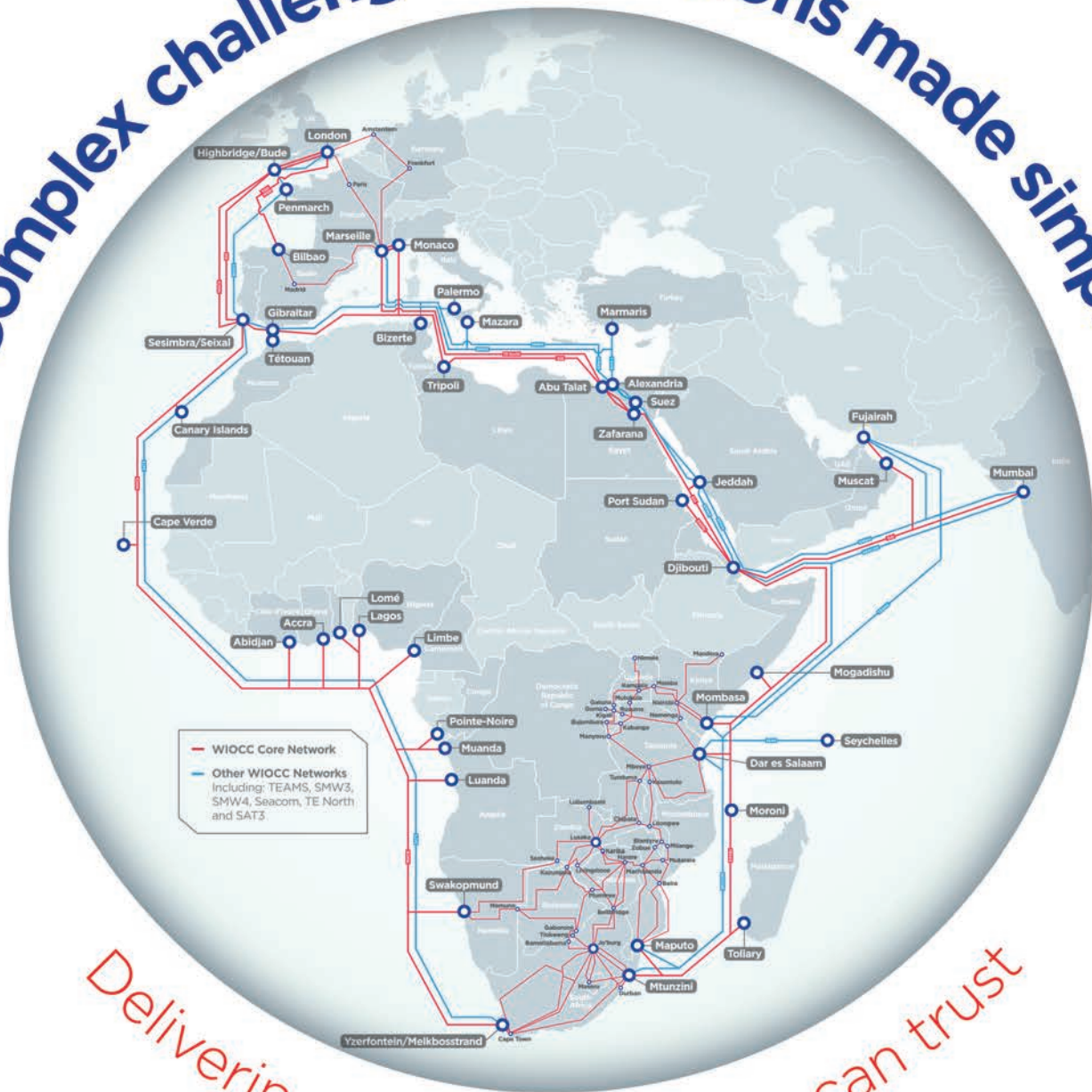## Bridging the Gap, Developing a new route

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Brazil

Sangano
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angola cables

We are connected to the Future
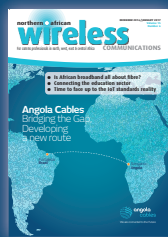
Angola Cables is dedicated to the exploitation and marketing capacity of international voice and data circuits for submarine cables. Our purpose is to contribute to technological development and improve access for all to digital information.

We manage the Angolan participation in the West African Cable System (WACS), deployed in 2012. This cable connects Africa to Europe, from the city of Cape Town in South Africa to London in the United Kingdom. WACS connects 11 African and 3 European countries and, since the 2015 upgrade, boasts a 14.5 Tbps capacity.

From our Angonap data centre we offer colocation services for companies in various sectors and also manage Angonix, Angola's Internet Exchange Point, where operators and nationwide content providers exchange information and data.

Angola Cables is also building the South Atlantic Cable System (SACS), the first subsea fibre optic cable system to connect Africa and South America.

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Boeing to build new AMOS and GiSAT satellites

GiSAT will feature Boeing's new digital payload technology and provide coverage over sub-Saharan Africa.

PHOTO: BOEING

Boeing will help expand broadband services in Africa with two new satellites planned for the continent.

In a deal worth USD161m, Spacecom announced in late December 2016 that it had contracted the company to build *AMOS-17*. The new satellite is expected to be launched in 2019 and will cover Africa, the Middle East and Europe. It will operate from 17°E – the same location that was previously used by *AMOS-6* before all contact with it was suddenly lost at the end of 2015 resulting in its write-off *(see 'Rocket Power' feature, Dec 2015-Jan 2016)*.

Spacecom said *AMOS-17* will be designed for an in-orbit life of more than 15 years and offer a payload power of around 8.5kW. It will offer Ka-, Ku-and C-band services, and feature a combination of broad regional beams and high throughput spot beams to maximise throughput and spectral efficiency.

In a separate deal announced in September 2016, Boeing will also build *GiSAT* for Cayman Islands-based Global IP. The spacecraft will be based on Boeing's *702* platform but with a new digital payload offering twice the capacity of previous designs. Global IP's mission will be to deliver streaming media, digital broadcast and other communications services to sub-Saharan Africa. With a coverage area encompassing 35 countries and 750 million people, it claims *GiSAT* will deliver higher data rates at lower costs than previous satellites serving the region.

"Our vision for *GiSAT* is to provide end users with connectivity and services that are affordable, rich in local content and truly broadband in nature," said Bahram Pourmand, CEO, Global IP. "With the ability to reconfigure the *GiSAT* on-board processor, the Boeing digital payload will allow us to broadcast different channels to different beams from different locations, providing better service to broadcasters, mobile operators and ISPs."

Scheduled to enter service in 2019, GiSAT is designed to operate with more than 10 gateways in Europe and multiple gateways within Africa.
AsiaSat relocates its satellite to cover Spacecom's 4°W orbital position – Wireless Business, p15.

NSSLGlobal brings L-band to Nigeria

NSSLGlobal is working with Nigerian ISP and system integrator Coollink to bring L-band coverage to remote parts of Nigeria where mobile services are non-existent or erratic.

Coollink's Nadim Chidiac said: "Satellite remains the only viable means of providing universal internet access beyond the reach of terrestrial communications in emerging markets."

NSSLGlobal believes that by investing in local agents such as Coollink, it is stimulating technology development and business opportunities in Nigeria which is Africa's largest economy.

From its Cape Town office, the firm said it brings together the "best-in-class" satellite solutions from key market providers, offering options across L-, C, and Ka-band networks.

It also has a wholly-owned and fully operational VSAT network, including six teleports, 23 beams and 15 satellites covering 95 per cent of the Earth's surface, and with specialist services for land-, sea- and air-based applications.

Liberia's internet taken down

In early November, it was widely reported that Liberia had become the first country to have its entire internet taken down following a DDoS attack.

Experts said 'Mirai' was used – the same malware that crippled sites such as Netflix and eBay earlier in 2016. The code for Mirai is freely available online

The Liberian attack is thought to have come from a single source and therefore may have been the work of a lone attacker. Mirai botnets targeted the companies that co-own the fibre cables into the country and flooded the network with traffic.

Liberia's subsea fibre connectivity comes via ACE and this is then extended across a national backbone developed by the Cable Consortium of Liberia which is made up of the government along with local telcos.

Ooredoo claims "groundbreaking" transmission speeds in Algerian trial

Ooredoo Algeria claims to have successfully achieved what has been described as a "groundbreaking" transmission speed of 1.2Tbps over optical fibre.

At the end of last year, the operator carried out the trial between the cities of Algiers and Ain Defla over a distance exceeding 200km. It used the Nokia (formerly Alcatel-Lucent) *1830* photonic service switch platform which has been designed to help in optimising optical networks to meet unpredictable traffic demands.

Ooredoo also utilised the vendor's 500G DWDM muxponder which can carry up to five 100G services per line card and is said to help service providers achieve "superior" capacity, reach and wavelength flexibility.

Commercial deployment of the technology in the near future will be a first for Africa and will allow Ooredoo Algeria to offer high capacity-based solutions to its subscribers.

Pierre Chaume, head of Nokia's North Africa market unit, said: "This trial is an important and critical step in helping Ooredoo Algeria increase capacity and add flexibility to its network. The deployment will also support the 4G deployment plans of the service provider."

The vendor added that because of the new performance levels achieved during the trial, Ooredoo Algeria is updating its digital knowhow by better understanding the needs of the telecoms sector. It said the cellco's core network will therefore be able to integrate new technologies for better performance and optimum care of the increasing demand for mobile services.

Ericsson and Qualcomm demo Gigabit Class LTE in Africa – News, p8.

The commercial deployment of Nokia's *1830* PSS platform in Algeria will be a first for an optical network in Africa.

Microsoft to use Nominet's TVWS tech

Microsoft and Nominet have teamed-up to help ISPs across Africa leverage unused broadcast frequencies and

In Africa, Microsoft is currently supporting TVWS projects in Botswana, Ghana, Kenya, Malawi, amongst others.

deliver low-cost broadband access using TV white space (TVWS) spectrum.

As the available set of TVWS frequencies varies, Nominet has developed a geo-location database that tells devices which frequencies they can use in a particular area, at what power, and for how long. The database allows wireless devices to access TVWS frequencies, and was the first to receive regulatory approval for use in the UK.

As part of its *Affordable Access Initiative*, Microsoft is working with public and private sector partners around the world to develop technologies and business models that will make it easier for billions more people to affordably

get online. The company is currently supporting broadband connectivity programmes in Kenya, Botswana, Malawi, Ghana, amongst others.

To support its goals, Microsoft will use Nominet's TVWS database across its *Azure* cloud platform to enable the deployment of low-cost terrestrial wireless broadband internet to communities across the continent.

It will also leverage Nominet's dynamic spectrum management technology. This has been designed to support two-way communications at relatively high data rates over long distances, and delivers connectivity to large open areas where it would be

difficult to deploy fixed infrastructure.

"Spectrum is a scarce and valuable resource, and demand can outstrip supply," said Adam Leach, R&D director at Nominet. "Dynamic spectrum sharing allows the available spectrum to be used more efficiently than any existing static techniques. Maximising the efficiency of the spectrum usage lowers the barriers to access, enabling more users and devices to get connected."

UK-based Nominet is a global internet company. Since 1996, it has managed and run domain names that end in .uk, and is now said to be one of the world's largest country code registries.

Intelsat helps Quantis and Orange expand in Africa

Quantis Global is aiming to expand its network and bring higher performing broadband services across the region with Intelsat's help.

Part of Spain-based Eurona Wireless Telecom, Quantis is said to be a leading broadband service provider in Northern Africa and Europe. It will incorporate services from two satellites that use Intelsat's *EpicNG* high throughput satellite system – *Intelsat 33e* and *Intelsat 37e*. The firm will also use the *IntelsatOne Flex for Enterprise* managed service.

Quantis' network leverages Intelsat teleports and will serve NGOs, enterprise, embassies, the oil and gas sector, and maritime customers in Africa, the Middle East and Europe. The firm's CEO

Aquilino Antuña said: "The global footprint of the Intelsat solution means we can support our growth strategies in the countries where we currently operate as well as quickly respond to new market opportunities anywhere in the world."

Meanwhile, Orange Group has renewed an agreement with Intelsat and will use C-band capacity from *Intelsat 22* to help deliver 3G services in Cameroon. The deal will also enable the operator to expand its network into remote parts of the country.

Orange has been in Cameroon since 1999, and is presently the country's second-most popular mobile operator after MTN. It currently has 850 3G and 1,650 2G sites across the country.

ACE connectivity extended in Guinea via microwave

Mobile operator InterCEL + is building a major wireless network that will distribute high-capacity broadband from the ACE (Africa Coast to Europe) submarine cable system to major urban and business regions in Guinea.

The company is using a point-to-multipoint (PMP) microwave system and has already established phase one in Conakry. It has rolled out a network that supports 600Mbps across many parts of the capital, and is said to be offering businesses up to a ten-fold increase in bandwidth compared to the legacy WiMAX links they had previously been limited to.

InterCEL + is now extending connectivity to major urban areas along the coast and inland to the

underserved mining regions, which have previously lacked substantial broadband provision.

InterCEL + is part of Dubai-based Expresso Telecoms Group which also runs African operations in Sudan, Senegal, Mauritania and Ghana. As well as offering consumers and enterprises a range of mobile, high-speed data and voice services, Expresso plays a key role in managing ACE's cable landing stations and expanding connectivity across the countries it operates in.

The new PMP network in Guinea is using CBNL's *VectaStar*. It's claimed this offers up to 50 per cent TCO savings over alternative carrier-grade point-to-point technology, and has given InterCEL + the ability to build hub sites delivering up to 14.4Gbps.

Liquid and GlobalReach launch managed Wi-Fi service

Businesses in Africa that want enterprise-grade Wi-Fi without the worries of procuring and managing a WLAN can now benefit from a new managed service from Liquid Telecom and GlobalReach Technology.

