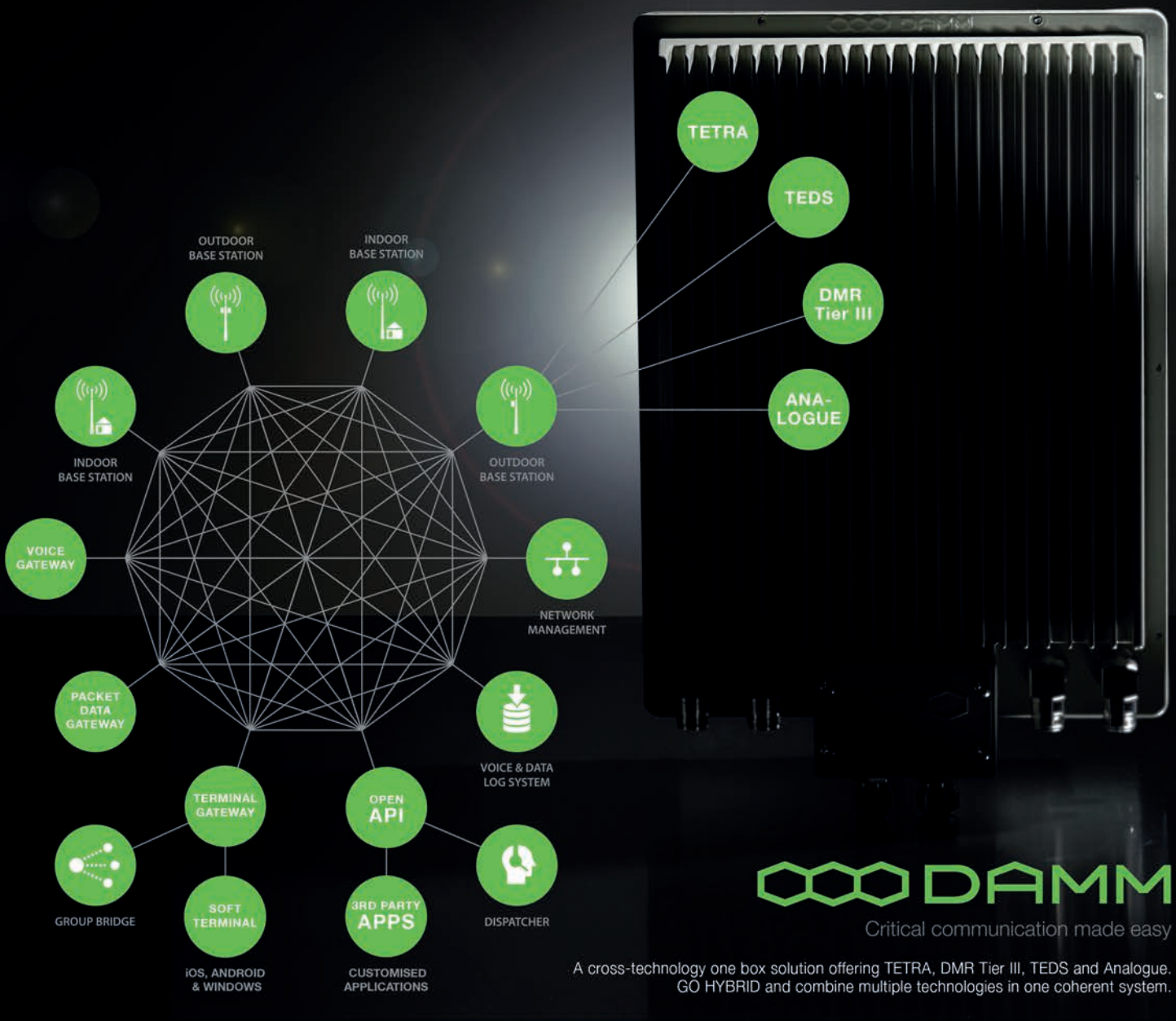
DECEMBER 2015/JANUARY 2016
Volume 14
Number 6

northern african wireless COMMUNICATIONS

For comms professionals in north, west, east & central Africa

- What's coming up for satellite in Africa
- Critical comms in the energy and utilities sectors
- Using L-band to extend RF for the military



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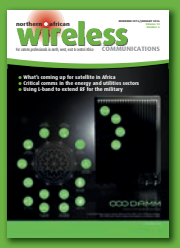

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ITU preserves spectrum for satellite use

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

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

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

Held every three to four years, WRC reviews the international regulatory framework for radio communications and revises it as needed. The most controversial item on the agenda for 2015 was the possible re-assignment of C-band spectrum. Terrestrial wireless operators had been lobbying for additional frequencies in C-band that include the 3.4GHz to 4.2GHz spectrum used for satellite receive/downlinks.

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

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

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

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

Other bands

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

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

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

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

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

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

What's next for satellite in Africa? Feature pp18-20.

ACE begins next phase of cable construction

The second phase of expanding the Africa Coast to Europe (ACE) submarine cable system has now started. It will extend the network 5,000km from São Tomé and Príncipe to South Africa.

The development of the second phase was originally announced last year *(see News, Jun-Jul 2015)*. When it is completed by the end of 2016, ACE will cover a total distance of 17,000km, enabling access to high-speed internet services for up to 25 countries.

As well as São Tomé and Príncipe and South Africa, phase II will connect DRC, Congo-Brazzaville, Angola and Namibia. An extension to Cameroon is also included.

According to the consortium behind the cable, ACE uses the "most advanced" high-speed broadband fibre optic technology which allows capacity to be increased as needed without additional submarine work being required. Overall capacity will be boosted to 12.8Tbps using 100Gbps WDM technology which supports high-capacity networks.

The consortium has invested around USD700m in the construction of the cable, which includes USD250m from the Orange Group and its subsidiaries.

Yahsat broadband service now covers Uganda

ISP iWayAfrica is using Yahsat's *YahClick* service to provide broadband coverage across Uganda.

The two companies are providing user equipment, installation and customer care services in the country.

They say they are offering packages designed to cater to the needs of business and home users, and claim subscribers can now instantly connect to the internet anywhere in the country using a small dish and satellite modem.

iWayAfrica says satellite technology is providing reliable internet services, even in the remotest places, without the need for terrestrial infrastructure.

"The partnership will enable iWayAfrica Uganda to offer Ka-band VSAT connectivity in areas within Uganda not currently covered by other service providers," claimed iWayAfrica's Uganda CEO, Godfrey Sserwamukoko.

Based in Mauritius, iWayAfrica says it currently services more than 87,000 corporate and domestic customers across sub-Saharan Africa. As well as satellite, it uses fibre and other wireless technologies to offer high-speed internet connectivity across the continent. The company is part of pan-continental ICT provider Gondwana International Networks.

Yahsat CCO David Murphy says iWayAfrica understands the Ugandan market's unique requirements.

Speaking during the signing of the contract late last year, Yahsat CCO David Murphy said: "iWayAfrica understands the unique requirements of this market. They will support us in a country where there is a massive growth demand for reliable internet access."

Yahsat prepares for Al Yah 3 – pp18-20.

Smile claims East African first with rollout of Voice over LTE services

Smile Telecom claims it has launched East Africa's first VoLTE service.

It was initially introduced last November in Kampala, Entebbe and Mukono. Rollouts in other towns and cities are also under way, and will include Jinja, Mbale, Soroti, Tororo, Lira, Gulu, Masindi, Kasese, Fort Portal, Kabale, Mbarara and Masaka in the coming months.

As well as in Uganda, Smile also operates LTE networks in Nigeria and Tanzania, and is planning to launch a new broadband network in the DRC later this year. The company says it will provide VoLTE in each country.

This latest development for the operator follows on from it raising USD365m worth of investment to fund the expansion of its 4G networks last year *(see Wireless Business, Aug-Sep 2015)*.

Smile launched LTE services in East Africa using its own IMS platform together with technology and service support from Alcatel-Lucent. The vendor deployed its end-to-end LTE network operating at 800MHz, as well as its IP mobile core and backhaul technologies. For the VoLTE launch, Alcatel-Lucent's services included integration, testing and project management.

Speaking last November, Smile's COO Tom Allen said: "4G LTE mobile broadband has the potential to transform economies and lives. New video and internet-based services will connect people, while allowing businesses to communicate to a wider audience, opening up new revenue streams."

Orange and ENGIE aim to increase power in Africa

ENGIE's deputy CEO and COO Isabelle Kocher signs the partnership deal with Orange Group CEO Stéphane Richard.

Orange will work with ENGIE on two projects to expand the rural electricity grid and optimise the energy supplied to its telecoms infrastructure in Africa.

France-based energy specialist ENGIE says it currently supplies 760MW of power across the continent. As part of its aim to become one of Africa's major energy leaders by 2025, it has created a dedicated business unit with around a hundred employees and has a number of projects planned.

Under this latest initiative, ENGIE says it will combine its experience in renewable energy production, aggregation and maintenance, with Orange's expertise as a telecoms carrier.

Working together, the two companies will trial a range of domestic power supply solutions for rural populations that could then be marketed by the telecoms operator.

These solutions could include, for example, individual solar kits and small-scale local electricity networks. The service could then be billed via mobile using *Orange Money*.

The partners say the trials will allow them to validate the technical solutions, sales and distribution models, and economic feasibility of the service before making it available on a larger scale.

Orange and ENGIE say they are keen to play their roles as "socially responsible" players on the continent. Citing figures from a 2014 BearingPoint study, they say around 90 per cent of the rural population in sub-Saharan Africa has no access to the electricity grid.

Solarkiosk and SES to bring internet to underserved villages – p10.

SES offers expansive broadband coverage across East Africa

SES is boosting broadband connectivity in East Africa with the launch and support of new services.

Last November, it unveiled *SES Broadband* for Ethiopia, Ghana, Kenya, Nigeria and South Africa. The satellite operator says it offers up to 1Gbps for both customisable data rates and fixed packages. It claims the new service has more than 99.5 per cent availability and is supported by a "highly responsive" round the clock operations team.

SES reckons its new platforms simplify the process of getting connected without limiting the experience. Krasimira Bozhinkova, the company's VP of data portfolio management, adds: "In anticipation of customers' demand for faster broadband connectivity in the next few years, SES will continue to invest in platform innovation to adopt new and more efficient technologies that can work seamlessly with next generation high throughput satellite architecture."

In a separate deal, Intersat will expand its internet services to East Africa using Ku-band capacity on SES's *NSS-12* via the SES Djibouti teleport.

Intersat says it currently serves more than 200 VSAT terminals using the SES service. Under this latest multi-year agreement, it plans to double the number of terminals served by 2016. The firm says it will offer shared and dedicated internet services delivered via iDirect VSAT technology, with a capacity of up to 70Mbps.

Intersat will expand its services to East Africa using Ku-band capacity on SES's NSS-12 via the SES Djibouti teleport.

"Intersat is in the business of breaking down the price barrier that has held back the majority of Africans from benefiting from the internet," said Subrata Roy, CTO, Intersat. "Not only have we connected businesses, government organisations, ISPs, educational institutions and hospitals, but we have also brought affordable broadband internet via satellite to rural Africa."

New Airtel services

Airtel will use IMImobile's *Tap2Bill* mobile billing solution for merchants and content providers across Africa. And in Nigeria, the operator has launched an enhanced messaging system with the help of Kirusa.

Tap2Bill will enable content providers and merchants to utilise Airtel's billing infrastructure to charge their customers. The service will be available via a secure merchant portal.

"*Tap2Bill* will give our customers access to services and content that were unavailable previously," says Airtel CEO Christian de Faria. "It will support the growth of content services, and enable content producers and merchants across Africa to share and benefit from Airtel's scale, market and technology."

