- **4G – not fast enough in Africa?**
- **How the satcoms industry should evolve**
- **Using OSS/BSS to enhance crucial network functions**

Digitata focuses on delivering intelligence in the mobile telecommunications and digital media arenas. New offerings include:

- On-device mobile data control
- Smart bundle offers to a segment of one
- Unique customer interaction with mobile gamification
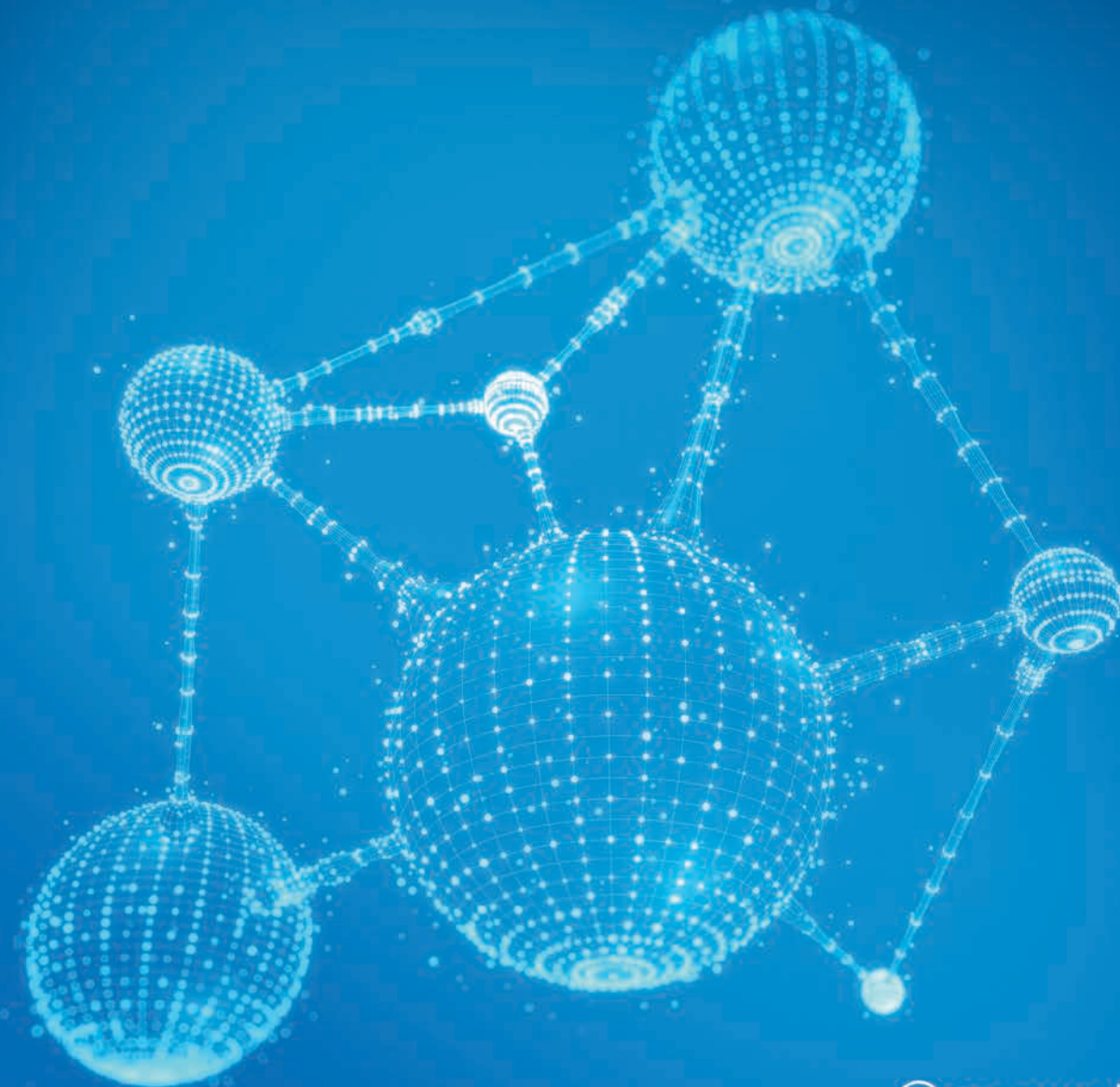- Subscriber-centric view of operator network performance

Dynamic Tariffing

Digitata Insights

Digitata Networks

digitata

Digitata focuses on **delivering intelligence** in the mobile telecommunications and digital media arenas, enabling mobile operators, brands and agencies to offer their customers greater value and an enhanced user experience. This is achieved through the application of Machine Learning and Artificial Intelligence.

Dynamic Tariffing™, trusted by operators to intelligently price data, calls and SMS, applies this same intelligence to a segment-of-one. Our smart-app, SnapTariff, provides data control and can present near-realtime segmented offers including smart bundling.

Digitata Networks provides intelligent vendor-agnostic network configuration management, performance/revenue monitoring, asset tracking and customer experience management to transparently monitor, control and automate all major mobile technologies across multi-domains.

Digitata Insights offers a mobile media technology solution that enables operators to leverage digital marketing channels, creating a new revenue source. Brands reach mobile users with USSD messages, targeted by time and location, while USSD and smart games provide unique customer engagement.

Digitata has a global customer-base with our offerings serving tens-of-millions of consumers.

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KADIUM

"Watershed" moment for African internet as first SACS link is installed

The link was officially launched in early August at an event attended by José Carvalho da Rocha, the Angolan Minister of Telecommunications and Technologies (sixth from left), local and international business leaders, as well as Angola Cables' shareholders and guests.

Angola Cables has moved a step closer to completing the South Atlantic Cable System (SACS) with the installation of the first direct subsea link between Africa and South America.

In what has been described as a "watershed" moment for African internet, the link was officially launched on 9 August in Sangano, Angola.

SACS was first announced more than two years ago (*see News, Jan-Feb 2015*). The 40Tbps system is being built by NEC and is now expected to begin operations during 1Q18. When it is completed, SACS will stretch more than 6,500km connecting the Angolan coast in the municipality of Quissama

Angonix project manager Darwin Costa says Angola Cables will become the only carrier able to directly connect networks from the Americas and Europe to the third-largest IXP in Africa.

to Fortaleza in Brazil, the closest point to Africa in South America.

In a separate announcement made in early July, Angola Cables said construction had begun on its data centre in Fortaleza. It said the Tier III facility will play a crucial part in promoting Africa's digital inclusion and empowerment and providing high speed internet at some of the lowest latency speeds between the two continents.

According to the company, it currently takes around 300 milliseconds to connect between Angola and Brazil. SACS is expected to reduce latency to approximately 60 milliseconds. Angola Cables CEO António Nunes says: "For Angolans, the time to access content available in America – the largest centre for the production and aggregation of digital content and services – will improve five-fold."

Two key routes will run from the Brazilian data centre: SACS will connect Fortaleza to Luanda and is expected to be completed by mid-2018; meanwhile Angola Cables' Monet system will connect Miami with both Fortaleza and São Paulo and is due to be completed by the end of 2017. The data centre also aims to accommodate more connections from the cable-dense region of

Fortaleza. Clients who have already signed in Brazil include Prefeitura de Fortaleza, Claranet and AmLight.

SACS is considered a strategic project for Angola to advance the region's digital economy and improve global communications. According to Nunes, the country is becoming a major telecoms hub in sub-Saharan Africa with cable systems such as WACS (which Angola Cables is a partner in with 11 other companies), SACS and Monet, together with local data centres.

Keeping African traffic in Africa

In separate news, Angola Cable says Angonix – the internet exchange point it manages in Luanda – has grown exponentially to become the continent's third-largest IXP in just two years.

"As a neutral IXP, Angonix allows content to be localised at greatly reduced per-bit delivery costs and offers improved routing efficiency," says the facility's project manager, Darwin Costa. "With a suite of strategic communications assets on the continent, Angola Cables will become the only carrier able to directly connect networks from the Americas and Europe to the third-largest platform in Africa."

Angonix currently has 17 members including major financial institutions, cable and satellite companies, ISPs, MNOs and various CSPs operating on the continent. It's claimed the IXP recorded peak traffic of 10.8Gbps in July 2017.

Costa says Angonix features peering ports of 1GbE and 10GbE with speeds of 1000Mbps and 10,000Mbps, respectively. He adds that remote peering services will soon be launched whereby ports on the IXP will be available in other markets. Since then, France-IX has announced the launch of a remote peering service to boost connectivity between members of its IXP in Marseille and those at Angonix.

France-IX says the new service will reduce latency and costs for global and national carrier networks, CDNs, social networks and cloud and IT service providers looking to establish themselves in sub-Saharan Africa. It adds that it will also reduce international IP-transit costs for local ISPs and network operators, as well as increase their access to French language content and services.

"Since joining the France-IX Marseille peering community in May 2017, we have seen a more than three-fold increase in traffic," says Costa.

Partnership for LTE-A in South Africa

Internet Solutions (IS) and Rain are offering commercial LTE-A to ISPs in South Africa.

Previously known as 'Wireless Business Solutions', Rain is building an LTE-A network to boost fixed and mobile connectivity in the country. Since September 2016, it has so far deployed 750 active base stations extending across South Africa's major centres and metropolitan areas.

Speaking earlier this year, Rain chairman CEO Duncan Simpson-Craib said that the company says is on target to reach 2,000 sites by the end of this year and expects to increase its footprint to 5,000 base stations by 2018, ultimately growing to 10,000 sites over

Rain CEO Duncan Simpson-Craib says all tests are "looking good", and that the company remains on track to roll out 2,000 sites by the end of 2017.

time. He added: "In future, we will be launching a full mobile data service."

According to the firm, in areas of high-density mobile coverage, LTE-A offers ISPs and their customers distinct advantages over a wired network like ADSL or fibre, particularly for ISPs that wish to deliver services to customers quickly with minimal

disruption during installation.

IS will act as the open access partner for delivering the company's fixed wireless broadband service, *Rain to the Home*. The two firms believe that offering competitively-priced access to LTE-A will lead to new growth opportunities for local ISPs whose customers will benefit from fibre-like mobile connectivity.

"As Internet Solutions is already integrated into all existing telcos, with a sophisticated billing and management platform that allows ISPs to administer the packages they market to customers, adding LTE-A to their offering will demonstrate their responsiveness to new technologies and consumer demand,"

claims Murray Steyn, executive head: Wholesale, Internet Solutions.

■ In separate news, IS has deployed its first POP in Madagascar and commissioned a second one in Zambia. Co-locating with Airtel Madagascar and NetOne in Zambia, the company says it now has 68 POPs in 16 African markets. Steyn says: "Deploying POPs in Madagascar and Zambia is in direct response to business prospects anticipated by our existing clients, particularly in the retail and telecoms industries, and our own expectations of economic development in these countries."
LTE: not so fast in Africa? Feature, pp21-24

Intelsat 37e launch aborted

As we went to press with this issue, Intelsat announced that the launch of *Intelsat 37e*, the fifth of its next-generation of high throughput satellites, had been aborted.

The spacecraft was due to go up from French Guiana on board an Arianespace *Ariane 5* on 5 September. But an announcement on Intelsat's website said the launch was stopped due to an "out of specification condition" on the launch vehicle.

The following day, Arianespace said: "Just after the ignition of *Ariane 5*'s main stage *Vulcain* engine, the on-board computer detected an anomaly affecting electrical equipment on one of the two solid-propellant boosters (EAP). This anomaly led to an interruption of the automated lift-off sequence."

It added that the aim was to try for a relaunch at the end of September as soon as the analysis of the anomaly had been completed.

Built by Boeing, *Intelsat 37e* is an all-digital satellite with full beam interconnectivity in C-, Ku- and Ka-bands, and also includes enhanced power sharing technology and steerable Ku- and Ka-band beams. It will be used by broadband, mobility and government customers in the Americas, Africa and Europe.

Intelsat 37e will be placed into service at 342°E where it replaces *Intelsat 901* which will be repositioned to another location.

In early July, Intelsat did manage a successful launch for *Intelsat 35e*. It will orbit at 325.5°E to deliver C- and Ku-band capacity in Africa, Europe, Caribbean and the Americas.

MTC to spend more than a billion to upgrade network

Namibian cellco MTC (Mobile Telecommunications) operator plans to invest NAD1.1bn (USD848m) on expanding its network capacity.

The programme is part of the company's *081EVERY1* project which its describe as the "beginning of a journey towards 100 per cent population density coverage".

Starting in October 2017 and running until October 2019, MTC plans to build more than 524 new sites which is said to represent a 10-fold increase in its network footprint. The sites will include 412 new locations in rural areas, and 88 in urban zones across all of the country's 14 regions.

The operator adds that the billion-dollar project will also see the introduction of 3G in major rural

areas. Currently, MTC says it mainly has 3G and 4G coverage in urban areas and limited coverage in most rural areas which have 2G.

Acting CEO Thinus Smi says *081EVERY1* is geared towards future full system convergence, especially with forthcoming IoT and 5G technology. He says: "There is a noticeable rapid growth in technology, where customers engage in an increasing number of ways with the network, and this enhanced network coverage project will aid these communications."

While MTC has not as yet announced who its technology partner(s) will be for the project, it has been working with Huawei on what was described last year as Africa's first 4.5G trial *(see News, Mar-Apr 2016)*.

Vodacom to bring "mobile revolution" to remote areas

Vodacom has outlined accelerated plans to expand network coverage for people who live in South Africa's rural areas.

Through continued investment in its *Rural Coverage Network Expansion* programme, the operator says it has committed to expanding its footprint to cover an additional 150 small deep rural communities during this year alone. Most of these communities are in KwaZulu Natal, Limpopo, Eastern Cape, North West and the Free State.

Vodacom claims it's already achieved voice coverage for 99.9 per

cent of the urban and 99.6 per cent of the rural populations, and data coverage for 99.9 and 95.6 per cent of the urban and rural populations, respectively. The company says it is now looking at "innovative" ways to connect the outstanding 4.4 per cent rural population with data coverage and 0.4 per cent with voice coverage.

Vodacom says the plan is to increase network capacity, and bring faster data services to tens of thousands more people living in rural areas who only have voice and EDGE data services.

Vodacom CTO Andries Delport says it's "no longer acceptable" for people in rural areas to be on the internet sidelines.

"It can no longer be acceptable that multitudes of people in our rural areas watch the Internet Revolution from the sidelines without being part of it," says Andries Delport, CTO, Vodacom Group.

■ In August, Vodacom announced that all customers affected by a recent billing systems error would be given a 500MB bundle for free, over and above any airtime and data refunds. The operators said the system error, which impacted certain pre-paid and top-up customers, was caused by a configuration change on its billing system. In issuing his apology, Vodacom Group CEO Shameel Joosub said: "An error of this kind has never happened before and we've taken steps to ensure it never recurs."

Moving Wireless Forward

Mobile Mark is a leading supplier of innovative, high performance antennas to wireless companies across the globe. We've been in the wireless industry for over 30 years and have our roots in the early Cellular trials. We have grown and evolved over the years, along with the industry.

Today, we benefit from enhanced design capabilities and expanded production capacity – along with a greater understanding of new and emerging markets – all of which have allowed us to become one of the best antenna developers in our field.

Our customers have been our partners throughout the years. We believe in taking the time to understand our customers' individual needs. Through close consultation with clients, we are able to deliver innovative, tailored solutions that meet specific antenna requirements.

Rapid prototyping capabilities allow us to take our designs from concept to reality in an extremely short time span, and to verify the performance of the antenna. A variety of network analyzers and an anechoic chamber enable us to conduct measurements up to 13 GHz, and ensure that the antennas designed meet or exceed customer requirements.

We have onsite injection molding equipment and a fully equipped modeling shop staffed with skilled model makers to assist in the design phase and help us come up with a superior product – an antenna that not only meets the customer's electrical specifications, but is also very attractively packaged.

Mobile Mark antennas are used in many sectors of the wireless industry. Here are just a few examples:

Asset Tracking & RFID

Managing and tracking important assets can be a challenge in the field, and both RFID and WiFi offer effective wireless solutions. RFID / WiFi technology allows us to identify, monitor and track items ranging from medicine to fruit to parcels to people. Since each application has its own challenges, Mobile Mark offers a range of antennas so network developers can choose the right mix.

Mobile Mark
antenna solutions

Commercial Fleet Management

Mobile Mark has consistently lead the industry with the most extensive and innovative range of antenna solutions that combine multiple wireless technologies: from simple GPS & Cellular antennas to complex 6-cable antennas combining LTE MIMO, WiFi MIMO, DSRC and GNSS in the same antenna housing. This combination of wireless technologies allows fleet owners to track and/or redirect their fleets of cars and trucks for optimum efficiencies. Mobile Mark antennas are rugged enough to handle tough environments and efficient enough to maintain reliable connections.

Public Transit & Bus Management

From monitoring the location of the bus to monitoring the condition of its tires, wireless has become an essential part of professional bus management. Mobile Mark's multiband antennas allow the system to capture that information and transmit it back to a central monitoring station with real-time connectivity. For an added touch, real-time WiFi service can also be added for the passengers. That's why companies like INIT have selected Mobile Mark antenna to complete their product offerings. And they have made the following endorsement:

"INIT GmbH – as a worldwide leading supplier of integrated planning, dispatching, telematics and ticketing systems for buses and trains – uses Mobile Mark bus antennas in public transportation projects all over the globe.