It's claimed users ranging from the smallest cafés to the largest shopping malls and hotels will be able to offer Wi-Fi securely to customers without having to incur high installation costs.

According to Liquid, the partnership with UK-based GlobalReach brings the "power and scale" of a global

Wi-Fi enabler into its core network and data centres, allowing its customers to benefit from the latest Wi-Fi technology deployed in-country.

The service combines connectivity from Liquid with hardware from Ruckus Wireless and GlobalReach's cloud-based platform which provides authentication, authorisation and accounting. It enables businesses offering Wi-Fi to their guests to connect and engage with them through customisable and branded captive portals, and tap into new

commercial opportunities. The platform is also said to offer "comprehensive" analytics of user demographics and engagement. This will allow businesses to better understand customer behaviour, and tailor their services accordingly.

Liquid's existing managed Wi-Fi customers, along with its public Wi-Fi networks, will be migrated to the new GlobalReach platform over the coming months. The new service can be bought for a fixed monthly fee and is now available in Zimbabwe,
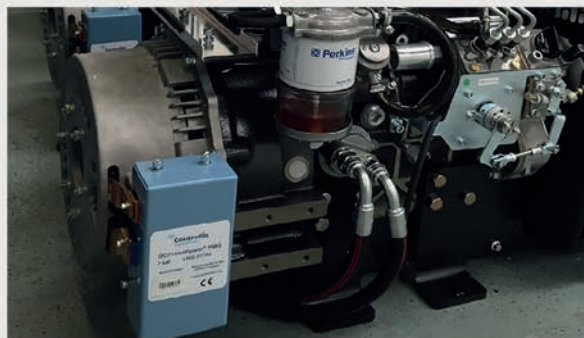

Liquid Telecom said consumers now expect free and reliable Wi-Fi when visiting many public venues.

Zambia, Rwanda, Uganda, DRC and Kenya, with Tanzania and South Africa following soon.

Ericsson and Qualcomm demo first Gigabit Class LTE in Africa

Ericsson and Qualcomm say they have successfully demonstrated Africa's first over-the-air Gigabit Class LTE with the use of licensed spectrum.

Gigabit Class LTE (LTE Category 16) means up to one billion bits of information delivered to a mobile device in one second. It utilises three-carrier aggregation (CA) with 256 QAM, and by applying 4 x 4 MIMO across 40MHz of spectrum.

It's claimed that during the demo, peak data speeds of more than 900Mbps were recorded using Ericsson's RAN equipment and a Qualcomm *Snapdragon X16* LTE modem mobile test device.
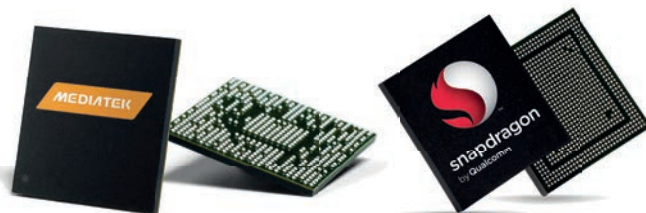
Right: The demo used an LTE modem with Qualcomm's first chipset to support LTE-A Pro. Left: Ericsson has also teamed up with chipmaker MediaTek to bring affordable LTE-A handsets to Africa.

The *X16* is Qualcomm's first processor to support LTE-A Pro. According to the firm, the modem can receive 10 streams of LTE data simultaneously using four antennas. It claims the device uses better signal processing to extract more bits out of every LTE transmission, boosting the throughput of each of the 10 streams to around 100Mbps.

In a separate development, rival mobile chipmaker MediaTek is also working with Ericsson to make LTE-A features available in mainstream mobile devices across Africa.

At the end of 2015, there were 72 live LTE networks in 32 countries across Africa. Ericsson says that most, if not all, can expect to evolve to LTE-A over the next three years.

However, mobile devices that can currently support this technology can cost as much as USD800. MediaTek says its smartphone chipset technology, which enables consumers to take advantage of the benefits of CA, will be available on affordable MediaTek-powered handsets for the mass market in Africa.

Ku-band happiness from iWay

iWayAfrica has launched what it describes as a "much needed" pan-continental Ku-band managed retail satellite service.

Jola – which is said to mean 'one who brings happiness' – aims to provide affordable satellite internet to households and businesses in sub-Saharan Africa, including those in areas with limited connectivity options.

According to Ali Bofulo, iWayAfrica's general manager, *Jola*'s pricing is lower than any existing Ku-band satellite services. He adds: "We are offering users true flexibility to select a monthly data allowance and speed that suits their needs."

With pre-defined, branded packages available throughout its retail channel and extending across all user profiles, it's claimed the service effectively addresses both business and household needs.

Some of the features offered include the *Jola SOS* business continuity service, a 1GB emergency data advance for those occasions when a user's data allowance has expired, free night usage, and others.

Globalstar protecting Tunisia oil industry

Oil companies working in Tunisia have been turning to Globalstar's satellite systems to monitor their fleets and safeguard workers.

Virtual Mobile Data (VMD), Globalstar's partner in Tunisia, has worked with local technology firm Neuron Technology Systems to design the *integrated Vehicle Monitoring System* or *iVMS*. It's claimed this switches seamlessly between Globalstar's simplex satellite network and land-based GSM/GPRS networks in the event of outages or transmission failures.

In VMD's most recent deployment, a Ukrainian oil services company is using 30 *iVMS* devices which incorporate Globalstar's *SmartOne B* simplex tracker to help its oil exploration and production customers monitor their vehicle fleets and safeguard staff across Tunisia.

Earlier in 2016, Tunisian civil works contractor Kilani Enterprise for Public Works deployed *iVMS* to track its fleet of 4x4 vehicles for better security and to help monitor driver behaviour. Kilani has also been using Globalstar's *SPOT* handheld devices since 2013 as its only means of safeguarding staff carrying out operations in southern Tunisia's vast desert.

In a third deployment, VMD integrated *SmartOne B* transmitters with GPRS devices from another local reseller for a Tunisian company that supports oil industry firms.

The unnamed company's services include providing equipment, transportation, site maintenance and staff services. It is using 56 *iVMS* devices to track transporters and containers carrying mechanical and oil rig equipment used in petroleum production and refining.

Asian telcos to expand in Africa via Djibouti

Two Asian operators will use the Djibouti Data Center (DDC) as a strategic hub for their pan-African expansion.

The DDC serves as a major meeting point for submarine cable systems including the new SEA-ME-WE 5 (Southeast Asia-Middle East – Western Europe) cable which was launched at the end of 2016. Stretching around 20,000km, SEA-ME-WE 5 connects Djibouti with China via 18 landing points including one in Egypt.

Last December, China Telecom Global (CTG) announced that the centre will help facilitate its network expansion in East Africa. CTG is a founding member of the SEA-ME-WE 5 consortium.

In addition to SEA-ME-WE 5, the DDC provides access to cable systems such as EIG, EASSy, Aden-Djibouti, and Ethiopia-Djibouti. In November 2015, it also announced an agreement with PCCW Global to support the AAE-1 (Asia-Africa-Europe 1) submarine cable network.

Hong Kong-based PCCW Global is a founder consortium member of AAE-1 which spans around 25,000km, uses 100G technology, and has a capacity of more than 40 terabits. The system is due to be ready for service in early 2017.
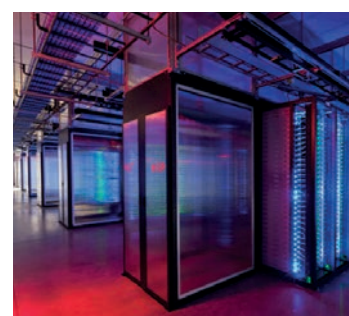
The Djibouti Data Center is East Africa's first and only Tier 3 carrier-neutral facility with direct access to all major international and regional fibre systems connecting Africa with Europe, the Middle East, and Asia.

Solar kits and mobile money to help power rural homes in West Africa

The kits include a solar panel connected to a battery that can be used to power domestic appliances. Billing is managed via *Orange Money*.

Orange and France-based energy specialist ENGIE will deploy around 1,000 solar kits in Senegal, Côte d'Ivoire and Cameroon. Several villages in rural areas have been identified to participate in the first phase of this pilot programme, prior to larger scale rollout.

The kits include a solar panel connected to a battery that can be used to power LED lights, small electrical appliances, or recharge mobile phones.

ENGIE will supply the solar kits and take responsibility for the installation and maintenance of the equipment.

The kits also contain a remote control solution and a mobile payment system. Orange will ensure the commercial deployment and management of billing via *Orange Money*. This will enable customers to pay the rental charges for using the equipment, and allow them to pay by instalments rather than through an upfront investment.

It's claimed the kits offer a low-cost alternative to kerosene lamps, disposable batteries or diesel-powered devices, which are all potentially dangerous pollutants.

This latest announcement from Orange and ENGIE follows a deal they signed in late 2015 to work on projects to expand the rural electricity grid and optimise the energy supplied to Orange's telecoms infrastructure in Africa *(News, Dec 2015-Jan 2016)*.

Cashing in on mobile money services

Mobile money services in Africa have been boosted following two separate initiatives from SimbaPay and Azimo.

UK-based digital money transfer provider SimbaPay has launched its money transfer service to Ghana and Uganda. Using the SimbaPay app or website, people living in Europe can now send money to users in the two countries instantly. Transfers are credited within seconds to the recipient's mobile money wallet, such as *MTN Mobile Money*.

SimbaPay also delivers money transfers via mobile money and bank accounts to other African countries, such as Nigeria and Kenya, and says that more destinations and partners are being sought for addition in 2017.

SimbaPay CEO Nyasinga Onyancha says: "By delivering money via existing mobile money wallet services, many recipients who previously could not access formal financial services can now do so."

Meanwhile, legendary Nigerian footballer Kanu Nwankwo is helping to bring low-cost online money transfers to the Nigerian community by becoming the brand ambassador for Azimo.

As many as three million Nigerians receive money from overseas every year, with more than GBP20bn sent back home in 2015 alone. But according to online digital money transfer service Azimo, the fees charged by legacy providers have been "very high".

It claims to offer the best rates and zero fees to Nigeria, saving customers as much as 10 per cent. The company adds that users can also now send money from their mobiles, tablets or PCs to any bank in Nigeria in as little as six seconds.

To celebrate its partnership with the former Nigeria captain and Arsenal striker, Azimo has pledged to make a donation to the Kanu Heart Foundation for every transaction sent to Nigeria.

Kanu, known as "Papilo" to his fans, says he is championing the work Azimo is doing to make sending money home "radically cheaper and faster".

Nexans connects

Huawei Marine Networks has awarded Nexans the contract to supply 6,000km of its second-generation submarine repeatered optical cables for phase II of the National Broadband Network project linking Cameroon and Brazil.

The project represents the first intercontinental project for France-based cabling solutions specialist Nexans. The cable system will be manufactured and tested at the company's Rognan factory in Norway, with delivery expected to be completed by the end of 2017.

Huawei Marine and Nexans previously partnered in 2015 to deliver the Nigeria Cameroon Submarine Cable System. This constituted phase I of Cameroon's National Broadband Network being developed for Camtel, the country's national wireless and fixed line operator.

Agriculture digitises with Mastercard mobile marketplace

Mastercard has launched *2KUZE*, a digital platform that connects small-holder farmers, agents, buyers and banks in Kenya, Uganda and Tanzania.

2KUZE (Swahili for 'let's grow to-gether') enables farmers to buy, sell and receive payments for agricultural goods via their feature phones. The platform aims to bring the benefits and security of mobile commerce and payments to farmers in the three countries.

In the initial pilot, *2KUZE* is being launched in partnership with non-profit organisation, Cafédirect Producers Foundation. Currently, 2,000 small-scale farmers in Nandi Hills, Kenya are using the solution to sell their produce and working with farmer-friendly agents to ensure they reach the right buyers for the best price.

"80 per cent of farmers in Africa are classified as smallholder farmers

having less than 1-2 acres of farming land, making it extremely difficult to drive growth and prosperity within this community," says Daniel Monehin, division president for sub-Saharan Africa and head of financial inclusion for international markets at Mastercard. "We believe that by using mobile, a technology that is so ubiquitous among farmers in Africa, we can improve financial access,

bring in operational efficiency and facilitate faster payments."

2KUZE was developed at the Mastercard Lab for Financial Inclusion in Nairobi which was set up in 2015. Through an USD11m grant from the Bill and Melinda Gates Foundation, the lab is working with East African entrepreneurs and other stakeholders to develop local products rooted in what Mastercard says is its "global knowhow".

Fall in Kenya subscribers

Statistics released by the Communications Authority of Kenya (CAK) in January 2017 revealed a decline in the number of mobile subscriptions for the quarter ending September 2016. Users fell from 39.7 million to 38.5 million, representing a three per cent drop from the previous period. As a result, mobile penetration now stands at 87.3 per cent, down from 90 per cent in the previous quarter. CAK attributed the decline to adjustments in Telkom Kenya's reporting because of a regulatory change in the way active subscribers are now defined.

ABS-2A goes live

ABS-2A began commercial service on 21 January 2017 following its launch on board a SpaceX *Falcon 9* rocket last June and subsequent testing. Equipped with 48 Ku-band transponders, the satellite orbits at 74.725ºE and will serve ABS' customers in Africa, the Middle East, Russia, South Asia and South East Asia. *ABS-2A* is the second of two all-electric satellites Boeing has delivered to ABS. The operator adds that it has now completed its investment to build and launch three satellites in three consecutive years.