In a separate development, Airtel has launched Kirusa's *InstaVoice* service for its 31 million subscribers in Nigeria. It enables them to record a voice message that can be delivered to users anywhere in the world.

To send an *InstaVoice* message, users just dial 'star' followed by the recipient's number. The voice or text message is then delivered to smartphone users with the free *InstaVoice* app.

WatchAfrica debuts mobile IPTV and VoD

African media and content specialist WatchAfrica has teamed up with VAS and payment company net-m to launch what's claimed to be the continent's first mobile IPTV and video on demand (VoD) service.

It uses net-m's *Anyscreen* platform which supports the streaming of multiple channels onto smartphones, tablets and set-top boxes. *Anyscreen* is also compatible with net-m's mobile payment technology which means anybody with a smartphone in Africa will be able to pay for content.

"We believe that as one of the highest growth regions for mobile entertainment, Africa is deserving of a tailored mobile IPTV and VOD solution," said Carsten Müller, SVP B2O and media at net-m. "We also know that with the low credit card penetration and high smartphone usage in Africa, the traditional forms of payment offered by many other VoD services wouldn't appeal to consumers."

Much of the launch content will be delivered by AfricaXP, an independent creator and distributor of custom designed channels and themed VoD content for local audiences.

WatchAfrica will also launch with Aflix, an African content service similar to Netflix, a range of news services including Kenya's K24, and TV10, the first private TV channel from Rwanda with direct access to social networks.

Ericsson to support Tunisia's digital agenda

Tunisia's Ministry of Communication Technologies and Digital Economy has signed an MoU with Ericsson outlining several initiatives to boost ICT innovation in the country.

As part of the agreement, the ministry will host start-up as well as application and services developers at the Elgazala Technopark innovation centre in Tunis. Ericsson will provide them with access to its IoT-platform using an 'as-a-Service' model, and will also place IoT experts as facilitators of innovation at the centre.

The vendor recently opened a service centre in the technopark which will act as a hub for its services organisation supporting customers in the Mediterranean region and Africa.

Ericsson has recently opened a new service centre at the Elgazala Technopark in Tunis to support its customers across the region.

These latest initiatives from the Government are in line with the National Strategic Plan Digital Tunisia 2018 which focuses on enabling digital technology projects with the potential to support economic development.

Citing a report published by Pyramid Research last July, Ericsson says Tunisia's telecoms market was expected to generate estimated revenues of USD1.5bn in 2015, a 4.1 per cent increase in local currency terms from 2014.

ACE

A two-phase project:

Phase 1:

- 3 segments in service:
  - France-Senegal,
  - Senegal-Cote d'Ivoire,
  - Cote d'Ivoire-Sao Tome & Principe.
- 16 countries connected on the coast, 2 landlock countries.

Phase 2, under construction or planned:

- Extension from Sao Tome & Principe to South Africa
- Canary Islands, Benin & Nigeria, Operational May 2015
- Cameroon, Democratic Republic of Congo, Angola, Namibia

ACE,

With its large bandwidth and high quality transmission technology, supports the present and future growth in telecommunication traffic between Africa and the rest of the world, reduces digital divide and drives economic and social growth.

The Africa Coast to Europe (ACE): a 17,000 km long broadband optical submarine cable between Africa and Europe

First West African nation to use cloud networking

Burkina Faso will use the cloud to enable connectivity between public departments and municipalities via an e-government platform.

The project is part of an ambitious ICT strategy being administered by the country's Ministry of Development of the Digital Economy and Posts (MDDEP), and forms an integral element of Burkina Faso's Economic and Social Development Strategy. Financing for the project is being facilitated by the Danish government through the Danida Business Finance agency which is contributing EUR30m.

Under an agreement with the ministry, Alcatel-Lucent will support network and infrastructure operations to be installed by 2017. It will supply its NFV, *Cloudband* and IP platforms which will be integrated into the government's 'G-Cloud' infrastructure. This is being built around virtualised network resources from cloud nodes in Ouagadougou and five provinces.

Around 400 buildings in 13 regional urban centres will be connected via a 513km fibre optic IP/MPLS WAN. Backhaul will be provided by an 800km fibre transmission system that will become part of Burkina Faso's National Fibre Optics Backbone.

Alcatel-Lucent will also provide a training and development programme for more than 100 government staff.

MDDEP minister Nébila Amadou Yaro said: "The G-Cloud network will allow the distribution of applications and resources at all times, wherever necessary, while providing consolidated cloud and network management. This will allow the system to be operated as a unique virtual environment."

MDDEP minister Nébila Amadou Yaro (*pictured second from right*) says the G-Cloud project will lead to micro and macro economic growth in Burkina Faso.

Safaricom sets up M-Tiba health payments

Safaricom, the PharmAccess Foundation, and CarePay have introduced a new mobile payment platform that aims to broaden access to healthcare in Kenya.

Donors are currently responsible for around 30 per cent of all health payments in Kenya, but they are often unable to track the use of their funds.

M-Tiba will deliver a mobile health wallet that channels donor funds meant for health services directly to recipients. Donations will be placed in specialised health wallets through *M-PESA*, and their use will be restricted to conditional spending at select healthcare providers who form part of a nationwide *M-Tiba* network. Donors will receive real-time access to monitor fund usage.

"We are extending the capability of the mobile phone to make a tangible difference in the way healthcare is delivered in Kenya," says Safaricom CEO Bob Collymore. "*M-Tiba* will allow services to reach previously inaccessible areas to transform the way healthcare is delivered."

Safaricom has been trialling the service at 44 clinics, and has so far reached 10,000 beneficiaries. The Pfizer Foundation is the first donor partner to utilise the *M-Tiba* platform which it is using to help people in Nairobi's slums. Safaricom hopes to develop similar solutions with other public and private partners.

PharmAccess adds that in the future, *M-Tiba* can include public and private health insurers, and also offer low cost micro-insurance products to those that couldn't be reached before.

Solarkiosk helps bring internet to villages

Solarkiosk and SES Techcom Services have teamed-up to deliver high-quality connectivity to communities around the world.

Germany-based Solarkiosk is a global energy and business gateway provider to underserved communities. Under its agreement with SES Techcom, the company will use satellite connectivity to provide internet access to underserved areas, initially in Africa.

This will be done via Solarkiosk's *E-HUBB* structures which use solar technology to provide electricity to all systems, including the satellite dish. The company says *E-HUBB* can then enable a wide range of connectivity services to the local community.

The two partners say this the first of many steps to deliver off-grid connected solar infrastructure solutions for communities worldwide, targeting individual users, businesses, schools, medical centres and farms.

Prior to its agreement with SES, Solarkiosk had already deployed several *E-HUBB*s in Ethiopia. They include two kiosks in the villages of Belela and Mero Qebado which are in the country's southern Awassa region. The *E-HUBB*s were manufactured locally in Addis Ababa and are run by local women who were trained by Solarkiosk.

The Ethiopian *E-HUBB*s are part of the *EKOCENTER powered by SOLARKIOSK* project which is run as a partnership in several countries with Coca Cola *(also see News, Feb-Mar 2015).*

One of the new Solarkiosk *E-HUBB*s in the Awassa region of Ethiopia.

MainOne connects Nigeria and Cameroon

The Nigerian-Cameroon Submarine Cable System (NCSCS) has now has gone live. Work on the NCSCS started in June 2015 following a partnership between Cameroon's Ministry of Post and Telecommunications, MainOne, and Huawei Marine Networks.

The new cable connects Kribi in Cameroon with Lagos. MainOne says the six-pair, 1,100km repeater system is being lit with 40GB capacity from day one and will deliver capacity of up to 12.8Tbps in Cameroon. It is expected to boost the country's extremely low fixed broadband penetration which is currently estimated to be around five per cent.

David Nkoto Emane, GM of Cameroon Telecommunications (Camtel), said: "The NCSCS enables us to provide users with faster bandwidth connectivity at a significantly lower cost. By providing direct connection to Nigeria, [it] will also serve to enhance Cameroon's position as the major bandwidth hub in the region and to Europe and beyond."

The system has been built with branching units to enable strategic extension. MainOne's regional executive for West Africa Kazeem Oladepo said: "The proposed extension of our submarine system to the Niger Delta region is particularly important for further development of the oil producing region of Nigeria, and will aid the region's rapid transition from an oil-dependent economy to a knowledge-focused one."

In separate news, MainOne has upgraded its submarine network between Nigeria, Ghana and Portugal to a 100G wavelength system. The upgrade was carried out using Xtera's *Nu-wave* Optima optical networking platform.

The system now has an upgradable capacity of more than 10Tbps. MainOne says it will provide a more resilient network and gives it the capability to offer higher capacity bandwidth to its wholesale customers in West Africa.

Cotecna expands African reach with hybrid network

Cotecna will use satellite connectivity from Orange Business Services (OBS) to connect its remote sites in Africa and around the world.

Based in Geneva, Cotecna specialises in solutions that help governments combat fraud, protect customs revenue, maintain internal security, and facilitate lawful commercial exchanges at national borders. It also provides the private sector with a wide range of testing, inspection and certification services, as well as assistance in trade finance services and e-documentation.

Over the last few years, the company says its business has expanded significantly in the private sector. To stay competitive, it developed a five-year digital transformation plan to simplify and reduce the administrative work of customs agents.

With its network at the core of this plan, Cotecna needed a partner with a global footprint that could reach remote sites, particularly in Africa. OBS says it achieved this with a hybrid network solution that incorporated satellite connectivity. The solution comprises a business VPN with satellite and internet for 53 Cotecna sites in 29 countries across Africa, Asia and Europe.

In addition to the hybrid network, OBS also helped Cotecna extend its *Cotrack* system into Burkina Faso and Senegal with local M2M connectivity.

The company needed a network partner with a global footprint that could reach remote sites in Africa.

The system uses M2M technology to help governments fight fraud and secure the transport of sensitive merchandise.

Co-op Bank partners with SimbaPay for diaspora money transfer services

The Co-operative Bank of Kenya has partnered with SimbaPay to offer international money transfer services to customers living overseas.

The new service is currently only available for the UK-Kenya remittance corridor. Maurice Matumo, director of retail and business banking at Co-op Bank, said: "We hope to expand this partnership to cover more regions of the world where Kenyans live and work, [and] enable the economy tap the full potential of diaspora, especially at this moment when the need for forex inflows has become critical."

Co-op says the new service will enable the diaspora to send money home without "suffering" the cost of making the cash transfer. According to the World Bank, Kenyans abroad currently send home an estimated USD2.5bn annually, making remittances Kenya's largest foreign exchange earner.

To use the service, Kenyans living in the UK with a bank account, debit or credit card need to download the SimbaPay app from the Apple or Google app stores. They can then make money transfers directly from any mobile device or computer. Co-op Bank accounts receiving funds will be credited instantly.

All 143 Co-op Bank branches have been pre-loaded on to the SimbaPay platform which eliminates the need for customers having to remember branch codes. If a branch name is not known, the SimbaPay access to *M-Pesa Pay Bill* option can be used.

Gemalto helps Guinea to modernise national voter register ahead of elections

Gemalto's *Coesys Mobile Enrollment* portable biometric citizen registration kits were used to register voters, even in remote areas.

Gemalto modernised Guinea's voter register on behalf of CENI, the country's National Independent Electoral Commission. The aim was to ensure that millions of eligible voters were enrolled accurately and reliably ahead of the elections that took place last October.

The digital security specialist says it provided CENI with the benefits of a single source, end-to-end secure solution that upgraded Guinea's existing voter registration system and processes. 5,000 operators were hired and trained to successfully conduct the enrolment of voters across the country and abroad.

As part of the process, they used Gemalto's *Coesys Mobile Enrollment* (sic) portable biometric citizen registration kits. 2,500 units were used throughout Guinea, reaching even the remotest parts of the country where there is limited infrastructure.