For example: INIT has installed Mobile Mark antennas in projects located in Abu Dhabi, Hertfordshire UK, Turku Finland, Oslo Norway, Montreal Canada, Luxembourg, as well as several German projects.

In 2017, a fleet of more than 1,500 buses will have Mobile Mark Antennas installed in one of INIT`s

current major projects for National Express, West Midlands, UK."

Remote Monitoring & Surveillance

Surveillance plays an important role in maintaining secure settings. Network deployments need to be low maintenance and weather resistant. Broadband surface mounts offer flexibility for multi-frequency coverage and are rugged and dependable. YAGI antennas provide practical point-to-point coverage. Our antenna solutions are designed to handle tough conditions while providing the reliable wireless connection you would expect from a Mobile Mark antenna.

Mining & Exploration

Modern mining operations rely on a battalion of vehicles, ranging from massive extraction vehicles to modest-sized material transport trucks. These vehicles operate in tough environments where high vibration is a frequent wear and tear challenge. Mining companies throughout Africa have relied on our rugged, foam-filled mobile antennas for consistent connections. Mobile Mark's infrastructure antennas have been used for rapid deployment and redundancy coverage for effective wireless coverage in isolated settings.

Smart Cities & Smart Highway

For cities and highways, the lynchpin of a successful "Smart" system will be dependable wireless connections. Companies like Kapsch understand this, and have worked with Mobile Mark to find ideal antenna solutions. Wireless networks must reach seamlessly into hard-to-cover corners of city intersections and along vast expanses of highways. They must be carefully embedded in city lighting and electrical meters. Mobile Mark offers both small network infrastructure as well as embedded antenna elements to help network designers tie all the pieces together.

Let us know how we can help

We understand the RF wireless world and are ready to help you evaluate your options. Contact us by email, phone or fax and let us know how we can help.

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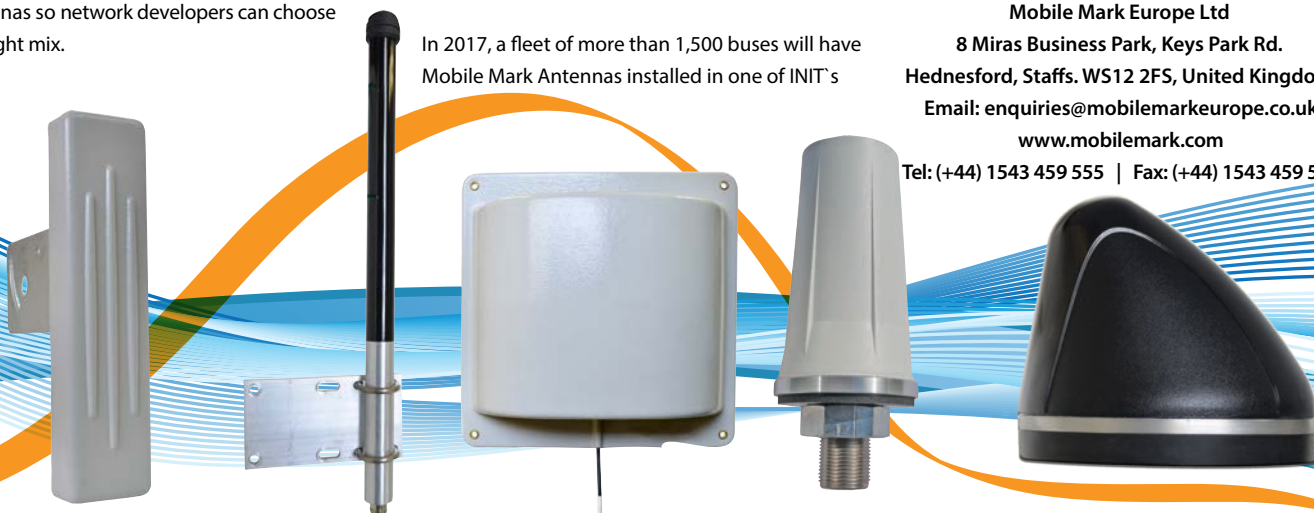
Sub-Saharan Africa driving global mobile money deployments

Sub-Saharan Africa accounts for more than half of all mobile money deployments worldwide, according to the GSM Association.

In its latest *State of Mobile Money in Sub-Saharan Africa* report published in July, the GSMA says the number of live mobile money schemes in SSA reached 140 across 39 countries at the end of last year, accounting for more than half of the 277 mobile money deployments globally. It says that there were 277 million registered mobile money accounts across SSA at the end of 2016, plus 1.5 million registered agents.

According to the report, there are now seven markets in SSA where more than 40 per cent of adults are active mobile money users: Gabon, Ghana, Kenya, Namibia, Tanzania, Uganda and Zimbabwe.

It adds that the region is pioneering a range of new use cases where mobile money has evolved from primarily being used to top up airtime and make P2P transfers, to becoming a platform that enables additional financial services, including bill payments, merchant payments and international remittances.

The GSMA says the volume of these new types of 'ecosystem payments' almost quadrupled between 2014 and 2016, and now accounts for about 17 per cent of all mobile money transactions, driven by a significant rise in the number of mobile-based bill payments.

The association's director general Mats Granryd says: "Mobile money is now achieving mass-market adoption in all corners of sub-Saharan Africa, enabling millions of people to access financial services for the first time and contributing to economic growth and social development."

Growth of 90-day mobile money accounts, 2011 to 2016

Sub-Saharan Africa*
Rest of the world

*Sub-Saharan Africa comprises: East Africa, Central Africa, Southern Africa, West Africa

Mobile money account adoption in sub-Saharan Africa has outpaced growth in the rest of the world (note, Rest of the world excludes SSA).

SOURCE: 2016 THE STATE OF MOBILE MONEY IN SUB-SAHARAN AFRICA, GSMA

Tola Mobile helps merchants reconcile transactions

Tola Mobile says it has enhanced its mobile payments platform to provide business continuity and operating resilience for merchants in Africa.

Designed to give customers a seamless mobile payments experience, the company says its *Tola.wallet* mobile money system can now reconcile transactions that would previously have been delayed or even potentially lost when mobile network outages and downtime occur.

Tola Mobile CEO Shane Leahy says: "During this downtime, *Tola.wallet* enables merchants to continue operation, buffering the systems until they are operational again and ensuring that there is a full and complete reconciliation of mobile money transactions once operator services are available again."

Headquartered in the UK and with offices in Tanzania and Kenya, Tola Mobile says *Tola.wallet* enable companies looking to receive payments from mobile money throughout Africa. It says a single API connection allows organisations to receive and make real-time payments across countries at the same rates as bank or credit card transactions.

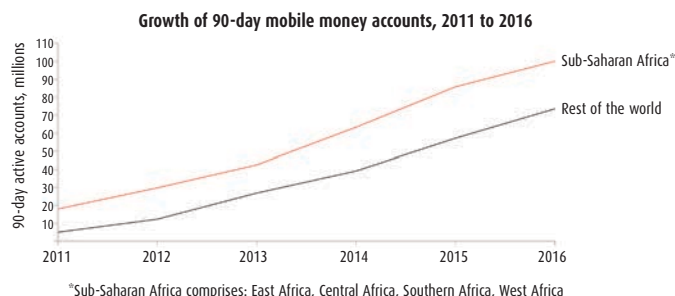The firm claims *Tola.wallet* is already the fastest-growing mobile money solution in sub-Saharan Africa. It says that the platform has so far processed 100 million transactions across the region, equating to funds valued at more than USD75m.

"The mobile payments infrastructure provided by operators is now as important to a country's commerce as Visa/MasterCard/AMEX processing is in the Western world," says Leahy. "Being able to reconcile transactions is vital in the region. Merchants in Africa also need resilience and continuity in order to run and maintain their businesses."

Nationwide TETRA and LTE to be deployed in Angola

Hytera will deliver a nationwide critical communications system to the Ministry of Interior of Angola in a deal worth around USD31m.

The PMR specialist says the turnkey project includes TETRA infrastructure, TETRA radios as well as LTE-TETRA multi-mode advanced radios, and convergent dispatching systems.

As part of the government's initiative of modernising public security and safety in Angola, the new mission critical communications system will be used by departments such as police, firefighting, customs, etc.

Hytera claims its new LTE-TETRA convergence solution ensures highly resilient infrastructures for mission critical users in the country, and offers versatile features enabled by LTE technologies.

Officially launched at Critical Communications World 2017 in Hong Kong earlier this year, the vendor says its LTE-PMR convergence solution comprises "cutting-edge" multi-mode advanced radio terminals, narrowband-broadband infrastructure, and management software.

Hytera adds that its platform incorporates feature-rich broadband technologies while ensuring that critically important voice services remain reliably accessible using narrowband technologies such as TETRA, DMR, and PDT.

Hytera says its recently launched LTE-TETRA convergence solution will result in "highly resilient infrastructures" for the country's mission critical users.

Brightwave teams up with Microsoft to harness TVWS

Microsoft and ISP Brightwave have teamed-up to bring Wi-Fi and broadband access based on TVWS technology to schools and clinics in South Africa.

Under their agreement, more than 213,000 students at 609 primary and secondary schools in the OR Tambo district, as well as several healthcare clinics in the municipality of King Sabata Dalindyebo in the Eastern Cape, will gain network access.

Brightwave is a certified black-owned enterprise that builds infrastructure to enable the delivery of high speed, affordable broadband access and services for the majority. For instance, in the under-served community of Soweto, the ISP is said to have successfully deployed and commercialised the largest Wi-Fi network through offering data bundles at a tenth of market prices by leveraging an ad-driven 'freemium' model.

This latest deployment for the

Brightwave CEO Charles Mwaura (left) says the partnership will enables his company to offer an integrated services value proposition. Also pictured is Lumko Mtimde, CEO, USAASA.

company is being co-funded by Microsoft and the Universal Service and Access Agency of South Africa. Lumko Mtimde, the agency's CEO, says: "This initiative will provide many entrepreneurs within underserved communities and rural areas with the tools they need to create businesses, address community problems and also help close the local skills gap."

Under the agreement, Brightwave

will also be able to leverage the Microsoft partnership to sell internet access, devices, as well as cloud-based services such as *Office 365* to government offices, small businesses and consumers.

Brightwave CEO Charles Mwaura says: "Our new partnership with Microsoft enables Brightwave to offer an integrated services value proposition that will power e-learning, e-health, e-government and e-commerce in rural and underserved communities in South Africa."

Microsoft is working with companies such as Brightwave as part of its *Affordable Access Initiative*. It says this is a holistic, partnership-based programme that invests in internet connectivity, energy access, and IoT projects in unserved and underserved communities. The initiative also seeks to foster business developing technologies that enable local communities to utilise cloud-based services.

ON THE NETWORK

Africa's mobile boom has peaked

All the signs indicate that the incredible growth of mobile telephony in Africa has hit a wall. The boom is bust and the peak has been reached. Growth has been in decline for the past two years and is rapidly heading towards zero.

There are five major obstacles to further mobile growth in Africa: the inefficiency and outdated nature of the power supply needed to run networks; the inability to maintain networks due to the lack of forex required to purchase equipment from abroad; the short-sighted competition between telcos that keeps coverage concentrated in urban areas and not remote villages; inefficient patchy network coverage (even in densely populated cities); and a lack of spectrum due to government reluctance to convert to digital broadcasting.

What Africa needs in order to reach the target of one billion people connected by 2020 is a cheap, robust and entirely self-sufficient network. This is why we developed Qwickfone: a low-cost, solar powered technology that forms a local network to connect a village to the world via satellite or long distance Wi-Fi. Our goal is to install a mobile network in every unserved and disconnected community in the world, starting with trials in Kenya, DRC, Malawi and Zambia beginning in the final quarter of 2017.

To make this a truly viable solution for millions of unconnected people, we will provide a free handset for everyone who wants network access. This should start to address basic human needs, such as better access to healthcare, education and finance.

Our dream is to make a difference to the lives of millions of people across the world by connecting them to each other.

TerraPay and Instant Cash enable cross-border money transfers to mobile wallets

TerraPay and Instant Cash have teamed up to enable real-time cross-border money transfers to mobile wallets.

A B2B company incubated by Mahindra Comviva, TerraPay has developed an interoperability engine to enable real-time transactions to be sent and received across diverse payment platforms and regions.

In an initial rollout, TerraPay has enabled Instant Cash customers to send remittances to mobile wallets in Tanzania as well as in Nigeria

and Uganda.

In Tanzania, they will be able to send remittances directly to *Vodacom M-Pesa*, *Tigo Pesa*, *Airtel Money* and *Zantel Ezy Pesa* wallets. In Nigeria, they can send money to any mobile number as well as bank accounts, while in Uganda, funds can be sent directly to MTN and Airtel mobile money wallets.

The service is expected to expand shortly to other African countries that have a very high adoption of mobile money. Philip C. Daniel, acting CEO,

Instant Cash, says: "We are looking at expanding our customer base in Uganda, Nigeria and Tanzania through this strategic partnership. This means we are now able to widen our mobile money wallet reach into relevant African markets that have expat populations in the GCC."

Instant Cash is a UAE government-owned money transfer company with a network of more than 250,000 locations across the globe. It has offices in Kenya as well as in the Middle East and Asia.

iSAT and Thaicom partner for services

Thaicom is providing iSAT's key customers in East Africa with fully managed telecoms services via satellite, including backup of its fibre network.

Part of the UAE-based Wananchi Group, iSAT Africa specialises in broadcasting, data and internet services. As well as offering teleport facilities, it runs fibre networks that cover Africa, Europe, Asia and America.

In the event of the company suffering any fibre network outages, Thaicom will provide IP connectivity using its *THAICOM 6* satellite. The Thailand-based operator says the full-time, managed service will enable iSAT to offer its clients a fully redundant and "highly available" backup solution for the provision of uninterrupted broadband services.

Thaicom adds that its services are based on a point-to-point satellite link between its designated teleport and iSAT's remote site, thus providing uninterrupted access to the network.

iSAT CCO Munish Sharma reckons the collaboration will help meet growing demand and offer data services through a resilient fibre network, while maintaining "high" QoS standards.

Cell C extends FTTH footprint

Cell C has extended C-Fibre, its commercial FTTH offering, across major open access fibre networks in South Africa, with additional network agreements underway. The operator says customers that are in areas covered by Openserve – the wholesale and network division spun-off from national incumbent Telkom – can now join those already covered by Frogfoot, Mitsol and Vumatel. Cell C has offered *C-Fibre* on those networks since 2016. It adds that the service has both symmetrical and asymmetrical offers on all networks.

SEACOM fibre rollout

SEACOM is bringing high-speed internet access to the Greater Johannesburg area, starting with the rollout of 8km of fibre in the southern suburb of Meyersdal. The company says it plans to "rapidly extend" the reach of its fibre network to more parts of South Africa, including areas that are currently under-serviced by last-mile fibre operators. SEACOM claims some of the benefits of its network include service offerings with low or no contention ratios, symmetrical speeds, and no fair usage policy or out of bundle charges.

A boost for digital skills

In mid-July, Facebook Africa's teams were in Zimbabwe to host a series of training events and workshops designed to help local tech entrepreneurs and small businesses sharpen their digital skills. Working in partnership with Digify Africa, Facebook's *Boost Your Business* training programme aims to help small business owners understand how to use digital platforms to grow their companies. Topics covered included content marketing, digital marketing, tips on how to understand and engage audiences on *Facebook*, and more.

AAE-1 ready for service

What's been described as the largest subsea cable system to launch in almost 15 years has now gone live.

Asia-Africa-Europe 1 (*AAE-1*) stretches 25,000km and is the first high-capacity cable system to link all of the major Southeast Asian nations to Africa and Europe via the Middle East. It connects Hong Kong, Vietnam, Cambodia, Thailand with Malaysia and Singapore, then onwards to Myanmar, India, Pakistan, Oman, UAE, Qatar, Yemen, Djibouti, Saudi Arabia, Egypt, Greece, Italy and France.

The system is said to deploy "state-of-the-art" 100Gbps transmission technology, with a minimum design capacity of 40Tbps.

Whilst *AAE-1* terminates at two POPs in Singapore, one unique feature is that it also continues further into Asia via diverse terrestrial routes across Thailand, connecting Vietnam, Cambodia and

The submarine system is said to follow a route similar to the 'Silk Road Economic Belt'.

Hong Kong. As a result of transiting through these countries and avoiding the heavily congested Malacca Straits, it's claimed this routing enables the cable to have one of the lowest latencies between Hong Kong, India, the Middle East and Europe.

By connecting major carrier-neutral POPs in Hong Kong, Singapore and Marseilles, the consortium behind *AAE-1* says

members can choose their preferred backhaul providers available in these POPs or in landing stations in Asia, the Middle East, Africa or Europe.

Members of the cable consortium include China Unicom, CIL, Djibouti Telecom, Etisalat, GT5L, Mobily, Omantel, Ooredoo, OTEG, PCCW Global, PTCL, Reliance Jio, Retelit, Telecom Egypt, TeleYemen, TOT, Viettel, VNPT and VTC.

