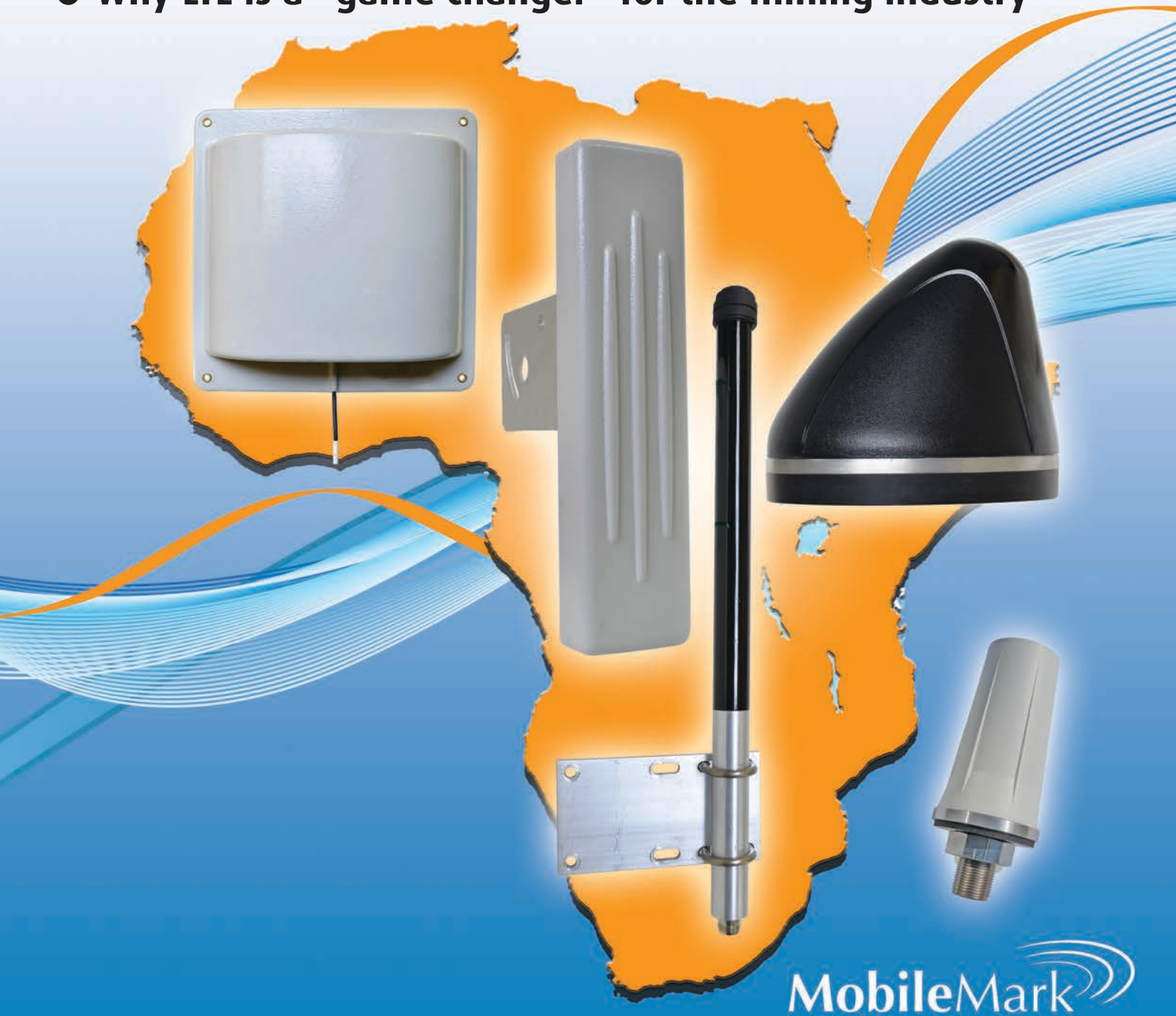
For communications professionals in north, west, east & central Africa

# NORTHERN AFRICAN WIRELESS COMMUNICATIONS

JUNE/JULY 2018 Volume 17 Number 3

- Are LEO satellites the best options for connectivity via space?
- How the agriculture sector is growing with wireless tech
- Why LTE is a "game changer" for the mining industry

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Mobile Mark is a leading supplier of innovative, high-performance antennas to wireless companies across the globe. They have been in the wireless industry for over 30 years and have roots in the early Cellular trials.