The company also delivered a back-end solution comprising an automatic fingerprint identification system to ensure unique and verifiable registration of citizens.

USF strategy roadmap

The Communications Authority of Kenya has released the initial findings of a study commissioned to provide a roadmap for its universal service fund (USF) strategy. It revealed that around 94.4 per cent of the population has access to ICT services while 5.6 per cent remain unserved, accounting for around 2.66 million people. Of the KES2.94bn USF collected so far, KES1.5bn has been set aside for projects focusing on voice and broadband. The authority says tenders for infrastructure will be advertised from September 2016.

GDP boost from mobile

The mobile industry contributed USD102bn to the region's economy in 2014, according to the GSMA's *Mobile Economy – Sub-Saharan Africa 2015* report. The association said this was equivalent to 5.7 per cent of the region's GDP, with mobile operators directly contributing 1.7 per cent or USD31bn. It forecasts the industry to contribute USD166bn in value to the region by 2020 which will be equivalent to eight per cent of expected GDP.

Remittance corridors

Users of *MTN Mobile Money* in Rwanda and Safaricom's *M-PESA* in Kenya can now send and receive remittances between themselves seamlessly. In Rwanda, they can send funds via their mobiles and are shown the equivalent amount to send based on prevailing forex rates. However on the receiver's side, Safaricom has a transaction limit of KES70,000 for *M-PESA* users. MTN has also recently introduced cross-border transactions with MTN Uganda. Both services are supported by mobile wallet aggregator MFS Africa.

Critical Communication made easy

DAMM is a world-leading provider of Critical Radio and broadband Communication solutions to industrial, commercial and public safety customers. The DAMM TetraFlex® system is 100% IP based. It offers the most rugged, reliable and easily scalable communication system available for mission critical communication. The full package from DAMM includes infrastructure, built-in applications as well as soft terminals.

A Cross-technology one-box solution
DAMM's latest innovation, the new BS422 outdoor base station, is a cross-technology one-box solution offering TETRA, DMR Tier III, TEDS and Analogue in one integrated system. With the new BS422 Outdoor Base Station you can work across technologies and be more flexible than ever. Simply choose the technology to match your current needs – and scale anytime to meet changing voice and data demands with a simple click. Additionally the BS422 offers improved synchronisation, improved redundancy, high power and an extended frequency range.

Need to Go Hybrid?
The BS422 allows hybrid usage combining multiple technologies in one coherent system with full integration. This can be done in a more permanent network setup, where several technologies, for example TETRA and TEDS are combined in one system to meet the need of voice and data communication.

Need to migrate from Analogue?
The unique BS422 enables easy migration from Analogue to digital. Same hardware, same software – simply upgrade to digital with one click. Combine multiple technologies in one system and secure a smooth, efficient migration with the use of existing Analogue radios in an Analogue/TETRA setup.

Need the flexibility to scale in coverage and capacity?
The open decentralized architecture, based on a true IP backbone, makes DAMM TetraFlex® easy to scale. You can not only scale freely in coverage, but also in redundancy and number of carriers.

The DAMM TetraFlex® Product portfolio
The DAMM TetraFlex® System comes complete with outdoor or indoor base stations used in any combination and now even across technologies.

DAMM offers built-in applications including Network Management, Dispatcher, Voice & Data Log System and Group Bridge giving you full control and allowing you to manage your assets and improve performance. With the TetraFlex® Client you can use your tablet or smartphone to benefit from coverage extension, as well as data capacity for videos and pictures. The complete range includes Android, iOS and Windows, offering communication operating through WiFi, LTE(4G) or other technologies.

The DAMM TetraFlex® Concept
The DAMM decentralised infrastructure means the network design is a 100% IP-based architecture with distributed intelligence. This gives full flexibility in site and capacity expansions, meeting the constantly changing needs of the industry. Each site can stand alone with the full TETRA feature set. DAMM TetraFlex® offers integrated solutions with a true IP backbone, and boasts features that are ideal for mission critical communications, such as scalability, redundancy and remote management.

Trusted by industry leaders worldwide
Hundreds of successful companies worldwide have put their trust in DAMM´s TetraFlex® system, and are now enjoying the benefits of staying agile in a changing and highly competitive market. Let's help you think big, start small and scale fast.

Contact damm.dk to learn more

NCC tells MTN Nigeria it's had "the carrot" but still faces "the stick"

MTN has not paid the multi-billion dollar fine it was hit with by the NCC (Nigerian Communications Commission) last year.

The penalty relates to MTN Nigeria's late disconnection of 5.1 million improperly registered subscribers in August and September 2015 *(see Wireless Business, Oct-Nov 2015)*. The commission originally issued a fine of one trillion, forty billion naira (around USD5.2bn), but in early December this was reduced by 25 per cent to NGN674bn (around USD3.4bn).

MTN was ordered to pay by 31 December 2015, but the company is still challenging the decision. At the time of writing, temporary executive chairman Phuthuma Nhleko was still in discussions with the Nigerian authorities, and said he will follow "due process" before reaching a final decision on behalf of the company.

NCC director Tony Ojobo said punishing MTN will help "sanitise" the operating environment.

The NCC is likely to remain intransigent over the issue and appears keen on wanting to make an example out of MTN.

In a recent statement, the commission's director of public affairs Tony Ojobo said: "This sanction is good for us because it will instil discipline, move our market forward, sanitise our operating environment, and also show that the regulators are alive to their responsibilities in the sense that we don't have any preferences when our regulations are abused.

"What we have applied is a carrot and stick approach. The stick was the sanction; the carrot was the waiver of 25 per cent."

Following a hearing on 22 January of this year, a judge at the Federal High Court in Lagos decided to adjourn the matter to 18 March in order to enable all parties to try and settle before formal legal proceedings begin.

In a separate development, there are further woes for MTN, this time in Cameroon. In January it emerged that CONAC, the country's National Anti-Corruption Commission, included MTN Cameroon amongst the companies indexed in a recent report.

In a press statement issued soon after, MTN said: "While waiting to receive a copy of the said CONAC report, the management of MTN Cameroon wishes to reassure its stakeholders that MTN Cameroon is not, and has never been, implicated in corruption-related actions in the exercise of its activities."

MTN Cameroon said it has always had "transparent" dealings with the local government. The operator added that it is one of the two biggest contributors to the state in terms of taxes and customs duties.

Nokia now controls Alcatel-Lucent

Nokia has completed its acquisition of Alcatel-Lucent. In January, the Finnish company said it had gained control after buying nearly 80 per cent of Alcatel-Lucent's outstanding shares through a public exchange offer.

Nokia first announced plans of the merger last year in a deal which, at the time, valued Alcatel-Lucent at EUR15.6bn *(see Wireless Business, Apr-May 2015)*.

Nokia Corporation – the name given to the merged entity – has now assembled its new leadership team and board of directors.

Rajeev Suri remains president and CEO while Risto Siilasmaa continues as chairman. Olivier Piou has been elected vice chairman.

Suri also chairs the group leadership team which, amongst others, includes: Samih Elhage as president of mobile networks; Basil Alwan as president of IP/optical networks; Ramzi Haidamus as president, Nokia technologies; Ashish Chowdhary as chief customer operations officer; and Marc Rouanne as chief innovation and operating officer.

New operating structure at MTN

The MTN Group has reviewed its operating structure in a bid to strengthen business oversight, leadership, governance and regulatory compliance across all its operations in MEA.

The group will re-implement its previous reporting structure and cover three regions: West and Central Africa (WECA); South and East Africa

INVESTMENTS, MERGERS & ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
10/11/15	Helios Investment Partners	Orange	70% stake in Telkom Kenya	NA	Orange's deal to sell its entire stake in Telkom Kenya remains subject to approval from the relevant authorities. Telkom Kenya is third in the country's mobile market and also its incumbent fixed-line operator. According to the local regulator, it had four million mobile users at the end of June 2015.
1/12/15	Unnamed telco in West Africa	Tecnotree	Various OSS/ BSS systems	USD3.5m	Tecnotree says its solutions will enable the operator to improve subscriber loyalty, boost brand reputation, offer personalised product bundles, build a sustainable competitive advantage, & enhance customer experience.
22/12/15	O3b Networks	Various investors	Finance package	USD358m	Package comprises $184m in a covered COFACE bond, along with $143m in equity & $31m in debt. O3b is using the funds to purchase eight new satellites & launch four of them.
29/12/15	SpeedCast International	NewCom International	Company	NA	Satcoms provider NewCom specialises in the South & Central American regions. SpeedCast says the acquisition will strengthen its capabilities to serve & support its customers globally, including in the South American market where it did not previously have a direct presence.
12/1/16	Orange Côte d'Ivoire	Cellcom Telecommunications	Cellcom Liberia	NA	Orange will acquire 100% of Cellcom's Liberia subsidiary which is said to be the country's leading mobile operator. Orange says the deal – which is subject to approvals – will "strengthen" its positions in Africa; describes the continent as a "strategic priority" for the group.
13/1/16	Orange	Bharti Airtel	Airtel Burkina Faso & Airtel Sierra Leone	NA	Orange to acquire 100% of each companies' share capital. The outlay for the transactions will be based on their financials for the year ended 31 March 2016, & represent the equivalent of 7.9 times Airtel's EBITDA in these two countries at this time. Consolidated revenue of the two companies is around €275m.

(SEA); and Middle East and North Africa (MENA). A number of senior management changes have been made to support the restructure *(see New Appointments table, below)*.

Jyoti Desai has assumed the new position of group COO, and MTN says a replacement for her previous role of group chief technology and information officer will be announced soon.

In the meantime, the company is still searching for a new CEO following the resignation of Sifiso Dabengwa last year in the wake of the NCC fine *(see previous page)*.

SkyVision to use ABS-3A

SkyVision will support DTH services across sub-Saharan Africa using capacity on *ABS-3A*. Under the terms of the deal, it will help deliver two new Ku-band-based video platforms covering free-to-air channels and pay TV markets, including Francophone countries and South Africa.

SkyVision operates more than ten satellite platforms, a network of high-capacity fibre via its gateways in Africa, Europe, North America and the Middle East, as well as multiple POPs in Africa. It will connect this global hybrid system to the internet backbone via *ABS-3A*.

The company claims this will enable "superior" distribution services of special events, news and DTH channels from Asia and Europe to Africa.

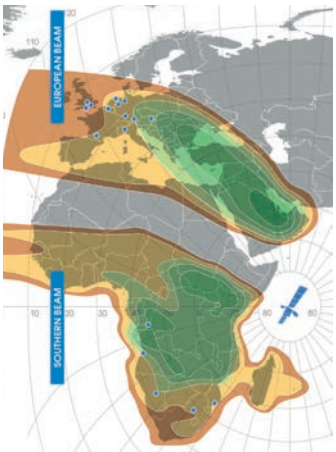
RSCC capacity to help Castor grow

Castor Networks will provide satcoms services in Africa using capacity on the Russian Satellite Communications Company's (RSCC) *Express-AM8* which orbits at 14°W.

Under the terms of the contract, the European service provider will use two transponders. The company says it will utilise the new capacity to enable the continued expansion of its business in the maritime industry, and support existing contracts with private mining and energy companies on the continent.

In order to ensure the highest quality and reliability of services provided via *Express-AM8*, RSCC says Castor has installed a nine metre antenna at its teleport based in Burum, Netherlands.

Castor plans to continue upgrading its ground-based facilities to support the operation of its teleport with the RSCC fleet. RSCC will also use the teleport in Burum to provide services through its other satellites.



Sat-Space Africa will use *Yamal-402*'s southern and steerable beams.

More space for Sat-Space

Sat-Space Africa has doubled the amount of leased capacity it uses on Gazprom Space Systems' (GSS) *Yamal-402* satellite. The capacity will allow the company and its customers to expand their capabilities to provide high-quality internet access on the continent.