Partners go OTT with video streaming

Falcon Media House (FMH) has joined forces with Media Nucleus and Quiptel to offer an OTT service to millions of users in Africa and Asia.

The partnership enables FMH – a UK-based global digital media group – to offer an OTT platform to medium- and large-sized broadcasters, as well as parts of its content portfolio to local content service providers.

Media Nucleus specialises in broadcast and pay TV solutions, and

its clients include African satellite broadcaster Zuku TV.

It will use FMH's *Q-Flow* technology to enable customers to experience high-quality video streaming. It's claimed this overcomes the challenges of congested and slow connections to deliver content to the end user using the most efficient and cost-effective route. FMH reckons this results in "seamless streaming over even the most challenging networks and

mobile conditions".

The two companies will work with Chinese business-to-business OTT platform provider, Quiptel. It will integrate with Media Nucleus' subscriber management software to provide billing solutions to customers.

The partners add that their joint solution will enable broadcasters and cable companies to increase their market share with lower capex, as they will not need to invest in hardware and lay new network cables.

Cisco to upgrade Gilat Telecom POPs

Gilat Telecom (formerly Gilat Satcom) is working with Cisco to enhance its African network in order to meet growing demand for broadband and introduce new value-added services.

Over the next few months, Cisco will upgrade and expand the operator's existing points-of-presence in DRC, Ghana, Nigeria, Uganda and Zambia, and also build an additional POP in each country.

According to Gilat, the investment in its POPs – said to be around USD1m – will enable it to provide services based on "cutting-edge" technology and a "robust" network

Gilat Telecom CEO Dan Zajicek hopes enterprise customers will realise the benefits of using existing wholesale networks rather than building their own.

with faster and more reliable web browsing. In addition, the company plans to enhance its portfolio of services by including data protection, cloud telephony and distributed private networks.

Gilat Telecom claims to be one of the continent's most reliable connectivity providers, and reckons its integrated fibre and satellite networks enables it offer "very high" SLAs.

"Our recent name change supports our strategy of long-term investment in African fibre as well as satellite network," says CEO Dan Zajicek. "This significant upgrade of our network will enable us to support the rapid growth in Africa and introduce value-added services as blue chip customers realise the many benefits of using existing wholesale networks rather than building their own."

Digitata Networks expands existing offering to enable a subscriber-centric view of mobile networks

Digitata Networks offers a range of software products developed to control, monitor and automate all major mobile technologies (2G, 3G, 4G and WiFi) across the different domains within a telecommunications network (Subscriber, RAN, Core and TX). These vendor-agnostic products include Configuration Management, Performance and Revenue Monitoring and Asset Tracking. With the recent acquisition of NetTrax from RanWorx Solutions (rebranded to NetCE), Digitata Networks is able to also offer Mobile Network Operators a subscriber-centric view of their network performance.

"The synergies between the newly-acquired NetCE and Digitata Networks' existing solutions ensure a combined offering that will be of great benefit to our current and future customers. The addition of NetCE gives Digitata Networks the subscriber component that the Digitata group is proud to support in all of its product streams."

Philip Korf, **CEO: Digitata Networks**

About NetCE

Customer Experience App
NetCE is a Customer Experience app residing on subscriber handsets. It monitors the customer's experience of the network and reports back to a centralised server for further analysis by network engineers.

Online Analysis
Data collected from subscribers can be viewed and analysed by an engineer on an online portal. This includes reports on the different events in tabular, graphical and geographical formats.

Drive Tests / Active Monitoring
Engineers can use the app in active monitoring mode for drive tests. Data is collected along the route and uploaded to the centralised server for analysis of problem areas.

Passive Monitoring
For subscribers, the app runs in passive monitoring mode. It collects data about call quality, call drops etc, in the background without the subscriber doing anything. This data is then sent to a centralised server.

Crowd Sourcing
If many subscribers install the app, the operator essentially has a team of network quality testers. If multiple people in the same area experience similar problems, engineers can react quicker to fix the issues.
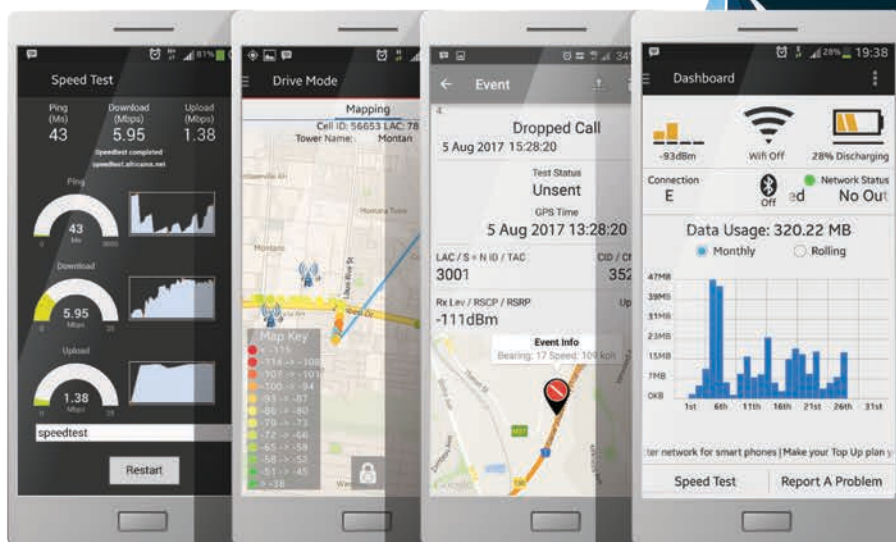
Customer Complaints
Customers can also log specific complaints directly on the app, and receive feedback on these complaints too.

digitata networks

www.**digitata**.com

Contact us at
info@digitata.com

NetCE

MTN and Fenix partner to bring power to the people in Zambia

MTN is extending its partnership with energy and financial services firm Fenix International to launch pay-to-own solar home systems in Zambia.

The Swedish Embassy in Lusaka is committing nearly USD3m (SEK24.75m) to Fenix between now and 2020. The funding is provided as part of the *Power Africa: Beyond the Grid Fund Zambia* (*BGFZ*) initiative which is managed by the Renewable Energy and Energy Efficiency Partnership. *BGFZ* has been setup to accelerate private sector growth in clean energy generation and enable a million people to access such energy.

USAID is contributing an additional USD750,000 to Fenix. Its support is provided as part of the *Scaling Off-Grid Energy: Grand Challenge for Development* programme which aims to create up to 120,000 new connections in off-grid communities across Africa.

The Zambian launch represents Fenix's first step to expand the availability of its *ReadyPay Power* system across the continent. This provides what's described as "ultra-affordable" solar power to people living off-grid. They can buy the system with instalments of as little as USD0.20 per day via *MTN Mobile Money* until they have paid in full. Fenix uses these continuous micro-payments to generate a credit score, enabling customers to access additional system upgrades or financial services.

The two companies have already been working together in Uganda where it's claimed that Fenix's more than 120,000 customers have so far generated in excess of three million payments via mobile money.

Wane Ngambi, MTN Zambia's head of mobile financial services,

At the heart of Fenix's technology is the *ReadyPay Solar Power* system. Customers can purchase it by paying low cost instalments via *MTN Mobile Money*.

says: "In the past, MTN was focused on voice and then data. We've been working on unlocking the potential of *MTN Mobile Money* for many rural consumers who have gone without access to basic financial services for far too long."

Fenix now expects to reach 850,000 people living in rural Zambia by 2020.

According to the firm, around 15 million inhabitants live without access to the electrical grid, representing 80 per cent of the total population and 95 per cent of rural residents.

"Over 90 per cent of rural Zambians lack access to electricity and have no options other than dangerous candles and kerosene lanterns to light their homes," says Lyndsay Handler, CEO, Fenix International. "Ten years from now, we hope to eliminate the use of candles and be an important part of our customers' lives across Zambia."

She adds that with MTN's distribution networks, Fenix will be able to reach unbanked and off-grid customers. "Once power and credit are established, the possibilities to bring other life-changing products – from smartphones to financial services – are endless."

Cell C concludes recapitalisation and appoints new board member

After two years, South African MNO Cell C has now concluded its recapitalisation process (*see Wireless Business, Jan-Feb 2016 issue*).

The company says the recapitalisation reduces its net debt to no more than ZAR6bn which includes USD184m of bonds. These are fully hedged into South African Rand.

The recapitalisation was made possible by a subscription for shares from Blue Label Telecoms of ZAR5.5bn and a further subscription from Net1 for ZAR2bn. Cell C says former bond and debt holders supported the debt restructure.

Blue Label Telecoms now has a 45 per cent shareholding in Cell C, 3C Telecommunications has 30 per cent (which comprises 29.4 per cent by the Employee Believe Trust, 45.6 per cent by Oger Telecoms, and 25 per cent by broad-based black empowerment grouping CellSAf), Net1 has 15 per cent, and 10 per cent is held on behalf of Cell C management and staff.

The company points out that its ownership by South African shareholders has now increased from 25 to more than 86 per cent, and

that the participation of "historically disadvantaged" persons has risen from around 25 to more than 30 per cent at ownership level. It says that, for the first time, Cell C management and staff now have the opportunity time to participate in the equity of the company.

The recapitalisation secures jobs for around 2,500 full-time Cell C employees, and a further 15,000 people that are employed in the industry value chain as a result of the company's operational and commercial activities.

CEO Jose Dos Santos adds: "The recapitalisation provides a sustainable growth platform for Cell C that will promote healthy competition in the South African telecom market to further drive down costs and improve our value offerings."

Following the conclusion of the process, Cell C announced the appointments of new board members.

Kuben Pillay, who has previously served on the boards of several public and private companies, replaces Mohammed Hariri as Cell C's non-executive chairman. An attorney by trade, Pillay currently sits on the boards of Transaction Capital

Ltd. and the Outsurance Group of companies.

Larry Nestadt, a co-founder and former director of Investec Bank, has been appointed as Cell C's non-executive deputy chairman. He is chairman of a number of listed and unlisted companies including Blue Label Telecoms, Melrose Motor Holdings, National Airways Corporation, amongst others.

Earlier this year, Cell C also announced the appointment of two other new executives (*see New Appointments table, right*).

Satellite market pricing set for further falls

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

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

According to the index, there are several factors contributing to the decline. In total, it says 13 factors

can exert influence over pricing depending on a company's growth strategy and sales positioning, consolidation in its value chain vertical (operator, service provider or anchor customer), customer relationships and deal contracts.

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

He notes that data/backhaul deals have consistently come in at prices under USD500 per Mbps per month during this year.

"Some of the most prominent examples of the deals include backhaul capacity leased at sub USD400/Mbps/month in Western Europe and Africa, aero capacity leased at sub USD700/Mbps/month in Southeast Asia, and video capacity at sub USD2,000/MHz/month in North America," says Agrawal.

Some of the key factors influencing price reductions in the satellite market.

SOURCE: NSR
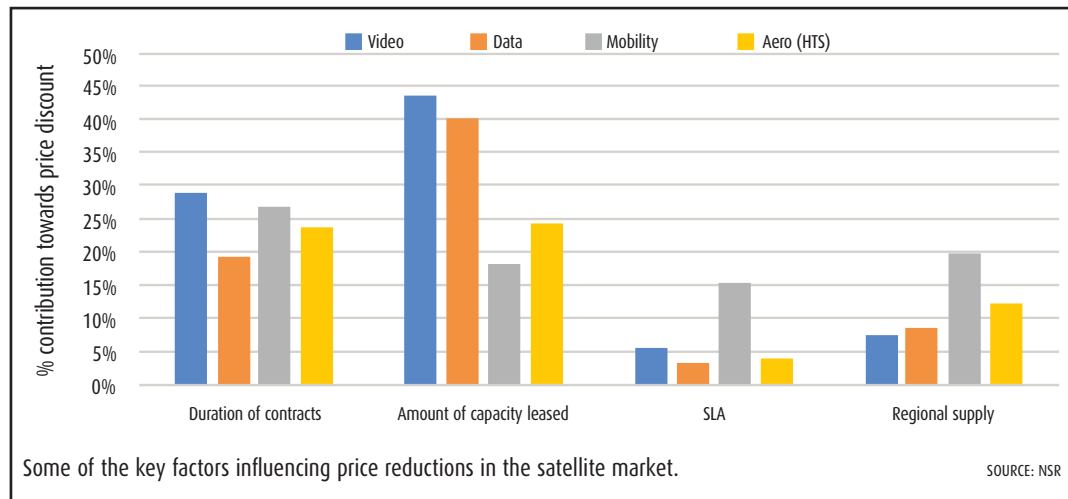
NSR expects mobility and data pricing to drop between five to 15 per cent and 10 to 30 per cent globally in the next year. For a leasing economy to maintain/grow top line revenues, it says operators would need anchor customers in the aero, backhaul and broadband businesses for their upcoming satellites and, in addition, fight off competition from new entrants to maintain the relevance of their ageing FSS fleets.

Given these price drops, Agrawal reckons a wholesale business with a pseudo-lease or mixed lease-service model could be one of the winning strategies for operators to adopt. "Application specific fleet consolidation and downstream customer consolidation strategy is yet to be seen in the market, and strategic partnerships matching

wholesale distribution network to HTS architectures have the potential to support the pseudo-lease model. A near to medium scenario with a large fund backed telco (e.g. Softbank) merging the lease and service economies for a particular region can't be ruled out."

He continues by saying that a mixed lease-service business on the operator's end or upstream vertical integration on the service provider side has potential to grow top line revenues for either of the players in the value chain. "Ultimately, the companies which pivot early based on efficient fleet consolidation and customer matching, stand a chance in winning the pricing battle," he concludes.
How the satcoms industry should evolve – GVF interview, p29.

Silvertree to invest more millions in African tech firms

Silvertree Internet Holdings says it has now channelled more than USD15m (around ZAR 200m) into African consumer-focused technology companies since it was established in 2014.

The Cape Town-based firm, which claims to be the continent's leading internet platform, says its portfolio has achieved an average annual revenue growth rate of more than 200 per cent, helped by fast-growing companies such as car-buying site Carzar and meal-kit delivery company Ucook.

Silvertree now plans to invest more than USD10m (ZAR130m) in the next 12 months into new and existing portfolio companies that make use of technology to reach consumers, with

a focus on growth stage and buy-out opportunities.

It believes the biggest opportunities for tech investment in Africa are in businesses driven by strong teams that are executing simple, proven models. Furthermore, it claims that a focus on all three long-term value creation drivers – net revenue growth, margins and cash – allows the group's operations to reach break-even much earlier in their lifecycle.

"We want to partner with like-minded entrepreneurs looking to disrupt large and high margin industries in Africa," says Silvertree founder and MD Peter Allerstorfer. "It is still day one of the internet in Africa."

To help build on its success, the company has appointed Freddy Caspers as non-executive chairman of the board. Caspers was previously an executive board member and CEO of emerging markets for UK-based multinational Reckitt Benckiser.

Hellas Sat expands Southern African presence

Hellas Sat is hoping to strengthen its presence in the region with the opening of a new sales office in Johannesburg.

As well as allowing it to increase the scope of its operations in Southern Africa, the satellite operator says the new facility will also help maintain its longstanding relationships within the South African telco industry.

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
19/6/17	John Colvin	Mimosa Networks	SVP of global field operations	Calix	SVP of sales for the Americas
30/6/17	Gregory Lee	Nokia	Head, Nokia technologies	Samsung Electronics North America	President & CEO
30/6/17	José Manuel do Rosário Toscano	Intelsat	Head of international government affairs & asset management	International Telecommunications Satellite Organisation	Director general & CEO
1/7/17	Tyrone Soondarjee	Cell C	CFO	Sasfin Group	Financial director
3/7/17	Andreas Pauly	Rohde & Schwarz	EVP, test & measurement division	Rohde & Schwarz	VP, signal generators, audio analysers & power meters
3/7/17	Roland Steffen	Rohde & Schwarz	–	Rohde & Schwarz	EVP, test & measurement division – retiring at year end
4/7/17	Dirk Karl	MTN Group	Procurement & supply chain head	Buyln	SVP for network technology. Buyln is the procurement JV between Deutsche Telekom & Orange.
18/7/17	Mark Rasmussen	Intelsat	VP & GM of mobility	Intelsat	VP Americas
18/7/17	Robert Cerbone	Intelsat	VP & GM of media	Time Warner Cable	VP & GM for wireless products
19/7/17	Mark McCallum	Orange Business Services	Country manager, South Africa	Orange Business Services	CTO, director & head of global solutions for business Africa
21/7/17	Tony Gray	TCCA	CEO	Regional business director	P3 Group
21/7/17	Phil Kidner	–	–	TCCA	CEO – retiring as of September 2017
1/8/17	Nihmal Marrie	Cell C	Chief digital officer	Liberty Group	Divisional director: digital & customer value proposition
22/8/17	Kevin Isaac	Forcepoint	VP of sales, EMEA	Symantec	VP of EMEA enterprise sales

Antonis Maniatis will manage the new office and act as Hellas Sat's primary contact for the region. He will also be responsible for business development, as well as account management of the leading communication services and media companies operating in the region.