Sparkle PoP for Ooredoo

Sparkle's Sicily Hub in Palermo, Italy has become Ooredoo Tunisia's main PoP in Europe. The operator says its customers will now benefit from an "enhanced" data experience, improved coverage and increased diversity options as a result of the reduced latency and shorter traffic routes for ISPs exchanging content locally through the PoP. In addition, the hub provides direct access to the 19 submarine cables that land in Sicily, connecting Europe to Africa, the Middle East, Asia and North America.

Sonema reaches for new Heights in Africa

Sonema is aiming to expand its satellite networking capabilities across Africa with the help of Comtech EF Data.

The global VSAT integrator and telecoms service provider will use the vendor's *Heights* networking hub at its teleport in France. It aims to use the platform to provide enhanced connectivity services on star and mesh network architectures to 50 countries on the continent.

According to Comtech, *Heights* is a scalable networking platform and offers the industry's highest throughput and traffic optimisation capabilities. It said the system "cost-effectively" supports multiple business models simultaneously, from traditional full hub ownership to VNO operation within a home network operator configuration.

The company said that *Heights* also features a powerful traffic analytics engine that allows simplified design, implementation, monitor, control and optimisation of networks.

Sonema marketing director Yves Du Sault said his company reviewed the different satellite networking options available before deciding to team with Comtech EF Data because of its "innovative" approaches to the dynamic and stringent demands of its clients, particularly financial institutions, across Africa.

He added "*Heights* delivers on high spectral efficiency, network intelligence, scalability and flexibility; we can

Sonema will use Comtech EF Data's network optimisation and management platform to provide connectivity services to 50 countries in Africa.

leverage those key differentiators to offer enhanced services to customers for whom performance and availability are paramount."

YouTube will be Africa's top mobile app

Video traffic on mobile networks in Africa has doubled in the last year, increasing from 8.6 to 18.1 per cent, according to research from Sandvine.

For its recent *Global Internet Phenomena* report, the network intelligence specialist gathered data from a selection of its 300-plus communications service provider customers in Africa, Asia-Pacific and the Middle East.

It found that *YouTube* is driving video growth in Africa, and continues to be the top mobile application in both APAC and the Middle East. Sandvine predicted that the rapid growth of video in Africa will make it the top app on the continent within the next 18 months.

The report also revealed that WAP browsing, typically associated with feature phone use, has seen its traffic share cut in half in Africa over the past two years. Sandvine said this is indicative of increasing smartphone adoption in the region.

The vendor believes that the rapid growth of video on mobile networks in Africa underscores the need for operators to have solutions in place that allow them to measure, monetise, and optimise the real-time entertainment traffic that subscribers value.

Tom Donnelly, Sandvine's COO for sales and global services, said: "These strategies have been extremely successful for our customers in both Asia-Pacific and the Middle East, and has allowed them to provide their subscribers a high quality of experience when using the applications they care about most."

Omantel Wholesale connects Asia and Africa

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

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

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

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

The company said it will connect to the Ethiopia border from Berbera, and then Ethiopia Telecom will extend the cable from into its national network. The total investment in both projects

will be more than USD80m.

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

Fortaleza Brazil

Sangano Angola

SACS - Fiber optic cable linking Africa to the Americas, from Angola, is close to 50% completion

SACS, a fiber-optic cable system that will link the African and American continents, from Angola is completed at 46%. The phase of the Survey was already completed, in Luanda, the stage where the MV Ocean Endeavor vessel, a specialized vessel belonging to the company Gardline Brasil, carried out the preliminary survey and inspection studies on the route to be made by the cable, in order to define the route and the type of coating thereof, in order to reduce the risk of SACS being damaged in interaction with the rocks on the seabed.

The survey lasted more than a month and a half and required about 50 technicians in a study that began in Brazil and ended in Angola.

This is one of the most important phases because the information resulting from this study will allow the supplier to finish manufacturing the cable with the most appropriate coating, its repeaters, as well as to finish the final design of power, stated Clementino Fernando, the SACS project manager.

Extending over 6,200 kilometers of network in the South Atlantic and costing US$160million, SACS will connect Luanda to the Brazilian city, Fortaleza, connecting the African continent directly to Latin America for the first time,

making it international data transmissions in large volumes and at high speeds between these two points of the globe.

From Fortaleza, SACS will be connected to another cable system that goes to Miami, Florida, making it possible for Africa to be connected directly to the United States of America.

SACS incorporates state-of-the-art optical technology capable of delivering the most advanced submarine telecommunication system, together with a control system based on the innovative (SDN) concept, a technological solution used to respond to applications that require high bandwidth. The Submarine cable will have an initial capacity of 40Tpbs (100Gbps x 100 wavelengths x 4 fiber pairs).

Our main goal is to improve the quality of communication between Africa and the Americas by creating a whole new route in the Southern Hemisphere capable of meeting the traffic demand and growing data needs of the region, both current and future, stated António Nunes, CEO of Angola Cables.

Angola Cables is a multinational telecom company operating in the wholesale market and engaged in the exploration and marketing of international voice and data

circuit capacity, in our subsea cables: WACS, MONET & SACS.

It is our purpose to contribute to the technological development and to improve access to digital information for all.

Established in 2009, the company manages the Angolan participation in WACS, the West Africa Cable System, launched in 2012.

At our Data Centre, Angonap, we provide Colocation services to companies from various sectors and industries, with a commitment to quality and connectivity.

We are managing Angonix, the Internet Exchange Point in Angola, where operators and suppliers of national and international content exchange information and data.

The company is also building the Monet cable which will connect Brazil to the EUA and it has also been working on the construction and management of the Fortaleza Data Centre.

Find more about Angola Cables at

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Sub-Saharan Africa growth lowest in more than 20 years

GDP per capita in sub-Saharan Africa will contract for the first time in 22 years, according to the IMF.

In its *Regional Economic Outlook for Sub-Saharan Africa* report published late last year, the organisation projected average growth to fall to 1.4 per cent in 2016. It said that's less than half of last year's growth and "far below" the five per cent plus experienced during 2010-14.

Abebe Aemro Selassie, head of the IMF's African department, identified two main factors behind the sharp slowdown: "First, the external environment facing many of the region's countries has deteriorated, notably with commodity prices at multi-year lows and financing conditions markedly tighter.

"Second, the policy response in many of the countries most affected by these shocks has been slow and piecemeal, raising uncertainty, deterring private investment and stifling new sources of growth."

The IMF said most commodity exporters are under "severe" economic strain. It pointed out that this is particularly the case for oil exporters like Angola and Nigeria, and five of the six countries from
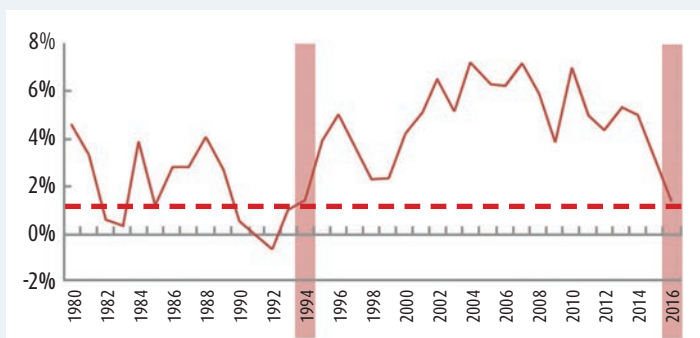
The IMF said real GDP growth in the region is at it's lowest level since 1994.

SOURCE: WORLD ECONOMIC OUTLOOK DATABASE

the Central African Economic and Monetary Union (CEMAC) whose near-term prospects have "worsened significantly" in recent months despite the modest uptick in oil prices. (The five CEMAC countries include Gabon, CAR, Chad, Republic of the Congo and Equatorial Guinea. Cameroon is the exception.) Repercussions from the initial shock are now spreading beyond the oil-related sectors to the entire economy in these countries, and the slowdown risks becoming deeply entrenched, stated the IMF.

Conditions in non-oil commodity exporters also remain difficult,

including in South Africa where output expansion is expected to stall this year. Likewise, growth in the DRC, Ghana, South Africa, Zambia, and Zimbabwe is "decelerating sharply or stuck in low gear".

The IMF added that the challenges for several of these countries have been compounded by an acute drought affecting large parts of eastern and southern Africa.

However, it is more optimistic about non-commodity exporters which represent around half of the countries in the region. It said they continue to perform well with growth levels at four per cent or

more, and benefit from lower oil import prices, improvements in their business environments, and strong infrastructure investment. Countries such as Côte d'Ivoire, Ethiopia, Senegal, and Tanzania are expected to continue to grow at more than six per cent for the next couple of years.

The report showed that overall growth in the region could recover to close to three per cent in 2017 if policy makers take "strong action" in the coming months.

While many of the hardest-hit oil-exporters have taken steps to adjust to the new reality of low commodity prices, Selassie believes their adjustments have generally been too slow and incomplete. "Given the scale and persistent nature of the shock and limited policy buffers, a growth rebound will require a much more sustained adjustment effort, based on a comprehensive and internally consistent set of policies to re-establish macroeconomic stability," he said.

For countries outside monetary unions, the report urges central banks to allow the exchange rate to fully absorb external pressures, and tighten monetary policy where needed to tackle sharp increases in inflation.

Méditel becomes Orange in Morocco

Méditel in Morocco has now been re-branded as Orange. The country contributes nearly 10 per cent of revenues within the French telco's MEA footprint, and with 14.2 million subscribers as at the end of September 2016, it provides services to the second-largest number of customers for the group in the region, after Orange Egypt.

The Orange Group has backed Méditel since December 2010, when it acquired 40 per cent of the company. In July 2015, it increased its holding to 49 per cent.

Formed in 1999, Méditel operates both mobile and fixed networks. Orange said the company's infrastructure currently includes more than 5,400km of fibre and more than 4,000 radio sites which provide 2G and 3G coverage for 99 per cent of the population. In June 2015, Méditel

became the country's first operator to launch 4G after gaining a license just three months earlier.

Commenting on the re-brand, Orange chairman and CEO Stéphane Richard said: "Our goal is to offer fixed and mobile digital services under a single brand, and to strengthen our position in Africa and the Middle East."

He added that Orange now serves more than 55 million Arabic-speaking customers across a region which he described as "strategically important".

Intelsat and Sonema to support enterprise networks

Sonema has extended an agreement with Intelsat to provide satellite services to enterprises in Africa.

Monaco-based Sonema is a telecoms service provider which owns and operates two teleports in France. The company said it supports more than 650 VSAT sites for banking

and financial institutions across the continent, and the majority of the networks are supported by C-band services from *Intelsat 14* which orbits at 315°E and *Intelsat 904* at 60°E.

Using Intelsat's global infrastructure, Sonema said it will provide "enhanced" communications services to customers on the continent. Jean-Philippe Gillet, Intelsat's VP of EMEA sales, said: "This agreement ensures that Sonema's customers will be able to expand their operations knowing that each of their sites will have access to the same level of reliable broadband connectivity, regardless of location."

Under the multi-year extension, Sonema will integrate C-band connectivity from *Intelsat 33e* to expand services to more remote regions of Africa. *Intelsat 33e* was successfully launched last August and is the second satellite to use Intelsat's *EpicNG* high throughput system.

Intelsat 33e was due to enter service during 4Q16 but this has now been delayed to 1Q17. Intelsat said this was due to a malfunction in the primary thruster which means orbit raising will now take longer than planned. The satellite arrived on station for testing in December 2016.

Once it goes live, Sonema hopes the combination of Intelsat's *33e* and *14* satellites will enable it to provide customised solutions, with a focus on robustness and high quality of experience.

The firm's MD Catherine Delom said: "The banking sector is a major growth engine for Africa. As such, our customers depend on the highly reliable and secured corporate networks we deploy and maintain for them.

"*EpicNG* will also enable the option to offer our customers new, innovative solutions and services that can be easily delivered via C- and Ku-band spot beams to the most remote locations."

LeoSat and Thales in new deal for revolutionary LEO constellation

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

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

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

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

The company's programme brings together a range of tried and tested systems for the first time. They include optical inter-satellite links, gigabit class onboard processors, flexible steerable antennas, and RF over printed circuit boards.

Thales added that following its recent acquisition of RUAG's opto-electronics business, it now has the ability to provide an in-house solution for the constellation's critical optical inter-satellite link technology, which is key to overall system performance.

LeoSat said its constellation will offer very high-speed broadband, low latency and secure global connectivity. Through the use of tracking spot beams and specific techniques, it said the system is designed to prevent interference with geostationary and non-geo satellite orbiting systems operating in the same frequency band.

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

MTN exchanges shares in INT Towers

The MTN Group will exchange its 51 per cent interest in Nigeria Tower InterCo., the parent company of INT Towers, for an additional shareholding in IHS Holding.

As a result of the transaction MTN's interest in the IHS Group will increase from around 15 to approximately 29 per cent. The operator said this will enable it to simplify its tower ownership structure and diversify its tower infrastructure exposure across the IHS Group which operates in a number of markets across Africa. In addition, it said that the transaction will better enable it to "crystallise value" for shareholders in the future.

Until now, MTN's interest in IHS was non-voting. Following the transaction, and to ensure IHS Group's continued independent and competitive proposition, MTN's influence remains significantly constrained by limitations on voting rights, no board representation, and restrictions on access to information.

Ericsson expects mobile infrastructure market decline in 2017

After last year's dismal financial results which ultimately led to the departure of Hans Vestberg as its CEO in July, Ericsson is trying to reassure backers that it will continue to focus on accelerating its strategy execution and improve performance.

At its annual meeting of investors held in New York last November, the Swedish company said the total addressable market is expected to grow by one to three per cent in 2016-2018, despite an expected decline in the mobile infrastructure market by two to six per cent this calendar year.

Ericsson's strategy for faster business execution is based on a new company structure that was implemented in July 2016 and features three segments: Networks; IT and Cloud; and Media.