Sat-Space Africa will use *Yamal-402*'s southern beam which covers sub-Sahara Africa, as well as a steerable beam pointed over Angola, Congo, DRC, Namibia, Tanzania, Zambia and neighbouring countries.

With its head office in Mauritius and an operations office in Windhoek, Sat-Space Africa offers IP connectivity solutions using fibre, satellite and other wireless networking technologies.

Globacom and Vodafone team-up

Globacom and Vodafone have signed a new non-equity partnership agreement that covers Nigeria and the Republic of Benin.

Under Vodafone's Partner Market agreement, the two operators say they will work together to "significantly" boost the experience for customers, utilising a wide range of their mobile, voice and data products, and global experience.

Vodafone says it now has Partner Market agreements with operators in 57 countries across the world. With this latest contract, chief executive Stefano Gastaut says Vodafone will gain from Globacom's "expertise and deep understanding" of African markets.

He adds: "This strategic partnership with Globacom for Nigeria and the Republic of Benin will help deliver enhanced roaming benefits for Globacom's consumer and multinational corporate customers, including countries where we have an ultra-fast 4G network.

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
12/11/15	Amr Karim El-Leithy	Nokia Corporation	Head of Middle East & Africa	Alcatel-Lucent	President, Middle East, Turkey & Africa
26/11/15	Youssef El Masri	Ooredoo Tunisia	CEO	Ooredoo Tunisia	COO
1/12/15	Karl Toriola	MTN West & Central Africa	Regional VP	MTN Nigeria	CTO
1/12/15	Ismail Jaroudi	MTN Middle East & North Africa	Regional VP	MTN Syria	CEO
1/12/15	Michael Ikpoki	–	–	MTN Nigeria	CEO – resigned
1/12/15	Akinwale Goodluck	–	–	MTN Nigeria	Head of regulatory & corporate affairs – resigned
1/12/15	Ferdi Moolman	MTN Nigeria	CEO	MTN Nigeria	CFO
1/12/15	Amina Oyagbola	MTN Nigeria	Head of regulatory & corporate affairs	MTN Nigeria	Head of regulatory affairs
28/12/15	Juliet Anammah	Jumia Nigeria (Africa Internet Group)	CEO	Accenture	Partner & MD of consumer goods practice, Nigeria
11/1/16	Jon Eddy	VimpelCom	Head of emerging markets	dtac	CEO
13/1/16	Scott Jackson	Infinera	VP, subsea business group	4-D Security Solutions	CTO
14/1/16	Christopher Schlaeffer	VimpelCom	Chief digital officer	yetu & NYOUM	Founder & CEO
15/1/16	Scott Willis	Zinwave	CEO	Goodman Networks	EVP & chief sales & marketing executive
19/1/16	Howard Watson	BT (British Telecom)	CEO of technology, service & operations, & Group CIO	BT	Chief architect & MD global IT platforms
19/1/16	Patrick Joggerst	GENBAND	EVP of global sales & marketing	GENBAND	CMO
2/1/16	Nick Watson	Ruckus Wireless	VP EMEA	VP EMEA	HP Networking

Managing the bias in spectrum valuation

If mobile operators encounter the 'principal-agent problem', it could force up prices in a spectrum auction, says GRAHAM FRIEND.

Over the next few years, regulators across Africa will be looking to award the 700 and 800MHz digital dividend spectrum to mobile operators. The process by which this will be awarded will vary from market to market, but irrespective of the process, regulators will almost certainly be seeking to raise significant revenues from the sales.

Before they hand over potentially large amounts of cash, operators will therefore need to estimate their value for the spectrum to ensure they do not overpay. Groups with a strong presence in Africa, such as Airtel, Millicom, MTN, Orange, Vodafone, will often delegate this task to the local business unit. This makes perfect sense as the local management team have a better understanding of the value of the spectrum compared to the head office.

But the task of spectrum valuation can be extremely challenging, and unfortunately the local business unit often lacks the skills and resources to perform an investment grade valuation exercise.

There are many factors that influence the price paid for spectrum at auction and these include the design of the auction itself, the number of bidders, the packaging of spectrum into lots, and the prospect of additional spectrum being awarded in the future.

MNO shareholders will, of course, hope that the prices also reflect the value of the spectrum to the business and this is where bias in the valuation process can result in higher than expected prices.

Asymmetry of information causes confusion

Economists like to talk about the 'principal-agent problem'. This can occur when an agent (the management of a mobile business) make decisions (the value of spectrum and how much to bid), that affect the principal (the shareholders of the business).

The problem arises when agents are motivated to act in their own interests, which are not aligned with that of the principal. This results in an asymmetry of information between the agent (who is better informed) and the principal, such that the principal cannot ascertain whether the agent is acting in their best interests or not.

Graham Friend, Managing director, Coleago Consulting

The complexity of the process makes it inevitable that the management team have more insight into the true value of spectrum compared to the shareholders.

It is therefore not surprising that the combination of poorly aligned incentives and asymmetries in information can introduce a significant upward bias in the spectrum valuation process. In nearly every spectrum auction there will be an element of bias leading to upward pressure on prices.

A key question for shareholders or group level executives is how to manage the principal-agent problem. A number of clients have provided us with a very clear mandate to develop an unbiased and independent view of the value of spectrum in order to circumvent the principal-agent problem.

However, the asymmetry of information remains. We have observed local business units sometimes seeking to 'game' the valuation process in order to support higher valuations. In these circumstances, the spectrum valuation process requires a high degree of political, facilitation and persuasion skills on the part of the consultants. They have to provide an unbiased view of spectrum values whilst forging consensus between the group, business unit and the consulting team to ensure the final valuations have full support.

The process of building consensus is best achieved by adopting a spectrum valuation approach that seeks to minimise subjective judgements and uses an evidence-based approach to developing key assumptions. However, as long as shareholders continue to delegate the task of spectrum valuation to the business unit, there will always remain a risk of an upwards bias in the valuation process.

Before they hand over potentially large amounts of cash to regulators, operators will need to estimate their value for the spectrum on offer to ensure they do not overpay.

Block upconverters feature built-in testing

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

MANUFACTURER: AnaCom

PRODUCT: ELSAT

MORE INFORMATION: www.anacominc.com

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

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

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

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

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

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

CommScope first with "intelligent" RRU power supply

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

MANUFACTURER: CommScope

PRODUCT: PowerShift

MORE INFORMATION: www.commscope.com

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

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

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

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

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

Sepura enhances TETRA picture messaging solution

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

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

MANUFACTURER: Sepura

PRODUCT: IMAGE 3.0

MORE INFORMATION: www.sepura.com

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

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

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

xStats correlates LTE metrics from third-party OSS

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

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

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

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

MANUFACTURER: SevOne

PRODUCT: xStats

MORE INFORMATION: www.sevone.com

Centralised power system allows faster network rollouts

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

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

MANUFACTURER: Eltek

PRODUCT: High Voltage DC

MORE INFORMATION: www.eltek.com

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

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

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

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

Lightening the load for body-worn cams

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

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

MANUFACTURER: Motorola Solutions

PRODUCT: Video Speaker Microphone

MORE INFORMATION: www.motorolasolutions.com

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

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

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

Turning customer data into revenue

With end users expecting always-on connectivity, carriers, managed service providers and enterprises are looking for new ways to better monetise network services.

ADTRAN reckons it's come up with the solution with *ProCloud Analytics*. It says this enables providers and organisations to capture customer demographics and translate that data into actionable business intelligence.

MANUFACTURER: ADTRAN

PRODUCT: ProCloud Analytics

MORE INFORMATION: www.adtran.com

The company says the first natural application for *ProCloud Analytics* is in the wireless network. After a patron logs onto a Wi-Fi network, the software enables the authorised collection of the user's email, name, age, gender, home town, type of device used to connect, birth date and more.

What's described as a "sophisticated" built-in marketing platform within *ProCloud* is said to make it easy for network owners to push targeted emails or text messages and incentives

based on a wide range of criteria. For example, ADTRAN says retailers can automatically welcome a first-time customer with a coupon, or reward frequent visitors with a free gift.

Analytics is part of the firm's range of *ProCloud* managed services. It says this provides an "easy" solution to layer on top of a service provider's existing offerings for a wide range of customers and vertical markets.

ALSO LOOK OUT FOR

DMR standard is enhanced

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

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

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

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

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

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

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

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

Rocket power

OneWeb and Airbus Defence and Space have set-up a new joint company to design and build 900 satellites as part of an ambitious mission to eliminate the digital divide by 2019.

With a host of satellite launches scheduled for 2016 and beyond, RAHIEL NASIR looks at what's on the horizon for Africa.

2016 year will prove to be a milestone year for Intelsat as it has now launched the first satellite to use *EpicNG*, its much vaunted platform for high-throughput satellites (HTS). *Intelsat 29e* went up on 27 January. While it is aimed at the Americas and the North Atlantic region, it will be followed during the second half of 2016 by *Intelsat 33e* and *Intelsat 36*, as well as *Intelsat 35e* in 2017. All three will cover Africa.

Located at 60°E, *IS-33e* will offer C-band coverage for sub-Saharan Africa and spot beams, Ku-band multi-spot and transatlantic beams, and a Ka-band beam. It will also serve Europe, the Middle East and Asia. *IS-36* will feature Ku- and C-band transponders, and will be co-located with *IS-20* at 68.5°E, Intelsat's premier DTH neighbourhood in Africa. *IS-35e* goes up to 325.5°E next year from where it will offer Ku- and C-band spot beams for the continent.

Space age platforms

EpicNG is designed to use C-, Ku- and Ka-bands, wide and spot beams, as well as frequency reuse technology to provide a variety of customer benefits. The platform is fully integrated with Intelsat's existing fleet and global *IntelsatOne* terrestrial network. The company reckons it provides "unprecedented adaptability" for a customer's network configuration and topology, allowing them to leverage installed hardware and to operate mixed spectrum networks.

One of *EpicNG*'s features is an all-digital payload design that was initially developed by Boeing for use on the US Department of Defense's Wideband Global SATCOM satellites. Intelsat says it allows connectivity in any bandwidth increment from any beam to any beam, and means independent frequency selection of the uplink and downlink.

The company goes on to claim that *EpicNG* will provide three to five times more capacity per satellite than its traditional fleet. It adds that the expected throughput will vary according to application and satellite, but is expected to be in the range of 25-60Gbps which is typically 10 times more than its traditional fleet.

Gilat Satellite Networks (GSN) is also aiming to break new ground in the market with its own platform. Using software-defined networking, the company says its distributed *X-Architecture* offers a single system for satellite operators and service providers to address the growing demands of HTS.

According to the company, the programmable cloud-based architecture supports networks of any size, and uses traditional wide beam and high-throughput satellites to deliver managed services in hosted or virtual business models.

GSN says *X-Architecture* has been built to support dynamic on-demand services, and features unique cloud bandwidth management capabilities which allow both mobility and VNO services over spot beam satellites.

The firm adds that flexibility is enabled by a distributed architecture which separates data centre functions from baseband elements. It claims the network is easily controlled by *TotalNMS*, its global, unified and centralised network management system.

Not one to be left behind, Eutelsat is also developing a software-based system. It says *Quantum* will be the first universal satellite to repeatedly adjust to business requirements and be able to operate in any geographic region in the world.

The company claims its programme represents a first in the commercial satellite industry by enabling the complete electronic synthesis of 'receive' and 'transmit' coverages in Ku-band, including on-board jamming detection and mitigation.

Using *Quantum*, clients will be able to actively define the performance and flexibility they need. Eutelsat says it will give them access to premium capacity through footprint shaping and steering, power, and frequency band pairing. The first *Quantum* class satellite will be manufactured by Airbus Defence and Space (ADS) and is expected to launch in 2018.