Part of the Arabsat Group, Hellas Sat offers services in Africa, the Middle East and Europe from *HS-3* which was launched to 39°E in June 2017, replacing *HS-2* which has been in space since May 2003. Capacity from the new satellite will be complemented with cross-region connectivity solutions between Europe and sub-Saharan Africa for both data and broadcasting services.

HS-3 will be joined by *HS-4* in 1H18 to deliver additional Ka-and Ku-band capacity and services over the EMEA region.

Spam calls "big business" in Africa

Five African countries are among the top 20 affected by the growing number of spam calls, according to Truecaller.

India, the USA and Brazil head the list with phone users in those countries receiving more than 20 average spam calls each per month. South Africa is at number five with an average of 15 spam calls per user per month. It is followed by Nigeria at number nine with 10.4 calls and Egypt at 10 with 9.9 calls. Morocco and Kenya occupy the bottom with an average 7.7 spam calls received per user per month.

Truecaller provides a suite of phone services including one that enables users to see all caller IDs, block calls as well as texts, and report spam callers and messages.

For its study, the Sweden-based company aggregated data anonymously from incoming calls that had been marked as spam from January to May 2017. During this period,
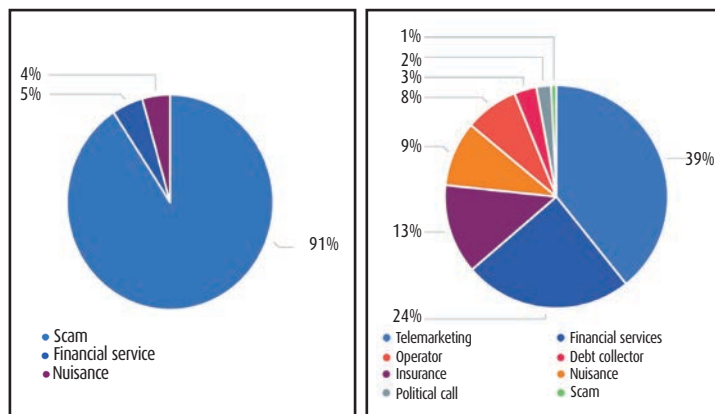
Left: Scam callers are a major problem in Kenya. **Right:** South Africa seems to have a more even spread when it comes to who is spamming, with telemarketing leading the way. SOURCE: TRUECALLER INSIGHTS: TOP 20 COUNTRIES AFFECTED BY SPAM CALLS IN 2017

Truecaller says its worldwide users received more than 5.5 billion spam calls. Globally, the firm says there are common categories that link all such calls together. Some of the most common ones it identifies include local scams, telemarketing and debt collection calls, and unsolicited finance and insurance product offerings.

According to Truecaller, spam is "big business" in South Africa. The country's direct marketing industry reportedly employs more than 150,000 workers, with the average call centre agent logging around 1,600 calls on a monthly basis. The company says this amounts to phone users in South Africa being collectively bombarded by tens of thousands of spam calls every day, with telemarketing leading the way at 39 per cent.

While only one per cent of local calls in South Africa were marked as scams, the story was very different in Kenya. Here, the research revealed that scammers made up 91 per cent of the reported spam calls. The rest were made up by financial services such as banking product offers, unsolicited credit union offers, or cold calling by credit card companies.

Nigeria also has an issue with scam calls, but unlike Kenya this was smaller at 10 per cent of all reported spam calls. Truecaller says one major problem in this country are spam calls from operators; these amount to the majority (61 per cent) of the total that are reported. During these type of calls, it says call centre agents attempt to upsell data plans or push promotional offers.

Nuisance calls present a further problem for users in Nigeria. Accounting for 27 per cent, these are generally unwanted and unsolicited calls that are a disturbance for users, or at the very least amount to prank calls and at worst, harassment.

Digitata Networks acquires IPR to NetTrax and TecTonix

Digitata Networks has acquired certain assets from South African network specialist RanWorx Solutions. They include the intellectual property rights in and to *NetTrax* (which has now been rebranded *NetCE*) and *TecTonix* (now rebranded to *NetPA*).

According to Digitata, the new additions mean it can now offer

MNOs both a network- as well as a subscriber-centric view of their network performance.

The firm claims that combining its network-centric solutions (*NetCM* and *NetVU*) with the newly-acquired customer-centric solution (*NetCE*) will enable operators to have a clear line of sight to their subscribers and their actual experience on the network. It reckons the ability to measure subscribers' experience and correlate it with the relevant network node's configuration and performance will "greatly assist" MNOs in their daily operations.

Furthermore, Digitata says adding the newly-acquired *NetPA* passive asset tracking solution to its active asset management platform (*NetAM*) will allow operators to discover and track all network assets, both active and passive, throughout their network.

Millicom signs new agreement to sell its Senegal business

In an announcement made at the end of July, Millicom says it has exercised its right to terminate its agreement to sell its Tigo operations in Senegal to Wari Group, the Dakar-based provider of mobile and digital services.

Separately, the company also announced that it has signed an agreement to sell its Senegal operations to a consortium consisting of NJJ, Sofima (the telecoms investment vehicle managed by the Axian Group) and Teyliom Group, subject to customary closing conditions and regulatory approvals.

NJJ is the private holding company owned by French telecoms entrepreneur Xavier Niel. Incorporated in France, NJJ holds various stakes in a broad range of operations in Europe and the USA. Niel is the founder and main shareholder of Iliad, the parent company of Free in France.

INVESTMENTS, MERGERS & ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
22/6/17	Globetouch Inc.	Teramatrix	Acquisition	NA	Globetouch will integrate Teramatrix's *xFusion* platform to create IoT applications that support connected cars, autonomous driving, predictive maintenance & edge intelligence.
7/7/17	Liquid Telecoms Financing	Debt capital markets & banks	Bond & term loan financing package	UD700m	Liquid Telecom's financing arm has raised USD550m in the international debt capital markets in its debut bond, in addition to a USD150m term loan. The notes will bear an interest rate of 8.5% p.a. Funding will enable Liquid to further expand & enhance its pan-African fibre network.
28/7/17	Motorola Solutions	Airbus	Plant Holdings	NA	Plant Holdings includes Airbus' DS Communications business which provides command centre software for fielding emergency calls & citizen emergency notifications in North America.
12/7/17	CommScope	Cable Exchange	Acquisition	NA	US-based Cable Exchange manufactures a variety of fibre & copper cables, trunks & related products used in high-capacity data centres and other enterprise applications.
9/8/17	Investor group	Globecomm Systems	Company	NA	An investor group led by HPS Investment Partners & funds managed by Tennenbaum Capital Partners have entered into a definitive agreement to acquire Globecomm from a New York-based private equity firm. Financial terms have not been disclosed. Due to be completed 3Q17.

Owned by the Hiridjee family, the Axian Group specialises in infrastructure and services in Indian Ocean countries and Africa. It has interests in energy, financial services, property, as well as in telecoms through Telma, Tom, TRM and Telco OI.

Teyliom is said to be one of one of the precursors of mobile telephony in Africa and has been active in the sector since 1996. Focused on West and Central Africa, it is now a diversified investment holding group whose interests include, amongst others, a seven per cent stake in MTN Côte d'Ivoire.

Wits appoints Brian Armstrong as professor of Digital Business
Professor Brian Armstrong, said to be one of South Africa's most prominent

ICT leaders, has been appointed as head of the Wits Business School/Telkom Chair in Digital Business.

Armstrong describes himself as both a "business scientist" as well as a "scientific businessman". He believes that while digitalisation is a very real part of today's world and applies to every aspect of business, it is a concept that is "over-traded but under-researched".

"Most of the information we have about digitalisation is anecdotal – there is no body of knowledge available which is underpinned by rigorous academic research," says Armstrong.

The Wits Business School (WBS) says this is the reason that it established the chair in digital business in 2016 through a five-year

funding commitment from Telkom.

Claimed to be a first for Africa, the chair aims to ensure that WBS is at the forefront of developing important research as well as teaching programmes that are essential for doing business in today's digital world. Its flagship programme will be a masters degree in digital business.

Armstrong has more than 30 years of experience in the industry. After 15 years at South Africa's Council for Scientific and Industrial Research (ultimately as director of its ICT division), he worked at British Telecoms Global Services as MEA VP. He then joined Telkom in 2010 and was appointed group CCO in 2013 before leaving in March 2017.

Armstrong holds bachelors and masters degrees in electronic

Professor Brian Armstrong describes himself as both a "business scientist" as well as a "scientific businessman".
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engineering from the University of the Witwatersrand, and obtained his PhD from University College London in 1992.

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
6/6/17	IDT Corp.	US	3Q17	USD	370.0	9.1	0.28	Earnings up 4.2% compared to 3Q16, driven by wholesale carrier services & payment services. But revenue from retail communications fell 8.9% YoY to $148.6m. *BOSS Revolution* calling service negatively impacted by increased competition from wireless operators' 'unlimited' offerings & rise of OTT voice & messaging.
6/7/17	Lancom Systems	Germany	FY16	EUR	>50	NA	NA	Grew by 22% &, for the first time, generated revenues of more than EUR50m. Growth was across all product lines – routers & VPN gateways, switches & WLAN.
18/7/17	C-COM Satellite Systems	Canada	2Q17	CAD	3.03	NA	0.0125	Earnings for the VSAT antenna specialist increased 68% QoQ.
18/7/17	Ericsson	Sweden	2Q17	SEK	49.9 (bn)	−788	-0.30	Reported sales down 8% YoY; plans to accelerate actions to cut costs & ensure it can meet target of doubling 2016 operating margin beyond 2018. MEA accounts for 13% of sales, & YoY earnings for the region were down 17%. Sees some limited signs of recovery in MEA's macro-economic environment, but challenges in capacity business continued, accompanied by decline in services domains.
20/7/17	Millicom	Luxembourg	2Q17	USD	1,517	535	0.22	Total revenue declined 1.5% YoY. In Africa, the telco says its primary objective this year is to ensure that the region can fund itself going forward. Results exclude Tigo Senegal which was sold to Wari group for USD129m earlier this year.
20/7/17	Vodacom	South Africa	1Q17	ZAR	20,685	NA	NA	3.9% growth in group earnings. South Africa revenue growth accelerated to 7.8%, aided by stronger device sales, but international revenue declined 8.2% due to continued currency volatilities.
27/7/17	Intelsat	US	2Q17	USD	533.2	417.9	(0.20)	Total net loss of USD23.8m for the quarter. Total on-network revenues reported decline of USD7.9m to USD485.9m as compared to 1Q16.
27/7/17	Nokia	Finland	2Q17	EUR	5,629 (bn)	1,196	0.08	Overall reported net sales for period compared to EUR5,577bn in 2Q16. Net sales for MEA reported as EUR435m compared to EUR402m for 2Q16.
28/7/17	Eutelsat	France	FY16-17	EUR	1,477.9	1,133.6	1.21	Like-for-like earnings down 2.2% but in line with expectations. CEO Rodolphe Belmer said performance supported by "solid" commercial momentum in core video business & other verticals, particularly mobile connectivity.
28/7/17	SES	Luxembourg	1H17	EUR	1,048.7	687.1	0.56	Expected improvement in YoY development between 1Q17 (-4.2%) & 2Q17 (-1.9%) led to overall reduction of 3.1% for 1H17 compared with prior period.
4/8/17	MTN Group	South Africa	1H17	ZAR	64,386	24,399	2.50	Group revenue in constant currency grew by 6.7%, underpinned by 10.8% growth in revenue in Nigeria and 5.2% (on an organic basis) improvement in service revenue growth in South Africa. Uganda, Ghana & Côte d'Ivoire also contributed positively to top-line growth. Cameroon experienced challenging period, negatively impacted by the data network shutdown in some parts of the country in 1Q.
16/8/17	Cisco	US	FY17	USD	48.0 (bn)	NA	1.90	YoY decrease of 2%. EMEA business totalled USD12,004m, a YoY decline of 2%.

Airbus promises "new era" in PMR communications with TETRA server

Airbus reckons its new IP-based *Taira Tetra Server* for PMR networks can replace conventional switches

MANUFACTURER: Airbus

PRODUCT:
Taira Tetra Server

MORE INFORMATION: www.
securelandcommunications.
com

and operates at much lower costs. According to the company, the server is smaller than a typical switch and works more efficiently and economically while still providing high service availability.

It has also been designed to be easily managed as it fits into existing IT environments. Airbus says using modern IT server technology in the framework of a TETRA network enables operators to integrate a TETRA system into their existing

data centres. The network can then be operated with the same processes and personnel used for other IT services.

The *Taira* consists of standard solutions with virtualisation layers. Airbus says this ensures true hot standby redundancy even in extreme situations.

It adds that thanks to the virtualisation of COTS hardware, server capacities can be exploited in a better way. For instance, Airbus says the server enables the installation of TETRA in complicated and narrow surround-

ings, such as in mining, airports or in underground systems, for example.

The company goes on to claim that all this helps operators to reduce their opex, and marks the start of "a new era" in critical communications infrastructure.

Monitoring tool can reveal 'silent unhappy customers'

Cloud-based customer experience

MANUFACTURER:
SpatialBuzz

PRODUCT:
RF measurement tool

MORE INFORMATION:
www.spatialbuzz.com

analytics and service monitoring specialist SpatialBuzz has launched a new handset measurements tool to help MNOs to identify customers receiving poor service levels.

It works by collecting radio related measurement data in real-time. Using a unique set of algorithms, SpatialBuzz claims its solution allows cellcos to geospatially visualise RF conditions on the network. It says

the tool is quick and easy to deploy, and can be embedded into existing operator self-service apps.

The tool retains anonymity for the customer, and is said to be optimised to minimise battery usage. Subscribers can choose to opt-in or out of the service at any time.

According to SpatialBuzz, device measurements not only help diagnose dissatisfaction hotspots faster, they

also help identify where dissatisfaction might be increasing. It adds that the new tool also allows for a "deeper, relevant and more meaningful" conversation to be had with customers experiencing network problems.

Furthermore, the company says hotspots of 'silent unhappy customers' can be revealed by using the tool for subsequent experience optimisation and engagement.

G+D SIMs for secure connection of IoT devices

G+D Mobile Security reckons its *IoT Attach* and *IoT Advance* SIMs are "essential solutions" for connecting billions of IoT devices.

It says the two modules have been developed in cooperation with reference mobile operators and IoT application providers. According to the company, the dedicated SIMs not only offer the benefit of network protection to MNOs, but also protect IoT data and help tackle the major concern of IoT device lifecycle management.

IoT Attach and *IoT Advance* are

MANUFACTURER:
G+D Mobile Security

PRODUCT:
IoT Attach & IoT Advance

MORE INFORMATION:
www.gi-de.com

the first in a series of IoT-specific products from G+D. While further form factors are under development, the company says the current solutions offer operators the required services and performance with "ultimate" flexibility.

Both SIMs come equipped with end-to-end security which secures data from the IoT endpoint, through the LPWAN (low power wide area network), and onto the application server.

In addition, it's claimed *IoT Advance* provides further flexibility in terms of power optimisation, root-of-trust for firmware updates over the air, and QoS.

Infinera launches *XTM II* for metro packet-optical apps

Infinera has unveiled its next-generation packet-optical platform for delivering rich Layer 0, Layer 1 and Layer 2 services with high density, low latency and low power consumption.

A key component of the new *XTM II* platform is the 400G Flexponder. This is a dual, 200G muxponder that uses 16QAM for high-capacity transport, or a dual 100G transponder that uses QPSK for longer reach operation.

Infinera says the device provides 400G of line and client capacity per slot, giving an eight-fold density increase over the previous generation.

Including optics, it adds that the device operates at as low as 20W per 100G service which it believes is the lowest power consumption per 100G available in the industry on any WDM-based platform.

The *XTM II* also includes the

EMXP440 transport switch which provides Layer 2 packet-optical switching with dual 100/200G ports and 12 or 24 10G ports.

The switch supports CE and MPLS-TP, packet transport with sub-50ms protection, MEF CE 2.0 service creation, and QoS-aware traffic aggregation.

MANUFACTURER: Infinera

PRODUCT: XTM II

MORE INFORMATION:
www.infinera.com

R&S signal generator offers lowest possible phase noise

Rohde & Schwarz (R&S) has introduced a high-end analogue RF and microwave signal generator.

The *SMA100B* has a frequency range up to 20GHz and is claimed to be the most powerful analogue signal generator on the market. R&S says it provides the "purest"

signals with the "lowest possible" phase noise at all offset frequencies (1GHz, −152dBc/Hz, 20kHz offset). A 6GHz instrument generates up to 38dBm RF output power, and a 20GHz instrument generates up to 32dBm in the microwave frequency range.

The vendor adds that harmonics are extremely low across the entire frequency range; above 6GHz it says they are even significantly lower than 70dBc at 18dBm output power. Non-harmonics are also said to be below 110dBc at an output signal of 1GHz.

The *SMA100B* is also claimed to be the world's only analogue signal generator that can simultaneously provide a second, independently configurable, extremely pure and synchronised clock signal up to a frequency of 6GHz. As a result, R&S says users can characterise ADCs with a single signal generator.

MANUFACTURER:
Rohde & Schwarz

PRODUCT: SMA100B

MORE INFORMATION:
www.rohde-schwarz.com

New cellular router offers power versatility and SDN management

Lancom Systems has extended its range of LTE/4G cellular routers with a new *700* series device. The *730-4G* is aimed at supplementing network infrastructures with LTE/4G and, when used in combination with the vendor's routers, is said to be "ideal"

for intelligent backup scenarios.