Jan Frykhammar – who officially took up his position as Ericsson's new president and CEO on 16 January 2017 – said: "We are forcefully executing our strategy to drive incremental profit improvements through greater efficiency, monetising our installed base in Networks and building new revenue base in IT and Cloud and Media. Current focus is on speed, efficiency and fine tuning of strategy execution."

Based on its new segment structure with products and services combined, Ericsson estimated an addressable market for its Networks division of USD100bn in 2016, with -2 to 0 per cent CAGR growth during 2016-2018. For IT and Cloud, it estimated an addressable market of USD100bn in 2016, with five to seven per cent CAGR growth during 2016-2018. And for Media, it estimated an addressable market of USD12bn last year, with nine to 11 per cent CAGR growth over 2016-2018.

Starting 1Q17, the firm will introduce a new financial reporting structure based on the three segments. The restated numbers for 2015 and 2016 will be disclosed ahead of the 1Q17 report. Meantime, it has provided the following high level, unaudited numbers for the new segments based on FY15:

- Networks: 75 per cent of net sales with mid-teens operating margin, excluding restructuring charges
- IT and Cloud: 20 per cent of net sales with break-even operating margin, excluding restructuring charges
- Media: five per cent of net sales with negative low-teens operating margin, excluding restructuring charges

USD1m to boost for African history

The MTN Group is supporting a drive by the UN's Educational, Scientific and Cultural Organisation (UNESCO) to rewrite Africa's history

INVESTMENTS, MERGERS & ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
1/11/16	SpeedCast	Harris CapRock	Company	USD425m	SpeedCast says acquisition strengthens its "already strong" position in maritime industry, in which Harris CapRock has a leading position in the fast-growing cruise sector. The combined entity will service more than 6,200 vessels, hundreds of rigs & platforms, as well as enterprise & government customers around the world.
19/12/16	SoftBank	OneWeb	40% stake	USD1bn	Japanese tech giant becomes biggest stakeholder in OneWeb which now has estimated worth of USD2.5bn. Softbank founder Masayoshi Son reportedly said he will put USD50bn into US businesses over next four years.
7/2/17	Wari Group	Millicom	Tigo Senegal	USD129m	Wari Group says combining its platform for digital financial services with the benefits of mobile telephony will offer offer "more convenient & affordable services to users".

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
27/10/16	ZTE	China	3Q16	RMB	71,564	NA	0.69	YoY growth of 4.44% mainly attributed to sales in 4G system & optical transmission products in domestic & international markets, as well as devices & terminals in domestic market.
3/11/16	VimpelCom	Netherlands	3Q16	USD	2,372	896	0.13	Reported service revenue declined 3% YoY. Deal to merge Mobilink with Warid in Pakistan closed in July. Mobilink's service revenue increased 16% during quarter, supported by all revenue streams. Banglalink's service revenue increased 2% to BDT12bn, mainly driven by continued increase in data revenue of 45%, partially offset by lower voice revenue.
1/2/17	RSCC	Russia	FY16	RUB	11.4 (bn)	NA	NA	Revenues up 24 per cent compared to RUB9.2bn in 2015. 40% came from international earnings; entered Latin American in 2016 & "significantly expanded" customer base in South Africa through provision of backbone links, corporate applications & services to MNOs.

from an African perspective.

The groundbreaking General History of Africa (GHA) project began in 1964 and was the first of its type to present the entire history of the African continent, free from discriminatory prejudices. The initiative also aims to ensure that the revised history is commonly known and accessible to the public at large.

The first phase of the project was completed in 1999. Over a 35-year period, more than 350 of the world's foremost experts on African history, linguistics, fine arts, performing arts, musicology and natural sciences worked to produce eight volumes of content in 12 languages, highlighting the shared heritage of Africa's people.

The second phase, which began in 2009 and is currently running, focuses on the compilation of a ninth volume. Scientists are also utilising this phase

to expand the history curricula and educational materials for primary and secondary schools, based on the first eight volumes already compiled.

MTN is supporting the project with a USD1m donation over two years which will partly be used to fund the compilation of the ninth volume. This will take into account the latest developments in scientific research and the major events that have occurred in Africa since 1990, as well as the new challenges faced by the continent and its diaspora.

Chris Maroleng, the MTN Group's executive for corporate affairs, describes the GHA project as a "crucial education initiative which is aimed at re-appropriating the interpretation and writing of Africa's history".

GHA Volumes 1-8 are available on the UNESCO website at *http://tinyurl.com/gu3aq5t*.

IN BRIEF...

Bharti Airtel is reportedly looking into consolidating some of its African operations in an effort to reduce company debts of around USD12bn. Speaking to Indian financial news outlet *BloombergQuint* at the World Economic Forum held in Davos in January, chairman Sunil Bharti Mittal said Airtel was considering either the sale or merger of its businesses on the continent within a year. While he did not give further details about which of the company's 15 African operations could be affected, it has separately been reported that a 50-50 merger with Millicom in Ghana is being discussed.

Hong Kong's Asia Satellite Telecommunications has agreed to relocate *AsiaSat 8* from 105.5°E to Spacecom's 4°W

orbital position. It will be co-located with Spacecom's *AMOS-3* for a four-year period and is expected to begin service in 1Q17. Spacecom has an option to extend the agreement for an additional year of service. *AsiaSat 8*'s beams will cover Africa, the Middle East and central Eastern Europe, enabling Spacecom to continue serving its customers at 4°W following the expected end of life of *AMOS-2*.

In a project valued at around USD7.6m, MER Group has been contracted to deploy a 330km long optical fibre communications network in an African country. The deal is its third fibre project on the continent. While the company has not named the country it will work in, it says the deployment is for a new client and will provide broadband for residents of a West African nation.

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
24/10/16	David Barrass	Sepura	Interim CEO	Various	Various advisory & executive roles. Takes over as CEO from Gordon Watling who is on extended leave following medical advice.
24/10/16	Alan Lovell	Sepura	Chairman	Various	Various advisory & executive roles
24/10/16	Jason Smith	Inmarsat	COO	Rolls-Royce	President of nuclear business
26/10/16	Börje Ekholm	Ericsson	President & CEO	Patricia Industries	CEO. Due to join Ericsson on 16 January 2017.
26/10/16	Farhad Khan	Yahsat	COO	Airtel Africa	CCO
31/10/16	Ralph Mupita	MTN Group	Group CFO	Old Mutual Emerging Markets	CEO
31/10/16	Gunter Engling	MTN Group	Deputy CFO	MTN Group	Acting group CFO
1/11/16	Alistair Carwardine	Cerillion	SVP APAC	M2 Group	Technology director
2/11/16	Joel Kibazo	FTI Consulting	MD	African Development Bank	Director of communications & external relations
8/11/16	Amr Kamel	Microsoft Africa	GM for West, East, Central Africa & Indian Ocean Islands region	Microsoft Egypt	Public sector director, WECA region
10/11/16	Mark MacGann	VimpelCom	Group chief external affairs officer	Uber	Senior board advisor & head of public policy EMEA
10/11/16	Jeffrey Hedberg	VimpelCom	Group chief people officer	Mobilink	CEO
28/11/16	Kalpak Gude	Dynamic Spectrum Alliance	President	OneWeb	VP, legal & regulatory
7/12/16	Bernice Samuels	MTN Group	Group executive of marketing	SAB Miller	Executive director of strategy & business development
7/12/16	Jens Schulte-Bockum	MTN Group	Group COO	Vodafone Germany	CEO. Replaces Jyoti Desai who is retiring.
8/12/16	Oliver Fortuin	MTN Group	Executive head of business enterprise	BT Global Servicves sub-Saharan Africa	CEO
8/12/16	Sjoerd De Clerck	Newtec	VP APAC	Barco Capital	Global director
19/12/16	Michel Miglia	Advantech Wireless	Operations director	VP operations	MEP Technologies
21/12/16	Thomas Van den Driessche	Newtec	CEO	Newtec	CCO. Replaces Serge Van Herck who has resigned.
28/12/16	Carlos Caceres	Kirusa	Advisory board member	Markest, USA	President
5/1/17	Herbert Merz	Radio Frequency Systems	President & CEO	Coriant	President
18/1/17	Arun Sarin	Mobileum	Board director	Vodafone Group	CEO
24/1/17	Augusto Argento	Neural Technologies	Director of partners & channels	GM, revenue intelligence	HP Communications & Media Solutions
24/1/17	David Kagan	SpeedCast	COO	Globalstar	President & COO

Codan solves some practical issues for tactical radio users

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

MANUFACTURER: Codan Radio Communications

PRODUCT: Sentry-HTM

MORE INFORMATION: www.codanradio.com

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

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

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

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

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

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

LTE gateway for highest performance and lowest power

Sierra Wireless' new *AirLink RV50X* LTE-A industrial gateway supports 21 LTE bands worldwide, and is

MANUFACTURER: Sierra Wireless

PRODUCT: AirLink RV50X

MORE INFORMATION: www.sierrawireless.com

claimed to provide high-speed connectivity while retaining the lowest power consumption.

For advanced edge-computing applications, it features a dual-core processor and the ALEOS Application Framework. The latter is said to enable simple integration with existing equipment and sensors, as well as secure and reliable delivery of critical real-time data over LTE networks to Sierra's *AirVantage* IoT platform,

or other software applications and operational systems.

The *RV50X*'s *AirLink Management Service* provides cloud-based remote management, including OTA registration, configuration and software updates, along with alerting and monitoring of key variables, such as signal strength, location, temperature and voltage. Sierra also offers the

AirLink Mobility Manager to remotely configure, manage and monitor gateways in the field.

The *RV50X* features dual SIM support for automatic failover between carriers.

Low PIM connectors for wireless applications

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

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

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

MANUFACTURER: Amphenol RF

PRODUCT: 4.3/10 Series

MORE INFORMATION: www.amphenolrf.com

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

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

Ensuring network uptime at remote sites

Opengear's latest *Remote Site Gateway*s offer between four and eight console ports, introduce redundant GbE, and provide built-in SFP connectivity and a PSTN modem for out-of-band (OOB) dial-up access to remote sites. The four new models also feature upgraded CPUs, expanded memory, and more internal storage than the vendor's previous *ACM5000* series.

The gateways feature Opengear's *Smart OOB* technology which is designed to enable secure remote access and monitoring of network, power and server infrastructure. The firm says it ensures remote availability of critical equipment even when a primary connection goes offline.

With *Smart OOB* , it's claimed the need for onsite staff is eliminated, as proactive analysis provides

administrators anywhere in the world with immediate notifications when fault conditions arise. This analysis includes the built-in *Auto-Response* feature which is said to be capable of automatically remediating common issues using event-based custom scripts.

MANUFACTURER: Opengear

PRODUCT: Remote Site Gateways

MORE INFORMATION: www.opengear.com

Drones create 'towers' for meshed broadband network

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

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

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

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

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

MANUFACTURER:
Rajant Corporation

PRODUCT: AirMast Tethered Drone System

MORE INFORMATION:
www.rajant.com

Industrial 4G router interconnects via VPN

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

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

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

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

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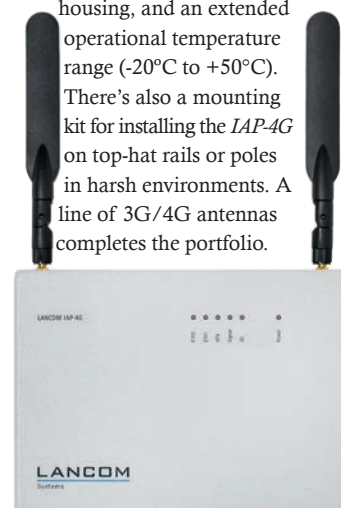
MANUFACTURER:
LANCOM Systems

PRODUCT: IAP-4G

MORE INFORMATION:
www.lancom-systems.com

Hunting system tracks RF interference

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

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

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

MANUFACTURER:
Viavi Solutions

PRODUCT:
InterferenceAdvisor

MORE INFORMATION:
www.viavisolutions.com

ALSO LOOK OUT FOR

Network Mind aims to control automation

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

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

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

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

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

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

A fibre future?

Fibre infrastructure has been slow to expand past coastal regions. DAVE HOWELL wonders whether it can truly deliver universal broadband access across the continent.

As the African telecoms sector approaches one billion subscribers, the question many across the industry are asking is whether consumers across the continent are benefiting from the promised broadband speeds and consequential services that were promised.

Indeed, Ovum's Broadband Development Index (BDI), which measures how different countries and regions are adopting high-speed broadband networks, gave Africa's fixed broadband status a score of 106 at the end of 2015 – the lowest among world regions.

In addition, a focus on the 'low hanging fruit' has largely lead to a patchy rollout of fibre. Even in some wealthier areas and within major conurbations, several competing fibre services can be seen, but the question remains whether they are delivering the services consumers demand at a price they can afford.

While the level of submarine cable availability has continued to expand, this has not in many cases translated into more service availability. Bottlenecks continue with a lack of affordable cable and therefore affordable fibre backbone.

The Internet Society points out that cross-border infrastructure in the region remains the least developed element, but adds that encouraging developments are emerging.

For example, it says work has started on an East African Backhaul System to serve Kenya, Tanzania, Uganda, Rwanda, and Burundi. (EABS is a joint venture between operators from the five East African Community Countries and involves around 30 other MNOs in Eastern and Southern Africa.) Also, the society says that the landlocked countries of East Africa (Uganda, Rwanda and Burundi) have already established backbones that give them access to international bandwidth via submarine fibre at almost the same price as the coastal countries.