Meanwhile last August, Eutelsat launched its 38th satellite in the shape of *EUTELSAT 8 West B*. Two months later, the spacecraft entered commercial service and is now already said to be broadcasting TV channels to more than 52 million homes in North Africa and the Middle East.

Equipped with 42 Ku- and 20 C-band transponders, *EUTELSAT 8 West B* is co-located with a constellation of satellites operated by Eutelsat and Nilesat at the 7/8° W neighbourhood.

Eutelsat says it completed a "seamless" overnight upgrade of more than 210 television channels onto the new satellite from two of its satellites located at 7/8° W. *EUTELSAT 8 West A* and *EUTELSAT 8 West C* have now been relocated, enabling the company to further optimise its fleet.

Going electric

Looking further ahead, Eutelsat's next step in its broadband strategy for Africa includes a new-generation HTS from Thales Alenia Space (TAS). To be launched in 2019, the all-electric spacecraft will be the first to use Thales' new *Spacebus NEO* platform.

Eutelsat says the baseline mission will be to provide 75Gbps of capacity across a network of 65 spot beams that together provide "quasi-complete" coverage of sub-Saharan Africa. It says the satellite will address consumer and enterprise broadband services using dishes from around 75cm. It will also be used for community networks connected to Wi-Fi hotspots, mobile backhauling and rural connectivity.

Eutelsat's African broadband business, including sales, will now be managed by a newly created London-based affiliate.

According to TAS, *Spacebus NEO* offers a fully modular platform with "a smart Ka-HTS payload for unrivalled flexibility and maximum throughput". It adds that the all-electric version of the platform combines high efficiency and light weight, and will also mean that Eutelsat benefits from more cost-effective launch options.

The all-electric *NEO* is currently capable of carrying payloads weighing more than 1,400kg, and with power exceeding 16kW. During the coming months, Eutelsat has the option to upscale the satellite to significantly increase overall throughput and service areas. Starting this year, TAS says *NEO* will be able to handle payloads up to 2,000kg, with "record power" of 20kW.

Following last year's launch of *ABS-3A* – one of the world's first satellites to use an all-electric propulsion system – ABS is now finalising plans for *ABS-2A*. It is expected to lift-off on a SpaceX *Falcon 9* rocket in the coming months, and like *ABS-3A* it has been built using Boeing's all-electric *702SP* platform.

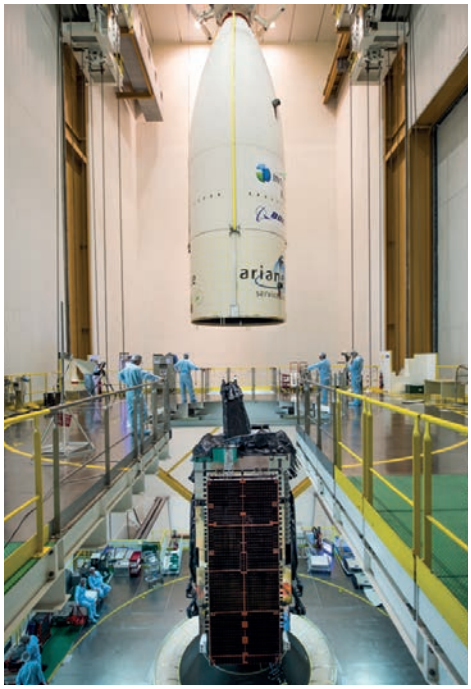
ABS-2A will be co-located with *ABS-2* at 75°E from where it will serve Africa, the Middle East, South and South East Asia, and Russia. It is designed with 48 transponders and five dedicated high powered Ku-band beams, and ABS says it is suitable for DTH services, VSAT operators, as well as maritime and mobility solutions.

Yahsat continues its preparations for the launch of its third satellite which is scheduled for the final quarter of 2016. The UAE-based firm says the Ka-band *Al Yah 3* will bring additional connectivity into 18 African countries for consumers and enterprises. The spacecraft is currently being manufactured by Orbital Sciences Corporation using its *GEOStar-3* platform and hybrid electric propulsion system. Arianespace has been awarded the launch contract.

Last November, Yahsat announced it had signed an agreement with Hughes Network Services for the delivery of its *JUPITER* system and related network operations services in support of its expansion across Africa in 2017. Hughes will supply gateways and broadband terminals together with its OSS and BSS solutions as turnkey outsourced managed services.

Yahsat CCO David Murphy said the partnership signifies a "major milestone" for the successful rollout of services from *Al Yah 3*: "Our long-term relationship with Hughes Network Systems will allow Yahsat to better address evolving market requirements in Africa, from broadband access to mobile backhaul for telcos and ISPs. Moreover, as the new Ka-band coverage becomes live, the *JUPITER* platform will ensure consistency and smooth transition across the respective countries."

New satellite-based internet provider OneWeb reckons it will "fully bridge" the digital divide by 2019 with its innovative system of low Earth orbit satellites *(see News, Jun-Jul 2015)*. It has now joined forces with Airbus Defence and Space to create the OneWeb Satellites company. Under their joint venture, the two partners will design and build 900 satellites for OneWeb as well as spacecraft for other future constellations marketed by ADS.



The payload fairing being positioned over *Intelsat 29e* which is integrated to the top of an *Ariane 5* launcher. It went on to a successful launch on 27 January 2016, and is the first of Intelsat's satellites to use the revolutionary *EpicNG* HTS platform.

OneWeb Satellites will undertake all design activities for the entire OneWeb fleet. The manufacture of the first 10 prototypes will take place at a newly set-up production line at ADS' factory in Tolouse, France, with mass production of the operational satellites planned for North America.

Each satellite will weigh less than 150kg and operate at an altitude of somewhere between 99 to 1,200 miles. They will be launched by Arianespace and Virgin Galactic starting from 2018, and reach their orbital positions using electrical propulsion.

Other birds to watch for

The Russian Satellite Communications Company (RSCC) added two more orbiters to its fleet with the launch of *Express-AMU1* and *Express-AM8*. Of the 13 spacecraft it now operates under its own name, six have dedicated footprints over Africa.

Express-AMU1 was launched to 36°E from the Baikonur Cosmodrome on 25 December 2015. Following the successful completion of in-orbit tests, it is expected to enter commercial service in February. It carries a Ku- and Ka-band payload aimed at developing broadcasting and broadband services in sub-Saharan Africa and the European part of the Russian Federation.

Eutelsat is leasing transponders on *Express-AMU1* to provide follow-on and expansion capacity for *EUTELSAT 36A*. It will commercialise its services on the Russian spacecraft under the name *EUTELSAT 36C*.

Express-AM8 went live at the start of December following its launch two months earlier. Orbiting at 14°W, it features fixed C-band beams for Africa and the Americas, plus fixed Ku-band beams for Africa, Europe and the Middle East. The new satellite will support broadcasting, data and internet access, corporate and agency-owned communications networks, as well as communications services for maritime and other users in the mobility sector.

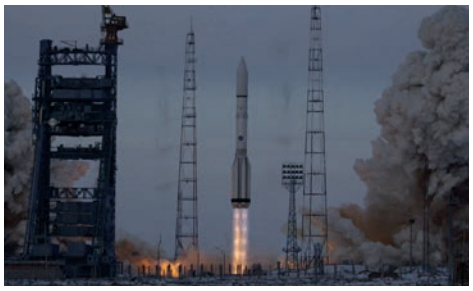
On 10 November 2015, Arabsat launched *Arabsat-6B (BADR-7)*, the first of the sixth generation of satellites in its fleet. From its orbital location at 26°E, *BADR-7* will provide telecoms and DTH broadcast services for the Middle East, Africa and Central Asia. It is fitted with 27 Ku-band transponders and offers multiple Ka-band spot beams. The operator now has six spacecraft in orbit and all of them cover Africa.

Luxembourg-based satellite operator Fibersat has already signed up to use Ka-band capacity on Arabsat's next-generation satellites to provide extensive coverage over the continent using an innovative new system. The company is planning to launch its *Fibersat-1* HTS payload in 2018. This will use beams that are smaller than conventional geo satellites but are claimed to be capable of

delivering up to 100 times more bandwidth. Fibersat claims its optimised payload design will enable satellite services to be offered at the cost of fibre throughout Africa.

For Arabsat, the deal means it will be able to expand its coverage across the region. Speaking last year, CEO Khalid Balkheyour said: "This cooperation with Fibersat will position Arabsat as a major service provider to the growing markets of sub-Saharan Africa, with a portfolio of broadband and telecom services. By employing an innovative payload design in Ka-band, Arabsat will have blanket coverage over the MEA region."

Thai satellite operator Thaicom is planning to launch its second satellite for Africa. *THAICOM 8* will be located at 78.5°E and will also provide services to Thailand and India via a Ku-band payload comprised of 24 transponders. It is being built by Orbital ATK and will be launched from a SpaceX *Falcon 9* rocket later this year. *THAICOM 6* – also known as *AFRICOM 1* – was launched in 2014 and offers C-band capacity to the continent.



Clockwise from top left: RSCC's *Express-AMU1* is rolled out to the launch pad at Baikonur; after leaving Earth in 2011, *AMOS-5* is now lost in space; Thales Alenia Space says its all-electric *Spacebus NEO* platform will be able to handle payloads with record power of 20kW; *Al Yah 3* will bring connectivity to 18 more African countries for Yahsat.

What happened to AMOS-5?

As well as satellites going up, Africa was hit by the tragic news of a satellite going down. At around 06.00 GMT on 21 November 2015, Spacecom lost all communications and signals from *AMOS-5* which covered the continent from 17°E. In the days that followed, the company said it was working around the clock to re-establish links.

But in documents that have been filed with the Tel-Aviv Stock Exchange over the last few weeks, Spacecom said *AMOS-5* had suffered an "absolute failure" and was now a "total loss". The operator has filed an insurance claim for around USD158m which it believes will be paid, hopefully during the first quarter of this year.

AMOS-5 was built around the *Express-1000H* platform by Russia's Information Satellite Systems (ISS)-Reshetnev Company. It was launched in 2011, and had an expected lifespan of 15 years.

In mid-December, ISS-Reshetnev issued a press statement which said that it had set up a commission, headed by its deputy general director for quality Yuriy Maximov, to search for possible causes of the failure.

According to the telemetry data that *AMOS-5* had been sending until the moment it failed, ISS-Reshetnev said there were no signs of troubles and that all systems were running nominally.

It added that while the satellite remains at its assigned orbital position as seen from the ground, it has completely lost power and its further operation is therefore not possible.

The statement continued: "The most likely cause is the total failure of its onboard electric supply system or the 100V cable network bus. Or it is also possible that the satellite failed due to the external exposure of a critical element of the power supply system or the onboard 100V cable network bus to high-energy cosmic ray particles. Among other possible causes are the problems in the satellite's tracking, telemetry and command system or its payload."

ISS-Reshetnev's commission continued its investigations into the root causes of the malfunction, and its assessments included data analysis received from Thales Alenia Space which built *AMOS-5*'s payload, tracking, telemetry and command system. The Russian manufacturer was due to submit a report to Spacecom at the end of last year but the details of this have not been made public, and are unlikely to be.

In the meantime, Spacecom told *AMOS-5* customers that it would work with them to restore their services and negotiate deals on their behalf to switch to other satellites operators. For instance, the company has extended an existing framework agreement it has with Eutelsat for the cross-commercialisation of Ku-band capacity on *EUTELSAT 16A* which is positioned at 16°E.

SpeedCast International said it was able to restore most of its customers' links within 48 hours after the loss of *AMOS-5*. It migrated users to MEASAT's *AFRICASAT-1a* and Intelsat's *10-02*. German operator CETel said it was also standing by to offer contingency services in Africa with available capacity on various satellites from Arabsat, Intelsat, SES or ABS.