The company design and manufacture antennas from 138 MHz–6.0 GHz. Applications include public transit, commercial trains, smart highways, mining, utilities, remote monitoring, machine-to-machine (M2M), and the Internet of Things (IOT). Antenna styles include omni-directional and directional infrastructure antennas for network rollout; multiband mobile antennas for fleet management; low-profile and embedded antennas for M2M/IOT applications.

Mobile Mark antennas are manufactured in the USA and UK. Their responsive manufacturing capabilities and production controls ensure that antennas are delivered on time and to spec. Their experienced engineering design group can take a project from initial concept through to final production. They also offer in-house engineering design and RF testing facilities for custom designs.

**To find out more about Mobile Mark, turn to page 7.**

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MobileMark
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# "Tough" action needed to enforce SIM registration in EAC

Kenya's ICT cabinet secretary Joe Mucheru has called for tough measures on the enforcement of SIM card registration within the East African Community (EAC) as part of efforts to promote the safe use of ICT infrastructure across the region.

Speaking during the *East African Communications Organisation Assemblies* held in Nairobi in June, he said ICT infrastructure, including unregistered SIMs, is being increasingly used for criminal activities such as terrorism and kidnappings.

Mucheru said MNOs must strictly adhere to SIM registrations to help law enforcement agencies within the EAC Organisation to track down criminals. He warned: "If some countries or mobile operators do not enforce SIM card registration to the letter, criminal elements shall continue misusing unregistered SIM cards from neighbouring countries to perpetrate criminal activities across our borders."

**ICT cabinet secretary Joe Mucheru said cellcos "must strictly adhere" to SIM registrations to help law enforcement agencies track down criminals.**
PHOTO: WMUCHERU – OWN WORK/CC BY-SA 4.0, COMMONS.WIKIMEDIA.ORG

The secretary also advised EAC member states to work together in dealing with what he described as the "menace" of counterfeit devices. He said the use of fake phones was on the rise across the region, and that they are hard to track down. He added that while counterfeit devices are denied service in one country, they can still find their way onto the networks of neighbouring countries.

Mucheru's concerns come barely two weeks after the Communications Authority of Kenya (CA) directed all mobile operators to deactivate all unregistered or partially unregistered SIM cards within their networks.

At the end of May, the authority warned that any mobile user providing false information to register a SIM risks six months imprisonment or a fine of KES100,000 (USSD993) if found guilty.

Kenya's regulations also outlaw the hawking of SIM cards which carries a fine of up to KES500,000 or 12 months imprisonment or both for guilty offenders. A CA crackdown has so far seen 62 hawkers apprehended and convicted.

The CA said SIM card registration is aimed at enhancing national security by making it possible to trace details of subscribers engaged in criminal activities.

Registration became a legal requirement in Kenya through the Finance Bill 2011. This allowed an amendment of the Kenya Information and Communications (Amendment) Act 2013, regulations requiring companies and individual subscribers to register their SIMs.

# Sudatel to deliver ultra-broadband services in Sudan

Sudatel has begun trialling 4.5G, 4.9G and 5G technologies along with fixed FTTH in an effort to boost mobile and residential broadband in Sudan.

Under its *2020 Strategy*, Sudatel is focused on transforming its fixed access and mobile service offerings. The company says it wants to enhance the subscriber experience on any device, in the home and on-the-move, with high-speed delivery of voice, data and video and fixed and mobile packages, as well as e-government, e-health and other consumer and business services.

The operator will conduct several different use-case tests using Nokia's fixed and mobile technologies in its labs in Finland and Belgium.

With an initial focus on enhancing mobile data services in Khartoum, the companies will evaluate how the vendor's *AirScale* radio access portfolio can increase capacity and speeds today while providing a path to 5G in the future. In July, Sudatel also started trialling high-speed fixed technology in Khartoum, using Nokia's PON fibre solutions for residential broadband.

