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COMMUNICATIONS

MAY/JUNE 2017
Volume 22
Number 1

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- Connecting the mining & energy sectors
- Latest kit for critical comms



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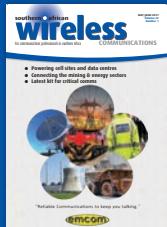
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KADIUM

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IoT network deployed across Kigali to support smart city initiatives

From having very little network connectivity just a few years ago, Rwanda now has ambitions to become a smart city blueprint for other African nations to follow.

The country's government has launched a flagship Internet of Things project in Kigali which features technology supplied by Inmarsat and Nokia.

Inmarsat has deployed low power WAN infrastructure around the capital using the LoRaWAN protocol to connect sensors and devices in the IoT. The network went live at the beginning of May and will remain active for an initial period of a year. It has been developed with Actility, the France-based M2M and IoT specialist which Inmarsat recently invested in.

The network will provide city-wide coverage enabling a variety of organisations to develop and deploy IoT applications on a large scale, as well as allowing entrepreneurs to easily connect their front-end IoT devices through a middleware layer.

To demonstrate the IoT's transformative potential, Inmarsat plans to work with Jersey Telecom and other partners to deploy a number of proof of concepts and technology validations around Kigali.

These include a smart bus which will be equipped with satellite internet to provide ubiquitous connectivity for remote communities. The bus will also be LoRaWAN-enabled to provide real-time data acquisition in the communities that it services.

Other planned demos include



Engineers setting up Kigali's smart city LoRaWAN network.



Rosine Mwiseneza, the 2016 winner of Rwanda's 2016 'Ms Geek' competition, has developed an IoT-based agricultural irrigation solution.

a precision farming initiative intended to increase crop yield and better manage water resources, and environmental monitoring systems that will feature sensors installed in buildings to gauge air quality.

Inmarsat has also started a range of initiatives designed to educate and empower the next generation

of students and entrepreneurs in Africa. It has launched a Smart Cities Education Programme in Rwanda and plans to replicate it in other countries on the continent in an effort to accelerate the deployment of IoT and smart city solutions. The programme will include a three-month student internship, as well as an IoT boot

camp for students and entrepreneurs.

As part of the initiative, Inmarsat is also working with Rosine Mwiseneza, the 2016 winner of Rwanda's 'Ms Geek' competition which is designed to inspire female university students to employ technology to overcome local issues. Inmarsat is collaborating with Mwiseneza and her team to implement a prototype IoT-based agricultural irrigation solution for potential commercialisation. The goal is to create a scalable solution that can be used across Rwanda as well as Africa and the rest of the world via Inmarsat's global networks.

Separately, Nokia has been chosen by local company SRG as part of its collaboration with the government's smart city rollout. SRG will use a variety of products from the Finnish vendor including a mission-critical access network, IP and Cloud Core networks, as well as its Impact Platform with associated IoT applications.

Speaking at the Transform Africa Summit held in Kigali in May, Rwanda's youth and ICT minister Jean Philbert Nsengimana, said: "Through this project, we will not only improve people's day to day lives with improved services and security, but [also] anticipate long-term, positive socio-economic benefits."

Nsengimana claimed Rwanda was now a "pioneer" in deploying a smart city solution in Africa, and that the government's vision is to position the country as a technology hub. He added that plan was to share Rwanda's experience with other nations on the continent.

Monthly mobile data traffic predicted to reach 7.4EB

Mobile data traffic will grow 12-fold from 2016 to 2021 in Africa and the Middle East, according to Cisco.

In its latest annual *Visual Network Index (VNI)* released in June, the company forecasts that mobile data traffic in the region will rise from 610.3PB per month in 2016 to 7.4EB per month by 2021 – the equivalent of 1,842 million DVDs.

Cisco says business mobile data traffic in MEA grew 79 per cent in

2016. It predicts this will grow at a CAGR of 52 per cent to hit 493.9PB per month by 2021, up from 60.7PB per month in 2016.

The *VNI* reveals that the average mobile connection speed in the region was 3,778kbps in 2016. It reckons this will increase 2.9-fold from 2016 to 2021, reaching 10,784kbps by 2021.

In terms of network connections, the index says there were 1,330

million mobile-connected devices in MEA last year. Fifty-nine million net new devices and connections were added to the mobile network during the period. The *VNI* forecasts the number of mobile-connected devices to grow at a CAGR of six per cent over the next four years, and says there will be 1,814 million by 2021.

The number of mobile-connected M2M modules rose by 33 per cent to 55 million in 2016. Cisco expects this

number to quadruple between 2016 and 2021 to reach 223 million.

M2M traffic is predicted to grow 13-fold from 2016 to 2021 and will be 116.6PB by the end of the forecast period. It will account for two per cent of total mobile data traffic compared to one per cent at the end of 2016.

The *VNI* adds that the average M2M module will generate 523MB of traffic per month by 2021, up from 161MB per month in 2016.

Eutelsat launches Konnect Africa

Eutelsat has begun what it describes as its "bold ambitions" for broadband in sub-Saharan Africa with the launch of its much-vaunted *Konnect Africa* initiative.

On 6 June, the company launched services in Benin, Cameroon, Kenya, Lesotho, Nigeria, South Africa, Swaziland, Tanzania and Uganda. This followed an earlier announcement confirming that the *Konnect Africa* initiative was back on track thanks to a partnership with Yahsat (see *News*, Feb-Mar 2017).

Eutelsat says it will deliver "innovative" services including packaged offers inspired by 'pay-as-you-go' models and Wi-Fi hotspots schemes. It says Wi-Fi hotspot access will be available for a "few cents" while family offers will be optimised for a "few dozens" of dollars. High-grade enterprise services are also proposed to enable video-conferencing, storage, multimedia content development, and safe and reliable communication.



By working with local partners, Eutelsat hopes to accelerate satellite broadband connectivity across Africa.

Some of the first partners to support *Konnect Africa* include: AfrikaNet GoSat;

Bentley Walker; China Telecom, which is establishing communication links between Africa and Asia-Pacific; Terrace Projects, a managed satellite service solution provider in South Africa; amongst others.

Eutelsat says it will give partners the means to succeed through dedicated commercial, marketing and technical support. The company adds that it will also train and reward local installers to enhance service quality and drive more talent into the industry.

Pan-African Wi-Fi roaming hub from Liquid Telecom

Liquid Telecom has introduced a new roaming hub that enables operators and ISPs to access its pan-continental network of public Wi-Fi hotspots for the first time.

The company says *Africa Wi-Fi Hub* will allow the customers of its wholesale clients to connect to hundreds of locations across Kenya, Rwanda, Uganda, Zambia and Zimbabwe, with additional markets to be rolled out soon.

Partners can connect to the hub through peering points in Eastern and Southern Africa, with the option to connect to hundreds of locations in one country, or join a global network of public Wi-Fi hotspots. The hub is also available as a white label service.

Liquid claims that by joining the

hub, operators will be leveraging Africa's largest independent fibre network. It adds that they can also make their public Wi-Fi hotspots available to some of Liquid's Wi-Fi roaming partners.

This means that they will be able to take advantage of a global network of public Wi-Fi hotspots without the need to negotiate their own roaming agreements. Liquid's roaming partners currently include major Tier 1 carriers such as BT, as well as Wi-Fi network providers such as iPass.

"*Africa Wi-Fi Hub* is an important step in bringing together the region's Wi-Fi networks, reducing cost and complexity for operators and extending coverage for their subscribers," says Ben Roberts, group CTIO, Liquid Telecom.

MTC expands in Namibia with rapid rollouts

MTC (Mobile Telecommunications Company) says it has built more than a dozen new cell sites across Namibia in just four months.

In an announcement issued at the beginning of June, the mobile operator said the rollouts were part of its ongoing efforts to increase capacity and expand its network, especially in rural areas.

Spokesman Tim Ekandjo said: "Just in 2017 between February and May, we have erected 14 new sites in Okahandja, Rehoboth, Tschudi, Windhoek (Soweto), Otjiwarongo, Otjokavare, Fransfontein, Swartbooisdrif, Katima, Rundu Mall and Dr. Lemmer."

Ekandjo said the investment was an "absolute priority" because MTC needed to keep up with the rapidly

growing customer demand. He added that the company has taken a decision to make sure that development gets to each and every corner of Namibia. MTC will continue to build more sites throughout the course of the year with more new locations planned for both rural and urban areas.

However, Ekandjo also pointed out that the company remains concerned by the fact that it takes more than six months to get environmental clearances to build sites, and warned that this could delay the rollout plans.

"In as much as MTC is committed to bringing service to rural areas, patience was imperative due to the vastness of the country. We also implore authorities to speed up the process of approvals especially those that deal with environmental clearance."

NSR sees huge future for satellite-based mobile backhaul

Cellular backhaul is expected to be one of the fundamental growth pillars in the satellite industry, according to Northern Sky Research (NSR).

In its latest *Wireless Backhaul via Satellite* report published in early June, the analyst says the days of satellite being a last resort for USO with "negligible" returns for MNOs are now gone.

NSR expects satellite backhaul to generate large global growth opportunities in the next 10 years. It forecasts growth at double-digit CAGRs with more than 110,000 units installed by 2026.

The firm believes the arrival of HTS together with advanced ground segment is making satellite a viable option for backhauling 3G and 4G base stations.



per cent of the installed base."

NSR adds that broadband is taking over even in less developed markets like Africa where many new deals progressively include a 3G footprint. It predicts that the shift will be nearly complete by 2026 as more than 90 per cent of the installed satellite base will service broadband sites.

But the firm warns that price per Mbps is critical to facilitating broadband services. "The efficiency at which the system transforms MHz into Mbps has an obvious impact in this equation," says Palerm-Serra. "Satellite power, ground segment design, modem and other elements all have their roles to play in end-to-end system efficiency."

"Looking forward, the majority of new opportunities will be generated from 3G and 4G/LTE deployments," writes NSR analyst Lluc Palerm-Serra.

"2016 marked a key milestone in this transition. For the first time, 3G global data traffic surpassed 2G demand despite the latter still comprising 65

Moving Wireless Forward

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

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

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

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

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

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

Asset Tracking & RFID

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



We are now looking for distributors throughout Africa

Commercial Fleet Management

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

Public Transit & Bus Management

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

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

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

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

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

Remote Monitoring & Surveillance

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

Mining & Exploration

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

Smart Cities & Smart Highway

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

Let us know how we can help

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GiSat and JUPITER to bring broadband to millions

Global-IP will use Hughes Network Systems' *JUPITER* platform to bring high-performance connectivity to mobile devices in sub-Saharan Africa.

JUPITER will be used to provide 100 per cent of the capacity on Global-IP's *GiSat-1* 150Gbps high-throughput satellite which is expected to enter service in 2019. It's claimed to be the first VSAT system to support DVB-S2X which is widely

recognised as the most bandwidth-efficient standard available.

Hughes will supply 11 gateway stations in Europe using a centralised architecture for routing traffic in and out of the internet, as well as its *HT2500* and *HT2600* terminals. Beyond supporting high-quality Wi-Fi access, the company claims its "powerful" terminals are designed with LTE acceleration technology to meet MNOs' demanding

requirements, making it economical for data delivery anywhere.

Due to be launched by SpaceX during Q4 2018, *GiSat-1* is currently being built by Boeing (see *News, Jan-Feb 2017*) and will be the first in a series of satellites from Global-IP. The company says its network will have multiple gateways located in Europe for connectivity to the internet via Tier 1 fibre backbones.



Hughes is supporting Global-IP's mission of bringing high-performance connectivity to mobile devices throughout sub-Saharan Africa.

It claims *GiSAT*'s advanced digital payload capabilities will allow the deployment of multiple in-country gateways and terminals for customers who wish to have local connectivity.