According to local press reports, Spacecom said the total loss of *AMOS-5* will have a "negligible effect" on its equity. The company remains on track to launch *AMOS-6 (see News, Oct-Nov 2015)* this year although it is now expected to go up in May instead of around March as originally planned.

AMOS-6 has not been developed by ISS-Reshetnev. Instead, it has been built by Israel Aerospace Industries which was also responsible for the three remaining satellites Spacecom currently has in orbit. ■

In 2014, a SpaceX *Falcon 9* was used to launch *AFRICOM 1*, Thaicom's first satellite for Africa. The vehicle will also be used for its second, *THAICOM 8*, as well as ABS's *ABS-2A*, both later this year.

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Welcome to the middle of nowhere

TETRA is helping to keep workers safe at the Namdeb Diamond Corporation, a joint venture between the Namibian Government and De Beers.

How PMR technologies are playing a unique role in providing mission-critical communications for remote operations in the mining and energy industries.

Certain industrial sectors have unique communication requirements that cannot be met using conventional technologies, and they therefore require a more specialised approach. This is certainly true of companies operating in mining, utilities, as well as oil and gas. Working in remote locations, often in extreme climates, together with constant exposure to hazardous environments, is usually the norm in these industries. What's more, any downtime caused by a communication failure is likely to cost. Big time.

Critical communication technologies therefore have a crucial role to play in the mining, utilities and energy sectors, and South Africa-based Altech Alcom Matomo (AAM) is one company that can offer expertise in this area.

As an example, it recently announced the completion of a digital communications network rollout for the Namdeb Diamond Corporation, a joint venture between the Namibian Government and De Beers. The heart of the company's excavation activities are along Namibia's south west coast, while its main land-based operations are in Oranjemund, as well as in satellite mines near Lüderitz and along the Orange River.

Namdeb employs around 1,600 people and states that safety is its number one priority. As a testament to its "Zero Harm" policy, the company says it has continuously retained its Occupational Health and Safety Audit Standard and ISO 14001:2004 certifications.

In an effort to further enhance safety and security at its mines, Namdeb implemented an integrated digital communications network from Altech Alcom Matomo, a division of Altech Radio Holdings. AAM says it was chosen for the network upgrade because of its "proven" track record of implementing similar solutions in the public and private sectors. With safety and reliability as key components of the tender request, the firm claims it "met and exceeded" those expectations with the deployment of Motorola's TETRA 8.1 platform.

"Namdeb's two principal safety concerns are the mineworkers themselves and the rough diamonds recovered from the mining operations," said AAM MD Brett Nash. "A reliable communications system will enable Namdeb's mineworkers to be in touch with the central control system should they find themselves in a dangerous predicament."

Other than the planned analogue-to-digital migration, Namdeb also required an integrated radio network to ensure effective and secure inter-communication between personnel, departments, and mining areas. AAM's solution here centred on 13 remote TETRA sites spread throughout the mine. In addition, the network consists of one central switching office, two microwave link sites, three emergency control centres, one network control centre, and 1,500 two-way radio users.

The digital network and two-way handsets connecting users have proven to be reliable in an environment that is severe, dusty and corrosive. Jan Sutherland, Namdeb's project manager, strategic projects, said: "Since the nature of the terrain and mining conditions determine the quality of the communications network required, we had to be particularly strategic in our approach, ensuring the equipment rolled out would be both sufficiently durable and resilient."

Sutherland added that nearly 70 per cent of the project was implemented as a 'green site' with solar power supplying electricity to the microwave and TETRA transceiver equipment.

Namdeb's first sites went live in May 2014, and the project was completed in its entirety in December 2014. Around ten months later, AAM said a network performance report revealed system availability of 99.999 per cent, with nearly one million calls made during one month alone.

Emcom powers Eskom

Eskom is South Africa's primary electricity supplier and is responsible for around 95 per cent of the country's electricity requirements – claimed to be more than half of the power generated in the whole of the continent. The company handles the generation, transmission and distribution of electricity from its 24 power

stations with a combined nominal capacity of 40,585 megawatts, and more than 16,442 miles of transmission lines.

The maintenance and repair of this huge electricity transmission network requires an efficient communications system capable of covering the vast areas supplied with power, allowing for rapid deployment of repair crews when required. Eskom has its own radio infrastructure, made up of a conventional all-informed radio network that covers the country. The network is divided into seven regions and each one has a central control point to which all repeaters in a region are connected via various bearers. However, all job dispatching was being carried out via voice communications. There was no vehicle-location system in use which would have allowed a service unit closest to the job site to be dispatched.

With a modified Tait-based radio system, South African power company Eskom now has a more efficient comms network that enables rapid deployment of repair crews.

As a result, Eskom deployed its *SMK* platform, a mobile data system that was specifically developed for it by the R&D division of Emcom Africa. The system is made up of a combination Mobile Data Terminal (MDT)/enhanced control head, a radio controller/modem, and a GPS unit fitted to Tait mobile radios which have specially modified firmware. Emcom is Tait's exclusive distributor in South Africa, and the two companies have been strategic partners for many years.

Eskom's existing radio communications infrastructure was used without modification except for the addition of modem arrays at the control points. The Tait mobile radios it had been using were retro-fitted with the data equipment as required, and a number of new mobile radio units were also supplied to make up the 2,000 needed.

The computer-aided dispatch system used by Eskom was linked to the new mobile data system, enabling automatic job allocation and the recording of progress milestones. Vehicle position information was also made available to the company's GIS system, allowing more efficient allocation of technical resources.

After the system was made operational, Eskom reported that voice traffic on its radio network was drastically cut and efficiency of job turnaround increased by some 40 per cent. Misunderstandings between dispatcher and operator have been significantly reduced with the aid of text dispatching, and operator security has increased thanks to a panic facility that is now available should the need arise. A noticeable improvement in customer satisfaction has also been recorded.

VALE gets on track with TETRA

Global mining company VALE says it has a mission to transform natural resources into prosperity and sustainable development. The Brazil-based company has historical ties with Mozambique, and has been contributing to the development of the country's mining industry since 2004 after winning a deal to implement the Moatize Coal Project. In 2012, the Moatize Mine completed its first full year of operation and produced 2,501 million metric tons of metallurgical coal and 1,267 million metric tons of thermal coal.

The town and district of Moatize is in Tete, a huge province in north-western Mozambique. VALE is now investing heavily in the area in order to transport Moatize's output. Working with the government, it is currently building the Nacala Corridor, a new railway system linking Moatize to the Port of Nacala which is said to be the deepest port in Southern Africa.

The 912km-long railway corridor will pass through Mozambican jungle and Malawi before reaching a new maritime terminal at Nacala on the Indian Ocean. VALE says it will be able to carry more than 20 million tons of coal a year.

Given the railway's strategic importance, a control system was needed that would allow security and train speeds to be increased, thereby reducing operating costs for freight transport.

CRITICAL COMMS SPENDING IN OIL & GAS SECTOR FORECAST TO REBOUND IN 2017

Critical communications investment in the global oil and gas sector will reach more than US1bn by 2019, according to IHS.

The research firm defines critical comms as an integration of licensed mobile radio (LMR) terminals, infrastructure, accessories, command and control room technologies and services, and broadband LTE hardware and devices.

In its *Critical Communications in Oil & Gas – 2015* report published at the end of last year, IHS estimated that revenues for critical comms in the Middle East and Africa's oil and gas sector were around USD54m in 2015. This includes command and control technologies, LMR technologies, and private LTE eNodeBs and devices.

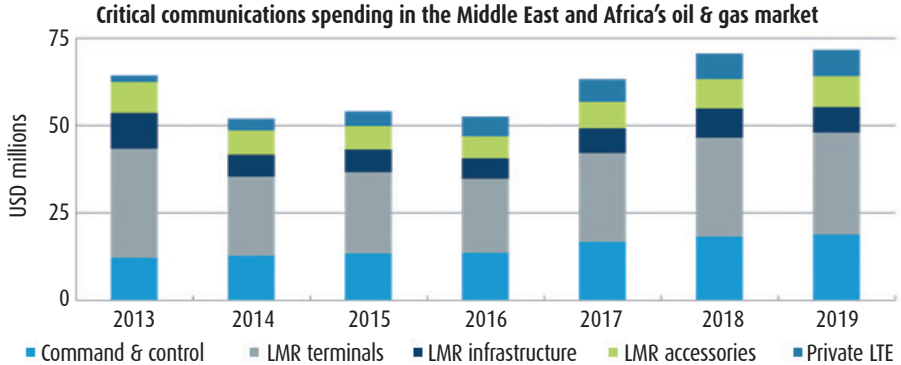
The company expects MEA's total market to grow at a CAGR of seven per cent over the next few years. It says command and control and LMR terminals are the technologies that make up the biggest portion of revenues, together accounting for more than 65 per cent of the region's market.

IHS believes the overall global market will fluctuate between 2015 and 2019, as revenues are heavily dependent on capex spending, and oil and gas projects. It points out that 2014 and 2015 were "tough" years for the critical comms market in the oil and gas sector, especially with the slump in oil prices.

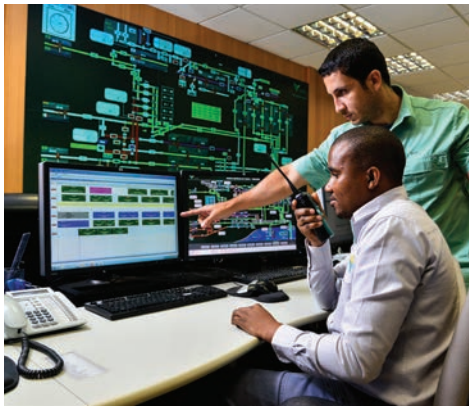
However, while investment in the sector continues to vary over the forecast period, IHS predicts a "strong rebound" for 2017 and beyond as capex picks up and stalled projects are restarted. The analyst says many oil and gas facilities will be in need of more modern communications as upgrades to these technologies were pushed out to save costs.

It adds that other trends – such as the transition to digital protocols, broadband network deployments and leasing equipment – are also changing the marketplace.

Critical communications spending in the Middle East and Africa's oil & gas market



Because investment in the region was quite high during the economic recovery from 2011-2013, IHS says 2014 saw some reduction in purchases. But it predicts investment will pick up next year.



Teltronic's *CeCo-TRANS* system is used by control centre operators at Nacala Port in Mozambique. The TETRA app displays train fleet positions in real-time.

The control system had to be supported by a robust and reliable communications platform. VALE therefore chose TETRA to provide voice and data communications. As a system based on radio technology, the use of TETRA means less wayside equipment is needed for the network which, given the characteristics of the environment, would have been difficult to deploy and expensive to maintain.

Spain-based Teltronic (which was acquired by Sepura last year) is providing the TETRA system based on its *NEBULA* infrastructure. The vendor claims its equipment's total Ethernet IP architecture provides high flexibility in the solution design, as well as easy management and maintenance.

The infrastructure part is composed of a central node which controls more than 50 TETRA base stations installed along the entire rail route. The backbone network used for the base stations is based on microwave links. Teltronic says mobile 10W coverage is 99.6 per cent, while overlapping mobile 10W coverage is 90.2 per cent.

The company also points out that each TETRA base station has been integrated within a special cabinet ready to support extreme environmental conditions. Additionally, in order to provide a higher level of network availability, a satcoms system has been installed as a backup to TETRA.

One of the first challenges Teltronic had to overcome was to work closely with Siemens, the rail system developer. VALE says an integrated solution was required, and engineers from Teltronic and Siemens therefore had to work together to carry out a coordinated project. The railway's Positive Train Control (PTC) signalling system being provided by Siemens will use the TETRA network to communicate details about wayside and mobile parts, and hence monitor and control train actions.