"And now, this cross-border terrestrial infrastructure is being further extended to the DRC, Ethiopia, and Somalia, with creation of regional backhaul rings to increase reliability also under way," states the organisation.
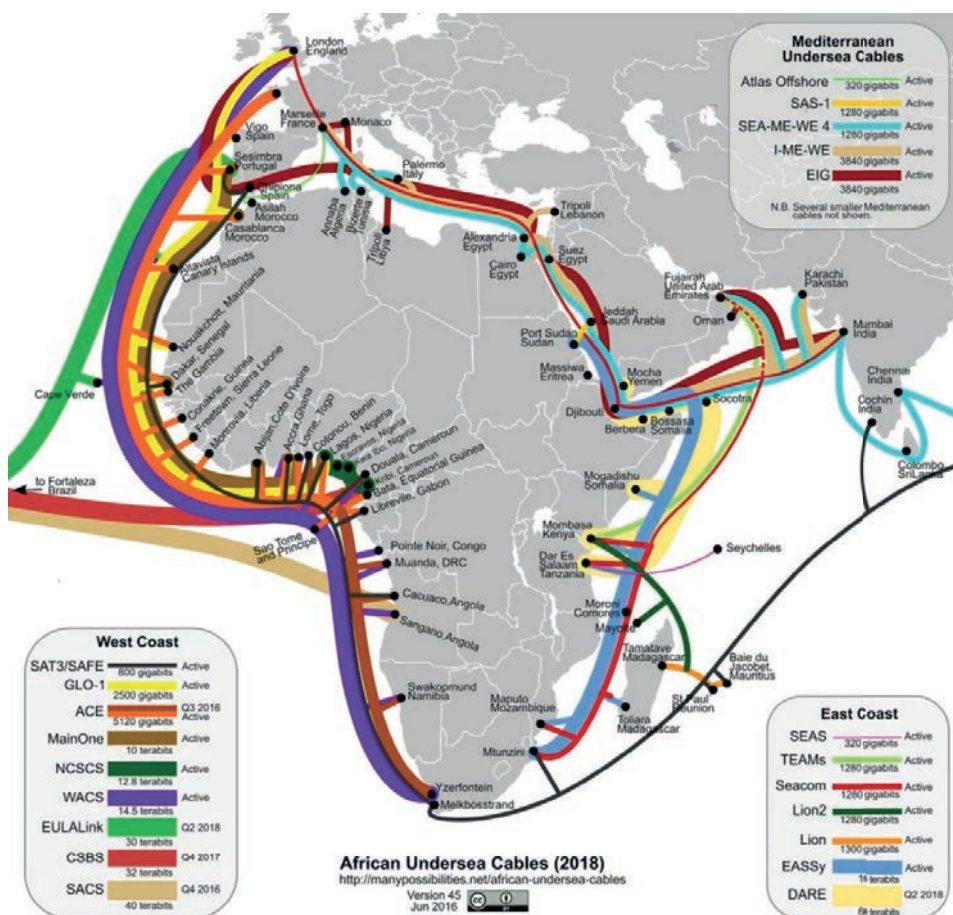
The many submarine cable systems that now surround Africa are used to connect countries and continents to the internet. But more terrestrial fibre is needed to extend this connectivity to landlocked countries or urban centres in countries without submarine cable access.

SOURCE: MANYPOSSIBLITIES.NET

António Nunes, CEO of Angola Cables, reckons African connectivity is getting better every year with a lot of projects in development across the region. His company is busy with its own landmark deployment, the South Atlantic Cable System (SACS), which will be the first submarine fibre in the southern hemisphere to connect Africa and Latin America.

But Nunes agrees that there are still hurdles to overcome: "One of the biggest challenges in Africa is infrastructure construction. Power also remains one of the big problems for African development."

Even with the eventual availability of backbone, delivering fibre over the last mile to consumers outside of urban areas will continue

to be a challenge. Unlike other developing regions, Africa's fibre network delivery has become fragmented. The main carriers have development plans but these have been slow to gather momentum. This has meant other players have entered the market, with some commentators likening this to a fibre land grab.

But Nunes points out that there is space in the market for various competitors. "Big telecoms cannot compete with small ones in some areas, since the demand is too low for them. In other areas, where the business opportunities are better, it makes sense for the big players to jump in."

He says the model created in Angola was to give an opportunity for new players to enter the market. "We are an example of it. Angola Cables is providing the international connectivity and the other operators are building out the fibre and developing the mobile networks all over the country. Working together gives us the ability to deliver specific services according to customers' needs and specifications."

That all sounds plausible enough. But across the continent, prices have also been volatile, as smaller players look to deliver the connections that consumers, particularly in urban areas, are looking for to access more online services at reasonable prices. And then there are the bigger players who can create difficulties for some fibre delivery companies that want to move forward with their plans. Dan Zajicek, CEO of Gilat Satcom which provides satellite and fibre-based connectivity across Africa, says: "The monopoly operators who are charging unreasonable prices for using their networks are an obstacle. There are also inconsistent rules from the regulatory bodies which can slow down infrastructure rollouts."

"On the cusp of a boom"

Suveer Ramdhani, chief development officer at SEACOM, believes innovation is often "stifled" in large organisations and, as a result, many "theorised for too long" about the viability of

**António Nunes,
CEO,
Angola Cables**

"Big telecoms cannot compete with small ones in some areas, since the demand is too low for them. In other areas, where the business opportunities are better, it makes sense for the big players to jump in."
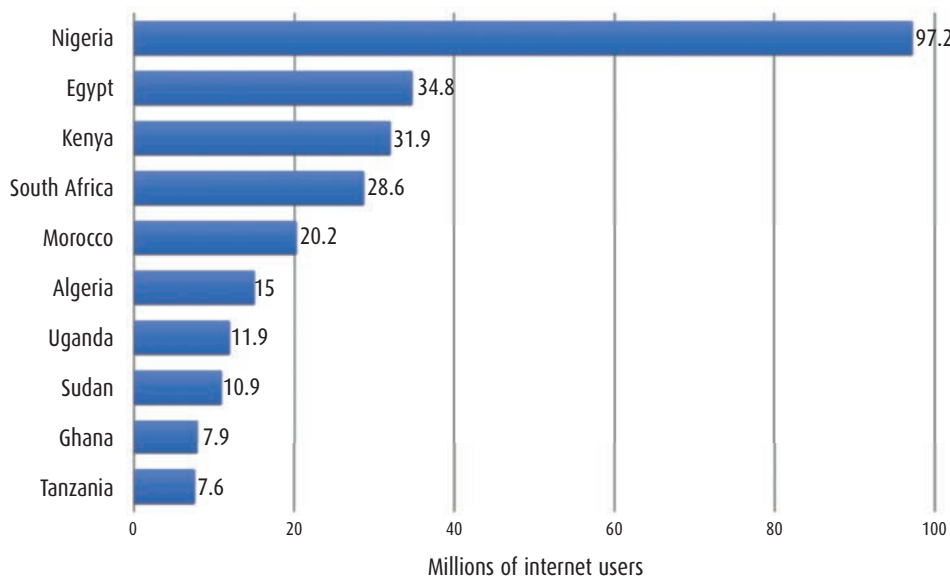
Estimated internet users in Africa as at the end of June 2016. An increase in access will slowly expand across the continent as costs reduce.
SOURCE: INTERNET WORLD STATS

fibre deployments rather than getting started. He says: "Entrepreneurial broadband suppliers followed a try-it-and-see approach. It paid off. They learnt how to deploy cost-effectively and they learnt about consumer spending behaviour, refining their business cases over time."

Ramdhani reckons this learning has now become pervasive, especially with some of the startups being bought out by larger players. "The reservoir of content online, especially video, means there is tremendous consumer demand for high-speed fibre and an excellent business case. There is also a large construction contractor base with experience in fibre deployments, so the engineering risk is mitigated. As such, we are on the cusp of a boom."

Various organisation now laying fibre to what they believe is a ready and waiting consumer base for services that require fibre's delivery speeds.

For example in Uganda, the Oxfam-lead *Internet Now!* project aims to connect 100 rural villages with fibre. Further east, Kenya Power has launched a year-long pilot project with Safaricom which aims to connect 12,000 homes in Nairobi with a fibre-based internet network. And in Rwanda, Liquid Telecom has invested more than USD35m in rolling out the country's first FTTH network to homes and businesses in Kigali, offering speeds of up to 100Mbps.

Liquid Telecom is arguably the continent's biggest terrestrial fibre network provider and now looks set to get even bigger. Late last year, the company was given permission for the ZAR6.55bn buyout of South African communications network operator Neotel. Liquid's partner, South African investment group Royal Bafokeng Holdings, will own a 30 per cent stake in the acquisition once the deal closes which is expected during the first quarter of 2017.

By merging Neotel's network assets and service platforms with its own, Liquid says it will have "unrivalled" reach across Eastern, Central and Southern Africa, enabling it to offer access via a single connection over 40,000km of cross-border,

national and metro fibre networks in 12 countries. Speaking at the time, Liquid Telecom group CEO Nic Rudnick said: "The combined companies will create an unparalleled footprint covering key markets across the continent, giving Liquid Telecom a significant competitive advantage through the breadth, depth and flexibility of our consolidated networks. We will be able to offer African companies the highest quality and most extensive connectivity on the continent."

Connecting consumers

The Internet Society says that as Africa's infrastructure and user base grows, the need to coordinate and manage internet growth and development becomes increasingly important.

"Several institutions and processes have emerged over the last 15 years, each playing a role in strengthening Africa's internet ecosystem," says the society. "Africa has embraced the multi-stakeholder model of internet governance which enables policymakers to draw from the expertise of the relevant stakeholders to develop sustainable public policy approaches that can meet the challenges of the digital age."

These approaches are clearly going to be key moving forward as broadband access reaches more people across the continent. Ovum predicts that the number of fibre broadband subscribers will increase from 400,000 at the end of 2016 to two million in 2021. It forecasts that fibre broadband subscriptions will represent 10 per cent of fixed broadband usage in 2021, compared to three per cent in 2010 (other fixed broadband technologies include ADSL, satellite, etc.).

In comparison, mobile broadband subscriptions will increase from 310 million at the end of 2016 to 975 million in 2021. But that huge forecast for the number of mobile broadband users will depend on the continued development of the backbone infrastructure which will be required.

Mike Last, CMO and VP of international business development with WIOCC, says: "Reach and accessibility will continue to increase as further investment delivers ever more terrestrial fibre and many more metro networks in major urban centres.

"Capacity utilisation will also increase, driven by ever greater uptake of demanding consumer and business applications. And with greater dependence will come a greater emphasis on service availability, rather than simply price. This will inevitably result in suppliers needing to invest more heavily in network diversity to protect their customers from downtime."

But the Internet Society warns that cost will remain a pressure point to the expansion of online services. It says users in Africa have to pay many times more for internet access than their peers in developed countries. "For instance, some studies show that bandwidth costs for broadband in sub-Saharan Africa are 30-40 times those in the US. [Given] the difference in earnings, what takes perhaps 15 per cent of US gross national income per capita will take over 800 per cent of sub-Saharan GNI per capita."

Citing Ethiopia as an example in Africa, the society says 60.4 per cent of the country's average GDP per capita is required for broadband access, while it is 31 per cent in Uganda, and 15.7 and 7.4 per cent respectively in Kenya and Sudan. South Africa fares better at 6.1 per cent – but that's still considerably more than the less than two per cent in most of Europe.

Angola Cables' Nunes agrees that price remains the biggest challenge: "The African market does not support the prices available for mobile phones or PCs in the world market. A new solution of devices needs to develop, so that this massive market of about one billion people can have access to the broadband services. We have to change the traffic profile of the African customer. We also need to provide access to the local internet exchange in order to reduce prices and increase the quality of service."

Nunes goes on to say that the continent's networks should exchange more African traffic in Africa. "Today, we are exchanging our traffic

in Europe. Local peering benefits local networks and local communities. This growth is important for the future of Africa's digital growth and the reduction of the market pressure. In 2015, we launched in Angola the fastest-growing exchange points in Africa. Called *Angonix*, this exchange point welcomes any kind of networks and aims to keep local traffic in order to minimise latency and to ensure better Internet quality."

A patchwork of operators and technologies

All the main fibre operators remain bullish about their plans for the future rollout of infrastructure, and there is little doubt that they will expand their platforms. However, as mentioned above, the large players have been joined by smaller and often more nimble operators that have seen lucrative gaps in the market that are not yet being filled.

Fast broadband access across Africa therefore remains a patchwork of operators and technologies. For instance, Gilat Satcom's Zajicek points out that the expected reduction in demand for satellite services as fibre expanded has not materialised. Indeed, satellite services are on an upward trajectory, as ISPs use several connection channels to deliver their services.

SEACOM's Ramdhani supports this view: "Mobile services create demand for fibre since mobile towers need fibre to work. Once the fibre is deployed, it becomes cheaper to connect homes and businesses in the vicinity of the tower. Satellite is expensive and fibre doesn't reach every corner of Africa – thus satellite is useful for remote parts of the continent where there is no infrastructure. But satellite is also often used to prove the financial viability of markets to justify the capital expense of fibre deployment."

Nunes adds to this by saying that Africa is a big continent and many of its rural areas do not have big data demands. Satellite connectivity is therefore still a backbone solution in such regions.

Andrew Rugege, ITU regional director for Africa, says that submarine communications cables are used to connect countries and continents to the internet, and terrestrial

**Suveer Ramdhani,
Chief development
officer,
SEACOM**

"Satellite is also often used to prove the financial viability of markets to justify the capital expense of fibre deployment."

fibre optic cables are then used to extend this connectivity to landlocked countries or urban centres in a country without submarine cable access. But he adds that while in most of the world a large number of such cables exists, often mounting to robust internet backbones, the insufficient number of high-speed cables poses a great problem for most African countries

"The deployment of both submarine cables and terrestrial fibre extensions is considered an important step to economic growth and development for many African countries. It is also a great advantage to successful implementation of the SDGs," says Rugege.