MTN Rwanda fined for "breaching" obligations

The Rwanda Utilities Regulatory Authority (RURA) has imposed administrative sanctions on MTN Rwanda for what it says is non-compliance with its license obligations.

In a statement released in May, the regulator said MTN Rwanda provided services that contravened the directives that were previously issued to it in 2011. These concerned a regional IT shared services initiative where MTN Rwanda was part of the MTN South and East Africa IT hub based in Uganda.

At the time, RURA instructed MTN Rwanda to exclude itself from the arrangement and said failure to do so would be considered a "serious breach" of its license obligations.

Despite the directives, RURA said MTN implemented an interim phase for the hub from September 2012, and then fully "operationalised" its

IT services management in Uganda in October 2014.

During a RURA regulatory board hearing on 12 May 2017, MTN admitted the breach. As a result, the operator now faces an administrative fine totalling RWF7.03bn (USD8.5m). This breaks down as a daily administrative fine of RWF5,000,000 from 26 October 2014 to 27 June 2016, and a daily fine of RWF15,000,000 from 28 June 2016 to 20 March 2017.

Following the announcement of the fine, MTN released a press statement acknowledging receipt of the penalty notification, and said that it had been in discussions with RURA about the issue since earlier this year. It added: "MTN Rwanda is currently studying the official notification and will continue to engage with the regulator on this matter."

Free conference calling launched in Tanzania

FreeConferenceCall.com has launched in Tanzania to give families, businesses and communities instant access to simple conferencing services for free.

The cloud-based technology aims to save users money in long-distance fees. Once they have created and activated an account using their email and password, users can invite up to 1,000 participants via phone or VoIP with in-country dial-in numbers. Video conferencing and screen sharing can be added by

downloading a collaboration tool to host free online meetings.

The firm says there are no hidden charges and participants can talk for as long as they want, paying only standard local rates. It also claims its service "meets or exceeds" security standards to protect stored data.

Tanzania now joins Kenya, Nigeria and South Africa on what FreeConferenceCall.com says is a growing list of countries with local access to free global conference calling.

FreeConferenceCall.com president Josh Lowenthal: "We will not stop until every country has access to free conferencing services."

It reckons the service has the potential to reach a user base of around 350 million people on the continent.

"For the past 15 years, our free collaboration model has changed

the way people communicate," says company president Josh Lowenthal. "Users gain rapid free access to high-definition audio, screen sharing and video-conferencing so they can meet and conduct business internationally with as little friction as possible."

He adds that FreeConferenceCall.com's mission is to continue to broaden its reach in Africa and across the world. "We will not stop until every country has access to free conferencing services," says Lowenthal.

Microsoft cloud services for Africa

Microsoft plans to deliver its complete range of cloud services for the first time from data centres in Africa.

The company will offer products such as *Azure*, *Office 365* and *Dynamics 365* from its own facilities in Johannesburg and Cape Town with initial availability anticipated in 2018.

According to Microsoft, many companies in Africa currently rely on

cloud services delivered from outside of the continent. It claims its investment will provide highly available, scalable, and secure cloud services across the continent with the option of data residency in South Africa.

Scott Guthrie, EVP, cloud and enterprise group, Microsoft Corp, says: "With cloud services ranging from intelligent collaboration to

predictive analytics, the *Microsoft Cloud* delivered from Africa will enable developers to build new and innovative apps, customers to transform their businesses, and governments to better serve the needs of their citizens."

Microsoft claims it has helped to bring 728,000 SMEs online across the continent and supported them to transform and modernise their

businesses. The firm adds that more than 500,000 firms are now utilising its cloud services, with 17,000 using the *4Afrika* hub to promote and grow their businesses.

In addition, it says the *Microsoft Cloud* is helping Africans build job skills, with 775,000 trained on subjects ranging from digital literacy to software development.

Marketing is all about MeMe

MTN Rwanda is using a system from Digitata Insights to enable new digital marketing channels on its network.

Called *MeMe*, the platform is said to deliver selected marketing messages to MTN's subscribers on their mobile devices in "an unobtrusive manner".

Digitata Insights says the system has the ability to target consumers based on demographics, time of day and location, and that its "advanced" profiling capability ensures that the right person is targeted to help ensure messages are not viewed as spam.

MeMe is also said to offer various engagement options including 'call me back' messages, surveys, app downloads and voucher offers, as well as customised methods such as bespoke gamification campaigns.

MTN's use of the platform comes amidst heightened enforcement in Kigali of a 2013 by-law aimed at regulating outdoor advertising. This requires agencies to modernise billboards to improve safety, aesthetics and functionality.



MTN Rwanda's acting CMO Gaspard Bayigane (left) says the platform will generate more awareness for advertisers. Also pictured is Digitata Insight CMO Henk Swanepoel.



Digitata Insights' MeMe Measurable Mobile Media platform offers mobile network operators a revenue-generating partnership opportunity to further their transformation in the digital arena.

MeMe geo-tags and enriches existing mobile messages based on subscriber location, allowing subscribers to discover new content and engage with new services.

Our sponsored gamification allows brands to educate consumers on the benefits of their product offerings in a fun and entertaining manner at no cost to the subscriber.

Richard Walton, CEO at Digitata Insights, says: "Gamification – the incorporation of game play into online marketing – is an extremely effective way to keep mobile users engaged, offering the ideal opportunity to educate them in an interactive manner."

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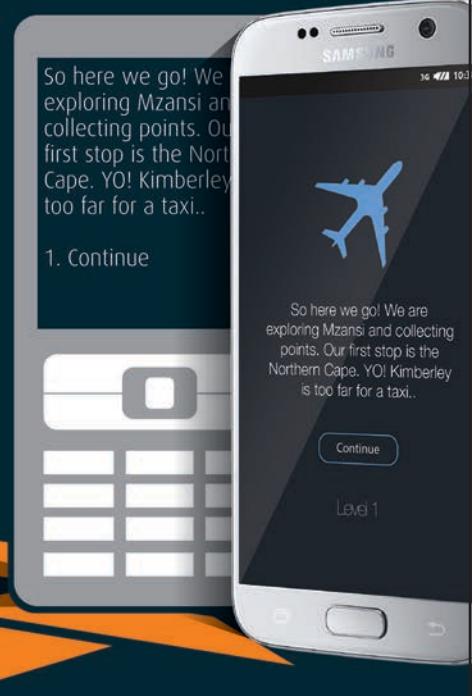


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'BSSaaS' in Rwanda

 Tigo Rwanda has gone live with Ericsson's 'as a Service' model for its complete BSS needs. The solution covers charging, billing, provisioning, mediation and roaming functionality, combined with advanced customer care and self-care solutions for management and ordering of services. Ericsson claims the partnership will enable Tigo to better serve its customers with new and innovative offerings together with shorter time to market, improved customer experience and increased operational efficiency.

HorizonSat covers Africa

 UAE-based HorizonSat will work with Russian satellite operator Gazprom Space Systems to deliver satellite services in Africa. Under a capacity deal signed in late April, it will use Gazprom's *Yamal-402* to provide internet connectivity in the Central African Republic, DRC, Kenya, Tanzania, and other countries. According to Gazprom, its satellite's Southern Beam offers good coverage of Central and Eastern Africa, while cross-strap with *Yamal-402*'s European Beam will enable HorizonSat to use its teleport in Munich which is connected to high-speed internet backbones.

Shipping coverage

 Globecomm has added the South Indian Ocean passage between the southern tip of Africa and Australia to its Ku-band VSAT network. The operator claims the expanded footprint now provides 100 per cent coverage of all major shipping routes to address new market demands. Globecomm's network already covered the Barents Sea, north of Scandinavia. The company says the extension was in response to its customers having increased transit to the South Indian Ocean area.

IOX plans new cable to connect Africa and Asia

IOX Cable has announced that it will build the first open cable system to connect Mauritius and Rodrigues island to South Africa and India.

This latest news follows the company's plans announced earlier this year to extend its regional subsea systems (see *News, Jan-Feb 2017*).

IOX will work with Alcatel Submarine Networks (ASN) to build a fibre network that will stretch more than 8,850km to connect the east coast of South Africa, Mauritius, Rodrigues and then on to India's east coast.

The company says its cable will provide Mauritius with route diversity and claims this will reinforce the country as a communication hub

in sub-Saharan Africa. It will also connect Rodrigues to a submarine cable for the first time, enhancing ultra high-speed broadband services.

Providing an ultimate design capacity of more than 13Tbps per fibre pair, the system will integrate ASN's *1620 SOFTNODE* and ROADM branching unit which is claimed to offer dynamic features for enhanced system resilience. It will also use the vendor's submarine repeaters as well as its end-to-end submarine network management system.

In addition, ASN will be in charge of project management, system design, marine operations and system commissioning.



IOX says its system will allow easy connectivity to current and future undersea cables on Africa's east and west coasts, delivering a gateway to the continent and a new alternate route to and from Asia.

Siemens targets Africa for growth

Siemens plans to double its order intake in Africa over the next three years.

Under agreements signed at the World Economic Forum on Africa held in Durban in early May, the German industrial giant said that it will work with its partners to develop solutions for the continent in the fields of power generation, transportation and healthcare, as well as the digitalisation of industry.

One key area they will support includes training for various technical fields in order to create a pool of well-trained local workers. As part of

this, Siemens is joining the German government's *Make IT Alliance* to promote startups and technology firms across the continent.

The company says it currently has more than 3,600 employees based in 15 countries across Africa and adds that it is investing an average of EUR10m per year for training programmes.

Siemens has already developed financing solutions for its power projects in Egypt and Nigeria, and is supporting its regional partners' efforts to implement these major infrastructure initiatives elsewhere on the continent.

This includes Uganda and Sudan where the company says its primary goal is to increase national power generating capacities and to connect the local population to the power grids.

"Our goal is to double our order intake in Africa to more than EUR3bn by the year 2020," said Joe Kaeser, president and CEO, Siemens AG. "Africa's economies are gaining ground and can develop their full potential with the right partner. Siemens wants to support their sustainable development – with solutions and projects in Africa, for Africa."

Linking Mastercard with mobile wallets

MatchMove will provide Youtap's customers in Africa and Asia with an off-the-shelf payment acceptance solution for mobile money wallets.

Founded in New Zealand in 2007, Youtap is a global provider of contactless mobile money payments and financial services software. Airtel and MTN are listed as among the MNOs in Africa that use *Youtap Pay*, its mobile money payment processing platform.

The firm has integrated MatchMove's secure mobile wallet solutions with its platform for the acquisition, processing and settlement of credit, debit and pre-paid cards linked to a mobile money wallet.

The companies say their partnership follows growing global demand for Mastercard companion cards connected with mobile money accounts.

They say their combined solution will enable MNOs to issue Mastercard companion cards to their customers. Cards can be branded and integrated with the cellco's current mobile wallet app and enable users to buy products online and in stores.

Shailesh Naik, CEO of Singapore-headquartered MatchMove, says: "Our partnership with Youtap will expand the availability of our secure



The firms say their combined solution will enable cellcos to issue Mastercard companion cards to mobile money users.

cashless solutions for mobile operators around the world, thus creating a new channel to bridge the gap between mobile money and end users."

As well as offices in Asia and the US, MatchMove plans to open new premises in South Africa and Dubai to support its global growth.

Orange to invest in African startups

Orange is creating a new Africa section in its flagship programme for investment in startups.

Orange Digital Ventures Africa is the group's investment vehicle for early-stage innovation projects in areas such as new connectivities, fintech, IoT, energy and e-health. The company says its aim is to target startups solutions responses to the continent's fundamental

challenges while leveraging its own assets on the continent.

It is committing EUR50m to support new entrepreneurs on the continent. This corresponds to half of the direct investments that will be made via the Orange Digital Ventures programme; the other half is devoted to indirect investments through specialised funding for Africa. All innovative

startups will be eligible for support, whether they're based on the continent or address its issues from elsewhere.