The PTC uses train-to-ground communication to transmit vital information regarding locomotive movements. The signalling application uses GPS and speed sensors to locate the train relative to an on-board track database. This equipment continuously monitors speed and location against the benchmark of limits and movements set by authorities. By predicting braking distance, the system warns the crew of potential safe movement violations. If no action is taken, brakes are activated automatically.

Teltronic says the on-board TETRA equipment provided has been designed following the recommendations of several signalling systems manufacturers. It features an Ethernet link to be connected to the vital on-board computer which then establishes data transmission sessions with the object controllers and interlockings distributed along the tracks.

Apart from managing signalling data, a second range of on-board TETRA equipment supplied for the Nacala Corridor will be used by train drivers to enable communication with the three operators at the control centre at Nacala Port. The equipment will be used to manage: voice communications between drivers and the control centre operators; data sent from the derailment sensors to the wayside application of the control centre to the train; and data sent from the wheel-bearing temperature supervision system to the wayside application of the control centre to the train.

The user interface at the control centre is based on Teltronic's *CeCo-TRANS* system. This is designed for the railway environment and allows displaying and interaction with trains by means of a synoptic line display. The application enables operators to view train fleet positions in real-time.

All Moatize Mine and Nacala Port workers, together with maintenance staff working along the line, have been supplied with portable terminals so that they remain in communication with the control centre operators and other users.

DMR – worth its weight in gold?

Burkina Faso's natural resources include metals such as silver, copper and nickel. Since 2011, production at its seven gold mines has increased by 32 per cent, making the country Africa's fourth largest producer after South Africa, Mali and Ghana.

In an insecure social environment, safety is one of the biggest challenges faced by mining firms such as Nantou. It runs the Perkoa Zinc mine which lies in the country's northern Sanguie Province, 120km west of the capital Ouagadougou. It needed an effective comms system that could be relied upon to protect the international visitors and workers at its site.

But before it could consider a solution, there was another hurdle to overcome: geography. Burkina Faso borders in the north with the Sahara where it is very dry and the mines are underground. Several geological studies were therefore required as part of the process to ensure good communications.

In order to provide two-way radio coverage between the the underground facility and the surface (an area with a radius of around 15km), Nantou wanted to establish a four-channel radio system at its site so that operators, engineers and mining experts could communicate with the various services on the ground.

Hytera and Ameritel International Wireless, its local partner in Burkina Faso, were commissioned to provide the solution. Deployment wouldn't be easy. The Nantou mine has been built in an S-shaped line, with giant caverns at each bend. These created blind spots and resulted in further difficulties related to the project.

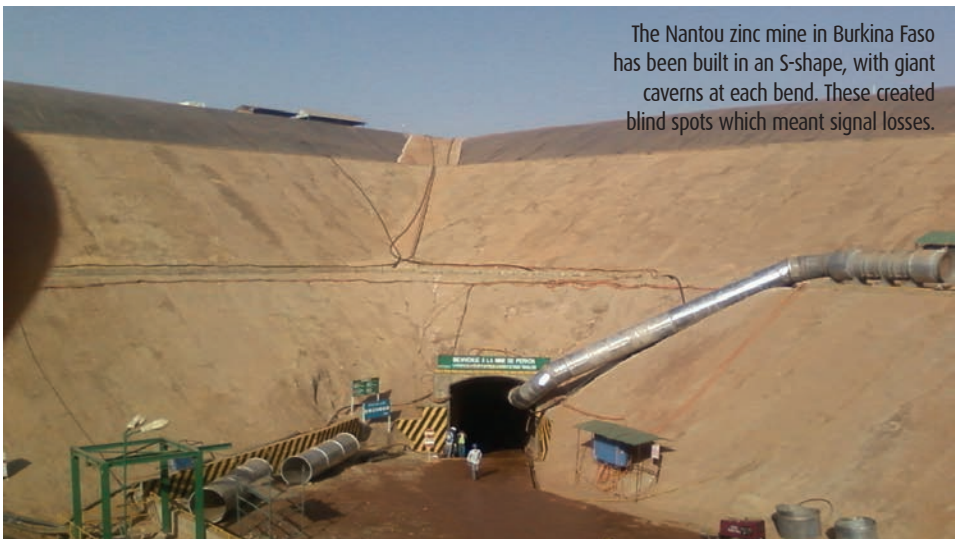
In order to avoid signal loss, Ameritel installed switches every 100 metres for signal regeneration, assuring uninterrupted communications between the site surface and all parts of the tunnel.

During the first phase of the project, Ameritel recommended and installed a four-channel Hytera DMR system, linking two *RD98X* repeaters from the surface via a wireless data system to six more *RD98X*s inside the tunnel. It says this allowed it to obtain very clear and seamless communications to 300 metres inside the tunnel.

To complete the project, the company installed a DMR system using yet more *RD98X* repeaters (32 this time) as well as 20 of Hytera's *PD70X* portable radios.

With the help of the vendor and its partner, Nantou has been able to build a more secure and reliable communication network at its mine. Furthermore, personnel can still use their existing analogue equipment from other manufacturers, thanks to the interoperability and support for digital and analogue technologies that is built into the DMR standard.

Hytera adds that all seven gold mines in Burkina Faso are now using its radio equipment. ■



The Nantou zinc mine in Burkina Faso has been built in an S-shape, with giant caverns at each bend. These created blind spots which meant signal losses.

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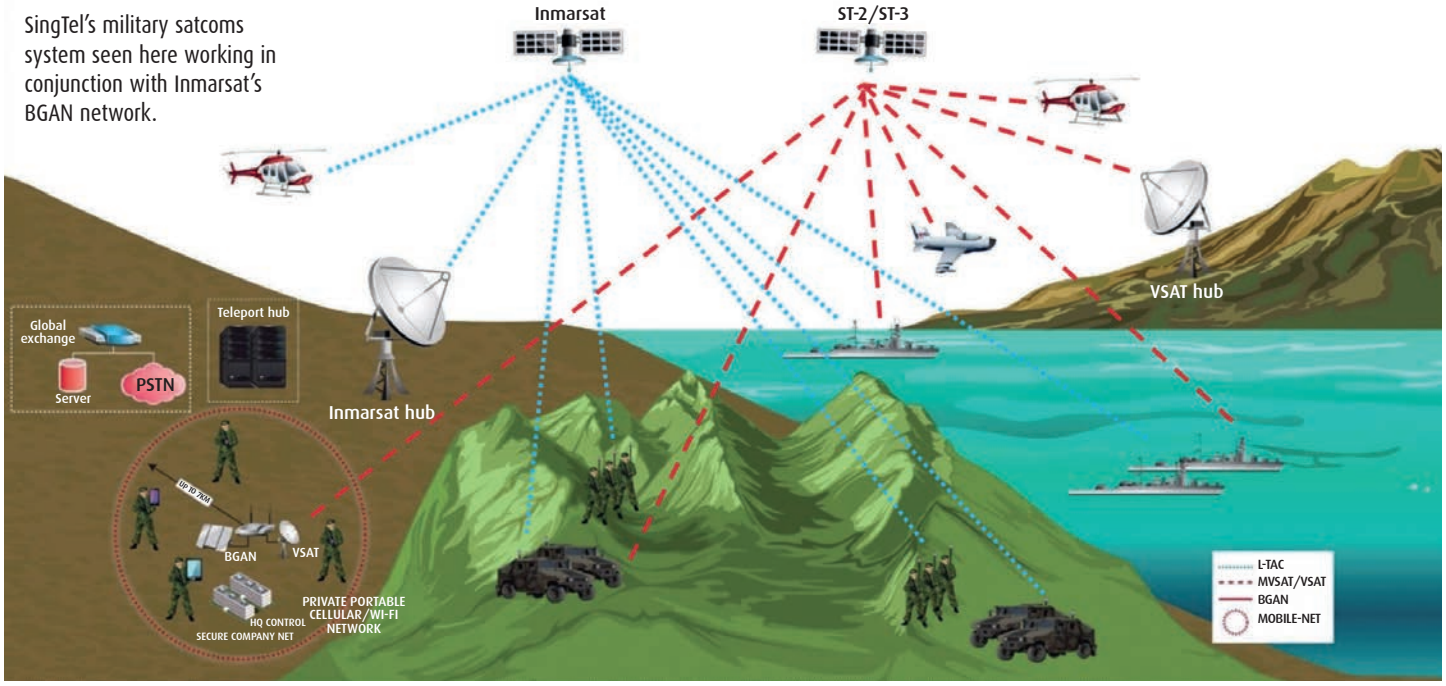


SingTel's military satcoms system seen here working in conjunction with Inmarsat's BGAN network.

A new force in military communications

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

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

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

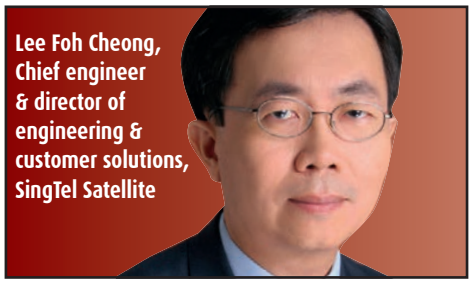
To work around this, the alternative is Communications on the Pause (COTP) using tactical satellite (TACSAT) which is conventionally provided in the UHF band on military-owned satellites. But the demand for these channels exceeds supply, and as a result nations are often unable to lease or gain access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

Overcoming RF limitations

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

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

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



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

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

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

Security and mobility

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

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

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

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

Because there is no requirement for additional infrastructure, cost is kept to a minimum. So instead of investing in a high radio tower to extend radio coverage, the costs of owning the ground space, electricity and high power radio towers are eliminated. Furthermore, with no repeaters, relays or cells, there are fewer targets for hostile forces attempting to disable command and control.

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

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

WHAT IS ONE OF ASIA'S BIGGEST TELECOMS OPERATORS DOING IN AFRICA?

KIAN SOON LIM, HEAD OF SINGTEL'S SATELLITE DIVISION, EXPLAINS HOW THE COMPANY HAS HIGH HOPES FOR THE CONTINENT

SingTel Satellite is a division of Singapore's incumbent telecoms carrier. The company has been providing fixed and mobile satellite services for almost four decades, and now covers more than 100 countries spanning Africa, Asia Pacific, Europe and the Middle East.

SingTel was one of the founding members of Inmarsat which was established by the International Maritime Organisation in 1979. The telco's first satellite, *ST-1*, was launched in 1998 but after 15 years of service it reached end of life and was retired in 2013. *ST-2* was introduced in 2011 as a joint venture with Taiwan's Chunghwa Telecom and covers Asia and parts of the Middle East.

ST-3 was developed as part of a transponder purchase agreement signed with ABS in June 2009. SingTel is now marketing its satellite services in Africa under the *ST-3* brand using capacity on *ABS-2* which was launched to 17°E in February 2014.

Lim Kian Soon (*pictured above*), head of satellite at SingTel, says Africa's business environment continues to look promising and believes the momentum will continue during this year and beyond.

In 2014, the company established teleport facilities to provide iDirect hub and SCPC VSAT services for *ST-3* coverage in Africa, and also signed several key customers contracts. They include what Soon describes as a "leading" international natural resources company, although he cannot name the firm.

"[It has] significant proven and probable reserves of copper, gold, molybdenum, cobalt, oil and gas, and needed to increase both the number of sites in its Democratic Republic of Congo network as well as it main facilities circuit size. We have provided a fully managed shared mesh network.

"In addition, the solution also includes SingTel's *integrated Network Management System* (*iNMS*) which is a fault detection, monitoring, management and reporting system that remotely monitors link utilisation, weather-affecting performance, link status, and router."