The *730-4G* has an integrated LTE/4G modem with 2G/3G support, and provides a wireless broadband connection at speeds of up to 100Mbps.

Power can be supplied via a GbE connection with PoE support (as per IEEE 802.3at). As a result, Lancom says the device can be positioned to take direct advantage of the best available cellular signal without expensive cabling for the power supply or for external LTE/4G antennas. Alternatively, the device also operates with the standard power supply unit it is shipped with.

The *730-4G* can be managed either with Lancom's conventional management tools or from the *Lancom Management Cloud (LMC)*. It's claimed the *LMC* is the world's first management system to employ SDN technologies for the intelligent orchestration, optimisation and control of an entire network (SD-WAN, SD-LAN and SD-WLAN). The firm says this "greatly" simplifies the management of installations of any scale, from small to very large.

MANUFACTURER:
Lancom Systems

PRODUCT: 730-4G

MORE INFORMATION:
www.lancom-systems.com

Wi-Fi Alliance adds indoor positioning

The Wi-Fi Alliance says its new certified *Wi-Fi Location* feature has "advanced" capabilities to meet growing market demand for mobile location-based services (LBS) indoors. It believes this will enable the creation of new, feature-rich applications

and services that will benefit many markets including enterprise, retail, manufacturing and healthcare.

Based on the Fine Timing Measurement (FTM) protocol from IEEE 802.11-2016, it's claimed *Wi-Fi Location* delivers metre-level accuracy for indoor device location data. By leveraging the ubiquity of Wi-Fi networks, it is said to deliver accurate and reliable position data without the need to deploy a separate or proprietary network infrastructure.

Wi-Fi Location works by determining the distance between two Wi-Fi devices, such as an AP and smartphone. It then

measures the time that it takes for the wireless signal to travel from one device to the other.

Until now, devices typically determined indoor location by measuring signal strength, which has limited accuracy, or fingerprinting, which is more difficult to maintain, according to the Wi-Fi Alliance.

The first *Wi-Fi Location* products which comprise the testbed for interoperability certification include Broadcom's 802.11ac *Acculocate* AP, Mediatek's *MT663X* 802.11abgn/ac Ref. STA, Realtek's *RTL8812B*, amongst others.

MANUFACTURER:
Wi-Fi Alliance

PRODUCT: Wi-Fi Location

MORE INFORMATION:
www.wi-fi.org

Researchers develop wearable power sources

Researchers at the UK's University of Surrey are developing technology that will allow people to act as their own power source through 'smart' clothing.

The wearable power sources are triboelectric nanogenerators (TENGs). These energy harvesting devices convert the movements of materials that produce static charge into usable electricity. This can then be stored in batteries or supercapacitors, and used to charge mobile phones or power medical devices. It's claimed large scale TENG networks could also provide household power requirements in off-grid areas.

The researchers have introduced a new model of the TENG concep which was originally invented by Prof. Zhong Lin Wang at Georgia Tech. The researchers say they have improved the sensors and energy generating devices that can be made into wearable applications, such as sewn into a tee-shirt like a patch (*pictured below*), or attached inside a pair of shoes.

Principle project supervisor and Advanced Technology Institute director Prof. Ravi Silva says: "Wearable TENGs can be made from natural fabrics, such as cotton or wool, so the idea is carbon-friendly 'renewable' technology that could be used for years."

TENGs could also be used in a sensor pad on a pavement which, when stepped on by pedestrians, would create the energy needed to light streetlamps. They could also be placed inside a tyre and connect to the vehicle's battery to generate electricity.
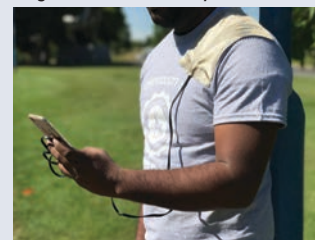
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LTE: not so fast in Africa?

LTE has now been deployed in almost every country on the continent – but there are still some notably large exceptions, as shown by the countries in grey.

© GLOBAL MOBILE SUPPLIERS ASSOCIATION

While 4G seems to have rapidly spread across the continent, the region still lags when it comes to mobile broadband. RAHIEL NASIR looks at the progress made so far, and how operators can expand their coverage.

Globally, 107 million new LTE subscriptions were added during the first quarter of 2017, to reach a total of 7.6 billion. That's according to Ericsson's latest *Mobility Report* which was published in June. It says that in the Middle East and Africa, where mobile broadband penetration is currently lower than in other regions, the number of subscriptions is expected to increase significantly.

Ericsson includes HSPA, LTE, 5G, CDMA2000 EV-DO, TD-SCDMA and Mobile WiMAX as mobile broadband technologies (but not WCDMA without HSPA or GPRS/EDGE). It predicts that between 2016-2022, MEA will "dramatically shift" from a region with a majority of GSM/EDGE-only subscriptions to one where 80 per cent will be WCDMA/HSPA and LTE *(see mobile subscriptions by region and technology graph, on page 22).*

The *Mobility Report* states that there are currently 591 commercial LTE networks deployed in 189 countries. These include many African nations. In its July 2017 snapshot, the GSA (Global mobile Suppliers Association) says new operators that have so far commercially launched 4G on the continent include: BTC in Botswana; Econet Leo in Burundi, Free (Telco OI) in Réunion; Libyana in Libya; Orange Madagascar; Qcell in Gambia; Somnet Telecom, Somtel and Sahal Telecom, all in Somalia; Sudani in Sudan; and Telkom Kenya.

Several operators in Africa are now evolving their existing LTE networks to LTE-A (also known as 4.5G or 4G+), or implementing this from the outset as they 'leapfrog' technologies and upgrade from previous cellular generations.

For example in Sudan, Sudatel's mobile subsidiary Sudani went live with an LTE-A network in Khartoum earlier this year. It worked with Huawei on the deployment, and is using LTE-FDD and carrier aggregation (CA) over 1800MHz and 850MHz frequencies. The operator plans to expand the network to other major cities and towns over the coming months.

In June, Kenyan MNO Safaricom announced that it had gone live with 100 LTE-A sites in Nairobi, Mombasa, Kisumu, as well as parts of Kisii, Naivasha, Kitui, Machakos, Kakamega and Kericho. More territories are scheduled to be switched on throughout the year. The operator said that the technology enables CA, and builds on its growing 4G network footprint which has been activated on more than 1,100 sites across the country.

Meanwhile in Zambia, Zamtel has launched a 4.5G network in the country's Copperbelt Province. Using LTE-2300 technology deployed by Huawei, the network has been rolled out
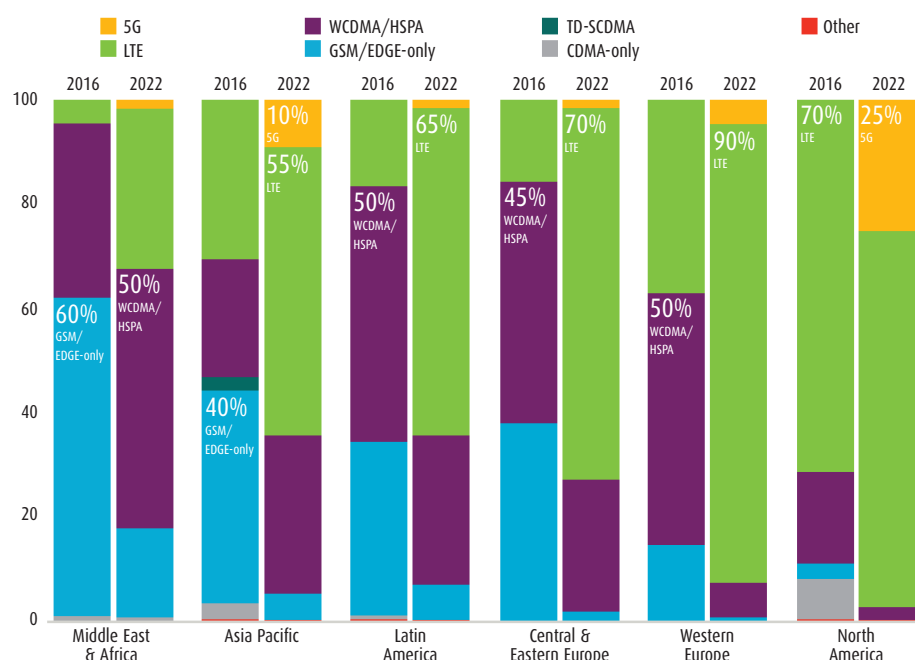
Mobile subscriptions by region and technology.

SOURCE: ERICSSON MOBILITY REPORT, JUNE 2017

in Kitwe, Kalulushi, Chambishi, Chingola, Chililabombwe, Mufulira and Solwezi.

Longer term evolution

Ericsson says many LTE-A implementations globally are combining lower and higher frequency bands (both for FDD and TDD modes) which will lead to a wider coverage area, increased network capacity, and faster data speeds.

Meanwhile, in its LTE in *900MHz market status* report published in July, the GSA says 900MHz (3GPP band 8) is used globally for GSM voice and basic data mobile communications. According to the association, technology-neutral licensing has enabled these frequencies to become a mainstream spectrum choice for mobile broadband using HSPA/HSPA+ (UMTS900).

"It has excellent propagation characteristics for wide area coverage (in rural areas) and in-building penetration (rural and urban)," says the GSA. "900MHz spectrum is typically limited in its availability for LTE due to its prior use for GSM networks; however, using 900MHz as an LTE band is gaining traction amongst operators, and the main infrastructure vendors all offer LTE900 solutions."

The GSA continues by saying operators around the world are known to have commercially launched LTE mobile broadband service in LTE900 either as a single band system or as part of a multi-band deployment, with many of the latter using LTE-A CA technology to deliver higher speeds for users. There are several African examples here.

For instance, earlier this year, Vodacom demonstrated speeds above 500Mbps on its LTE-A network using CA spectrum in the 900MHz, 1800MHz and 2100MHz bands at its regional office in Nelspruit, South Africa. In April 2016, ntel launched LTE-A in Lagos, Abuja and Port Harcourt using CA across 900MHz and 1800MHz

spectrum. And as far back as 2013, the GSA says Unitel demonstrated LTE-A CA in Angola by combining 900MHz and 1800MHz spectrum on its live network. Two years later in early 2015, Unitel went on to work with Ericsson and claimed a first for Africa with the successful demonstration of an end-to-end LTE-A CA solution capable of supporting data speeds up to 450Mbps. The partners used 60MHz of spectrum, with three 20MHz LTE carriers in band 3 (1800MHz), band 7 (2600MHz) and band 1 (2100MHz).

Late with LTE

In a research brief published last year, the GSM Association's Intelligence division said that despite LTE now covering more than half of African countries, 4G adoption in the region still trails the rest of the world by some margin. Francesco Rizzato, the GSMA's senior analyst, telecoms forecast, predicted that the gap will widen by 2020. He said: "We expect all regions except Africa to exceed 75 per cent 4G coverage in terms of population by 2020, with average adoption (as a percentage of total connections) surpassing 42 per cent. In Africa, 4G coverage will reach 32 per cent by 2020, although adoption will still be below 10 per cent."

Rizzato said that one of the reasons for this significant difference was the prevailing use of high-frequency spectrum on the continent: "In Africa, two-thirds of the live 4G networks for which the spectrum allocated is known, operate on higher frequency 'capacity' spectrum bands (above 1GHz) only. These have limited propagation, so such networks are typically confined to densely populated urban areas. However, Africa's urban population is still low compared to other regions, making it difficult for mobile operators to increase coverage. Only 16 per cent of the networks use spectrum at

frequencies below 1GHz, and 18 per cent use a combination of both."

According to the Global mobile Suppliers Association's *LTE in Africa* map on p21, there are around a dozen nations on the continent where there does not seem to be any 4G activity.

However, one such country which may soon benefit from better telecoms services is Guinea. After suffering dire financial problems since 2010 leading to its suspected bankruptcy in 2013, state-owned telco Sotelgui (Societe des Telecoms de Guinee) could be making a comeback. In August 2017, local reports cited telecoms minister Oye Guilavogui as saying that there was "no doubt" Sotelgui will start "very soon". The minister is also said to have revealed that the modernisation and expansion of the operator's infrastructure was still ongoing following a 2013 USD350m Chinese government loan for the construction of a 4,000km national fibre-optic backbone. Huawei has been awarded the USD238m rollout contract.

Meanwhile in Mali, Orange is reportedly hoping to introduce 4G technology in 2018. The telco is planning to renew part of its infrastructure in the country and is said to have pledged a XAF10bn (USD16.3m) investment for the operation this year.

Mozambique is another grey area on the GSA's map although reports earlier this year suggested that Vietnam's Viettel – which owns interests in Movitel, Mozambique's third-largest MNO – has expressed interest in installing 4G equipment.

There are also reports that Djibouti Telecom has been testing LTE since the beginning of 2016, but there have so far been no official announcements regarding its progress.

Building the networks

When it comes to increasing mobile broadband penetration, Ericsson says operators should begin by determining which sites to upgrade from 2G to 3G and/or 4G for the best ROI. It says one way to do this is by using CDRs associated with the existing 2G network as these will reveal which sites have the highest number of expected mobile broadband-capable users. By mapping how their spectrum assets match the capabilities of their
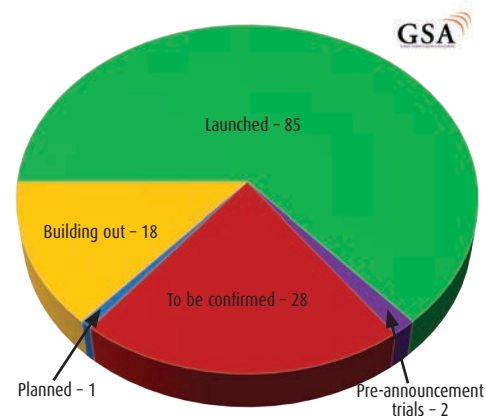
LTE activity in sub-Sahara Africa. From January-July 2017, the GSA says 11 new operators commercially launched 4G services. © GLOBAL MOBILE SUPPLIERS ASSOCIATION

Vodacom in South Africa and Mozambique, along with Malawian ISP Skyband, are among some of the African wireless operators using RADWIN's *5000 JET* point-to-multipoint radio system.

subscribers' device capabilities, MNOs will be able to identify sites with the most subscribers with 3G/4G-capable phones attached. Ericsson adds that upgrading existing 2G sites to 3G or 4G operating at low bands is possible on the existing network, and that there is potential to use larger antennas and beamforming to increase 4G coverage and capacity even further.

One vendor that is using beamforming is RADWIN. It believes the technology has already proved an industry game-changer; for example in South Africa, Vodacom launched its *Broadband Connect Wireless Premium* service using infrastructure based on RADWIN's *5000 JET*. It's claimed this has enabled the operator to offer speeds of up to 750Mbps while ensuring QoS of 1 to 250Mbps per user in a symmetric or asymmetric link. Other service providers using the *5000 JET* platform in Africa include Vodacom Mozambique, Internet Solutions Mozambique, Malawian ISP Skyband, amongst others.

RADWIN explains that when attached to its point-to-multipoint (PtMP) base station, a beamforming antenna provides a very narrow and steerable beam. This can be directed to the optimal reflection point in both line-of-sight and non line-of sight conditions to obtain the best possible link. The narrower beam reduces the level of mutual interference between adjacent sectors and sites, which means less spectrum is required thereby making network planning simpler, says RADWIN. Ultimately, the technology makes it possible to deliver increased gain, reach distances of up to 40km, and bring connectivity to multiple locations/users.

According to the firm, its *5000 JET* PtMP smart beamforming solution is the ideal choice for last-mile connectivity and for operation in heavily congested unlicensed and licensed bands where spectrum resources are scarce. The platform supports multiple bands in the same unit (3.3-3.8 GHz/3.65GHz or 4.9-5.8GHz), is designed to deliver up to 750Mbps per sector and 3Gbps per cell (four sectors using 2 x 80MHz), and offers dynamic channel bandwidth selection of 80/40/20MHz. It also features TDD radio synchronisation for greater network capacity as well as an integrated GPS receiver for syncing.

InfiNET Wireless is another infrastructure specialist that uses beamforming antennas with

its radios. In May, it launched the *R5000-Qmxb*, a TDMA base station sector with an integrated beamforming antenna. The vendor claims the antenna enables "superior" interference immunity thanks to its additional gain and the dynamically steerable radiation pattern, both in downlink and uplink. As a result, InfiNET reckons the *R5000-Qmxb* delivers a "major" increase in link stability, and at least a two-fold improvement in network capacity.

The company says the device's net throughput of up to 240Mbps allows for dynamic frequency selection, automatic distance learning and channel time adjustment. It adds that high-level QoS supports 17 priority queues which facilitate various management features such as automatic software updates and online monitoring.

InfiNET also has high hopes for *InfiLINK XG* which it claims to be the fastest point-to-point system (PtP) currently available. Operating in the sub-7GHz frequency band, the firm says it can reaching a peak of 500Mbps of net throughput in 40MHz of spectrum, and more than 130Mbps in just 10MHz.