Orange plans to set up a dedicated Digital Ventures team based in Dakar in September in order to respond to the startups' need for responsiveness and simplicity.

Pierre Louette, deputy CEO and chairman of Orange Digital Ventures,

claims new services and business models in Africa have been one of the priority investment themes of the group's corporate venture business.

He adds: "With this announcement, we are engaging a bit further alongside the African digital ecosystem which, like everywhere else and maybe even more than elsewhere, carries with it a development challenge."

SatADSL expands network coverage

SatADSL is expanding its network's geographical coverage while simultaneously integrating new technology. The Belgium-based firm is working with global network specialist Talia to add an eighth satellite to its service package.

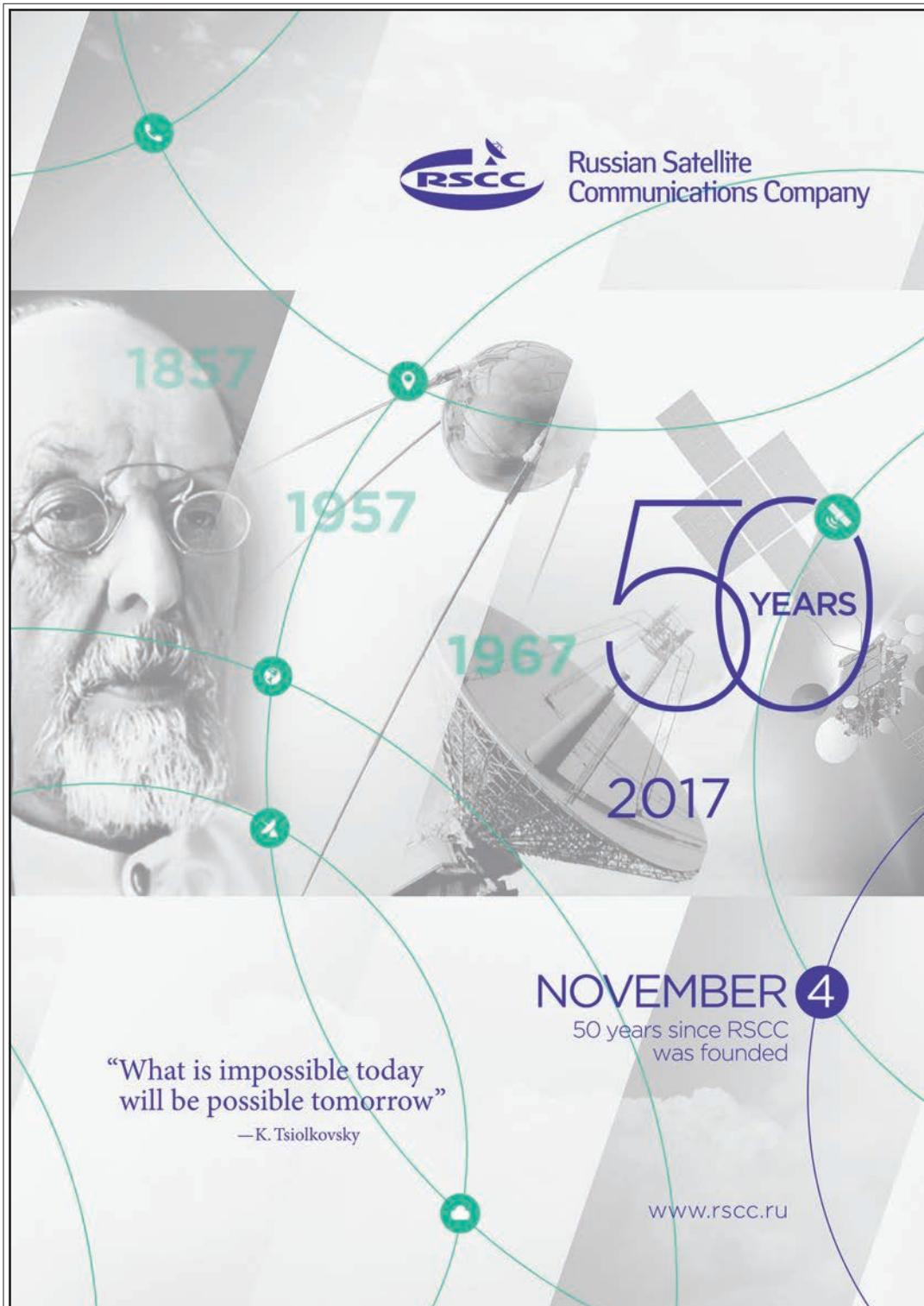
The two companies will leverage C-band capacity from *ARABSAT-5A* which covers Africa from 30.5°E. As a result, SatADSL says it can increase its satellite coverage, offer new technology, and give clients faster internet connectivity.

The company points out that it is "vendor agnostic" when it comes to choosing satellite services, and claims that its *Satellite Delivery Platform (SDP)* technically enables it to connect to any kind of satellite system.

It adds that on the technology side, the partnership with Talia means it can offer satellite services in C-band in addition to the already available Ka- and Ku-band frequencies.

"There are many advantages to using C-band frequencies," states SatADSL. "They can carry a large volume of communications; they are cheaper than Ka- and Ku-band frequencies; they offer more available bandwidth and higher connection speed; and they are less sensitive to heavy rain fade."

The company reckons all this makes C-band satellite services better suited for large service providers and subscribers with large bandwidth requirements such as major hotels.





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Opera invests USD100m in Africa

Opera Software plans to invest USD100m over the next two years to facilitate the growth of Africa's digital economy. The web browser specialist says its aim is to speed up internet adoption on the continent and strengthen the digital ecosystem with local partners.

Norway headquartered Opera says Africa is on its way to transforming itself into a digital continent with the rapid adoption of the mobile internet. For the past five years, the firm claims its *Mini* browser has been a "key facilitator" in bringing more than half of the region's internet population online by featuring tools for lowering data costs.

Richard Monday, Opera's VP for Africa, says: "We aim to invest heavily in Africa, to build a local platform and grow with the local business partners. This platform will expand the user base for content providers, e-commerce businesses, operators, OEMs and others to strengthen the African internet ecosystem."

Opera says it is now focusing on making the next generation of browsers to cater to the needs of local web users.



Opera's Africa VP Richard Monday (third from left) says the firm will build a platform to strengthen the continent's internet ecosystem. Also pictured from left to right: Jørgen Arnesen, global marketing head; Folarin Komaiya, business development director, Opera Nigeria; and Song Lin, COO, Opera Software.

For example, to bring more first-time internet users without the fear of high data costs or lack of local relevant content, the company plans to invest in developing what it describes as a "state-of-the-art" AI engine for smartphone users.

"Opera users in Africa will get fully personalised and localised content delivered to their browser, the entry point for their internet experience, while the data usage can be reduced up to 90 per cent," claims the firm.

The company adds that it is now working with more than 47 top tier African publishers covering 107 web sites on this initiative. It is also seeking local partners to integrate value-added services, mobile payment and data bundling into its browser product.

In addition, Opera is expanding with new offices in Lagos and Nairobi to support business and product development. These will add to the premises it currently has

on the continent in Cape Town and Johannesburg. The firm plans to hire around 100 people for its new offices over the next three years.

According to Monday, nine of the top 20 countries globally that use *Mini* are from the continent. Last November, Opera announced it had notched up 100 million monthly users in Africa, and claims *Mini* is now the region's most popular mobile browser.

This is partly corroborated by research recently published by Jumia. In its latest *Mobile Africa Study*, the Nigerian online retailer carried out surveys in 15 countries which generate more than 80 per cent of Africa's GDP: Algeria, Nigeria, Morocco, Tunisia, Egypt, Mozambique, Ghana, Côte d'Ivoire, Cameroon, Rwanda, Uganda, Tanzania, Kenya and Senegal.

Jumia revealed that while 50 per cent of customers on the continent access its mobile site using *Google Chrome*, that figure falls to 28 per cent in Nigeria. Here, *Opera Mini* is more popular, with 41 per cent of Jumia Nigeria's mobile traffic coming from the browser.

Intelsat-OneWeb merger collapses

Intelsat has terminated its proposed merger with OneWeb.

The combination of the two companies was announced earlier this year in a share-for-share deal (see *Wireless Business*, Mar-Apr 2017 issue). But on 1 June, Intelsat said that following the expiration of the deal on the previous day, the minimum tender conditions for the exchange offers and consent solicitations had not been satisfied.

A company press statement said: "The Issuers have not accepted any of the Existing Notes for exchange; any Existing Notes tendered for exchange will be promptly returned to holders, and the Exchange Offers and Consent Solicitations have accordingly been terminated."

According to Intelsat CEO Stephen Spengler, there were many stakeholders' interests that needed to be satisfied in the "complex" transaction, and bondholders were unwilling to accept the terms of the exchange offers presented.

Japan's SoftBank Group owns 40 per cent of OneWeb and had agreed to make a cash investment of USD1.7bn in exchange for common and preferred shares of the combined company. But although this is now off, Spengler said the pre-existing commercial agreement between SoftBank, Intelsat and OneWeb will still continue.

"Under this agreement, we plan to jointly develop integrated solutions utilising both of our fleets and to act as a sub-distributor to SoftBank for the attractive application segments of mobility, energy, government, and connected car," said Spengler. "As we create integrated services for these applications, we expect to accelerate and enhance our goal of unlocking new and larger opportunities in the communications landscape."

Vodacom set to acquire stake in Safaricom

Vodacom Group has agreed to buy Vodafone Group's 34.94 per cent stake in Kenyan cellco Safaricom. Subject to all approvals, it will fund the acquisition

by issuing 226.8 million new ordinary shares. Based on closing share prices at the time of the announcement in mid-May, the proposed transaction is valued at ZAR34.6bn (USD2.6bn).

Vodacom Group CEO Shameel Joosub said that given this is a related-party transaction, appropriate governance controls have been implemented to ensure that it will continue to be negotiated, evaluated and executed on an "arm's length basis." As a result, Vodafone, which currently owns 65 per cent of Vodacom, is precluded from voting at a general meeting in August where minority shareholders will vote on the matter.

According to Joosub, acquiring a strategic stake in Safaricom will provide Vodacom shareholders with access to a "high growth, high margin, high cash generation business operating in a high growth market". He said: "In addition to producing mutually beneficial opportunities for growth, it will create further incremental value through the close cooperation between the two businesses,



Vodacom CEO Shameel Joosub said deal will give shareholders access to a "high growth, high margin, high cash generation business operating in a high growth market".

particularly in driving *M-PESA* adoption across our operations."

Safaricom's *M-PESA* is regarded as an important driver of Kenyan economic growth. Joosub said the proposed transaction will improve Vodacom Group's presence in East Africa, jointly increasing the firm's growth in financial services customers to 32 million.

In its 2017 fiscal year, Safaricom saw 8.8 per cent revenue growth. It is Kenya's leading MNO with a 71 per cent customer share, and is the only one with a network that currently provides 3G and 4G coverage to 85 and 25 per cent of the population respectively.

CETel to acquire Onlime's managed satellite services business

CETel has agreed to acquire Onlime's managed satellite services for an undisclosed amount. Onlime says the spin-off will help it to fully concentrate on the expansion of its existing African focused software and communications businesses. According to the firm's CEO Paul Ziegler, this present a "coherent value-added service" to CETel's strength in the provision of VSAT and managed satellite service.

He adds: "Onlime continues to operate its teleport facility to serve satellite operators and service providers with enhanced teleport and data centre services. But our future focus will

definitely lie in working together with CETel to serve customers in the African and Middle East markets offering both satellite and terrestrial solutions."

CLX buys Dialogue

CLX Communications has acquired Dialogue Group, the UK-based provider of mobile messaging and security services, for GBP32m (USD41m) on a cash- and debt-free basis. CLX has also secured financing through a credit facility provided by Svenska Handelsbanken and Danske Bank.