Sudatel Telecom Group president and CEO Tarig Hamza Zain El Abdein said: "Bringing Nokia's technology expertise and innovations to Sudan is very strategic for us in the execution of our vision of becoming the most admired ICT provider in Africa."

El Abdein also hopes that working with the vendor for the development of ultra-broadband services in Sudan will contribute to enhancing the country's ranking in the Broadband Development Index.

As part of their mutually agreed sustainable development goals (SDGs), UN members have pledged to "significantly increase" access to ICT and strive to provide universal and affordable access to the internet in least developed countries by 2020.

In the 2018 *SDG Index and Dashboards* report published in July, Sudan's SDG Global rank is given as 143 (out of 156). The proportion of the country's population using the internet is 28 per cent, while mobile broadband subscriptions (per 100 inhabitants) is 25.8.

# New network speed record set in Tunisia

Huawei has claimed a new throughput record for Tunisia following a test of all LTE technologies carried out in the country at the end of May.

Working with Tunisie Telecom, the vendor tested 4-transmit-4-receiver (4T4R) antenna technology, CA and 256 QAM. Huawei said that during the demo, a single user peak throughput speed of 706.14Mbps was achieved – the fastest so far on a commercial network in Tunisia.

Tunisie Telecom is planning to build a large-scale 4T4R network with Huawei this year in a bid to deliver what it says is an "optimal" LTE experience for subscribers, as well as create the fastest network in the country. Data flow of usage per user is said to have reached 4GB in the country, while LTE traffic volume is expected to increase by 370 per cent in 2020.

The operator's CEO, Fadhel Kraiem, said: "Spectrum resources are fully utilised to ensure that our network is more efficient. In addition, large-scale 4T4R network deployment allows us to be fully prepared for an evolution towards a new 5G era."

According to Huawei, 4T4R increases network capacity by up to 80 per cent without adding extra spectrum or sites, greatly improving spectral efficiency. It adds that 256QAM is also a proven technology that can effectively increase peak data rate by 33 per cent.

Saeed Xia, the vendor's general manager in Tunisia, said: "Huawei 4T4R solution has been extensively deployed worldwide. We believe that this solution perfectly complements Tunisie Telecom's network development strategy and is an important tool to help maintain a leading competitive edge."


**Tunisie Telecom CEO Fadhel Kraiem (seated left) and Huawei Tunisia GM Saeed Xia will continue to work together to provide a "superb experience" for subscribers in Tunisia.**

*Tunisie Telecom activates 100G IP transit connectivity port – News, p10*

# 5G video navigation demonstrated

Ericsson and MTN have claimed a first in Africa by demonstrating 5G mobility in a moving vehicle.

Towards the end of June, the two partners announced they had "validated the technological prowess" of 5G wireless technology in a trial that involved a live feed from a car on a skid pan at the Gerotek testing facility in Pretoria.

The setup comprised four radio units, baseband equipment, a prototype of 5G user equipment with an external antenna installed in an SUV, a 4K video camera, and a VR headset.

All the hardware was connected to a live 5G network using 100MHz TDD spectrum in the 28GHz band. Spectators were able to view the driver's surroundings whilst moving around the track, allowing them to experience what the driver was seeing in real-time.


**During the demo, the driver's windscreen was obscured and he had to rely on a VR headset fed by a real-time 5G signal to navigate.**

Ericsson says the demonstration was then taken further by fully obscuring the driver's windscreen, leaving him to navigate the track by using just his VR headset and the live feed from a 4K video camera. The company says this was possible due to a throughput of more than 1.6Gbps and less than 5ms latency on the connection, and claims this has set a new record of mobile 5G performance in Africa.

This latest trial is one of the use cases that MTN and Ericsson have released following their MoU signed last November. This was followed by the launch of what was hailed as the first 5G trial in Africa in January 2018 (*see World News, Feb-Mar 2018*).

"Using pilots like this, we are not only assessing and preparing our network to roll out 5G in the future, but we are also future-proofing our infrastructure to enrich customer experience and take industries to the next level," says Wanda Matandela, chief business enterprise officer, MTN SA.

# Avanti leads project to help Kenya deal with disasters

A new satcoms-based project aims to enhance Kenya's ability to plan for and respond to disasters.