The SDGs – or Sustainable Development Goals – replaced the UN's Millennium Development Goals in 2015, and universal access to broadband plays a key part in helping to achieve several of the 17 global targets that member states have agreed to achieve by 2030.

Clearly then, Africa cannot depend purely on fibre for increasing broadband access. And the current reach of fibre across the continent isn't comprehensive enough to allow costs to reduce. Add in mobile services and satellite to the mix, plus a lack of critical mass with internet access demand, and the result is a strain on the available capital investments that can be made.

Once online services are in demand, the provision of fibre will expand to meet this. The main players in the marketplace will continue to invest, but it is the smaller concerns where more innovation and service provision is likely to appear.

For the African consumer, choice of access supplier, the performance of that access and, of course, its cost, are all at the moment slightly out of focus. Over the next few years this will change but for now, getting fibre inland still remains a challenge.

Nonetheless, there is cause for optimism. "I think that provision of fibre on the continent will keep growing," says Nunes. "The price for connectivity will drop and the demand will grow. Connectivity and access to broadband in the future will be a commodity – we are already observing that in Europe and USA. The African population is very young and with a growing appetite for digital content." ■
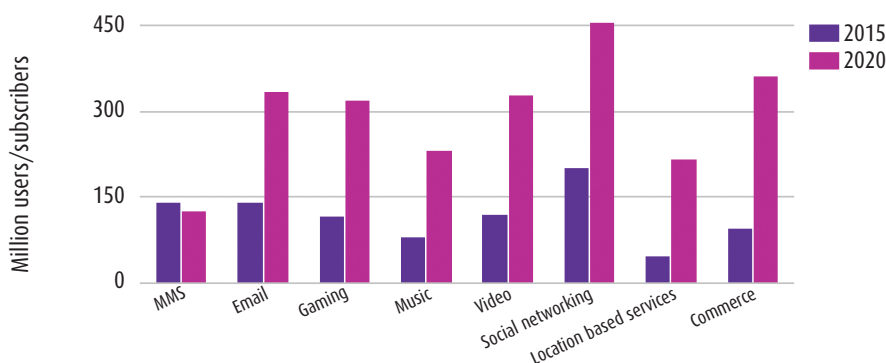
Growth in smart devices, mobile video and 4G networks will drive an eight-fold increase in global mobile data traffic by 2020, predicts Cisco. The above chart shows the forecasted adoption of mobile services in the Middle East and Africa from 2015 to 2010.

SOURCE: CISCO VNI SERVICE ADOPTION FORECAST, 2016

ACE

Africa Coast to Europe (ACE) submarine cable

ACE submarine cable

—————— In service

- - - - - - Under construction or planned

- France – Sao Tome & Principe : In service since Dec. 2012
- Sao Tome & Principe – S Africa: Target RFS Dec 2017
- Upgrade 1 - In service since 30 Sep 2016
- Design capacity upgraded to from 5.12T to 12.8T

France

Portugal

Canary Islands

Mali   Niger

Mauritania

Senegal
Gambia   Guinea
Guinea Bissau   Benin
                         Ghana
                         Liberia   Nigeria
Sierra Leone   Republic of Cameroon
                                        Equatorial Guinea
             Côte d'Ivoire   Gabon
Sao Tome & Principe   Democratic
                                 Republic of Congo

                                 Angola

                                 Namibia

                                 South Africa

. . . reducing the digital divide in Africa

ACE

No longer lost for words?

How mobile operators and network service providers are helping to boost education across the continent.

Connected via a VSAT supplied by Liquid Telecom, BRCK's *Kio Tablet* has transformed education for both teachers and children in the remote Kenyan village of Kiltamany.

MTN's *21 Days of Y'ello Care* is its annual employee volunteer programme that takes place during three weeks in June. 2016 marked the tenth year of the initiative which had the theme of 'Investing in Education for All'. 10,450 volunteers across the company's 22 country footprint established 56 libraries and eight ICT labs, built 10 classrooms, and created four online learning platforms. MTN said more than 140,000 people in Africa and the Middle East are now benefiting from the initiatives.

Each year, the company recognises the operations that delivered the most impactful *Y'ello Care* projects with a prize of USD100,000 to further invest in community projects. The winner for 2016 was MTN Côte d'Ivoire for the work its staff carried out at the Marchoux Elementary School. Located around a kilometre away from the Marchoux Village in the country's Bingerville municipality, the school is in an area inhabited primarily by people suffering from leprosy, and those from underprivileged backgrounds. In recent years, the area has seen an influx of displaced persons from Abidjan, which has led to a substantial population increase. As such, the school has been unable to meet the increasing enrolment demand due to limited capacity, and many children were placed on waiting lists with no certainty when they would receive access.

Last June, 663 staff from MTN Côte d'Ivoire, together with help from the government, partners and members of the community, built seven classrooms to accommodate an additional 350

Last year, MTN says 10,450 volunteers across its footprint in Africa and the Middle East established educational facilities such as classrooms and ICT labs that will benefit more than 140,000 people.

children and significantly improve learning conditions at the school.

Another one of the many projects undertaken by MTN employees during *Y'ello Care 2016* was in Cameroon. Here, the company has built classrooms at three primary schools, enabling an additional 600 learners to be accommodated per year. It has also helped the government equip ten schools with PCs, workstations, servers, printers, projectors and internet connectivity, enabling remote access to tutorials. MTN said its partnership with MINEDUB (Ministère de l'Education de Base – Ministry of Basic Education) has seen primary schools receive 54 extra classrooms and 16 portable water points.

The operator has now established nearly

40 multimedia centres in schools since 2005, bringing 60,000 students and 4,000 teachers online across the country. Similar centres have also been rolled out in Benin, Ghana, Côte d'Ivoire and Congo.

Other projects in 2016 saw mobile libraries bridging Cameroon's digital divide, and the first of eight libraries planned for the Congo was opened. Computer labs have been set up for special needs learners in South Africa, while MTN Sudan has been installing interactive whiteboards and training teachers on how to use them in the classroom. And in Swaziland, the operator's *Educare* programme has been broadcasting maths and science lessons over the airwaves – content is delivered via social media and learners can interact with teachers in real time using *WhatsApp* or *Facebook*. MTN said that the programme has been so successful that it's now going to be televised.

Digital school in a box

Vodafone is planning to provide free access to digital educational content as part of its *Instant Schools for Africa* initiative which will launch later this year.

Millions of young people in DRC, Ghana, Kenya, Lesotho, Mozambique, South Africa and Tanzania will be given free access to online learning materials developed in conjunction with local educational partners and experts, ministries of education, and Learning Equality. The latter is a US-based not-for-profit provider of open-source educational technology solutions which,

Each *Instant Classroom* is shipped in a durable and lockable storage box that weighs 52kg with its contents. Inside, is a laptop, 25 tablets pre-loaded with educational software, a projector, a speaker and a hotspot 3G modem. According to Vodafone, it takes just 20 minutes to set up.

according to its website, is led by people who "eat the digital divide for breakfast".

Vodafone said *Instant Schools for Africa* is a long-term cumulative programme, and it plans to increase the initiative's reach, scale and relevance over time. It will also encourage other major mobile operators in the countries involved to adopt a similar, non-commercial approach by giving them the technical specifications needed to extend the benefits of the programme to the largest possible number of beneficiaries.

Under the project, learners and teachers who are customers of Vodafone or its African subsidiaries will not incur any mobile data charges when accessing *Instant Schools for Africa*. They will simply need a data connection to the Vodafone network

The online materials will be tailored, drawing on what's described as a combination of the best openly licensed global and local educational resources to provide country-specific content. Vodafone adds that the content will also be optimised for simple, low-cost mobile devices with basic data connectivity (3G) and areas of low coverage/capacity.

In the meantime, the Vodafone Foundation's *Instant Network School* programme continues to provide previously remote and isolated communities with access to a wealth of educational content and resources. The company believes this link to the outside world can be a "game changer" for education programmes in refugee camps, and will be critical for the long-term future of the children and communities that live there.

As part of the programme, Vodafone connects classes to the internet providing connectivity, power, tablet computers, mobile content and teacher training. There are 70 trained Vodafone employees who make up the *Instant Network* team. These volunteers remain on standby ready to deploy to set up the schools, and manage on-site introduction teacher training alongside the UNHCR.

The training is aimed at building ownership of the *Instant Network School* programme within the local community, and to ensure that the technology and solution respond to its needs.

One of the team's latest deployments was at the beginning of September 2016 in the Mole and Boyabu refugee camps in remote Equateur Province. These camps host more than 50,000

refugees who fled civil war in neighbouring Central African Republic. Vodafone's team installed three new *Instant Network* schools with the help of Vodacom Congo and the UNHCR.

When the team arrived, many people at the camps had never used the internet before. After four days of training, the teachers gave their first digital lesson – teaching the alphabet. Using the *Instant Classroom*, they can project the alphabet on to the screen, stream *ABC* song from *YouTube*, and use tablets to practice writing. The *Instant Classroom* is another Vodafone innovation. It's described as a digital 'school in a box' and was created to bring tablet-based teaching to refugee camps and areas where electricity and internet connectivity are unreliable or non-existent.

Shipped in a robust, 52kg, lockable storage case, the *Instant Classroom* contains: 25 *Android* tablets with 10-inch screens for students; one 11-inch convertible *Windows* laptop/tablet (which also acts as a content server and AV source) for the teacher; 1000 lumen LED projector and 20W audio system; and a 3G Ethernet modem with integrated Wi-Fi hotspot/router and external antennas. According to Vodafone, it takes 20 minutes to set up the entire *Instant Classroom*. It adds that battery power is around 1.5 hours for the projector and around eight hours for the router/hotspot. A built-in system can be used to recharge all 25 tablets and the laptop simultaneously while they are in the case.

The bus that teaches ICT skills

Airtel Africa runs several CSR initiatives to support schools and help improve the quality and delivery of education to children in underprivileged communities. For example, under its flagship *Our School* programme, the company works closely with governments and has currently 'adopted' 38 primary schools in rural areas across its 15 country footprint. Airtel said its adopted schools presently cater to more than 18,000 children. The support it provides under the programme includes: infrastructural refurbishment of classrooms and furniture; provision of uniforms, books and teaching aids; and ICT and broadband connectivity.

In addition, the initiative also works towards

building community and employee engagement with the adopted schools. Airtel said the school calendar ensures there is enough opportunity for the community – as well as its own employees – to understand and be engaged with the programme by participating in activities undertaken by schools, such as cleanliness drives, tree plantations, etc.

Other programmes Airtel has been involved with include the *ICT For Schools Project*. Last September in Uganda, the company teamed-up with Huawei and the Kazo and Nasasira (KAN) Foundation to power 30 PCs in three schools. Set up by John Nasasira after he stepped down as Uganda's ICT minister last year, the KAN Foundation seeks to address ICT issues in education, water and sanitation, and agricultural businesses. The 30 computers were supplied by Huawei and donated to Kashwa Primary School, Rwemikoma Secondary School and Karo Secondary School which are all in the Kiruhura District, western Uganda. The PCs will each receive 2GB of data from Airtel for a period of one year.

Further east across the border in Kenya, Airtel announced last September that it had connected five schools in the Nyanza region and two in the Rift region to the internet as part of another one of its flagship programmes, *Internet for Schools*. The initiative aims to enhance quality of learning in order to enable more pupils to have access to relevant educational information that is available online.

Meanwhile, for *Education Day* last August, representatives from Airtel Madagascar visited the *CoderBus*, a mobile platform for learning

John Nasasira, of the Kazo and Nasasira Foundation and Uganda's former ICT minister, praises Huawei and Airtel for supporting e-learning in the country.

The *CoderBus* is a connected mobile platform that aims to guide women and children to learn about ICT. Nearly 500 children are said to have so far benefited from the project.

computer science. The *CoderBus* is a non-profit project and is backed by Madagascar's *Habaka* innovation hub. Its mission is to guide women and children to become passionate builders, not just consumers, of new technologies through hands-on learning of technical skills in a collaborative and social way. *CoderBus'* founders claim that nearly 500 children have benefited since they started up around a year ago, adding that this is just the beginning as the plan is to gradually increase this impact up to eight times.

Airtel said its visit to the *CoderBus* in Ivato, central Madagascar last August was an opportunity to support the enthusiasm of young Malagasy encoders, the local council and the Madagascar *CoderDojo* – a global volunteer-led community of free programming clubs for people aged between seven and 17. The grass roots organisation is made up of individual clubs ('*Dojos*') that act independently. Since 2015, when signing the partnership with Madagascar *CoderDojo*, Airtel has donated hardware, internet connections, phones and monthly communication credits to three clubs in Antananarivo and Fianarantsoa. It said nearly 500 young people have benefited from its ongoing support.

Liquid delivers internet to pupils at remote Kenyan school

For Liquid Telecom, internet access always has a "transformatory" effect in education. "Improving education is at the core of our own mission of facilitating the rise of Africa as an economic powerhouse," said Ben Roberts, CEO of Liquid Telecom Kenya.

For instance, the company has connected all 46 branches of Kenya's National Libraries to high speed internet so that more than 500,000 library members across Kenya have easy – and free – access to research materials, opportunities and information.

Another more recent deployment was for a school in the remote village of Kiltamany. According to Liquid Kiltamany is, in many ways, a typical rural Kenyan village surrounded by kilometres of dry, dusty barren land. It lies around 160km from the nearest town and is a seven hour drive from Nairobi. The men herd goats, the women make beaded necklaces, and there are few outside visitors.

There are around 170 children in the school divided into eight classes. But recruiting and keeping teachers is difficult. There were

usually only five teachers so the children were often behind in their studies compared to their contemporaries. In addition, there was a shortage of books, pens, papers and other essential items.