Founded in Sweden in 2008, CLX specialises in cloud-based communications services. It says the acquisition of Dialogue will help it in its

aim to build what it claims will be the world's leading CPaaS (Communication Platform as a Service) company.

Through the acquisition, CLX says it will strengthen its customer base in the UK and Australia and add Tier 1 operator connections in New Zealand, Singapore, Malaysia, Bangladesh, Vietnam, Cambodia, Japan, Philippines, Indonesia and Egypt.

In addition to delivering messaging solutions to enterprises, Dialogue provides A2P SMS monetisation software and services to MNOs around the world and primarily in APAC. It's claimed that the company processes around 1.7 billion messages annually across more than 10 countries.

The merger will also add *Sentinel*, Dialogue's security software solution for mobile operators, to CLX's product portfolio. Integration work will start immediately. It is expected to take 12 to 18 months and is targeted to be completed by 3Q18.

Following the acquisitions of Mblox, Sinch, and Xura Secure Communications, this latest deal with Dialogue is CLX's fourth buyout since its IPO in 2015.

Mobile Mark acquires Comtelco

US-based antenna specialist Mobile Mark has agreed to acquire Comtelco Industries which makes a wide range of LMR antennas for both mobile

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
18/4/17	ZTE	China	1Q17	RMB	25.75 (bn)	NA	NA	27.8% rise in first quarter profit due to increased sales of carrier network solutions & smartphones.
27/4/17	Intelsat	US	1Q17	USD	538.5	409.8	(0.29)	First quarter net loss of \$34.6m. Total On-Network revenues reported YoY decline of \$2.4m to \$491.4m. Transponder services reported aggregate decrease of \$1.5m. Decline mainly due to lower pricing on renewing wide-beam services for enterprise & wireless infrastructure related to activity in Africa, & non-renewals of point-to-point services from customers operating in Africa & Latin America.
28/4/17	Gemalto	Netherlands	1Q17	EUR	651	NA	NA	Revenue 8% lower at constant exchange rates. SIM sales down 14% to €118m due to a lower market share as MNOs upgrade to removable SIM. This is coupled with soft demand in Middle East & Africa as the result of stricter subscription registration processes.
28/4/17	SES	Luxembourg	1Q17	EUR	540.6	357.6	NA	Revenue up 12.2% over prior period & up 1% YoY. Eight satellite launches expected between now & 2020, but only SES-16/GovSat-1 & O3b's next spacecraft will offer African coverage.
4/5/17	Motorola Solutions	US	1Q17	USD	1,281	224	0.45	Sales up 7% YoY due to growth in EMEA & Americas. Expects revenue growth of 2% to 3% in 2Q17 compared to 2Q16.
9/5/17	Zebra Technologies	US	1Q17	USD	865	149	0.16	1.9% increase from 1Q16. "Better-than-expected first quarter sales performance in our Enterprise segment," said CEO Anders Gustafsson. "We also retired another \$80m of debt, keeping us on track for at least \$300m of pay down for the full-year."
10/5/17	Bharti Airtel	India	4Q17	INR	219,346	79,928	NA	Overall quarterly revenues down 12.1%. African earnings grew 2.6% in constant currency terms, with data revenue up 14.5% YoY to INR157m, accounting for 17.7% of total income from the continent.
11/5/17	Eutelsat	France	3Q16	EUR	364.3	NA	NA	Revenues down 4.9% reported & 4.2% like-for-like, but fixed broadband earnings for the quarter up 36% YoY at €24m. African broadband initiative to be launched in June to support revenues from next fiscal year. Revenues in line with expectations.
11/5/17	VEON	Netherlands	1Q17	USD	2,281	861	0.19	VEON (formerly VimpelCom) reports total revenue increase of 13% YoY, benefiting from currency appreciation, while organically decreasing by 1%, due to weakness in Algeria where total income fell 15%. Djazzy continued to face customer churn & ARPU erosion, the latter exacerbated by price competition. Company expects this pressure to continue.
15/5/17	Vodacom Group	South Africa	FY16-17	ZAR	81,278	68,286	0.83	South Africa service revenue increased 5.6% aided by strong customer net additions of close to 3m; service revenues from international operations fell 5.6%.
16/5/17	Gilat Satellite Networks	Israel	1Q17	USD	63.9	4.2	0.03	YoY revenues increased 21% from \$52.7m in 1Q16. Targets for 2017: revenues between \$280 to \$300m; GAAP operating income between \$4 & \$8m; & adjusted EBITDA of between \$20 & \$24m.
17/5/17	Cisco	US	3Q17	USD	11.9 (bn)	NA	0.50	Total revenue down 1%. Americas flat, EMEA flat & APJC down 2%. Product revenue performance led by wireless & security which grew 13% & 9%, respectively. Switching revenue increased 2%. Next-gen routing, collaboration, data centre & service provider video revenue decreased by 2, 4, 5 & 30%, respectively.

and site installations. Following the acquisition, which is expected to take effect in June 2017, Comtelco's manufacturing facilities will be moved from its existing location in Illinois to Mobile Mark's facilities,

also in Illinois. Mobile Mark says this will allow continued use of Comtelco's 'Made-in-the-USA' badge.

In separate news, Mobile Mark has acquired the X-WAV and TMA antenna ranges from Luxul Wireless, a brand of

Legrand. According to the firm, Luxul's products hold a "unique place" in the wireless industry with their patented designs and quality construction.

Mobile Mark president and CEO Michael Berry says: "The acquisition

of Luxul Wireless' X-WAV and TMA antennas will immediately expand the range of antenna solutions we can offer our customers and will position us to develop additional innovative antenna solutions."

INVESTMENTS, MERGERS & ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
25/4/17	BICS	TeleSign Corporation	Acquisition	USD230m	BICS claims the combination of its global network & reach to MNOs with Telesign's cloud platform & "state-of-the-art" mobile identity & authentication solutions creates the first global end-to-end Communication Platform as a Service (CPaaS).
8/5/17	MTN Group	Iranian Net	49% stake	ZAR540m (approx.)	MTN plans further investments of around ZAR3.4bn in both equity & loans to facilitate Iranian Net's rollout targets over the next five years. The fixed broadband provider has a national license for the construction & operation of an optical data transmission & access network across Iran.
22/5/17	VEON	Sberbank	Loan	RUB110bn	The five-year agreement will refinance existing loans between Sberbank & VEON's subsidiary, VimpelCom Holdings, as well as provide additional funds for general purposes.
26/5/17	Hytera Communications	Sepura Group	Acquisition	GBP74m (reported)	Hytera has now completed its acquisition of Sepura. It's added around 700 staff to its organisation & expanded its European operations with innovation centres in the UK & Spain. Hytera founder & president Qingzhou Chen said: "With enhanced capabilities, we can better serve local markets & help to address increasing security challenges in Europe."
30/5/17	Cevian Capital	Ericsson	5.6% stake	USD1bn	Said to be one of Europe's largest activist investors, Cevian Capital is now Ericsson's third-largest shareholder, but is likely to raise its position to be come the biggest, according to some reports. Cevian co-founder Christer Gardell has blamed Ericsson's board for doing "a very poor job" and is looking for people with greater industry experience.

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
5/4/17	Zeng Xuezhong	-	-	ZTE Corporation	EVP – resigned due to "personal reasons"
10/4/17	Selim Bouri	Airbus Secure Land Communications	Head of sales & programme delivery for Middle East & APAC	Kapsch CarrierCom	Director, head of MEA & Turkey/emerging markets
11/4/17	Chun-Yuan Gu	ABB	President, AMEA	ABB China	MD
25/4/17	Adeline Lum	Neural Technologies	CFO	Oracle	Director of business operations for APAC applications
4/5/17	Vince Molinaro	Proceras Networks	Board director	-	Retains current position as chief customer officer & EVP with Juniper Networks.
4/17	Jean-Philippe Gillet	Intelsat	VP & GM, broadband	Intelsat	VP EMEA
11/5/17	Gregory McCray	ADTRAN	Board director	-	Retains current position as CEO of the Access Company, the Alphabet subsidiary that oversees Google Fiber.
16/5/17	Mounir Qalam	SatADSL	Senior sales	Tigo Chad	CCO
26/5/17	Kyle Whitehill	Neotel	CEO	Vodafone Qatar	CEO
1/6/17	Arnaud de Puyfontaine	Telecom Italia	Executive chairman	Vivendi	Chief executive. Vivendi owns a 24% shareholding in Telecom Italia.
13/6/17	Tarik Zilate	Neural Technologies	EMEA business development manager	Roscom	Business development manager



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Vertiv unveils fully-integrated system for micro data centres across Africa

Vertiv (formerly Emerson Network Power) says it has come up with an innovative approach to deploying micro data centres. The firm has

MANUFACTURER: Vertiv

PRODUCT: SmartCabinet

MORE INFORMATION:
www.vertivco.com

designed what's claimed to be a complete IT infrastructure solution in a fully-integrated enclosure.

SmartCabinet is a single unit that offers plug and play installation for a broad range of applications such as telecom sites, retail stores and branch offices.

It comprises thermal management, power distribution, remote monitoring, infrastructure management, and what Vertiv

describes as a "high efficiency" UPS from its *Liebert* brand.

Ready to use from day one, the company says the *SmartCabinet*'s compact design means that no dedicated IT room is required. It adds that the unit is pre-engineered, pre-configured and factory tested to ensure system compatibility,



efficiency and reliability.

As well as targeting micro data centres with limited space, Vertiv says the enclosure can also be used by companies looking to quickly upgrade their server rooms and local nodes to support increased data processing for content delivery, such as mobile computing and the IoT.

Monitoring tool can reveal 'silent unhappy customers'

SpatialBuzz has launched a new handset measurements tool to help operators identify customers

MANUFACTURER:
SpatialBuzz

PRODUCT: Mobile network monitoring tool

MORE INFORMATION:
www.spatialbuzz.com

receiving poor service levels. Using a unique set of algorithms, the company claims its solution allows cellcos to geospatially visualise RF conditions on the network.

SpatialBuzz is a cloud-based customer experience analytics and service monitoring platform. It derives critical operational insights by continuously monitoring activity across all client network touch-points, giving a crowd-sourced view of network performance.

The latest tool works by collecting radio related measurement data in real-time. SpatialBuzz says it is quick and easy to deploy, and can be embedded into existing operator self-service apps.

The firm adds that customers retain anonymity, and that the tool is optimised to minimise battery usage. Users can choose to opt-in or out of the service at any time.

According to SpatialBuzz, device measurements not only help

diagnose dissatisfaction hotspots faster, they also help identify where dissatisfaction might be increasing.

It believes that the new tool also allows for a "deeper, relevant and more meaningful" conversation to be had with customers experiencing network problems.

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

Wave 2 combined with LTE CAT6 for "superior" Wi-Fi

Zyxel Communications says the *LTE5366* is one of the first LTE indoor gateways with 802.11ac Wave 2 Wi-Fi technology. This offers 4x4 streams for higher speeds, better coverage, and support for more devices and applications.

The device is designed to provide users with mobile broadband connectivity to take advantage of the latest carrier aggregation technology



compatible with LTE, DC-HSPA+/HSPA/UMTS and EDGE/GPRS/GSM. Zyxel says this enables connectivity with a variety of mobile broadband services all over the world.

With LTE category 6 compliance, the *LTE5366* is said to deliver downlink data rates of up to 300Mbps (at 2.4GHz) – according to the company, that's twice as fast as category 4 models and even outperforms fixed-line Ethernet.

It adds that by using the latest MU-MIMO 802.11ac technology, the gateway doubles Wi-Fi performance of Single User MIMO in venues where concurrent wireless access activities are intensive.