Funded under the UK Space Agency's International Partnership Programme, the *Satellite Enablement for Disaster Risk Reduction in Kenya* (*SaTDRR Kenya*) project is led by Avanti which will provide secure fixed and mobile communications for emergency situations via its *HYLAS 2* Ka-band satellite.

Other project partners include consultants from Torchlight Group, Airbus Defence and Space, Global Radiodata Communications, and the Red Cross Society in Kenya. All will work closely with the Kenyan Ministry of Interior and the National Disaster Operators Centre.

As well as enabling emergency responders and humanitarian organisations to act quickly and effectively on the ground, *SatDRR Kenya* will also provide Earth observation data. Avanti says this will improve Kenya's pre- and post-disaster strategy and planning, allowing end-users to access information on large-scale disasters such as floods and droughts.

According to the company, the project will demonstrate how high throughput resilient satellite connectivity and accurate remote sensing data can save lives, as well as reducing the social and economic impact on affected communities.

Avanti adds that access to satellite services will be underpinned by a capacity building and knowledge transfer programme to embed capability which will deliver sustainable benefits to the Kenyan Government and communities.

Graham Peters, Managing Director of Avanti Government said "Combined with knowledge from our project partners and satellite capacity from our *HYLAS 2* satellite, the project will provide Kenya's disaster response teams crucial communication tools and training to plan and respond to disasters."

# MNOs to play "key role" in next-gen critical comms

Mobile network operators must participate in delivering next generation critical communications solutions, not only for societal but also potential business benefits, according to the TCCA (TETRA and Critical Communications Association).

In a white paper published earlier this year, the organisation says true mission critical comms services have so far been based on dedicated technologies, dedicated networks and dedicated spectrum. It says service operators are typically government-controlled, serving only mission critical organisations such as public protection and disaster relief (PPDR) and related agencies. Furthermore, existing PMR digital technologies such as TETRA are narrowband, and their capabilities to deliver broadband applications are therefore limited.

But with PPDR users looking for new communications capabilities, new applications and new devices, which will improve their operational efficiency, the TCCA says the model of using dedicated networks is being challenged, and commercial mobile networks represent a new option for the provision of critical comms services. As a result, the association says the next generation of critical comms will be based on 4G/5G open standards defined by 3GPP.

Tero Pesonen, chair of TCCA's Critical Communications Broadband Group, says there are many projects either already ongoing or planned for the future where established PPDR service operators are looking to complement their narrowband services with critical mobile broadband offerings.

He says: "Often, the preferred option is to seek collaboration with MNOs. This opens a natural avenue for MNOs to enter the critical communications service market. PPDR service operators have the knowledge of their users' needs, manage the customer interface and operate within the necessary operational and legislative frameworks, while the MNOs bring economies of scale and knowledge of 4G/5G technology deployment."

The TCCA adds that existing MNO assets can be leveraged to deliver services for users. It says the technology base is the same as for consumer mobile networks so these can be utilised provided that the additional critical requirements on availability, reliability, functionality and security are met.

The association further believes that securing the network to fulfil such needs will also improve the attractiveness of the network for all users and provide the MNO an opportunity for diverse benefits. Depending on the country, it reckons these can include premium ARPU, access to additional spectrum, or government-financed network hardening and/or extended coverage. "A network with improved coverage and resilience is a competitive advantage not only with public safety users but also with other user segments," says the TCCA.