Available with a range of 22 to 28dBi flat-panel dual-polarity integrated antennas, as well as a connectorised version for use with third-party external antennas, InfiNET boasts that the *InfiLINK XG* has "best-in-breed" spectral efficiency of up to 14bps/Hz, processing power of one million packets-per-second, connectivity at distances of up to 100km as well as "guaranteed" availability with a range of more than 60km using integrated antenna units. Other features include instant DFS technology to enable automatic frequency channel change with zero downtime, no link degradation even in harsh weather conditions, and a small footprint design that is easy-to-align and install.

In February, Intracom Telecom launched the *UltraLink-GX80*, its latest PtP platform. Described as a compact all-outdoor Ethernet radio, it operates in the entire E-band range of frequencies – 71-76 /81-86 GHz. The company says the new radio is ideally suited for 4G/4G+/5G RAN macro cell backhaul and C-RAN fronthaul applications, as well as transport applications in metro and aggregation networks as a fibre substitute.

Using FDD, Intracom says the *UltraLink-GX80* achieves throughputs of up to 10Gbps full duplex

while offering a complete set of networking and packet frequency and phase sync features.

It adds that operating as an Ethernet bridge, the radio offers 1 x GbE plus 2 x 1/10GbE data interfaces, enabling deployment flexibility without the need for external switches. When operating in CPRI transport mode, three of the unit's interfaces can be used for CPRI transport up to Option 7.

The *UltraLink-GX80* is designed to be easily mounted on poles, while 'zero-touch' provisioning (via Bluetooth) is said to enable convenience, speed of installation and easier maintenance.

4G: the multibillion-dollar opportunity

Gartner forecasts that the worldwide market for end-to-end LTE network infrastructure will grow from USD20.9bn in 2016 to USD36.6bn in 2020, to account for 70 per cent of spending on mobile network infrastructure.

In August 2017, the advisory and research firm released its latest *Magic Quadrant for LTE Network Infrastructure* report. Ericsson is among some of the major vendors included here, and is described as one of the leaders in terms of numbers of LTE deals. "Ericsson's many long-standing relationships with CSPs are a solid advantage in terms of making it one of the 'go to' vendors for LTE upgrades," says Gartner.

The Swedish company's product portfolio focuses on the *Ericsson Radio System*, an end-to-end radio modular and scalable network that consists of hardware and software for radio, baseband, power, enclosure, antenna and site solutions. It also includes the firm's *MINI-LINK* range for microwave transmission as well as a fully integrated IP router portfolio, all managed by a common management system.

The company reckons its system includes the industry's most compact radios, which are 50 per cent smaller and lighter than previous generations, to enable more compact, higher density and cost-efficient site designs. It adds that TCO costs can be cut by 20 per cent through innovations such as a quick one-bolt installation process combined with the smaller size, weight, wind load and a high energy efficiency.

The platform is also claimed to include the industry's "most powerful" baseband, enabling operators to build distributed and centralised baseband configurations supporting high-capacity, multi-standard, multiband and multi-layer architectures. Ericsson says the baseband uniquely supports GSM, WCDMA, LTE and 'Massive IoT' simultaneously on one board, and also offers multi-standard operation, including carrier aggregation of combined LTE TDD and FDD.

Another major LTE infrastructure vendor that features in the *Magic Quadrant* is Huawei. As already stated on several occasions above, the company is highly prominent on the continent, and has been playing a major role in helping the region's service providers build out and upgrade their networks.

The Chinese vendor considers itself to be in the vanguard when it comes to network technology.

Left: InfiNET Wireless' *R5000-Qmxb* TDMA base station sector with integrated beamforming antenna. Right: the company claims its *InfiLINK XG* is the fastest point-to-point system currently available.

Late last year, it released a new solution which it claimed redefines spectrum refarming. As already noted by the GSA, an increasing number of operators are deploying UMTS900 networks by refarming 900MHz spectrum to supply coverage for basic mobile broadband networks. After refarming, the GSM networks are still used to serve GSM-only terminals, but according to Huawei, even when a UMTS small bandwidth (3.8MHz) solution is used, 6.2MHz of bandwidth is still required by the GSM and UMTS (GU) network. It says some operators are not able to upgrade their networks from GSM to GU because of insufficient 900MHz spectrum resources or heavy GSM network load – up to 15 per cent of global operators have only 5-6MHz of the bandwidth on the 900MHz frequency band, says the company.

To resolve these issues, Huawei has come up with what it describes as as a "innovative" solution to improve spectral efficiency using GSM and UMTS overlapping technology.

While the industry standard is to use dedicated spectrum resources for different radio access technology (RAT), Huawei says it has deployed GSM and UMTS networks on the same frequency band. According to the firm, its *GU@5MHz* solution allows a GU network to be implemented using just 5MHz of bandwidth, thereby significantly reducing the wastage of scarce 900MHz spectrum that results from non-decommissioning or slow decommissioning of GSM-only terminals on existing networks. As a result, Huawei says *GU@5MHz* reduces the spectrum requirement for dual carriers on the UMTS networks, and doubles UMTS900 network capacity while reserving the GSM networks.

The company explains that its solution uses inter-RAT joint scheduling and super narrowband filter technology to efficiently eliminate inter-RAT interference caused by the overlapped spectrum, ensuring the stability of KPIs on the GSM network.

It says *GU@5MHz* also supports flexible spectrum allocation: "When GSM traffic requirements decrease, more spectrum resources are automatically allocated to UMTS. The solution can be deployed only by upgrading the radio access network side; there are no dependencies on other network equipment".

Rohde & Schwarz's *CMW500* wideband radio communication tester has been used on the verification of LTE FDD three component CA in the downlink, including 4x4 MIMO on each carrier.

Next-gen test kit needed for next-gen networks

While testing, measuring and monitoring any type of network is crucial for all service providers, the evolution of mobile networks need to address particular technical challenges presented by upgrading from 4G to 4.5G, LTE-A Pro, and beyond. These challenges are characterised by complex scenarios involving features such as carrier aggregation, MIMO, etc.

For instance, Germany-headquartered test and measurement specialist Rohde & Schwarz (R&S) says quadrature amplitude modulation (QAM methods such as 256QAM and 64QAM in LTE and LTE-A increase data rates in both the downlink and uplink. Last year, the company worked with load testing solutions specialist Prisma Telecom Testing on the verification of LTE FDD three component carrier (3CC) aggregation in the downlink, including 4x4 MIMO on each carrier.

The solution consisted of three R&S wideband radio communication testers, the *CMW500*, an R&S *CMWC* controller, and Prisma's UeSIM multi-terminal simulator. The latter was equipped with two SDRv3 units and one eLSU unit for terminating the traffic. R&S says each *CMW500* generated a component carrier with 20MHz bandwidth and 4x4 MIMO, adding that the entire setup was able to provide a downlink data rate of 900Mbps.

R&S also demonstrated RF tests on the *CMW500* with 64QAM modulation in the uplink. These modulation methods increase the data rate in the uplink for LTE. The test setup is said to have reached a data throughput of 75Mbps on a single carrier or 150Mbps in combination with LTE-A uplink carrier aggregation. The *CMW500* also offers a number of other test functions, such as FDD/TDD joint operation, and LTE 4CC up to 8x2 MIMO.

R&S claims that the *CMW500* (in its *CMWflexx* configuration) and the Prisma UeSIM are the first test platforms to offer a combined downlink CA solution for up to three 4x4 MIMO carriers, protocol, RF and data performance verification up to 1Gbps. With the successful 3CC 4x4 MIMO verification, the partners said they had achieved an "important milestone" in the commercial evolution of LTE-A.

The *IxLoad LTE XAir2* has been designed to validate the performance and functionality of LTE-A Pro and 5G-related products and services. Developed by network testing, visibility and security specialist Ixia, the RAN test product is said to facilitate the realistic emulation of massive amounts of subscribers with multi-Gigabit OTT traffic via the internet, to help operators future-proof their networks and devices.

The platform features the company's *XAir2* load module to provide LTE user equipment emulation that enables an eNodeB Layer 1 to 7 test solution. Users can perform capacity tests, detail a cell throughput, measure voice and video quality, and model a wide variety of mobility scenarios. They can also test LTE on unlicensed spectrum.

TEOCO says its *SMART Capacity Management Solution* can help CSPs optimise current network capacity and plan ideal capex investments for traffic growth.

The analytics, assurance and optimisation specialist claims initial deployments of its solution with customers have demonstrated the potential of reducing upgrade spend by 10 per cent or more. The company says its data and algorithm driven platform does this by identifying the four most common areas of capex waste in terms of capacity: delays in re-purposing older infrastructure; failure to promptly re-farm spectrum; leaving 'default' settings across sites; and ineffective management of software licenses. SMART is said to uses network event data in combination with subscriber behaviour as a way to plug capex leakage in these four areas.

"As the demand on data grows exponentially and accelerated rollouts happen for LTE and VoLTE networks, capacity management will be more continuous in nature with the demand on 'what-ifs' and 'next best actions'," says Aloke Paskar, TEOCO's SVP of business transformation. "Capacity management is no longer learning lessons from the past, but also being able to predict the future by monitoring and managing the constantly changing customer behaviour patterns." ■

The *Ericsson Radio System* is a modular platform that comprises hardware and software for radio, baseband, power, enclosure, antenna and site solutions. It also includes the company's *MINI-LINK* portfolio for microwave transmission and a fully integrated IP Router portfolio, all managed by a common management system.

Keeping customers happy

With the right BSS and OSS platforms in place, MNOs can reduce subscriber churn and rapidly launch enhanced network services.

Orange Egypt was formerly known as Mobinil and is the Orange Group's largest operation in terms of customer numbers. With 33.9 million subscribers, it is bigger than the company's mobile operation in its home country of France where it has 30 million users (both figures reported as at end 2016).

Like many other MNOs across the world, Orange Egypt analyses CDRs in order to understand its subscribers' modes of consumption, ensure invoicing for its services is reliable, detect fraud, and for the creation of various reports for its marketing and accounts departments.

With millions of customers making around 200 million phone calls per day, the company has to manage huge volumes of data in quasi real-time. In order to improve its services, invoicing and marketing practices, it needed to extract different types of information from the CDRs, and then integrate these data into three different marketing campaigns, pricing simulation and revenue assurance management systems. Orange Egypt therefore needed a solution capable of organising these data movements and transformations.

At the same time, it had to provide adequate levels of openness to facilitate integration, not only initially with the three management systems, but also in the future with other applications, for example fraud management or legal action.

After a pre-study phase, the operator launched a call for tenders to which two major market players responded. They included GlobServ which specialises in telecoms services in France and Egypt, and offers consultancy, system integration and application solutions. Orange Egypt selected the firm to implement a solution from Talend that is specifically dedicated to managing Big Data and offers fast processing times.

Mohamed Hajji, GlobServ's business development director, says: "We completed a demonstration showing that Talend and GlobServ could meet all of the requirements. Talend also provided performance studies (benchmarks) and recommended hardware configurations. Ultimately, Orange Egypt felt that our joint offer best met its needs: GlobServ capitalised on its broad knowledge of the industry and telecom operator issues, and Talend contributed its well-known expertise in terms of integration."

According to Hajji, *Talend Big Data* uses open source, open standards technology, is easy to deploy and use, and also offers reduced implementation and integration costs. He explains that the solution

distributes data traffic loads on multiple servers (load balancing in 'active/active' mode) according to availability. This allows Orange to optimise the use of their capacities, in addition to the number of processors available to considerably improve processing times. Furthermore, the solution is said to offer horizontal 'scale out' possibilities, enabling the cellco to easily add additional servers with no restriction on the quantity allowed.

During the initial phase, the implementation involved just the management of marketing campaigns. GlobServ developed an 'Operational Data Store' for the extracted data which were then integrated into Orange Egypt's CRM application which is based on Siebel software.

"In practical terms, the Talend solution processes the Big Data originating from the CDR data or from the invoicing application," says Hajji. "After quick formatting, this data is inserted into Siebel to manage new marketing campaigns.

"In addition to marketing activities, we are also developing integration flows for two other components of this project – revenue assurance and pricing – which will be launched over time."

The CDR data comes from several systems: Ericsson network equipment; a real-time invoicing

platform for data services from Volubill; and a business support control system.

With reference to Ericsson's equipment, Hajji says this generates data in a specific format – ASN.1 – which was not originally supported by Talend. As a result, GlobServ developed an external library by adapting a market product and then integrated it into the Talend solution to guarantee the performance of the integration jobs. "Ultimately, we plan on developing a Talend-specific library which will take the form of an ASN.1 connector," says Hajji. "The scalability of the open source solution gives us great flexibility in integrating various types of data."

Orange Egypt hopes the Big Data solution will improve its effectiveness in several key areas where the financial stakes are said to be high.

Firstly, the company is looking to revitalise its marketing campaigns by increasing their responsiveness and reacting in quasi real-time as its customers' needs evolve. Data analysis also enables the operator to study its subscribers' consumption behaviour and launch marketing campaigns, for example, to offer new products.

Secondly, it is seeking to improve precision pricing by completing simulations based on the data collected. These *what if?* scenarios will help the firm analyse the accuracy of its prices and forecast potential changes by comparing several hypotheses.

Finally, Orange Egypt aims to ensure that all of the revenue expected from its service and product sales is invoiced and accounted for. The Talend platform enables the company to compare invoicing data with the actual flows passing through its network. The matching of these data from different systems then helps it track even the slightest loss of information that could have a significant impact on billing."

Cashing in on mobile data

Green Com runs the Muni branded mobile network in Equatorial Guinea. In late 2016, it launched 3G with ambitious plans to position itself as a pioneer in offering the most sophisticated data plans and promotions based on real-time business intelligence and value-added services.

However, its legacy BSS platform lacked the capability to quickly evolve to changing subscriber demands, thereby restricting its service offerings. As a result, the company turned to US-based Alepo to transform its legacy BSS environment.

Green Com's aim was to improve network operations and achieve real-time service creation capabilities. What it explicitly needed were complete, carrier-grade solutions for advanced policy control with real-time business intelligence. This would reduce time to market for new services and enhance the subscriber's digital experience.

Alepo deployed its *Service Enabler* platform and had to coordinate with multiple vendors to perform business configuration and subscriber migration from Green Com's legacy BSS system. This would ultimately reduce the operator's dependence on various suppliers with Alepo

becoming the end-to-end solution partner.

The vendor integrated its SCP, SMSC, USSD and IVR systems with a Nokia MSC. Alepo also integrated its PCRF with Nokia's GGSN.

According to the firm, *Service Enabler* features a number of components that specifically met Green Com's requirements. For instance, it features a converged system that enables real-time charging and billing, as well as a roaming and interconnect platform with billing. It also includes subscriber data management and CRM which is integrated with Green Com's legacy HLR from Nokia.

Alepo says it successfully delivered a complete business transformation within 10 months which was "well before" the project deadline. It adds that there were zero customer disturbances and zero reported data errors. The company claims *Service Enabler* has meant that Green Com has accelerated service creation and monetisation, and that it now has "rich out-of-the-box" capabilities to launch on-the-fly innovative data plans, dynamic discounting, personalised offers, application bundling, etc. As a result, the cellco can introduce additional VAS to generate revenues beyond voice and data.

As well as replacing manual billing and charging with automated real-time billing and charging, Alepo says its BSS platform prevents revenue leakage and delivers a "transparent" customer experience.

Service Enabler has also allowed Green Com to offer round-the-clock managed services support for prompt resolution of user queries and change requests – this was said to be a big challenge with the previous vendor (which is not named).

Furthermore, Alepo says it has evolved the operator's existing network and IT infrastructure to streamline overall business processes and operations.

Policy control to accelerate data innovation

Moroccan operator INWI wanted a policy-based solution enabling it to rapidly deploy new services

and create new revenue streams. Its ultimate aim was to unlock data innovation, accelerate time to market, and offer more visibility to its customers.

The solution came from Ireland-based software specialist Openet and its *Policy Manager* platform. The firm claims it was the first vendor to virtualise its BSS offers, adding that it keeps costs down by using proven open source software. All Openet solutions are built on its *Fusionworks* framework which runs on a fully virtualised automated networks platform and is claimed to ensure "ease of integration".

Policy Manager features a variety of components that have provided INWI with a number of benefits. For instance, it includes a single PCRF that interoperates with a wide array of other vendors in the operator's network. Openet says it has the ability to shape network traffic according to the type of service being accessed and the time of day, and there are QoS controls for different users, such as pre-paid versus post-paid, for example. INWI is also able to enforce user terms and conditions and bandwidth limits in real-time, thereby maximising the amount of available capacity for other customers.

Other features include support for VoLTE, enablement of shared data plans, and policy and charging control monetisation use cases. Examples of the latter include 'one day' application service passes to *Whatsapp* and *Facebook* (combined).

Openet says the new services ensure new levels of offer transparency and balance management for INWI. It says this has enabled the operator to maximise customer QoS, control local and roaming traffic, and reduce bill shock.

"Being agile and having the flexibility to react to, and capitalise on, new market opportunities is a critical contributor to our ongoing success," says Bernard Buyat, CTO, INWI. "Our partnership with Openet ensures we offer a high quality and differentiated service to our customers and ensure they remain firmly in control of their service usage."