Cable assemblies ideal for high data rate applications

MANUFACTURER:
Zyxel Communications

PRODUCT: LTE5366

MORE INFORMATION:
www.zyxel.com

Amphenol RF has expanded its coaxial cable assembly offering with a new line of SMPM cable assemblies. It reckons they offer the "ideal" pre-configured solution for high frequency applications with 50 Ohm impedance requirements.

The firm claims the assemblies offer "excellent" performance up to 20GHz. They are said to feature high quality SMPM plug connectors which are designed to accommodate both radial and axial misalignment in a small package size.

The connectors are terminated to industry standard 0.085- and 0.047-inch hand formable cables. Amphenol says they're available in standard lengths ranging from three to 48 inches (100mm to 2,000mm) to complement any RF design.

The company adds that due to their high frequency range and compact

size, SMPM cable assemblies are ideal for high data rate applications such as broadband communications, instrumentation and 5G wireless solutions.

It adds that their reliability under conditions of radial and axial misalignment also makes them ideal for use in environments that are exposed to shock and vibration, such as instrumentation equipment, aerospace, and military applications.

MANUFACTURER:
Amphenol RF

PRODUCT:
SMPM cable assemblies

MORE INFORMATION:
www.amphenolrf.com

First NB-IoT support for interference measurement

Viavi Solutions' (formerly JDSU) *CellAdvisor* base station analyser now supports the unique signal analysis required for narrowband Internet of Things (NB-IoT) connectivity.

In what it believes to be an industry first, the company says this new

MANUFACTURER:
Viavi Solutions

PRODUCT: NB-IoT support for *CellAdvisor*

MORE INFORMATION:
www.viavisolutions.com

capability meets the service providers' needs for immediate testing for the overlay IoT infrastructure that must co-exist seamlessly with traditional mobile networks.

The software-based NB-IoT testing feature can be installed as a license on existing *CellAdvisor* handheld instruments. It will enable users to measure the interference and performance impact an NB-IoT signal may have on the LTE wideband signal.

Viavi says it also confirms whether the signal has the reach and coverage required to serve the number of devices in the assigned geographic area, taking



into account considerations such as building penetration.

The vendor says engineers can use the new feature to analyse signal power levels, digital demodulation and interference down to the single physical resource block for the signal under measurement.

Hybrid system combines satellite and cellular to connect maritime users

NSSLGlobal has unveiled its first-ever hybrid cellular/VSAT services for maritime vessels.

Using its new *Cellular Marine System*, the company claims maritime vessels can connect to robust, high-speed internet with download speeds

MANUFACTURER: NSSLGlobal

PRODUCT:
Cellular Marine System

MORE INFORMATION:
www.nsslglobal.com

of up to 100Mbps for commercial and crew welfare broadband use.

NSSLGlobal says the system is supported by a mobile roaming service established through an unnamed "major" global operator, and allows the customer to automatically transfer from satcoms to 3G and 4G connectivity as appropriate. It adds that the service will help customers gain the most out of their onboard communication system when operating in coastal areas or waiting to get into harbour.

The new 3G and 4G connectivity will complement NSSLGlobal's



maritime VSAT *IP@SEA* service. This is said to combine "extensive" Ku- and C-band coverage with some of the fastest speeds in the industry. *IP@SEA* comprises six global teleport supporting 24 satellite beams and two network operation centres to achieve 'always-on' connectivity.

D-Link promises fast Wi-Fi with new AP

Built for outdoor use, D-Link's new dual-band wireless access point is designed to operate in temperatures from -30 to 60°C.

The IP67-compliant *DWL-8710AP* uses 802.11ac, and supports a maximum of 300Mbps at 2.4GHz and 867Mbps at 5GHz.

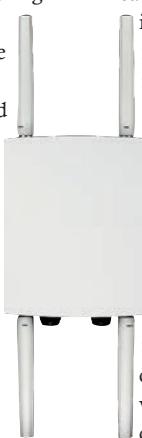
MANUFACTURER: D-Link

PRODUCT: DWL-8710AP

MORE INFORMATION:
www.dlink.com

D-Link claims band steering ensures that 5GHz-enabled clients can achieve maximum performance without being bottlenecked by legacy 2.4GHz 802.11b/g/n devices. The firm adds that AC *SmartBeam* technology enables the AP to have greater reach.

The *DWL-8710AP* includes two GbE network interfaces which enable administrators to bridge other devices, such as a



camera or another access point, into the network. Other features include support for 802.3at PoE, mounting brackets for installation on a wall or pole, and a metal and polycarbonate housing. The AP weighs just over 2kg (with antennas), and measures 250 x 220 x 45mm.

Like other models in its range, D-Link says the *DWL-8710AP* can be centrally managed when working in conjunction with its unified wireless switch or wireless controller.

ALSO LOOK OUT FOR

Qualcomm first to support new Wi-Fi standard

With the launch of the *IPQ8074* system-on-chip (SoC) and *QCA6290* for client devices, Qualcomm Technologies says it has become the first company to announce end-to-end commercial solutions to support 802.11ax.

The firm says the growing number of connected devices, diversity of traffic, and density of overlapping networks currently overloads Wi-Fi spectrum and threatens the quality of connected experiences. As a result, the 802.11ax Wi-Fi standard focuses on expanding capacity and making better use of spectrum to maintain excellent connectivity in more complex environments.

Qualcomm has designed the *IPQ8074* SoC to deliver maximum capacity, range and performance for the next generation of Wi-Fi devices. By utilising 12-streams (eight 5GHz and four 2.4GHz), 8x8 MU-MIMO, and supporting eight 80MHz streams, it's claimed the device quadruples capacity, delivers up to 4.8Gbps, and maintains fast connections over larger coverage areas.

The *QCA6290* client device SoC is said to offer an up to 4x increase in user throughput in crowded networks. It supports 2x2 MU-MIMO and realises the full benefits of the 8x8 MU-MIMO by supporting the advanced 8x8 sounding mechanism. Qualcomm says peak speeds of up to 1.8Gbps are offered through dual band simultaneous connections that combine 2.4GHz and 5GHz bands, and higher order 1024 QAM.

It adds that the *QCA6290* is optimised to reduce power consumption by two thirds compared to current .11ac devices, on top of support for the 802.11ax standard's power save features.

Although all these benefits will be greatest for .11ax-based devices, Qualcomm claims its solutions will also improve the performance of devices that use the .11ac and .11n standards.



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



The power behind the data

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

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

In terms of the latter, MNOs are keen to offer more enterprise-class services. As part of this, big name cellcos such as MTN and Vodacom are building their own data centres to add to the growing number of independent facilities that are beginning to sprout up across the continent. But whether they are expanding their wireless

networks or building data centres, all operators across developing regions typically face the same issue: a lack of reliable and cost-effective power for running their sites. So what's the solution?

South African power solutions provider Master Power Technologies (MPT) says that when faced with the potential losses involved in load shedding or general electricity outages because of poorly maintained infrastructure, many businesses have made the investment in their own power management solutions. Central to these solutions is the backup diesel generator. But as Rory Reid, MPT's sales and marketing manager

points out, power generation sets can be costly and buying one is not a simple decision.

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

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

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

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

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

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

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

Energy plan

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

client beforehand) to deal with the problem."

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

The future of power

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

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

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

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

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

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

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



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



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

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

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

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

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

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

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

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

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Unearthing a solution

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

As well as presenting communications challenges because of their remote locations, the terrain where mines operate is unforgiving and working conditions are perilous. Effective technology is therefore essential for improving safety.

To monitor the safety of miners and secure its site, an unnamed manganese mining company based in Kuruman, South Africa, needed communications infrastructure that would transmit high-quality video from all mining site locations back to a central control centre.

The wireless surveillance network had to satisfy several demands. It needed to deliver real-time, high-quality video with no interruption, meet extensive regulations and approval processes for each component installed, and operate in a tough mining environment with harsh elements including heat, snow and dust. On top of all that, it had to be capable of overcoming radio noise in a relatively flat mining terrain and transmit in non-line-of-sight conditions.

Miro Distribution, one of South Africa's major distributors, recommended RADWIN's wireless point-to-point (PtP) and point-to-multipoint (PtMP) solutions for the job. Specialist company I3S Security Solutions carried out the deployment and installed more than 150 IP-based security cameras that covered the entire site, from the construction village and mine shaft, to the entry turnstiles and everything in between.

I3S used RADWIN's 2000 PtP and 5000 PtMP radios in the 5.8GHz range and established a wireless network covering 12km². It says the systems offer a number of advantages including ruggedised, IP67-certified systems suited for installation in tough outdoor environments, and high throughput of up to 250Mbps for the 5000 and up to 200Mbps for the 2000. The devices are also said to offer long range and low latency for 24/7 wireless surveillance, fast set-up times, and low power consumption. In addition, RADWIN's solutions allowed I3S to effectively utilise the camera network as well as provide infrastructure for the access control system.

As well as meeting all the manganese mining company's stringent technical and performance requirements, the vendor claims its wireless links have improved visibility of field mining operations, enhanced the safety and security of miners and the sites, and means the customer can rapidly deploy video surveillance where and when needed. RADWIN adds that the use of its systems offer the lowest TCO as more high resolution cameras can be connected without the need to add extra radios.

RADWIN's radios were also called into action in another mining deployment in South Africa, this time for a company that was looking to establish a network at its gold mine.

The chosen wireless solution had to be able to transmit video in real-time from cameras located

at multiple locations, enable mining personnel to monitor activity around the clock from a command centre, and support voice, video and data applications that are crucial to safe and effective operations. What's more, the wireless network had to link surface infrastructure to underground systems, such as VoIP switches located 1,200 metres underground, for example.

According to RADWIN, wireless was the only relevant option for this type of deployment. It said use of fibre was unfeasible due to reliability and maintainability concerns. The mining site is a production shaft and any system placed in this type of harsh environment is subject to extreme abuse. An armoured fibre optical cable was therefore simply too costly to install and maintain.

After assessing equipment from different vendors, the unnamed gold mining company chose the vendor's 2000 PtP radio which offers support for voice, video and data services on a single platform. RADWIN says its system was also chosen for its high throughput, "superior" video quality transmission in challenging conditions, and IP6 certification.

The vendor adds that by using the 2000, the gold mining company was able to overcome challenges posed by multipath and fresnel zone limitations imposed by the moving skips and cages and the physical dimensions of the mining shaft.

Helping to connect remote explorers

Mining Projects Development (MPD) Congo SA is a subsidiary of Anglo-Swiss multinational mining company Xtrata. In May 2007, it was granted an exploration license to evaluate iron ore deposits in Lekoumou, a district in the south west region of the Republic of Congo. Known as the 'Zanaga' project, the mine is expected to produce 45 million tons of iron ore concentrate a year once it reaches peak capacity.

The iron ore exploration zone is 500km from MPD Congo's head office at Pointe-Noire and is accessible only by four-wheel drive vehicles. There is no electricity supply to the area and limited GSM coverage, presenting a challenge for tracking supply vehicles that travel between the two sites as well as communicating with staff.

MPD Congo thus needed to establish reliable, high-performance voice and data comms to manage its daily operations on site and ensure staff safety. But providing coverage across an area spanning some 40,000km² with virtually no infrastructure would necessitate a wireless solution that was robust enough to withstand a harsh environment and could be operated using solar power.

Drawing on its 30 years of experience providing radio communications in Africa, Motorola partner Soicex Electronique recommended *MOTOTRBO IP Site Connect* combined with *TRBOnet* dispatch software developed by application partner Neocom. Eight *MOTOTRBO DR 3000* repeaters with solar powered generators were connected using 10 *PTP 58500* and four *PTP 58300* wireless PtP Ethernet bridges to provide what Motorola says is reliable, high-speed voice and data connectivity throughout the coverage area, even in extreme conditions.