However, Kiltamany's fortunes changed when it was chosen by Kenyan technologist and entrepreneur Erik Hersman as an early recipient of his latest initiative: *Kio Kit*. This is a digital classroom in a box developed by BRCK Education which was co-founded by Hersman in 2014 and is said to be one of the first hardware startups in Africa.

Kio Kit comprises a rugged, battery-powered Wi-Fi router that can, according to its developers, "seamlessly" serve educational content to 40 tablets. Due to the demands of rural environments, and the fact that children are bound to drop and spill things on the tablets, the *Kio Tablet* was also designed to be hard-wearing, adaptable and highly functional. There is a single plug used to charge all the kit and one button to power up the entire system. As well as accessing information online, tablet users can also take advantage of a wealth of pre-loaded multimedia content including the local curriculum, games that stimulate critical thinking, and information focused on responsible citizenship.

However, Kiltamany is around 20km from the nearest base station and is only covered by a patchy and weak 2G signal. So Hersman asked Liquid to help provide connectivity. Although it is perhaps best known for its pan-African fibre network, Liquid also provides satellite connectivity across the continent. The company says it has "vast experience" in connecting remote rural locations which mostly share the same characteristics: unreliable or no power; poor roads; no local engineers; as well as dust and heat.

Liquid installed its most robust VSAT dish on a one-metre high pole. The firm says this offers upload and download speeds of 10Mbps. The antenna is wired to the BRCK Wi-Fi router while power is provided by a solar battery and generator set.

With almost zero interference, Liquid claims the tablets can be used up to 50 metres from the BRCK router which means people outside the classrooms can also use the network. Indeed parents, teachers, village elders and others are all encouraged to use the Wi-Fi network after school lessons have finished, and most of the villagers have accessed the internet, either by phone or tablet.

With satellite availability of more than 99

per cent, content can be constantly updated so children do not have to wait for new materials to come from the nearest town. Data about how the tablets are being used can be gathered by BRCK. This enables the company to constantly review online tests and interactive exercises in order to both monitor the children's progress and help it improve the content.

Kiltamany's five teachers all agree that their work has been made easier with the fast internet connectivity, and they have been able to widen their scope of teaching to match what is taught in urban schools. "We used to travel for about 20 kilometres to Archer's Post to update fresh educational materials into our kits," says teacher Elizabeth Leress. "But with the internet and solar infrastructure in place, we have reduced the cost and time we spent on the way."

Liquid trained a local man to manage and update the system although, to date, no connectivity problems have resulted. However, after the first week, a fence had to be built around the dish as goats were using it as a scratching post and misaligning it.

The operator concludes that the deployment has been a "textbook" example of how children can benefit from the internet. No longer are teachers the only sources of knowledge and information in the classroom. The world has got much bigger for both the children and adults of Kiltamany. ∎

Liquid Telecom engineers install a VSAT dish on a one-metre high pole in the Kenyan village of Kiltamany.

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17 - 18 May 2017, Radisson Blu, Nairobi, Kenya

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While satellites and radios have been used to track animals for several years now, using cellular networks for IoT applications can offer greater advantages. For example in 2012, conservation organisation Biosphere Expeditions fitted three leopards with collars embedded with SIMs from Namibian operator MTC. This was then used to track the animals' movements by sending data to a laptop whenever the leopard moved within range of a mobile tower.

Can the leopard change its spots?

While the IoT offers great potential, including helping to protect endangered species, PROFESSOR DAVID ROGERS says it will be for nothing if standards bodies like the ITU don't face up to reality.

was present at an ITU meeting in Geneva last year where the "Internet of Tigers" was discussed. The topic was raised by an African country – tigers are of course resident in Asia, although some do live on reserves in Africa, such as at Tiger Canyons in the Karoo, South Africa. Real-time tracking of endangered species is a use case that is great to describe the benefits of the future in terms of the Internet of Things (IoT). Tiger Canyons currently track its tigers using satellite, but with more advanced network technology, the sensors could be richer, send much more data, have hugely better battery life, and be less burdensome for the animal.

So wouldn't it be great if instead of only being able to use a few people to keep tabs on endangered wildlife, we could crowd-source round-the-clock monitoring from people across the world? Not just from tags on animals, but perhaps even from live streaming video services right across national parks, even from above? Advances in technology

in the past twenty years or so have been such that this is a realistically achievable objective by 2026. So how do we get there?

Part of the ITU's work is to develop technical standards in order to protect and support everyone's fundamental right to communicate. The problem is they're not very good at it. This is represented by the lack of implementation of many of the standards in the majority of the connected products on the market. The main reason for this that I hear from manufacturers is that the standards are often simply so bad that they cannot be implemented. The same can be said for testing against those standards.

Take the problem of counterfeit devices, for example. You wouldn't think this would link to Tigers, but bear with me.

Counterfeit mobile devices are a big problem for African countries where the market penetration is very high relative to elsewhere around the world. A number of countries, including Kenya, Tanzania and Uganda, have switched off these devices because they can cause havoc with network management; the radios are not calibrated properly and they simply can't be identified – the counterfeiters don't care as long as someone buys them. Furthermore, the components being used often contain harmful substances because they're being manufactured and sold illicitly.

There is, however, a real dilemma here. On the one hand, it could be argued that the challenge for regulators is that counterfeit products still help to connect people and that improves their lives. If the devices are turned off, where does that leave the user? But on the other hand, the phones have avoided (high) import taxation and have security and quality risks.

Solutions that won't work for Africa

One particular work item in ITU-T looks at tackling is the problem of counterfeit goods by attaching an IoT-enabled chip on every product, thereby actually increasing the price of an authentic product. The proposed work item was thrown out of Study Group 11 of ITU-T only to reappear in Study Group 20. The exact same proposal was then accepted.

The implications are massive: an increase in e-waste of 100 per cent on all products (not just electronic) shipped worldwide. The increased cost to manufacturers will of course be passed down the supply chain, ultimately inflated at the point of sale to the consumer. The eventual cost to the environment and to our world in consumption is absolutely not worth the limited gain.

The worst part of all is that the proposed solution would not impact the supply of counterfeit products. The criminals who run such operations do not stand still; they utilise and challenge new technologies in a constant arms race.

What is needed is pressure to deal with the source of these problems and prevent the export of counterfeits to Africa. Some of these issues

suffer from the country-driven approach at the ITU – it is not acceptable to say that China is the source of more than 60 per cent of counterfeits (according to an OECD report). It is deemed more appropriate to say that "there are a lot of counterfeits in the world". This kind of diplomatic get-out does not actually help to fix the problem.

So going back to our tigers, the authentic IoT tracking device would itself be required to have another IoT module to track the tracker, probably doubling its price. The proposed solution also attempts to use a proprietary platform called the 'Handle System' instead of the internet, thus potentially increasing the implementation cost by many times.

So how does any of this exactly help developing countries tackle the problem of counterfeit devices? The answer is it doesn't. Ultimately, it seems that African countries are being failed when it comes to ITU standards that should help them.

The World Telecommunications Standardisation Assembly (WTSA-16) took place in Tunisia at the end of October. It was important because, strategically, the resolutions agreed at the meeting is what ITU working groups will be focusing on for the next four years, nominally to produce standards that achieve some useful objectives.

The problem is in the production of those standards. In some of the working group meetings, there are less than five people – sometimes from the same country. There are lots of mailing lists with no discussions, just communiques from the secretariat. There are few technical experts, but lots of people from government institutions with policy backgrounds. There are gross inefficiencies in the way that the meetings are structured in comparison to other standards bodies.

The lack of openness at ITU means a severe shortage of peer-review from experts who could usefully contribute their knowledge. In the age of the internet, experts from all over the world should, and could, be able to read and contribute to developing standards. Why should a UN agency close its doors to the people of the world in this way?

So if not ITU-T, then where? Well here's a thing – other bodies were working on IoT standards long before the ITU's Study Group on the topic was started in 2015. For instance, the Internet Engineering Task Force (IETF) has a list of some of the work its done on IoT going back ten years, while the W3C Web of Things working group is doing some extremely interesting work *(see https://www.w3.org/WoT/).*

There are few gaps to fill that haven't already been addressed or where work is already scoped and under way. But because the Internet of Things is not one 'thing', it is impossible for any one standards body to declare ownership. To do so is arrogant and misses the point about the IoT – it encompasses so many types of things and network types that it is not monolithic. Thus, the ZigBee Alliance, ZWave, the Industrial IoT Consortium, the IoT Security Foundation, etc.,

are all individually doing their bit.

A long-term vision

In addition, there are emerging radio technologies that will offer longer range but low data transmission capability. This is also tied to the long-term vision of 5G; IoT is linked in the sense that network segmentation can allow for different types of equipment, connected heterogeneously via multiple types of radio bearer. 5G means that, for example, a personal health monitor could communicate along with a high-speed streaming video. The two have very different resilience and data usage requirements, and they almost certainly have very different physical and radio properties. New technologies such as Mobile Edge Computing (MEC) and NFV will all help to facilitate this new world.

Not surprisingly, many standardisation bodies have been working towards 5G for a long time now, so the ITU-T's IMT2020 project is not contributing much in this regard, either. Don't get me wrong – I do think the ITU could have a role to play, but not without wholesale reform. Representation of African countries in standards bodies is very low because the cost of participation is high. African requirements therefore end up being under-represented. That needs to change.

One model I like is the World Wide Web Consortium (W3C). It has offices in Senegal and South Africa, is open, and its standards can be downloaded and implemented for free. Participation is via mailing list and conference call. Anyone in the world can get involved. This is something that standards bodies should aspire to if they want to get a wider variety of opinions and expertise from around the globe.

So will we have our "Internet of Tigers"? I really do think so. If you are looking at use cases for 5G and IoT then it is sensible not to anchor to one standards body but to look to engage broadly across the spectrum. Try to use open, free, widely implemented standards, pick your radio network carefully, and you are unlikely to go wrong. ∎

Professor David Rogers runs UK-based software and security company Copper Horse Solutions. He chairs the GSMA's Device Security Group and also sits on the executive board of the Internet of Things Security Foundation. Rogers is a visiting professor in cyber security and digital forensics at York St John University and also teaches mobile systems security at the University of Oxford.

David Rogers, CEO, Copper Horse Solutions

Aircraft broadband system integrates satellite and terrestrial LTE networks

The European Aviation Network (EAN) has achieved a major milestone following a programme of test flights. Planned for introduction in mid-2017, the EAN is said to be the world's first integrated satellite and air-to-ground network dedicated to providing a true in-flight broadband experience.

The network is said to be unique in terms of the capacity and quality of broadband internet service it brings to the dense European aviation routes. The equipment it uses is very small and lightweight which, it's claimed, typical broadband satellite based solutions cannot offer.

The ground network will use 4G mobile infrastructure combined with satellite frequencies provided by Inmarsat. These are in the S-band spectrum (2-4GHz) that is typically used for weather radar, surface ship radar, and some communication satellites (particularly those used by NASA for communication with the International Space Station).

The tests were carried out late last year by Inmarsat and Deutsche Telekom together with their technology partners, Nokia and Thales.

The first live connection in the field was accomplished in a broadband video conference with both parties connected via the dedicated EAN LTE mobile network. The flight trial tested the performance of the onboard equipment provided by Thales and the ground network from Deutsche Telekom and Nokia.

The partners say the systems performed multiple successful handovers between sectors and cell towers, and maintained a stable connection.

The LTE ground network for the EAN differs from conventional LTE networks as it needs to work at speeds of up to 1,200kph, and at cruising

Working with Deutsche Telekom, Nokia has adapted its LTE BST and RRH to Inmarsat's S-band frequency and built a specific antenna to cover the sky.

altitudes requiring cells to function across distances of up to 150km. To achieve the live connection to the LTE ground network, Deutsche Telekom and Nokia have adapted Nokia's LTE base stations and remote radio heads to Inmarsat's S-band frequency, and built a specific BST antenna to cover the sky.

Nokia will manage the operations for the network from its global delivery centre in Romania. In addition to the live network, Nokia and Deutsche

Telekom will setup a full end-to-end ground network reference system in Stuttgart, Germany. This will include all components and integrated on-board equipment from Thales to prepare for technical challenges, such as compensation of the Doppler effect due to high aircraft speeds, for example.

Since the EAN's initial announcement in September 2015, Deutsche Telekom and Nokia say they have made steady progress and are on track to deliver the ground component of the project. This includes the rollout of the approximately 300 antenna sites needed across Europe and connecting the network live over-the-air.

In parallel, Inmarsat and Thales are moving forward with implementing satcoms for the EAN, having completed construction and associated sub-system tests of the satellite earlier last year.

Enet offers nationwide open access broadband network

Irish operator Enet has gone live with a backhaul network that connects and further integrates its metropolitan area networks (MANs) into a national telecoms platform.

This latest project for the company brings its total investment to more than EUR100m since it was acquired by specialist technology, media and telecoms investment firm, Granahan McCourt Capital, in late 2013.

Enet's national backhaul network is now fully operational. It includes more than 3,700km of high-capacity fibre and connects 55 towns.

The operator says the deployment marks a major breakthrough as it means a "top class" open access broadband network is now available throughout Ireland.

The company adds that it will also enable it to offer MAN customers access to higher speeds as well as greater network reliability.

Enet says it runs the country's second-largest fibre network. It includes 94 MANs operated on behalf of the government, what's described as a "unique" dark fibre backhaul infrastructure transiting the rail and gas network, and three proprietary metro networks including an 100km fibre ring in Dublin.

CEO Conal Henry says: "The investment in a national backhaul network gives us access to dark fibre for the vast majority of our traffic

sources and offers us a far greater flexibility of how we design and deliver our services to the benefit of our 70 operator customers and their end users."