By using *Openet Policy Manager,* Moroccan operator INWI can enforce bandwidth limits in real-time, thereby maximising the amount of available capacity for other customers.

Polystar says *KALIX* gives "clear performance indicators presented through rich, visual Insight Portals".

Automating business processes

With its headquarters in the US and R&D facilities in India, Panamax specialises in mobile financial solutions, and earlier this year, it announced it had helped Sudatel to streamline its interconnect billing, roaming, reporting, fraud management and dispute management systems.

The Sudatel Group provides mobile and fixed networks as well as wholesale services to international carriers. Among its other interests, it also owns 75 per cent of Dubai-based Expresso Telecom Group which provides services in Senegal, Mauritania and Guinea Conakry.

According to Panamax, Sudatel was using a "conventional" approach for its day-to-day management of business. This included manual billing, ineffective dispute handling, manual creation of ERP sheets, differential partner invoicing, etc. The company says the operator was creating manual rate sheets which were constantly generating negative margins and causing losses. In cases of dispute, it says Sudatel was conducting manual reconciliations which did not lead to accurate results and also consumed a lot of time and manpower.

As a result, such practises were increasing the company's overall operational cost and contributing to revenue losses. Panamax provided a solution in the form of its BSS platform, *BillCall*. The firm claims this facilitates higher operational efficiency, along with accurate interconnect billing, roaming, rating, fraud management, rate and policy management, deal and dispute management, and order management.

The platform is designed to offer business process automation with network, service and customer agility. Panamax reckons it gives carrier service providers accelerated time to market for new products and services, and also optimises development and deployment costs while supporting operators during every phase of the customer lifecycle.

For Sudatel, *BillCall* has enabled automatic near real-time billing with added features such as A-number billing. Panamax says the system is easy for the telco to access due to the availability of widgets that offer direct dashboard access, and identify partner-and destination-wise negative margin. Other platform features include *Dynamic Routing Manager* for offering flat and percentage-based margin configuration for routing, and a dispute module for CDR and invoice reconciliation.

As a result of the implementation, Panamax says Sudatel has been able to speed up its operations and make more savings. It says the accuracy of the operator's reports has been greatly enhanced with a 95 per cent success rate, and they can now be generated immediately – unlike the 6-12 hours taken prior to *BillCall*'s deployment.

Furthermore, dispute management has become streamlined with either a limited or zero number of disputes. Panamax says this has helped Sudatel to generate revenue while saving costs. Furthermore, negative margin identification has minimised losses by about 35 per cent. The company adds that CDR generation is no longer a cumbersome task for the operator, thanks to direct downloads available from the *BillCall* dashboard.

Gaining rich customer insights

Ooredoo Tunisia is aiming to gain rich customer insights and improve its subscribers' experience with the help of Polystar, the Sweden-based network and customer analytics specialist.

Previously known as Tunisiana, the operator was re-branded in 2014 after Orascom sold it to Qatari telco Ooredoo in 2011. In its recently reported financial statement for the first half of 2017, Ooredoo said its subscribers in Tunisia increased six per cent to reach eight million, which means it remains the country's market leader.

In addition to its mobile network, Ooredoo Tunisia offers a range of services for enterprise customers such as fixed broadband, cloud solutions and managed services including security and IP telephony. Additionally, the company operates a national fibre network as well as *Didon*, its submarine system that connects Tunisia to Europe.

Ooredoo Tunisia is said to have embarked on an ambitious programme of operational change to introduce a more customer-centric focus. As part of this, the company needed the abilities to more rapidly generate attractive offers for its subscribers, and to perform accurate segmentation. As a result, it sought a solution that would not only provide network quality monitoring but also crucial insights that could be used to more effectively target its marketing efforts.

Polystar says the combination of its *KALIX* and *Customer Insights Solutions* has enabled Ooredoo Tunisia to meet its goals. It claims they provide a "comprehensive platform" that delivers both the network performance information and the insight into subscribers and services required.

According to the vendor, *KALIX* provides clear performance indicators that are presented through "rich, visual Insight Portals". It says these indicators reveal valuable information regarding service usage, device activity and subscriber performance. Ooredoo can then use this intelligence to drive highly targeted and segmented campaigns to promote new offers to different subscriber groups.

"We needed to replace a legacy solution that did not provide the insight and intelligence with the flexibility we required to support our customer-centric focus," says Hatem Mestiri, CTO, Ooredoo Tunisia. "The Polystar team not only met all of our technical requirements, but also gave us additional functionality to enrich our knowledge of customer experience."

With clear visibility of real-time subscriber experience available from a range of measures, Ooredoo Tunisia now has the insights it needs to implement its customer-centric transformation plans. It can leverage these insights to proactively plan and execute relevant, targeted campaigns, based on clear segmentation of its user base, across subscribers, devices and services.
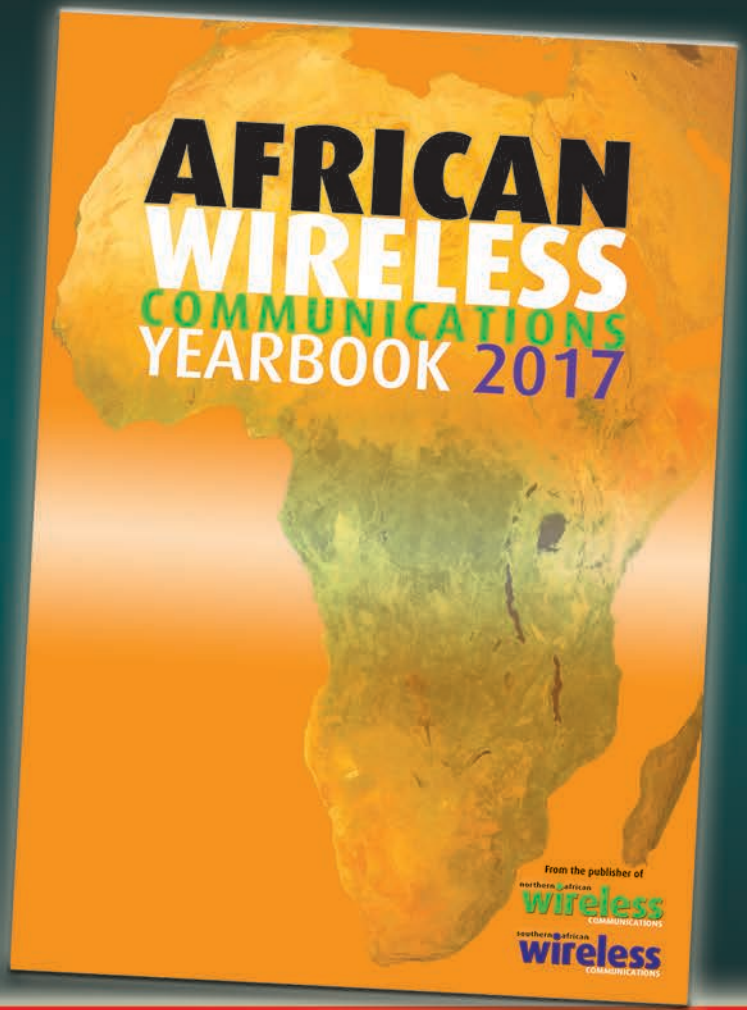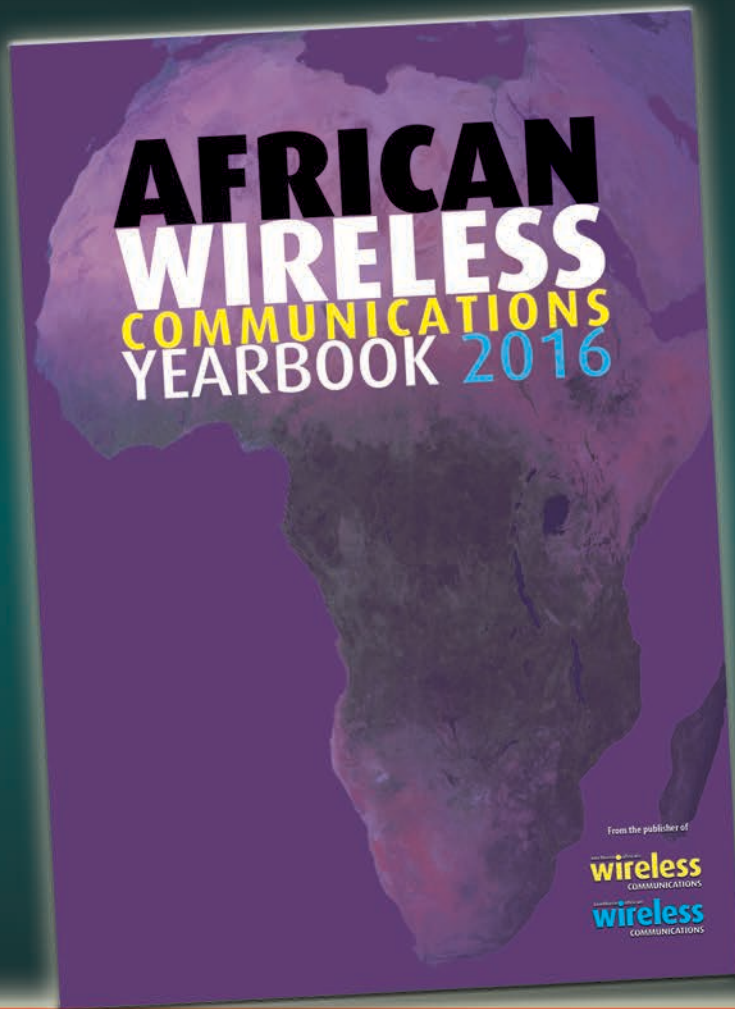
Polystar adds that its solutions also support virtualisation and are fully compatible with the overall vision of the Ooredoo Group as it moves to adopt virtualised network technology and infrastructure in the future. ■

The Sudatel Group offers mobile services in Sudan under the Sudani name. It launched 4G earlier this year.

Up in the air

The entire communication sector is evolving and user expectations are changing. DAVID HARTSHORN of the Global VSAT Forum explains how the satellite industry needs to adapt.

Will the perception that the price of satellite capacity is high ever go away? Go to any industry event dedicated to satellite technology and the issue continues to come up in some form. So is that a key concern for the Global VSAT Forum (GVF) which was setup in 1997 as the "single and unified voice" of the worldwide satcoms industry? David Hartshorn – who has been the forum's permanent secretary general since the very beginning – points out that not only is the technology changing, but the way different communications industries work together or compete against each other is also changing.

"The satellite industry is part of all that. The traditional way that the entire value chain, right down to the end customer, has viewed bandwidth is central to the change that is currently underway in the satellite industry globally."

Hartshorn says capacity costs have historically been viewed in the industry in terms of price per megahertz. He believes this stems from the traditional business model of satellite operators running a wholesale business selling bandwidth. "But now there is high throughput satellite

[HTS], new technologies on the ground as well as in other variables in play, where everyone is thinking not in terms of price per megahertz but rather price per megabit.

"And on top of that, is the layering of new managed services that are of value to the customer, such as cyber security, for example. So portfolios are being redrawn, and the price per megabit change is all coming from that.

"At the same time, you see satellite operators moving down the value chain looking for new ways to not only add value but to retain margin. There is so much capacity now that has become commoditised that they can't realise the type of margins they have grown accustomed to over the last few decades. So this is a fundamental change to the industry."

Hartshorn says there are also other elements of that change, such as traditional VSAT operators now adding non-satellite type connectivity solutions into the mix of the services they provide. He says while that has been going on in various ways for some time, it is now happening in the context of that "redrawing" of the value chain and the business models at each stage of that value chain – even to the

extent of re-thinking what the end customer's role is. "We had a task force meeting where we had a customer from the cruise line industry. Two years from now, their current bandwidth contract will come to an end and they are looking at every possible model to see what would make the most sense. And one model involves them actually becoming an owner of satellite capacity – not leasing but owning – and where the end user becomes a [virtual] operator.

"This is been playing out worldwide and the disruption has been evident in Africa for more than five years. It has been playing out there at a significant level – the redrawing of relationships, business models, positions in the value chain, portfolios – all of that is in the process of evolving in Africa right now."

How has Hartshorn seen technology play its part in helping to reduce capacity prices? "In Africa, for example, we saw a period where there was an under-supply and demand was starving, and prices went up to USD8,000 per megahertz, up from USD2,000-3,000 just a year or two before that. And now, fundamentally new types of satellites have already launched with high

throughput coverage over Africa that has driven the prices down into the hundreds of dollars. There's more of that capacity coming, and the satellite operators who own that capacity recognise that they cannot simply be wholesalers any more."

The fibre question

Looking at the recent history of satellite in Africa, Hartshorn says there was a long period characterised by the technology being used largely for point-to-point connectivity because there was no fibre. "And then five or six years ago, fibre starts washing up on Africa's shores, and all the African satellite communication customers and users said 'hooray! We can get this high-cost satellite off of our roof and go to fibre and get on with our lives!'. So they thought fibre was going to solve all their problems."

Hartshorn and his team then spent the next two years going across the continent to explain why that would not prove to be the case. "We had seen all this before in South America in the 1990s; there was no fibre there and an entire industry had been built around using satellite to do fibre's job. Why? It was because that was what was demanded and it was good money. While satellite can't match the functionality of fibre you can get, for example, from Rio de Janeiro to São Paulo with no fibre. Banks, oil companies and various other enterprise interests were using VSAT to do trunk route type point-to-point connectivity between offices.

"But then fibre comes in and bam! Gone! And the local satellite industry said the sky is falling. Some of them went out of business because they did not adapt their business plan to reflect point-to-multipoint service provision, others through mergers and acquisitions, etc. So for two years, we tromped all over Africa to explain that satellite is inherently at its best in a point-to-multipoint solution. Africa understands satellite as only a point-to-point tool; it can do that, but fibre is better at it. However, put satellite and fibre together and now you've got end-to-end service.

"We marched around Africa preaching this. We had Orange in one of our seminars and I said to them 'you're technology neutral, right? As you deploy fibre in your business do you deploy more or less satellite?' And they said the more fibre we deploy, the more satellite we deploy. Why? Because it is two tools doing different things to get towards the same objective which is end-to-end connectivity."

According to Hartshorn, things have "shaken out" since the initial rollouts of fibre in Africa. He says service providers and users are now starting to realise that in order to continue growing, they need to have point-to-multipoint connectivity off the end of a point-to-point fibre link so that they can add more subscribers or extend reach for existing customers.

Some of the bigger names in the satcoms industry, such as Gilat Satellite[1], Hughes Network Systems[2] and Intelsat[3] have said that satellite is usually the option to use when there's no fibre

alternative. Hartshorn clearly rejects this. "They can say what they want but they're wrong. You have two basic categories of customers. Firstly, there are those using satellite because there is nothing else (and satellite is good in those places, but not in every case – if it was, the world would be completely connected by now). Secondly, there are those who use satellite when there are other things but they're not optimised to do a certain task in the way that satellite inherently is. Most of the world's use of satellite communications is the latter, not the former.

"There is a huge misconception, not just in Africa but in the developing world generally, to say satellite is what you use when there is nothing else. That actually feeds into errant decisions that get made at the national policy-making level where they have the draft national broadband plan on the table and satellite barely gets any mention.

"In some cases with these national broadband plans, they are going hunting for elephants with BB guns and hunting for sparrows with elephant guns. I say this because we have come around, sometimes very late in the game, and found that the plan does not take any account of the possible use of satellite which is an indispensable complement to other tools to bridge the digital divide."

Spectrum: the defence continues

While the GVF does work closely with governments on such issues, Hartshorn says the last few years have seen the forum's energies consumed by a higher priority challenge: spectrum defence[4]. And it's not over yet.

"What is happening right now is what was happening after the World Radiocommunication Conference [WRC] in 2007. That was when the wireless industry made its first big push to go after a portion of the satellite industry's spectrum. At that time, it was very limited range, 34MHz to 36MHz ('extended' C-band) and they tried to get what is called a global identification of that portion of the band for use by wireless. They did not achieve that in 2007.

"Fast forward to November 2015 and the wireless industry came back in another wave. This time, it was not going after 34 to 36, but the entire C-band range, 34 to 42, and trying to get all of the satellite upper bands on the table for consideration. So after a two-year campaign at WRC 15 we were successful in preventing the wireless industry from getting a global identification for any portion of C-band."

During the run up to WRC 15, key organisations that led the wireless industry's case, such as the GSM Association, argued that co-existence between International Mobile Telecommunications and C-band frequencies was possible. Why did the satellite community remain unconvinced?

"They said that in 2006, even at the same time when wireless services were rolling out at 34 and 36. And in places like Malaysia, Indonesia, Tanzania and other countries, the interference was so bad that it was bringing incumbent satellite services down. There's no technology fix.

David Hartshorn, Secretary general, Global VSAT Forum

"For two years, we tromped all over Africa to explain that satellite is inherently at its best in a point-to-multipoint solution. Africa understands satellite as only a point-to-point tool."

"And so now the regulator is faced with an angry incumbent FSS provider, and an angry wireless operator who has already begun investing in deployment of the systems and who now has angry customers. In some of these cases, the regulator is forced to ask the licensed wireless operator to exit the band. That is not a conversation that any regulatory authority wants to have. But in other cases, some authorities perhaps did not have the maturity to stand up to a very powerful wireless operation. And so they just kept going along in an environment where you have polluted signals in the country – you don't want that either.