The company's *DP 3601* portable digital handsets and *DM 3601* mobile radios with integrated GPS are used to track the location of 200 personnel and 100 vehicles in real-time, while *IP Site Connect* is said to ensure "seamless" communication wherever they are on site and enables them to send voice and text messages to staff at MPD's head office. According to Motorola, automatic roaming allows the radios to select the best signal available without requiring users to manually tune their radios so they can enjoy high-quality communications at all times.

The *TRBOnet* client-server software application is being used by MPD Congo to enhance dispatch



As well as meeting all the manganese mining company's stringent technical and performance requirements, RADWIN claims its wireless links have improved visibility of field mining operations.

by facilitating the monitoring of large amounts of traffic on its network. The locations of vehicles and staff across the site are mapped on big screens set up in control rooms at the exploration site and head office. Motorola says multiple work groups can be linked at the touch of a button – an important feature for emergency situations. It adds that *TRBOnet* also enables the recording of voice conversations and the storage of GPS data such as vehicle location, speed and route. These data can then be transmitted in real-time across the PtP wireless links.

It's claimed the "robust" network has reduced MPD Congo's dependency on intermittent GSM signals and provided consistent voice, SMS and GPS communications to enhance the management of its ore exploration operations and ensure staff safety. Being able to track the exact location of trucks carrying iron ore and supplies along the 500km of road between the sites has greatly improved dispatch efficiency and enabled a quicker response to breakdowns and emergencies.

In addition, Motorola says cost savings have been realised through the ability to use the PtP wireless bridges instead of expensive satellite links for internet access, and travel costs have been reduced by using video conferencing for meetings.

"In a relatively short period of time, we were able to establish an advanced and robust communications

network with hardly any existing infrastructure," says Paul Reed, logistics director at MPD Congo. "*MOTOTRBO IP Site Connect* ensures we have constant voice and data communications with staff and vehicles on the move, which is critical when operating across such a vast and isolated area."

Exploring with satellite in Cameroon

SkyVision is providing reliable communications to help a mineral exploration firm and a local branch of a British mining company with its research and exploration sites located throughout Cameroon.

While the companies have not been named, SkyVision says one of them is credited with the discovery of one of the largest iron ore deposits in the country. But even so, it says finding the right area for establishing mineral exploration proved complex for the firm.

Exploration involves in-depth research of resources using geophysical and geochemical methods. It is therefore necessary to conduct geological, terrain and regional surveys in order to select the best prospective sites for the fast, easy and cost-effective location of ore deposits. Exploration field camps are established by teams in areas where various test sites have already been setup. Usually, such sites are located far from standard telecoms networks and therefore rely heavily on satellites. As such, satcoms is a critical factor for the successful establishment of exploration field camps and must be reliable.

When the mining firm's IT manager had to select a reliable service provider to provide communications to the exploration sites all across Cameroon, he turned to SkyVision: "I had previous experience with two other satellite service providers, but they failed to satisfy my requirements and the expected service availability and quality," he says.

SkyVision says its broadband connectivity allows the company to establish high-quality voice and high-speed data connectivity where no terrestrial infrastructure is available. The service provider claims its reliable links allow exploration field camp teams to send files back to headquarters and conduct telephone and conference calls critical to expediting their exploration data analysis. In addition, employees are able to use the link to communicate with their families.

The mining company now operates multiple exploration sites simultaneously, with all of its field camps served by SkyVision.



Above left: MPD Congo is using Motorola's *MOTOTRBO IP Site Connect* with a solar power generator. Centre: the iron ore exploration area is 500km from MPD's head office at Pointe-Noire and only accessible using 4x4 vehicles. Right: *DM 3601* mobile radios with integrated GPS track the location of 100 vehicles in real-time.



Helping to connect remote explorers

As some of the above case studies show, discovering and exploiting new mining opportunities is becoming increasingly difficult. The relative scarcity of resources is driving organisations to operate in more remote environments which are usually cut off from telecoms infrastructure and services, making mission-critical communications extremely challenging.

But no matter what phase the mine site is in – exploration, development, operation or relocation – there is a vital need for effective communications between remote sites and corporate office to improve efficiency, meet production targets and commercial goals.

Belgium-based SatADSL is certainly no stranger to dealing with such challenges, and when a large mining operator began establishing new sites in West Africa, it approached the communications specialist for its help. The unnamed operator already had a central office in Accra which serves as its regional African Hub. This was connected through a leased line but the remote sites were in areas without any telecoms infrastructure and needed to function as an extension of the company's corporate network. Employees at the sites needed to run essential business tools, especially SAP, as well as transfer large data files and access the internet for emails and web browsing.

SatADSL established a private network between the operator's new remote exploration sites and its HQ in Europe and regional hub in Ghana. This enabled the real-time sharing of information between all locations for improved decision-making, bypassing what SatADSL describes as "unreliable" local telco networks. All communications are secured through VPN tunnelling using private IP addresses and traffic encryption.

It's claimed that a complete operational network was achieved within six weeks of the initial order. SatADSL says its solution was based on a highly available leased satellite capacity on the *Astra 4A* satellite that covers

sub-Saharan Africa. It was uplinked via a teleport in Luxembourg, and connected through multiple and redundant fibre links to the internet backbone delivered by Tier 1 providers. Two ruggedised low-cost VSAT terminals were installed in each remote location to deliver two separate networks: one for professional and corporate activities, and the second for entertainment and social purposes.

According to SatADSL, onsite equipment (from Newtec) was installed and operational in less than four hours using the *Point & Play* feature of the deployed antenna and *Plug & Play* procedure of the modem. The IDU was pre-programmed by the company's technical support team in Brussels before shipping, while its in-country local partner for each site provided installation and maintenance training.

Workers at each location can now access the web, email, *Skype*, as well as other IP applications. SatADSL provided its SOHO pre-paid service package for each remote site which means customers pay for bandwidth only when used. It adds that the customer has also been supplied with a "powerful" web-based *Customer Management Tool (CMT)* for service management and monitoring. SatADSL says this will enable the company to monitor service quality (antenna pointing, signal-to-noise ratio, etc.) and service usage (data rate and volume consumed), as well as activate new sites, set the appropriate service plan for them, and terminate/upgrade/downgrade existing sites depending on their needs.

In addition to enabling access to social media and tools for staff entertainment, SatADSL says both service plans delivered "highly" cost-effective IP-based satellite services for the mining firm's business communication needs. This included the initial site survey, shipping, customs clearance, training, installation and testing.

Vivo Energy simplifies payments with M-PESA

Shell has had a recognisable presence in Kenya for more than a hundred years. Today, Vivo Energy operates using the Shell brand at its nationwide petrol stations, and is said to be one of the country's most popular fuel and lubricant suppliers. The company has an extensive network including major bulk oil storage terminals, aviation services, and a lubricants blending plant in Mombasa, enabling it to serve multiple retail and commercial market segments.

For years, cash has been the most common method of payment for goods and services but, as has been well documented, it is not without its challenges. It is inherently insecure, the cost of handling and accurately recording physical transactions is a burden on retailers, as is ensuring its security in-store as well as in transit.

"Customers no longer want to carry cash with them at all times and would prefer a cashless alternative," says Samuel Mbugua, retail sales card manager, Vivo Energy. "We wanted to find a flexible, secure method of transaction that would be available to all our customers."

SatADSL says mining firms are going to more remote environments cut off from telecoms, making mission-critical comms extremely challenging.

PHOTO: ACACIA



Vivo Energy said its customers no longer want to carry cash and prefer to pay for goods at its petrol stations using a cashless alternative.

While many people might not have access to financial facilities, the vast majority do carry a mobile phone. This presented one possible opportunity to introduce a more convenient payment method.

According to figures for the second quarter of the 2016-17 financial year published by the Communications Authority of Kenya late last year, the country saw 456.6 million mobile money transactions valued at KES586.4m (USD5.67m). More than 31 million mobile money subscribers were recorded for the period.

"We studied the consumer trends and looked into mobile wallets. It became clear that *M-PESA* was the market leader," says Mbugua.

Safaricom was responsible for rolling out *M-PESA* at the point of sale in 117 initial outlets for Vivo Energy. That number has since grown to 160. The mobile operator provided onsite installation and training to ensure Vivo's employees could use the system. Customers can now transact securely using *M-PESA* by entering a six digit shortcode to identify the outlet and their PIN to confirm the transaction. Both parties receive an SMS confirming the amount that has been transferred. Pre-paid Shell card holders can also conveniently top up their cards using *M-PESA*.

Deploying the mobile money system led to a number of immediate benefits for Vivo. Reducing in-store cash handling minimises the risk of robbery and makes the transaction process more efficient. It is also much simpler for customers who know they can pay easily without cash.

In addition, *M-PESA* introduces more accurate accounting which makes for increased operational efficiency. "It makes our job easier and means that all transactions can be precisely monitored so we run more effectively," says Mbugua. "At the same time, the customer experience is improved so our income grows. That's why we are looking at rolling out *M-PESA* to other countries." ■

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Maintaining good contact



While LTE looks set to dominate the market for new PMR products in the coming years, there's still plenty of life in traditional critical comms technology, as SARA FREWEN finds out. Additional reporting by RAHIEL NASIR.

The worldwide critical communications products market is anticipated to be worth USD18bn by 2019, according to a report published by IHS in 2016. While economic constraints have forced public sector cuts in many countries, its analysts said they are seeing strong growth on a global scale.

The two largest market segments are command and control solutions, and licensed mobile radio (LMR) terminals, which together account for more than two-thirds of critical communications revenue.

Public safety applications continue to make up a major part of the critical communications industry, and IHS estimates that the installed base of public safety and security users make up 43 per cent of the PMR market.

It is this potential that is driving the established critical comms vendors to continually innovate and develop new products. For example, Motorola Solutions reckons it's come up with a "one-box" digital radio system that reduces setup time to less than 15 minutes.

DIMETRA Express is an expandable single site TETRA system that integrates base radios and a switch. Motorola says it was created in response to demand from customers and partners for a product that was easy to deploy and cost effective enough to be used for smaller projects.

The system is claimed to be lightweight and energy efficient, providing all the voice, SDS and telephony services users require in a small physical footprint. Motorola says engineering expertise is not required as it can be set up and configured by a *Windows* or *Android* laptop or tablet, and is then managed and operated through web-based applications and tools. It adds that just a single IP address is required which further reduces setup as well as ongoing maintenance costs, making it easier to integrate into an existing IT network.

Hytera unveiled two new products at PMRExpo that took place in Germany last November. They included the *PD985 DMR* handset which features single frequency repeater mode. According to the company, this enables

the device to use one slot to receive signals and another slot to transmit it in the same frequency in DMO mode to extend communication distance. It's also equipped with Bluetooth 4.0 which not only supports audio transmission but also programming, and 3W audio output with Hytera's new noise cancelling technology.

The *PD985* has a protection rating of IP68 to comply with the highest dust and waterproof standards, and Hytera says the radio will continue to function for up to four hours after submersion under water to a depth of up to two metres.

Other features include 'Smart Battery'. The vendor says this makes it easier to monitor battery life and charging time which is "dramatically" reduced. There's also support for 32GB Micro SD cards enabling recording of up to 576 hours of digital/analogue audio.

The *DIB-R5* outdoor unit was the second product Hytera launched. The company says this expands its family of TETRA 2/TEDS base stations with an outdoor version for

ACCESSNET-T IP radio systems. Designed to be very small and space saving, the unit can be fixed, for example, to a wall, radio mast or in a tunnel. Furthermore, Hytera says the *DIB-R5* has low power consumption, enabling deployment in areas with critical electrical power supply. The firm adds that it has an IP65 rating making it dust- and waterproof, and operates in temperatures ranging from -30°C to +55°C.

Earlier this year, France's Airbus Defence and Space demonstrated what it described as the "future of digital radio". It said that in the foreseeable future, authorities will increasingly share photos, videos and other multimedia files with each other for which they require the appropriate technology.