Soon describes another customer as one of Asia's "fastest growing" telcos. "We deployed a space segment on our strong C-band satellite covering Europe to Africa for a VSAT project. We recommended a highly reliable and most advanced SCPC modem in the market, and the use of CnC [carrier-in-carrier] technology with total availability of 99.98 per cent."

According to Soon, satellite still plays a vital role in delivering critical communications to many parts of the continent that are still unconnected and under-served. "Africa has an enormous and dispersed land area. Most, if not all of it, has an under-developed telecom markets in terms of connectivity due to limited transport, telecoms infrastructure, and socio-economic conditions."

He adds that the backhaul market for satellite in Africa will remain strong: "The demand for satellite backhaul in Africa will continue to increase due to strong growth in mobile data usage. Telcos in Africa are looking at satellite to help them to provide services in to customers in rural areas."

As has been well-documented, the continent represents one of the fastest-growing telecoms markets in the world. But Soon acknowledges that it is also perceived as being "tough to penetrate", and is characterised by low per capita income levels, political instability, regulatory problems and linguistic barriers.

"Lack of transparency or sound governance practices and lengthy bureaucratic processes also reduce investor appetite and risk tolerance. This affects the development of infrastructure which in turn affects how communications network can be established, be it terrestrial or satellite. We are looking forward to seeing strong political support, sound regulatory systems, and support from users in the uptake of satellite communications."

He concludes by saying the outlook for African satcoms remains promising albeit uncertain at times. "We will continue to grow our partners' base so as that we can serve our customers more efficiently. For our global customers expanding their presence in Africa, we will enable reliable connectivity for them, ensuring that their businesses will operate successfully."

SingTel's teleport in Singapore. The firm has a capacity agreement with ABS and offers services in Africa branded as *ST-3* via *ABS-2*. Its payload includes a pan-continental C-band beam as well as Ku-band.

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

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

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

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

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

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

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

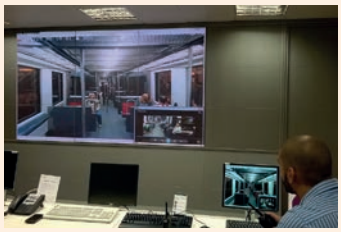
As part of their ongoing collaboration, Ericsson and SKT are also working on building the world's first cloud-based, hyper-scale data centre system for 5G early this year.

Public safety LTE added to Bilbao Metro communications network

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

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

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



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

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

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

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

LTE to replace TETRA for UK critical comms

The UK emergency services TETRA network will be replaced by LTE. Mobile operator EE has been selected to provide a resilient national network, giving 300,000 critical emergency workers access to 4G voice and data services for the first time.

Under its GBP1bn Emergency Services Mobile Communications Programme (ESMCP), the British Government wants to ensure that the UK is a 4G pioneer and a world leader in emergency services communications.

EE claims its 4G network will "significantly improve" the efficiency of the emergency services. It says users will gain access to the type of data and applications that have benefited private businesses in recent years, and which have not all been possible using TETRA.

EE's new 4G Emergency Services Network (ESN) will replace the existing TETRA system from mid-2017 as current contracts expire. The company says it has already committed to spend GBP1.5 billion on its network up to 2017, and will increase that investment in order to deliver the ESN.

EE plans to build a new, highly resilient dedicated core network for the emergency services, as well as more than 500 new sites, expanding coverage in rural areas. It will also switch on low frequency 800MHz spectrum on more than 3,800 sites to enhance rural and indoor coverage.

As part of the ESN, the operator says it will implement the capability to support network access priority to the emergency services when required, introduce VoLTE and new LTE voice capabilities including push-to-talk, deploy a fleet of rapid response vehicles to ensure maximum service availability, and use satellite backhaul for the most hard-to-reach areas.

EE is the UK's largest mobile operator and claims to be Europe's first to surpass 10 million 4G customers with LTE coverage that reaches 94 per cent of the UK population. It is currently in the process of being acquired by BT in a deal worth £12.5bn which is expected to close during the first quarter of this year.

U Mobile to develop 'pre5G'

U Mobile and ZTE will work on the development of 'pre5G' mobile broadband technologies in Malaysia.

Under a deal signed in 2015, U Mobile plans to make significant network upgrades using ZTE's proprietary pre5G technologies including MIMO. The two firms will also collaborate on the research and development of fifth generation mobile technologies.

Mobile data demand is soaring in Malaysia, and 70 per cent of U Mobile's subscribers are said to be smartphone users. According to a consumer behaviour study earlier this year, the country has South East Asia's highest internet usage with the public spending an average of 219 minutes each day browsing the web.

ZTE says 5G research is key to its strategy of becoming a global leader in next-generation network technology. In 2014, the company says it was the first to propose the pre5G concept, and at *Mobile World Congress* in March 2015 it launched a pre5G base station featuring an integrated BBU and RRU

ZTE says the base station enables carriers to emulate the behaviour of future 5G networks on existing LTE network infrastructure. The vendor also claims that it enhances spectral efficiency of current LTE networks between four to six times by using massive MIMO technology.

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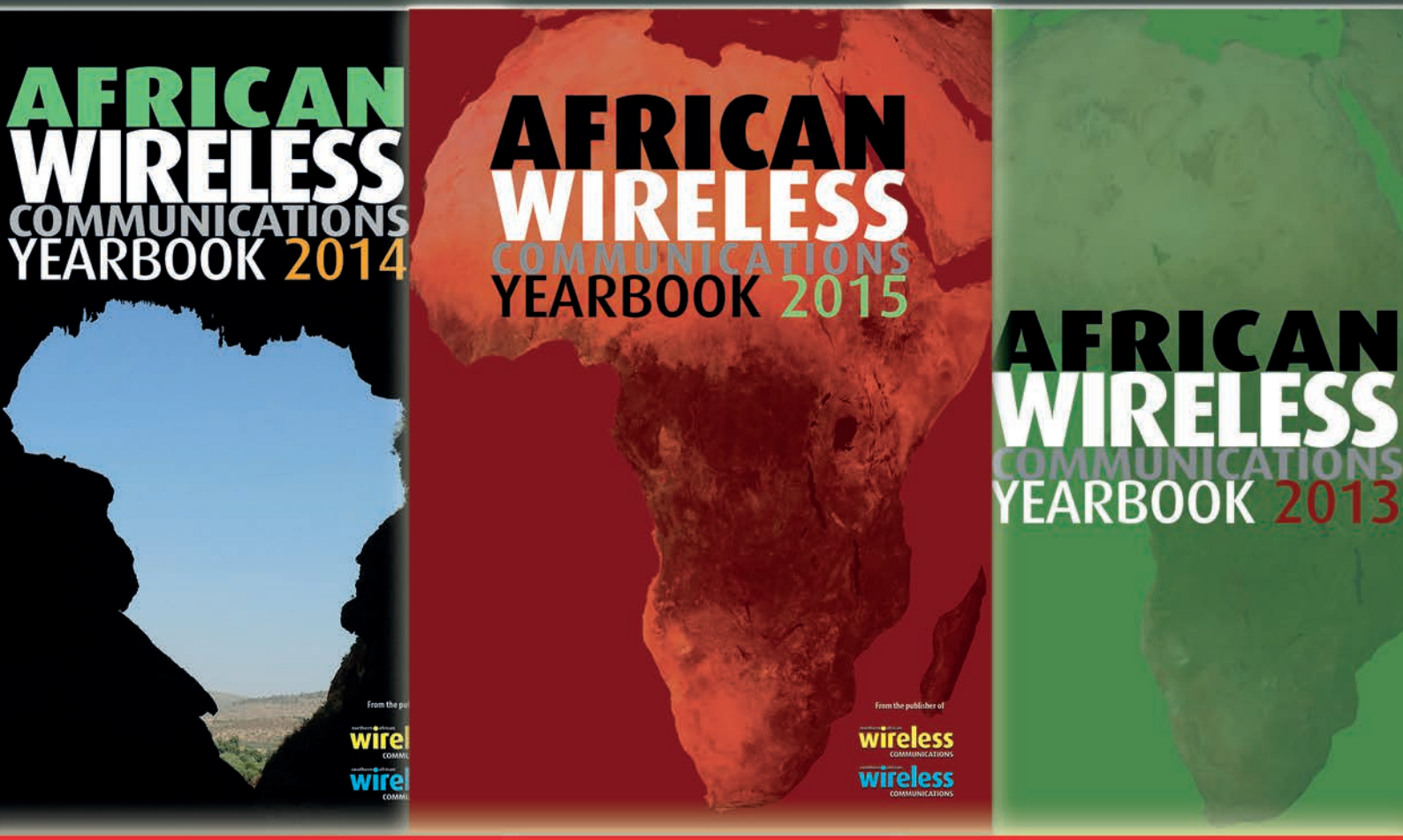

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Highest ever C-band transmissions

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

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

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

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

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

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

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

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

Turkish operator set for Pakistan?

Pakistan's government reportedly plans to conduct a new 3G/4G auction and wants to attract foreign bidders.

According to local media, ICT minister Anusha Rahman has held talks with the Turkish ambassador to discuss the high demand for new spectrum in Pakistan.

Rahman apparently told officials at the meeting that she wanted Turkish mobile companies to participate in the spectrum sale which would include 850MHz which the government has reserved for a new market entrant. As yet, there is no confirmed date for a new auction although reports suggest it could be held soon.

Following years of delay, the Pakistan Telecommunication Authority finally conducted a 3G auction last year and also included the sale of 4G frequencies. The country's five existing cellcos – Mobilink, Telenor, Ufone and Zong – were all awarded licenses.

But the auction brought in much less than the USD1.5bn the government was expecting in revenues, and the sale failed to attract any new foreign interest as hoped.

ICT minister Anusha Rahman has reportedly held talks with the Turkish ambassador.

Vodafone deploys mini 4G network

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

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

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

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

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

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

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

Verizon helps boost US networks from rural counties to an urban icon

US telco Verizon has announced that all the participants in its *LTE in Rural America* (*LRA*) programme have now fully met their original goal of deploying LTE technology across rural counties.

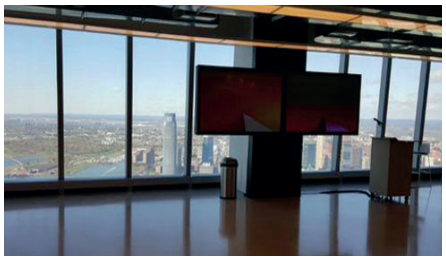
The operator launched the *LRA* initiative around five years ago with the aim of helping rural wireless companies across the US drive innovation through advanced 4G technology.

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

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

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

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



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

Caribbean microwave

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

Argentina IoT services

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

LTE roaming extended

Syniverse is providing Dialog Axiata with a single-connection access to its IPX backbone network. The firm claims the Sri Lankan operator's reach has now been expanded across the world's LTE networks. Syniverse says its IPX Network currently serves more than 1,000 LTE roaming routes and includes more than 100 LTE direct connections, all of which makes it possible for it to deploy LTE and VoLTE around the globe. Dialog and Syniverse have been partners for 10 years and have worked together on data clearing, roaming fraud protection, text and multimedia messaging, and Wi-Fi roaming.

Smart City networks go live using Weightless

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

Nwave specialises in hardware and software for the IoT and M2M. Its network solutions are based around an ultra narrow-band communications protocol operating in license-exempt ISM sub-1GHz spectrum.

The firm claims its *NWave* platform allows long-range, low-power, low-cost communications, and enables the penetration of the IoT into areas poorly served by traditional cellular or short-range technologies.

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

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

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

Indigo project boosts Euro satellite industry

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

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

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

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

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

TVWS used to broadcast live biking event

TV white space (TVWS) technology was used to enhance the spectator experience at the Enduro World Series (EWS) mountain biking event held in Glentress Forest, Scotland during 2015.

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

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

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

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

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

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

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