The company also claims to operate one of the largest licensed wireless networks in Ireland. When combined, Enet says its fibre and wireless infrastructure creates a fully integrated, nationwide network, making it the country's largest open-access network operator.

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

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

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

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

larger ones with better rain protection.

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

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

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

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

At launch in January 2017, the platform will carry at least 30 local free-to-air channels and more than 30 international channels. The aim is to grow the number of channels to more than 100 in the first six to 12 months.
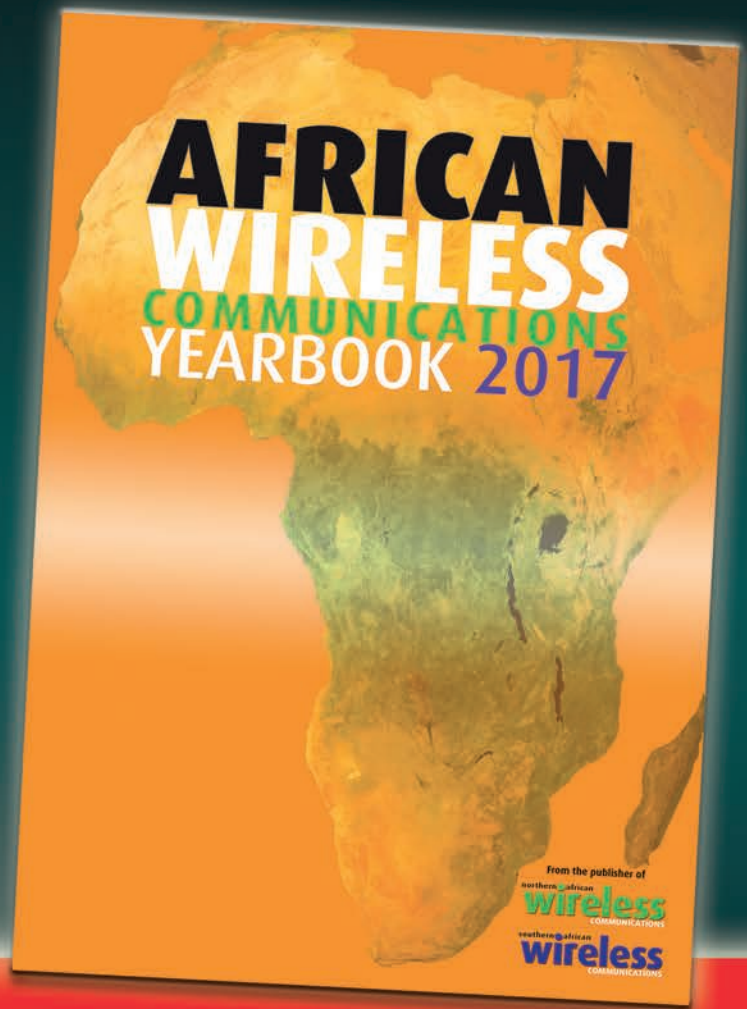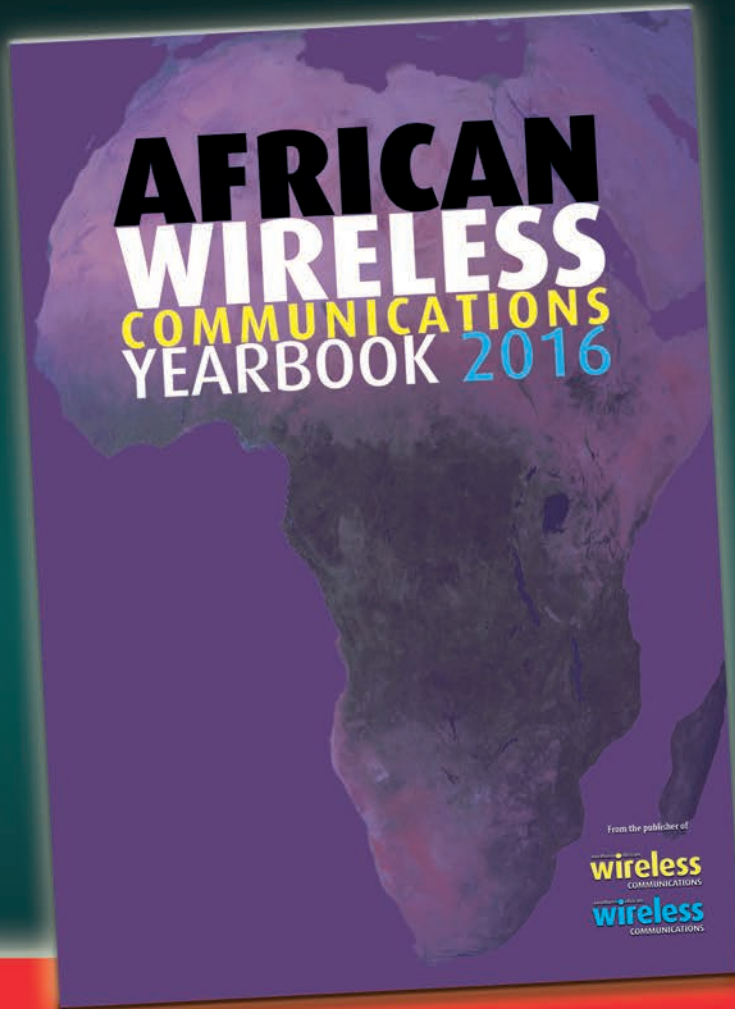
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Singapore to trial 'Li-Fi' for wireless data transmission

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

'Li-Fi' (light fidelity) was developed by Scottish company PureLiFi which recently received financial backing from Singaporean investor Temasek. PureLiFi claims its technology can turn every light into a wireless internet access point.

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

The idea of using off-the-shelf light bulbs for super high-speed transmission initially came from research carried out by Harald Haas, professor of mobile communications at Edinburgh University's School of Engineering/Institute of Digital Communications. In 2012, Haas co-founded PureLiFi and is the company's chief scientific officer. Since then, the firm has released three iterations of its Li-Fi system. They include the *LiFi-X* which consists of the world's first Li-Fi dongle, and is also available in the form of a LiFi-integrated luminaire developed in partnership with French lighting manufacturer Lucibel.

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

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

fees for technical Li-Fi trials will be waived to encourage interested companies to conduct assessments.

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

Europe's first mission critical LTE network deployed

Sepura Group subsidiary Teltronic says it has implemented Europe's first mission critical LTE network.

Already fully operational, the deployment provides complementary broadband services to RESCAN, the private TETRA network of the Canary Islands' public safety agencies whose end users include ambulance, police and environmental services.

Building on an existing Teltronic *NEBULA* platform, the new solution utilises the vendor's *eNEBULA MVC-6000*, a vehicular system capable of integrating different wireless technologies such as TETRA and professional LTE. Teltronic has also supplied rugged commercial LTE handhelds to provide services such as real-time field-to-control video transmission, internet/intranet access, and customised applications that tackle the agencies' operational challenges.

In accordance with spectrum regulations for public safety users and broadband services laid out in Spain's National Table of Frequency Allocations, the system was implemented in frequency bands below 1GHz, bringing additional benefits in terms of radio propagation and indoor coverage.

"A hybrid TETRA-LTE network expands the range of services available to PMR users, protecting their investment while maintaining the same levels of security, reliability and resilience," says Juan Ferro, Sepura's VP of systems.

Satellite helps monitor water levels in Malaysia

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

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

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

With little or no data available, government agencies were unable to forecast and predict the water level at dams and rivers.

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

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

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

Coast guard patrol boats rely on R&S radios

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

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

An automatic message handling system is also part of the package. The MRRVs will have situational awareness through the *Map Track*, email, chat and file transfer features of R&S' *Postman III* software. This has been optimised for communications over HF and VHF/UHF radio networks with variable data rates. Because the software is IP-based, R&S says it can interface with standard IP infrastructures such as LAN/WAN and satcoms.

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

R&S says the device combines its new *EB500* monitoring receiver with the accurate correlative interferometer

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

DF method. It claims this unique combination offers precise radio direction finding with sensitive radio monitoring capabilities.

Europe sees first 4.5G

TIM is the first European operator to offer its customers download speeds of up to 500Mbps on its mobile 4.5G network. The service is currently available in Rome, Palermo and Sanremo via the new Sony *Xperia XZ* smartphone. It is currently being rolled out to Naples and Milan, with other major cities to follow later this year. TIM's 4.5G technology uses new LTE 'L band' frequencies at 1500MHz, along with new coding and modulation techniques and antenna systems evolution to increase spectral efficiency.

New testing initiative

Cisco, Ericsson, Huawei and Nokia have signed an MoU to create the NFV Interoperability Testing Initiative. NFV-ITI will focus on NFV solutions actually used in service provider networks. It will recommend generic principles, including interoperability test cases, criteria, processes, methods, guidelines, templates and tools. It will also apply best practices from all existing interoperability testing activities in the industry, such as the NVIOT forum efforts. The general guiding principles for NFV-ITI are openness, fairness, reasonableness and non-discriminatory treatment.

Market expanding

India's wireless subscribers reached 1,049.74 million at the end of September. According to regulator data released in December 2016, 603.80 million of those users are in urban areas while 445.94 million are rural. Of the country's 12 MNOs, Bharti, Vodafone and Idea dominate with 24.76, 19.12 and 17.03 per cent market shares, respectively. The bottom three include state-owned MTNL (0.34 per cent), Sistema (0.64 per cent), and Reliance Jio (1.52 per cent), although the latter only started operations last September.

Iconic building adds Xirrus Wi-Fi network

The Van Nelle Fabriek complex in Rotterdam has installed a Xirrus Wi-Fi network throughout its office spaces and public areas.

Considered the main industrial monument in the Netherlands, the Van Nelle Fabriek was built between 1927 and 1930 for the production of tobacco, coffee and tea. After the factory stopped manufacturing in 1998, the building was transformed into offices and is now home to more than 80 entrepreneurs and businesses including a variety of new media and design companies. In 2014, it was recognised as a UNESCO World Heritage Site.

Xirrus Wi-Fi will be used across the site as part of a broad infrastructure upgrade. All critical building and facilities management systems across the Van Nelle Fabriek – which spans more than 68,000m² and is set in around 11 hectares of outdoor space – will be operated and managed via the Wi-Fi.

Businesses will also gain access to a high density 5GHz network that meets current demands for video streaming, cloud-based computing and document sharing – even when the complex plays host to major conferences or other big events.

"Because many creative industries have businesses here, they need to be able to stream high-resolution video, HD photography, and backup their large media files to the cloud for safe keeping or file sharing," says Roger Meertens, GM, Van Nelle Fabriek. "The high-density Wi-Fi offered by Xirrus ensures that companies can always rely on their connection, even at times of extreme usage."

Recognised as a UNESCO World Heritage Site in 2014, the Van Nelle Fabriek in Rotterdam is said to be an iconic example of Europe's Modern Movement.

Meertens adds that thanks to software programmable radios that can easily cope with new Wi-Fi standards, the system also has the capability to adapt to future needs, and means that there will be no need for Van Nelle Fabriek to resort to costly replacement programmes.

Vodafone Hutchison virtualises networks

Vodafone Hutchison Australia (VHA) is virtualising its networks with the help of Cisco and Ericsson.

Through simplification of its network and infrastructure, it's claimed VHA will benefit from having the tools to become more agile, innovative and more proactive in the way services are brought to market. It's hoped that this will ultimately result in an improved customer engagement experience alongside reductions in opex and capex.

The deal represents the first major collaboration between Ericsson and Cisco on telecom cloud infrastructure since they announced the formation of a global business and technology partnership in November 2015.

The joint architecture solution comprises Ericsson's *Hyperscale Datacenter System* and cloud and SDN software components, together with Cisco's *WAN Automation Engine*, *Network Services Orchestrator* and routers. Cisco is also providing both virtualised and physical security technologies, along with services and support. Ericsson will be responsible for the integration of its products with Cisco's.

VHA CTO Kevin Millroy says: "The new infrastructure opens the door to new business models and markets, such as Internet of Things, for Vodafone."

Ericsson has already worked with Vodafone Hutchison Australia. In 2014, it replaced and upgraded the cellco's core network, including virtual EPC and virtual IMS/VoLTE.

Creating 'intelligent radiating skins'

C-COM Satellite Systems and the Natural Sciences and Engineering Research Council of Canada (NSERC) are co-funding research into intelligent antenna and radio systems for millimetre wave mobile communications.

Backing for the five-year project goes to the Industrial Research Chair held by Professor Safieddin Safavi-Naeini at the University of Waterloo in Ontario, Canada.

Safavi-Naeini leads a team in the department of electrical and computer engineering, and the primary goal of their research will be the development of a new modular,
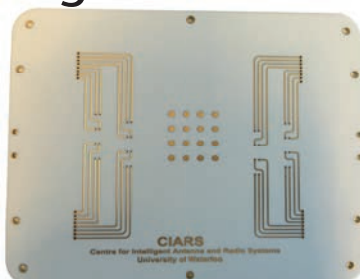
C-COM has already been working with the university on a new, tiny MMW 4x4 intelligent antenna module.

low-cost, intelligent antenna for next generation of mobile satcoms.

"Once you have a low-cost, ultra-thin, lightweight, smart and highly modular active antenna (an 'intelligent radiating skin'), you can have mobile high-performance internet connection everywhere," says Safavi-Naeini. "We have the potential to make this technology affordable and bring it to many parts of the world that have been left behind."

C-COM and NSERC will each provide total cash funding of CAD3,055,000 payable in instalments until the end of 2020. C-COM will also provide CAD751,000 of in-kind support to the project. Under the terms of the agreement, the firm will own the intellectual property resulting from the research conducted.

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