"Today, it's claimed sharing is still no problem because assurances are being given that wireless can co-exist within satellite bands without introducing interference, not only in C-band but in the upper bands as well. So nothing has really changed, except that the wireless industry is going after more spectrum."

According to Hartshorn, the wireless industry is now pushing for access to, among other bands, Ka-band, even though it was decided at WRC 15 that Ka is off the table for WRC 19. So is all this now going to consume most of Hartshorn's time during the coming years?

"Probably, the rest of my career – unless someone figures out a way of doing efficient spectrum sharing. If you can show me that innovation, I will be the first to invest because it is going to make a lot of money." ∎

[1] Eran Yoran, Gilat Satcom, 'Setting new sights on backhaul', *Southern African Wireless Communications* Nov-Dec 2015 issue, p25.

[2] Dave Rehbehn, Hughes Network Systems, *African Wireless Communications Yearbook 2016*, p96.

[3] Jean-Philippe Gillet, Intelsat, ibid. p68.

[4] Martin Jarrold, GVF, 'Spectrum defence', *African Wireless Communications Yearbook 2015*, p67.

New algorithms for evaluating satellite data helps create 3D maps

Researchers from the Technical University of Munich (TUM) claim to have set a world record in information retrieval from satellite data.

Using three million measurement points in one square kilometre from image stacks captured by *TerraSAR-X*, the researchers created '4-D' point clouds of Berlin, Las Vegas, Paris and Washington D.C.

Germany's *TerraSAR-X* is said to be the world's highest resolution civilian radar satellite. It has been orbiting the Earth at an altitude of around 500km since 2007, sending microwave pulses to the planet and then collecting their echoes.

However, these measurements only yield a 2-D image with a resolution of one metre, as Xiaoxiang Zhu, professor for signal processing in Earth observation at TUM, explains:
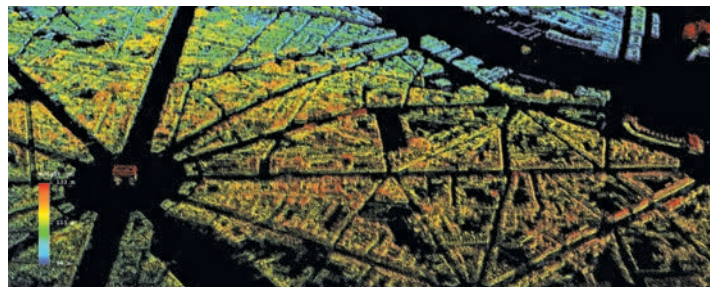
Using satellite tomography, researchers can map Paris in 3D, and show the deformation and subsidence of structures down to the millimetre. PHOTO: UNIVERSITY LIBRARY OF TUM

"The significance of the images is limited by the fact that reflections from different objects that are at an equal distance from the satellite will layover with each other. This effect reduces the three-dimensional world to a two-dimensional image."

TerraSAR-X flies over a region of interest every eleven days but its orbital position is not always the same and varies by 250 metres. As a result, the researchers use radar tomography to localise every point, and a variety of radar images taken from different perspectives are combined to create a 3-D picture. Additional compressive sensing methods are then applied to improve resolution by 15x.

Zhu has developed her own algorithm which makes it possible to reconstruct the third and even fourth (time) dimension. Since the images are taken at different times, the resulting 4-D model reveals tiny changes with a precision of around one millimetre per year, for example, the thermal expansion of buildings in the summer or deformations resulting from subsidence below the Earth's surface.

"The method is suitable for the detection of danger points. Satellite technology can thus make an important contribution to making our urban infrastructure safer," says Zhu.

Her team now plan to create four-dimensional models of every city in the world. The scientists will use various Big Data sources for the first time – measurements from satellites will be fused with data from Open Street Map and the practically unlimited stream of images, text and activity patterns provided by social networks.

# Fleet to build nano satellite network to backhaul IoT

A new company is embarking on a global tour to raise funds to launch a constellation of nano satellites connecting billions of devices with the IoT.

South Australia-based Fleet Space Technologies secured USD5m in funding in April to help it launch its first two satellites in 2018. It has booked its first satellite launch with SpaceX with a second deployment planned for the middle of the year. The company aims to have a constellation of more than 100 of its nano satellites, which measure just 30 x 30 x 40cm, in orbit by 2022, potentially connecting up to 75 billion devices to the IoT.

CEO and co-founder Flavia Tata Nardini says: "With one satellite in low Earth orbit you more or less cover all of Earth – almost 90 per cent of the planet. So the first two [launches] will do a couple of tricks for us: they will show our tech and start connecting our first customers,

CEO Flavia Tata Nardini needs funding for over 100 nano satellites.
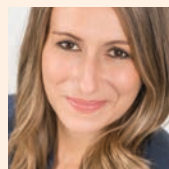
and they will secure frequencies." Nardini did not say exactly how much investment is being sought in the latest bid but it is hoped that it will fund at least half of the constellation.

Fleet believes nano satellite technology is ideal for creating a low-bandwidth global network to directly connect the millions of digital sensors already in the IoT.

It adds that vital remote areas, such as the Great Barrier Reef and Amazon Rainforest, could also significantly benefit from improved connectivity. Nardini says: "We are working in the Amazon Rainforest where people physically measure 500,000 trees a year with calipers in the middle of nowhere because there is no connectivity. People? You can do this with a sensor."

Eurasia Tunnel critical comms system features FM break-in

The Eurasia Tunnel, the first undersea road tunnel to connect two continents, has been equipped with a public safety network from Cobham Wireless.

The multi-band, multi-technology coverage solution provides the emergency services communication within the 5.4km tunnel which links two areas of Istanbul and spans both Europe and Asia.

The customised solution incorporates Cobham's digital channel selective repeaters and band selective repeaters. It supports UHF, VHF, DMR and FM technologies to ensure emergency services and operational teams can communicate at all times throughout the tunnel.

The network features two master sites. These include one combiner and one optical master unit, and sit at either end of the tunnel with one providing essential backup coverage. The sites are connected via fibre to multiple remote locations.

Each of the master sites contains a VHF repeater for communication between ambulance services, one UHF repeater each for the police and fire departments, and DMR for Istanbul's Disaster and Emergency Management Authority. In addition, a break-in system enables operational teams to access the FM channel and alert drivers to safety issues via their in-car radios.

The entire system can be overseen and controlled off-site using Cobham's *Active Element Manager*. Also, as the digital off-air repeaters are software-based, the company says new features can be easily added via a remote download.

Cobham was awarded the contract in September 2016 and worked with integration partner Yapı İDİS to

The 5.4km tunnel links two areas of Istanbul and spans both Europe and Asia.

install the system. The deployment was completed within three months in time for the Eurasia Tunnel's inauguration in December 2016.

DAS used to integrate operators

Copenhagen's new Royal Arena has overcome the problem of integrating three wireless carriers onto a single common DAS (distributed antenna system) with the help of US wireless specialist Microlab.

The 35,000m² multi-use venue opened earlier this year in February. It has a capacity of up to 16,000 seated and standing guests for cultural and musical shows, and up to 12,500 spectators for sporting events.

Eltel Networks, the Sweden-based technical services provider for critical infrastructure networks, carried out the DAS deployment at the arena. Lars Jessen, the company's business development manager, says: "Our challenge was to integrate a triple-band, high-power MIMO DAS solution for three operators. The main challenges were combining all services and operators in a compact, low-loss POI [point of interface] design with high performance and low PIM."

Microlab provided the solution with two POI designs, the *DCC601-B19* and *DCC601-B22*. These include nine inputs supporting different output configurations, and cover the Royal Arena's many sectors.

The vendor says its designs integrated the three carriers with three operating bands into common outputs. It claims that they also provided low loss solutions while achieving very low PIM and better than 55dB inter-band isolation to the passive DAS installation.

RSCC upgrades compression and multiplexing system

The Russian Satellite Communications Company (RSCC) has upgraded compression equipment at its Shabolovka Technical Centre in Moscow.

It says the refurbishments will give a boost to TV channels and media companies who want to more effectively use their orbit-frequency resources, as well as improve the quality of broadcasts without increasing costs.

The compression system is part of RSCC's technology platform, enabling it to provide what it describes as a "comprehensive, one-stop shop" service to broadcasters. The platform comprises space capacity, the radio-electronic facilities of the company's space communication centres, a programme package generation complex, and a terrestrial network. Services provided through the platform are focused primarily on media

RSCC's Shabolovka facility in Moscow is one of six technical centres operated by the company and is said to have capabilities beyond teleport services.

structures that distribute their content in Russia's cable television networks.

RSCC operates six space communications centres. As well as Shabolovka in Moscow, which offers more advanced technical capabilities, there are teleport facilities in Dubna, Medvezhyi Ozera, Skolkovo, Zheleznogorsk, Khabarovsk.

Established in 1967, RSCC owns

Russia's largest satellite constellation. Its current fleet of 12 spacecraft covers Russia, CIS, Europe, Middle East, Africa, Asia-Pacific, Australia and the Americas. It also runs its own fibre network in Russia.

The company's terrestrial spacecraft control complex monitors not only its own satellites but also those of other operators, such as Eutelsat.

Brazil FPSO fleet connects with ITC Global

ITC Global is delivering communications services to seven floating production, storage and offloading (FPSO) vessels located offshore Brazil for an unnamed oil and gas service company.

The customer provides floating production solutions to the offshore energy industry over the full product lifecycle and specialises in the construction and operation of FPSO vessels. These have been outfitted with ITC Global's VSAT solution to enable the fleet

to manage essential business communications and applications. The new infrastructure components include dedicated bandwidth links ensuring speed and uninterrupted service. All services include ITC's round-the-clock network monitoring and support.

This latest deal for ITC follows the successful deployment of its services to four vessels in West Africa last year. It represents the second of three deployment phases for the customer's globally dispersed FPSOs as part of a three-

year, multimillion-dollar contract that also covers North America.

Panasonic acquired ITC Global in 2015. It's claimed the combined company has become the world's largest buyer of commercial space segment with coverage spanning all major oil and gas hotspots, and more than 98 per cent of the busiest maritime routes globally.

The Panasonic network is comprised of traditional wide beam and HTS capacity as well as planned extreme high throughput satellite (XTS) capacity.

TETRA secures Guarulhos International Airport

Guarulhos International Airport (GRU) in São Paulo, Brazil, is using a TETRA system from DAMM to secure passenger safety and improve efficiency.

It has deployed the Danish vendor's fully redundant *TetraFlex Indoor High Power 7* carrier platform. This is said to offer a secure and reliable voice and data system which enables airports to efficiently respond to any potential danger. It includes features such as Dynamic

GRU is said to be Brazil's number one airport in terms of cargo passenger traffic.

Group Number Assignment (DGNA). According to DAMM, this makes it easy to create dynamic

work groups used for apron services such as luggage handling, jet-fuelling and catering.

The new IP-based, decentralised network was designed, installed and commissioned by local DAMM partner ALCON Engenharia. Its CEO Gilberto Koza says *TetraFlex*'s open API offers easy integration of third-party applications like the Siemens dispatcher solution, and was key to the airport.

GRU is said to be Brazil's number

one airport in terms of cargo passenger traffic, and reportedly saw more than 38 million customers in 2015. It has undergone an intense transformation since it began operations in 1985, and in May 2014 the airport inaugurated TPS3, a new passenger terminal geared toward international flights.

The new terminal, which covers 192,000m² and has an apron with 34 aircraft stands, has an initial capacity for 12 million passengers per year.

Avalanche detection devices using IoT connectivity

Wyssen is using IoT connectivity in its monitoring systems that help detect and prevent avalanches in the Swiss Alps.

The company uses various systems such as radars, infrasound sensors, geophones, etc., and artificial triggering techniques with explosive charges. It designs and manufactures avalanche towers which are solar powered and fitted with a deployment box holding the battery, electronics and the charges.

What's said to be a "sophisticated" algorithm is used in combination with sensors to provide an early warning of increasing avalanche activity in a given area based on detection of infrasound emissions.

All the data monitored by the towers (including feedback from weather stations), along with the results from radar installations and sensors, and footage from cameras, is sent to a central control centre where they can be analysed. Should action be required, an explosive charge can be detonated once it is confirmed no humans are in the danger area.

Due to the remote nature of the towers and the need for resilient, mission critical connectivity, Wyssen integrated multi-network SIM cards from PodsystemM2M into its devices.

According to PodsystemM2M, its solution includes global connectivity across multiple networks on one SIM, connection to the best signal on device start-up, and the ability to automatically swap to a backup network if signal is lost. It claims this gives the "most reliable and flexible" coverage for Wyssen's devices wherever they may be situated.

"The flexibility of the PodsystemM2M SIM card was paramount", says Wyssen engineer Bejamin Meier. "We wanted a single SIM card, interchangeable for each device that makes up our system. This makes management of the SIMs simple and straightforward."

Connect overcomes WiMAX and Wi-Fi-based outages

Connect has upgraded its network using InfiNet Wireless' equipment.

The Lebanese ISP uses a WiMAX network at 2.3GHz to serve residential customers, but the platform is limited to 5Mbps for downlink and 2Mbps for uplink. This meant it could not meet the high bandwidth requirements demanded by its premium residential and corporate customers.

To serve these users, Connect had to use Wi-Fi-based PTP solutions. But the frequency bands it was operating in started to suffer from major interference issues, resulting in a further drop in capacity and decreasing reliability.

"Links would go down frequently and we had to deploy field engineers to troubleshoot outages and maintain the network daily," says Jubran El Ayan, the company's RF manager. "Not only was this a drain on our resources and added significant costs to our operations, but we had several unhappy customers which was starting to hurt our reputation and revenue streams."

Connect deployed InfiNet's *InfiLINK XG* as part of its backbone network. The radio is said to be capable of reaching a peak net throughput of 500Mbps in 40MHz of spectrum and more than 130Mbps in 10MHz. It then installed the *InfiMAN 2x2* range of PTMP solutions to connect customers with higher bandwidth needs. More than 30 base stations and 250 subscriber terminals were implemented across Lebanon in just a few months.

El Ayan says that while the previous Wi-Fi-based PTP links were cumber-

InfiNet's technology has given Connect a more reliable and higher performing network across Lebanon.

some to manage and also expensive to procure and deploy, this is no longer the case with the *InfiMAN 2x2* platform. "All we need to do now is set up a base station sector in a specific area and we can provide, almost instantly, a large number of customers with high bandwidth connectivity, all achieved without disrupting any other customer or our wider network."

Platform solves three challenges for WISP

Wireless ISP Boundless Networks has replaced more than 300 of its 550 APs and is applying an over-the-air performance-improving software upgrade for thousands of its subscribers.

Boundless is said to be one of the UK's largest WISPs with a footprint running coast-to-coast across northern England. It is using Cambium Networks' *ePMP Elevate* platform to double the available capacity at each of its base stations, enabling new subscribers to be added and services to be expanded

with a 50Mbps product.

The new platform is installed on subscriber modules from other manufacturers already in Boundless' network. These modules are then connected to a Cambium base station, adding critical features to Wi-Fi equipment such as frequency re-use enabled by GPS synchronisation, airtime fairness and smart beamforming.

As no hardware upgrade is required at the subscriber's location, Cambium says substantial investment in new hardware and

installation crews is avoided.

Boundless CEO David Burns says the new system has solved three problems: speed, spectrum and service. "As our customers' expectations for bandwidth and service level rose, and our success in high-demand areas decreased spectrum availability, we were faced with a significant business challenge to deliver better service and higher performance in crowded airspace, without making the huge investment of replacing every access point and customer radio."

AER2100 helps break underwater record

Cradlepoint has helped a Dubai radio presenter break the world record for broadcasting live underwater.

The cloud-based network solutions specialist supplied one of its routers to Channel 4 104.8 FM radio presenter Stu Tolan, enabling him to set a new record of five hours, 25 minutes and 25 seconds.

The owner of the radio station, A1 Murad Group/Channel4 Radio Networks, uses Cradlepoint devices for pop-up networking in remote areas while on the air.

Channel 4 presenter Stu Tolan was broadcasting from the 11m litre aquarium tank at Dubai's Atlantis Palm Resort.

Muhammed Rafeeque, the firm's assistant manager IT, headed the technical team at the record-breaking event. "We used an *AER2100* router

to provide the connectivity between the radio studio and the outside broadcast location. It was critical to have uninterrupted uptime to ensure that the record was achieved."

Tolan beat the previous record of four hours and 33 minutes set by a UK radio station. He achieved the feat in the aquarium at Dubai's Atlantis Palm Resort on 13 May, and was submerged three metres below the surface in the 11 million litre tank as he played music, conducted interviews, and talked to his listeners while surrounded by 65,000 marine animals, sharks and stingrays.

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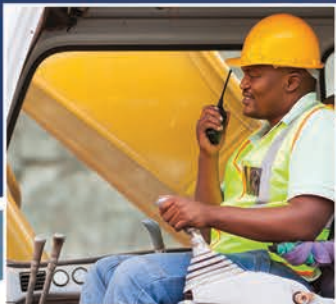**SPECIALISED ELECTRONIC & RADIO SERVICES**

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