At the European Police Congress held in Berlin in February, Airbus revealed that it had developed a product portfolio that enables multimedia communication in a secure radio network. Speaking at the time, Markus Kolland, head of sales and programme delivery for Europe and Africa at the company's Secure Land Communications division, said the most important thing is for TETRA to continue to prevail and be expanded with broadband technology. "Existing and future investments in the radio network will therefore continue to be of value," he said.

Airbus' range of broadband products also integrates applications for smart end devices, such as the *Tactilon Dabat* secure Android smartphone that has a built-in TETRA radio device (*also see '4G or not 4G?' feature, Q4 2016 issue*). This will now feature *Stashchat*, an encrypted messenger and file-sharing application that supports voice communication. Airbus claims it is a more secure choice for critical comms users than publicly available messenger applications.

The company developed the app in conjunction with Heinekingmedia, a German-based digital signage and professional secure messaging specialist. It is one of several companies Airbus is currently working with as part of its new app development programme, *SmarTWISP*. This aims to create a new application ecosystem that addresses the daily needs of PMR users.

The LTE alternative

Although LTE has been on the critical comms agenda for some time, its market entry has been slow and protracted because of its numerous challenges, such as the cost of spectrum.

However, it is now emerging as a leading candidate for critical communications broadband networks. In addition, with the recent approval of the mission critical push to talk (MCPTT) voice standard as part of 3GPP Release 13, LTE has also become an attractive substitute for providing LMR-like voice services.

Thomas Lynch, critical communications research director at IHS Technology, says: "End-users from several sectors are already implementing LTE, and some have chosen it over TETRA or DMR. As well as public safety, this is occurring mostly in small and contained networks, often in remote locations, for example, oil and gas platforms and in mining operations."

IHS projects that this growing trend will have an effect on existing critical communications technologies, especially on LMR terminals and infrastructure. Lynch says the trend has been seen in developing regions such as Africa where it has been easier to 'leap over' technology generations rather than set up an LMR infrastructure beforehand.

The TCCA (TETRA and Critical Communications Association) believes it is vital that mobile broadband services are provided to public safety users as soon as possible. However, it also points out that the inclusion of such functionality does not, by itself, make commercial cellular networks suitable for mission critical operation.

As a result, the TCCA has some significant reservations about the use of commercial mobile broadband networks for public safety applications, and recently issued advice to governments who may be considering LTE for their emergency services networks (*see 'LTE: what's needed for critical comms users', overleaf*).

Noel Watermeyer, sales director for Altech Alcom Matoma, says that once the public safety features and functionality are fully standardised, developed by a reasonable number of OEMs, and introduced to market, there is no question that LTE will be a valuable tool. "Popular belief amongst the international user group is that currently LTE can provide an invaluable overlay, specifically for broadband data (as opposed to voice and data) to complement the more mature narrowband technologies such as TETRA (still the preferred public safety technology in our region), APCO P25, DMR and dPMR, which [all] remain appropriate solutions for 100 per cent of the users."

To solve the interoperability dilemma, Watermeyer says a number of OEMs have introduced solutions for cross technology communication. He reckons that because of the standardisation problem, the best solutions are OEM specific: "The trend initially set in Europe of partnering with a specific OEM is therefore set to continue so long as this international situation persists."



Above left: Hytera's recently launched *PD985* DMR handset features single frequency repeater mode. Above right: the *DIB-R5* extends the vendor's range of TETRA 2/TEDS base stations with an outdoor version for ACCESSNET-T IP radio systems.

Making it all work together

At the end of January, Airbus announced its *LTE4PMR* (*Long Term Evolution for Professional Mobile Radio*) project to develop a full-fledged mission critical broadband solution. It described this as an "accelerator" in the standardisation, development and implementation of the specific products and features required to meet the public safety sector's secure communications needs.

Airbus has set up an R&D consortium with French telcos and universities, and says that a "substantial" amount of resources will be invested over a period of 27 months as part of *LTE4PMR*.

The project solution will offer what the firm says are "typical" PMR features, such as MCPTT, complex data, and video transmissions. It will also create the base station, core network and terminal chipset enabling the deployment of mobile broadband secure communication networks in various frequency bands.

The final results of *LTE4PMR* will be presented at the end of 2017. Airbus says they will consist of a "comprehensive and interoperable" set of mission-critical solutions leveraging commercial mobile broadband services as well as dedicated networks in the 400/450MHz and 700MHz frequencies."

Until then, many PMR specialists continue to develop and launch customised products that use current standards of LTE technology.

For example, France-based ETELM, believes LTE offers "excellent" options for high-speed data and use of mobile applications, and therefore has a "massive future" in the market. It has developed a range of 4G linked technologies, including TETRA, DMR and analogue base stations, which connect directly to any standard LTE core network without any gateways or specific interfaces.

Late last year, the company unveiled a new eNodeB LTE base station which is claimed to have the longest reach ever developed for PMR 4G technology. "The *e-LBS* is a major breakthrough for our 4G linked solution and introduces our own



Motorola Solutions' "one-box" *DIMETRA Express* is an expandable single site TETRA system that integrates base radios and a switch.

LTE technology to the mission critical sector," says ETELM sales and marketing director Nicolas Hauswald. "It will allow operators to boost their coverage areas from existing locations and make seamless calls between subscribers, and give the best of all technologies in a single network." He adds that the *e-LBS* uses LTE's multi-broadcast features to ensure the widest coverage area, including group calls which are essential to mission critical users.

ETELM says it has developed a fully integrated approach to avoid, wherever possible, the limitations of the gateway approach. Hauswald claims the firm's linked multi-technology solution is the only one in the market that is fully integrated to LTE.



ETELM claims its *e-LBS* base station has the longest reach ever developed for PMR 4G technology.

"Our solution implements the LTE protocol stack in every base station, thereby allowing our radio sites to directly and seamlessly connect to the LTE backhaul. In the future all operators will use the LTE core network, so having the ability and flexibility to connect onto this industry standard network is important for inter-technology communications."

Interoperability is key for PMR specialists working with LTE. For example, Hytera plans to launch its dual mode TETRA/LTE and DMR/LTE devices later this year, including a version with an additional small screen on top of the radio. It says the *Android* devices will support Wi-Fi, Bluetooth, RFID, GPS, NFC and video, and will work on LTE frequencies. And Motorola Solutions' already available *LEX L10* combines the features of its rugged *APX* series radios with capabilities more often associated with smartphones.

Jerry Nachmann, the firm's regional field and solutions marketing manager, believes that while public safety users will always need a fail safe option to communicate by voice (whether using TETRA or other PMR technologies), their ability to share photos and videos is "highly beneficial" to helping solve and prevent crimes.

"Public safety LTE provides additional layers of information that can help in critical situations. If you think of a situation where a terrorist or a criminal is on the loose, command centres could, over an LTE network, push out a picture of the suspect to the LTE devices officers are carrying and help apprehend the suspect with greater ease."



DAMM's *TetraFlex* app enables PTT in TETRA groups. It can be run on smartphones that use the *Android*, *iOS* and *Windows* mobile operating systems.

But sharing photos and videos are just part of the picture, and Nachmann points out that public safety LTE networks with smart devices provide a "great platform" for applications that improve a public safety agency's efficiency. Denmark-based DAMM is likely to agree here. Its *TetraFlex* client app offers TETRA over LTE and provides coverage extension as well as data capacity for videos and pictures.

It also supports full integration with the company's *TetraFlex* radio systems, and enables PTT in TETRA groups, individual calls, messaging, video streaming and GPR tracking. According to the firm, no radio gateways are required. It adds that the app supports *Android*, *iOS* and *Windows* operating systems, and offers a vendor-independent soft terminal for non-critical voice and data communications through Wi-Fi, UMTS and LTE networks. ■

LTE: WHAT'S NEEDED FOR CRITICAL COMMUNICATIONS

The TCCA (TETRA and Critical Communications Association) has identified four key focus points for governments to consider if they are looking to implement LTE-based public safety networks. In a recently published white paper, it says commercial mobile network operators already have the ability to deliver mobile broadband to public safety services. While many public safety organisations are already taking advantage of this, the association says it is only for non mission-critical applications, with the traffic carried by a 'best efforts' commercial service.

For safety critical applications – such as dispatching ambulances, sharing details of terrorist suspects, and dealing with major incidents – the TCCA says it is essential to use networks that are suited to mission-critical communication, taking four key areas into account:

Spectrum: For a public safety operator to build its own infrastructure anywhere in the country, it will be necessary to obtain suitable spectrum. Those responsible for public safety communications must review the opportunities for obtaining spectrum. They must engage with the appropriate government ministries and the national regulator to establish how this can be made available for public safety, and to enable choice in the provision of broadband data services.



Security: Secure communications are essential to enable confidential information to be passed safely over the network, and broadband data services will likely carry more confidential information than existing voice networks. Security mechanisms are being designed into future LTE standards, but the standard is not currently at a security level to match purpose-designed PMR standards. A review of the security arrangements available in LTE systems, and in any commercial network that is used, should be undertaken by suitably qualified staff.

Ownership: As with any business, commercial mobile networks are subject to being bought and sold. Such transfers of ownership may be to companies anywhere in

the world. Some governments are cautious about critical national infrastructure being owned by foreign firms. Those responsible for public safety communications should consider the national government policy with regard to foreign ownership and operation of telecoms infrastructure.

Funding: Assuming that spectrum has been secured, the degree to which dedicated infrastructure can be built will be dependent on funding. Nationwide infrastructure will be relatively costly in many countries and an optimal balance between dedicated and commercial networks will need to be found. The use of commercial networks can significantly reduce the capital investment for public administrations and also the time required to implement public safety services. However, their use will incur ongoing service charges. It is likely that the re-use of existing base station sites and sharing infrastructure can mitigate some of these costs.

The TCCA believes that there is no doubt mobile broadband services are likely to bring significant benefits for many public safety users, enabling faster and more targeted responses to incidents, as well as efficiency savings. But it adds that there is no simple answer to how mobile broadband should be provided to public safety users.

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Kenya begins USF backed rollouts

 The Communications Authority of Kenya (CA) has contracted three firms to deliver high-speed internet connectivity to schools under the first phase of projects financed by universal service funds.

Liquid Telecom, Xtranet Communications and Commcarrier Satellite Services will undertake the KES836m (USD8m) *Education Broadband Connectivity Project* which includes giving 898 rural secondary schools access to 5Mbps speeds

The schools were identified using 'e-readiness' criteria agreed upon between the CA and the Ministry of

Education. Qualifying institutions were expected to have: secure electricity supply from Kenya Power or a constant diesel/solar powered generator; secure computer lab with UPS; at least 10 working PCs along with a printer and projector; and at least one full-time accredited teacher for computer studies.

The education project is one of two key initiatives recommended for immediate implementation following an ICT Access Gaps study commissioned by the CA last year. This also identified a need for more 2G voice infrastructure in

selected sub-locations. According to the study, 5.6 per cent of Kenya's population (about 2.66 million people) have no access to telecom services. About 418 sub-locations have less than half of their population covered by services, while another 164 sub-locations have no access to 2G mobile services.

The study also established that 3G and broadband services are limited to urban areas. It found that only 2,454 sub-locations have 100 per cent population coverage of 3G and broadband, while 1,244 sub-locations have no access at all.



CA chairman Ngene Gituku described the project as "the beginning of a long journey towards building a digitally inclusive community".

Hidden PIM source found in mobile connections

 Researchers have found that humidity makes a significant contribution to passive intermodulation (PIM).

Working in partnership with the London South Bank University, in the UK, Hughes Electronics has been investigating and mitigating sources of PIM in cellular networks. In the latest research, its team has discovered that humidity deposits a layer of salts and other airborne contaminants which interfere with 'clean' signal transit.

Though almost impossible to see, researchers say the salts deposited during the evaporation process are electrically conductive and "play havoc" with skin effect signal transmission. They instigate surrogate

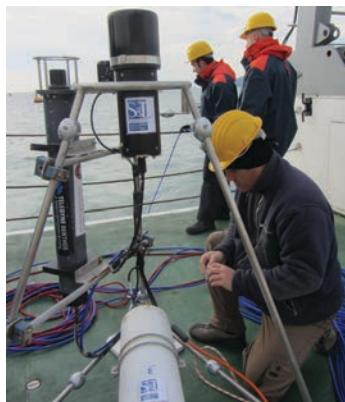
(signal) pathways, causing parallel path and harmonic signals and distortions, which are a root cause of PIM.

To counter the effect, Hughes has come up with an IP68 rated cap which is designed to protect open connector interfaces from mechanical damage, dust and humidity.

The transparent cap incorporates a blue indicator that turns pink when it detects the presence of humidity. Hughes says it is possible to determine the amount of humidity present by the shade of colour.

It adds that no special tools are required to fit the rugged and lightweight screw on caps which are available for industry standard 7/16 and 4.3/10 connectors.

NATO ushers in "new era" of digital underwater comms



Researchers on board the *Alliance* deploy a tripod used for the Littoral Ocean Observatory Network.

 NATO has established the first underwater digital communications standard.

Because none of the available protocols for aerial and terrestrial communications could be easily exported under the sea, the organisation sponsored research into a new platform to work with and enhance the capabilities of game-changing robotic technologies.

The result is JANUS, the first digital standard for underwater acoustic communications now recognised by all NATO members.

Developed by NATO's Italy-based STO CMRE (Science and Technology

Organisation – Centre for Maritime Research and Experimentation), JANUS has been 10 years in the making. It is a way of encoding information into sound simple enough that existing and new equipment can be brought into compliance with the standard relatively easily.

Over the last few years, CMRE has been testing the standard on board the NATO research vessel *Alliance* and using its Littoral Ocean Observatory Network (LOON). The latter has been developed to facilitate the experimentation of marine robots' mission-base teams. It does this by creating a monitoring acoustic network using tripods of

underwater comms equipment, such as Teledyne Benthos' transponders, that sit on the seabed. The network can then be accessed via the web.

Since its inception, it's claimed that the JANUS developing process has been as inclusive as possible, involving academia, industry, governmental agencies, and international subject matter experts. As a result, the protocol is said to work like a *lingua franca* and can make military and civilian, NATO and non-NATO devices fully interoperable.

The organisation adds that JANUS now opens the way for a standardised "Internet of Underwater Things".

Plug 'n' play mobile network



SES has launched what's claimed to be the world's first mobile platform to offer collaborative satcoms technologies over multiple orbits and frequencies.

The *Rapid Response Vehicle (RRV)* is designed to provide high-speed connectivity and global comms services tailored to commercial, civil, humanitarian and defence missions around the world. It supports Ku-, Ka- and military X- and Ka-bands across SES' GEO fleet, as well as the MEO satellites run by its subsidiary O3b.

The *RRV*'s wireless capabilities include MIMO SDR technology which help provide a mobile platform for private 3G/LTE networks and government PTT frequencies.

SES says the solution offers 'plug-and-play' versatility, and has modular features that can integrate a wide range of communication technologies and devices.

The company reckons the *RRV* can "easily adapt" with connectivity customised for specific scenarios and applications, such as HD video conferencing, streaming, voice, GSM backhaul, high-speed broadband, and large data file transfers in locations where infrastructure is non-existent or destroyed.

The vehicle can also quickly launch a number of other platforms, including the *SATMED* telemedicine service.

Mobitel launches first Sri Lankan 'Smart Bus Halt'



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

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

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

The bus halt is also equipped with



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

environment sensors which monitor a variety of factors such as temperature, humidity, noise level and toxic gas concentrations. Mobitel says data gathered from these sensors will enable the monitoring of air quality on a routine basis.

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

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

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

World's fastest 5G speed for connected car



SK Telecom (SKT) says it achieved a peak rate of 3.6Gbps for a connected vehicle travelling at a speed of 170 kph during a demonstration carried out in February.

The demo took place with Ericsson at BMW Korea's driving centre in Yeongjong Island, Incheon. This is where the three companies say they have deployed the world largest mmWave 5G trial network using the 28GHz band. According to SKT, millimetre waves in these bands use a high gain and high directivity

antenna which often causes signals to be blocked by objects standing in their path. They also have smaller coverage. Through the application of its advanced beamforming and beam tracking technologies, the operator claims it was able to address these limitations.

It adds that the 3.6Gbps data rate realised in the demo "significantly" enhances the stability of connected car services by improving image recognition and V2X (vehicle to everything communication) technologies.

As a result, vehicles will be able to communicate in real-time with each other as well as with traffic lights and surveillance cameras. They will be able to understand and respond to unexpected situations and obstacles, and remain within the lane in a much shorter time.

Moreover, the partners expect mmWave's ultra-high transmission speed to have a major impact on all 5G use cases including augmented and virtual realities, robotics, drones and autonomous driving.

BT introduces the "phonebox of the future"

 Residents, visitors and businesses in the London borough of Southwark are set to benefit from the fastest free public WiFi available, free calls, and a range of other free digital services on the street, following a partnership between BT, Intersection, and outdoor advertising company Primesight.

Southwark is home to a number of the UK capital's most iconic tourist attractions, such as Tower Bridge, the Shard skyscraper, Tate Modern art gallery, amongst many others.

The sleek looking *Links* kiosks will be installed on high streets across the

borough and will take up less space than the payphones they replace. BT says hundreds of users within their range will be able to access free ultrafast WiFi on the move, with speeds of up to 1Gbps. Other free services will include UK landline and mobile calls, rapid mobile device charging, online maps, directions and local information.

The telco says all these services will come at no cost to users or taxpayers as they will be funded by revenues from advertising on the *Links*' digital displays. Each kiosk will feature two 55-inch HD screens that can show

public service announcements as well as advertising for businesses.

They will also feature sensors that can capture real-time data relating to the local environment. This could include, for example, air and noise pollution, outdoor temperature and traffic conditions. BT says this offers the potential of introducing a new range of IoT smart services to local councils and communities.

At least 750 *Links* kiosks are expected to be installed across central London and in major cities across the UK over the next few years. More than 100 will be



installed in Southwark, with the first ones due to appear later in 2017.

Intracom in Italy

 EOLO will use Intracom Telecom's point-to-multipoint (PtMP) *WiBAS-Connect* system across rural Italy. Under a government contract, the operator will connect several hundred thousand subscribers with the ultra-broadband wireless network that will include equipment operating in the 28GHz band. The PtMP deployment will enable EOLO to improve its coverage to 13 regions and 70 provinces and offer speeds of up to 100Mbps. It plans to complete the rollout within five years and be the first to offer 5G speeds in Italy.

Motorola ICaaS launch

 Motorola Solutions has introduced Intelligent Communications as a Service to help Caribbean first responders. It says the service model gives users access to public safety mobile applications as a recurrent subscription for easy deployment without the need to invest in servers and data centres. The package includes apps such as: messaging; mapping; whiteboarding (for collaboration and information-sharing in the field); and secure, encrypted telephony. There's also *WAVE*, Motorola's secure PTT solution for smartphone users.

ZTE smart parking

 ZTE has unveiled a narrow band Internet-of-things (NB-IoT) smart parking system. It uses technology to detect changes in the magnetic field and judge whether a parking spot is occupied. ZTE claims its precision is higher than 99 per cent. Drivers can use the accompanying mobile app to search for a parking space in real-time, reserve it, and then be quickly guided to the vacant spot. The system is currently being commercially trialled in Shenzhen and Nanjing, and is scheduled to be used in more cities worldwide.

The art of the IoT

 Xirrus provided the wireless hardware and software infrastructure for an innovative art installation in Canary Wharf, part of London's financial district.

Created by digital art group Squidsoup, *Bloom* comprises around one thousand individual Wi-Fi-enabled IoT light bulbs that sway in the wind and spread a gentle glow each evening. Each light contains a GPS chip, accelerometer and speakers. These combine to create what's described as "a digital symphony" of light and sound set against a backdrop of iconic or historic landscapes.

Squidsoup says the combination of Xirrus Wi-Fi, GPS technology and IoT intelligence in each light makes every bulb location-aware. It says this allows them to

receive commands from a central digital hub, while bringing subtle choreography and control to the whole installation. Xirrus' Wi-Fi network enables each light to communicate over the network.

Among the challenges faced by Bloom's designers was the pressure of maintaining a strong and resilient Wi-Fi signal. They needed a single wireless network with the capability to reliably connect more than a thousand IoT devices across an open outdoor space, while also providing the consistency needed to ensure a stunning display each evening.

The installation also required a management system that could centrally control each Wi-Fi device and fully-utilise the IoT technology present in each node.



Top: featuring around 1,000 light bulbs, *Bloom* was on display at Canary Wharf. Bottom: each bulb is equipped with Wi-Fi, GPS and IoT intelligence which makes it location-aware.

Following its launch in London, *Bloom* is now expected to make its international debut in Mexico City during mid-2017.

World's first LAA ready commercial network

 Huawei, Vodafone and Qualcomm Technologies have worked together on a project to create what they say is the world's first network ready to use License Assisted Access (LAA) technology.

Based on the 3GPP R13 standard, the network was tested using a Huawei *Lampsite* base station in Vodafone Turkey's Arena Store in Istanbul. It used 40MHz of unlicensed spectrum in 5GHz, and 15MHz licensed spectrum in 2.6GHz for three carrier aggregation. The on-site peak download speed of 370Mbps

was achieved using Qualcomm's *Snapdragon 835* processor with an *X16* LTE mobile test device.

It's claimed the test showed that LAA's spectral efficiency is higher than Wi-Fi when using the same 40MHz of spectrum. The companies say it also showed that an LAA network can fairly co-exist with Wi-Fi by supporting the 3GPP R13 standard for 'listen before talk' technology.

Santiago Tenorio, head of networks for Vodafone Group, says: "The LAA network fully reuses the

existing core, network management system and accounting system we use for 4G, and so will effectively improve our return on investment."

According to the partners, the introduction of LAA on mobile networks will help improve the user experience by enabling faster download speeds.

They believe this will help consumers enjoy a more immersive experience when, for example, using VR or AR apps. Smartphones with support for LAA are expected later this year.

Wi-Fi camera aims to make cycling safer

 A crowdfunded startup company is aiming to enhance the safety of cyclists with the world's first Wi-Fi rear view camera.

HEXAGON has been developed by US-based Smart Bike Systems. Available later this year, the detachable full HD rear-facing camera uses Wi-Fi to "seamlessly" connect with the rider's smartphone which can be attached to the handlebars using a mounting accessory.

The camera enables cyclists to view the road behind them on their smartphones as well as stream their ride live on the web using an app. The device also features automatic stop, turn and motion signals. The entry-



The rear-facing camera enables users to view the road behind them and includes other safety features such as automatic stop, turn and motion signals, and more.

level *HEXAGON* comes with a wireless remote that securely attaches to the handlebars to support this feature.

Smart Bike says it uses a 2.5GHz Wi-Fi Direct connection rather than Bluetooth as it is more stable,

reliable and faster, and therefore better for transferring video.

Other features include a power bank, activity tracker, odometer and crash sensor. The latter can detect a crash and automatically sends an SMS to designated emergency contacts in the user's smartphone.

In addition, the *iOS* and *Android* compatible app has an activity tracker, navigation system, and more. Parents can also monitor their child's biking activity via the app and receive an SOS message in the event of an accident.

The IP65 rated weather and dustproof *HEXAGON* comes with two batteries that can be recharged with the supplied micro USB cable.

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