**The TCCA's Tero Pesonen says commercial mobile operators bring economies of scale and 4G/5G deployment knowhow.**

# 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.

MobileMark
antenna solutions

**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

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

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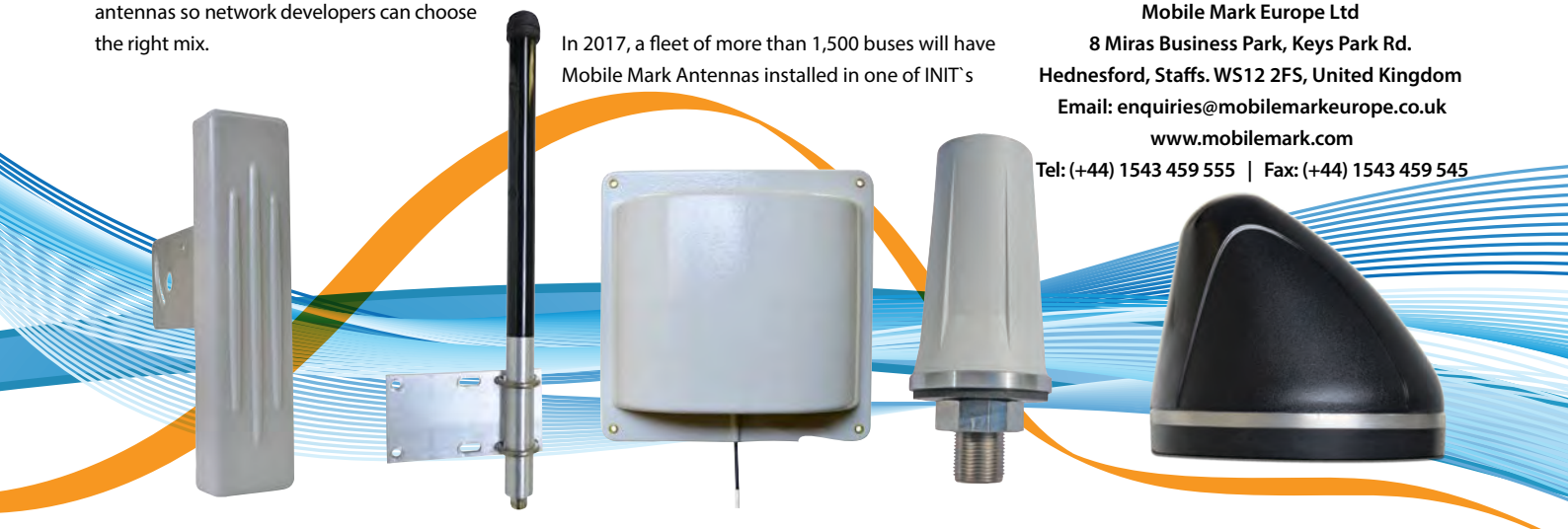


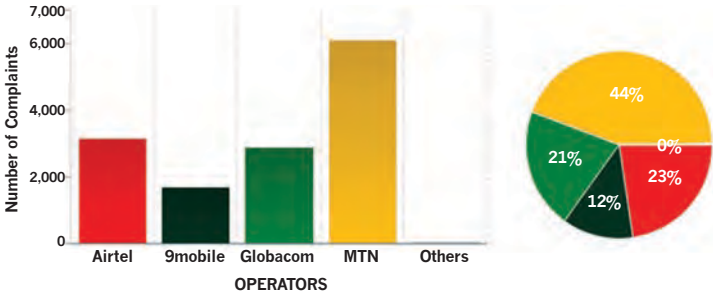
# MTN tops Nigeria complaints report

MTN was the most complained about mobile operator in Nigeria for 1Q18, according to the Nigerian Communications Commission's (NCC) latest consumer complaints report.

The NCC said it received a total of 13,880 complaints during the quarter from subscribers using its specially set up toll-free number, web portal and various social media channels. This is a 20 per cent decrease from the 17,247 complaints received during Q417.

Forty-four per cent of the complaints were about MTN followed by Airtel at 23 per cent (*see charts right*).

Billing issues accounted for the highest number of complaints received during the quarter at 51 per cent. Some of the complaints identified here include: inaccurate charges; charges for unauthorised services; inability to change tariff plan; virtual top-ups deducted but not received; among others.




**Consumer complaints report, 1Q18.** SOURCE: NIGERIAN COMMUNICATIONS COMMISSION, JUL 2018

VAS and call setup accounted for the second and third highest complaints at 14 and 8.4 per cent, respectively.

The NCC said the decrease in the number of complaints for the quarter can largely be attributed to the rise in the level of consumer awareness and activation of 'Do-Not-Disturb' (DND) services. In 2016, the commission mandated operators to set aside a short code for DND on their networks. The service gives subscribers the opportunity to manage unsolicited telemarketing messages on their lines.

By the end of March 2018, around 9.3 million mobile users had activated DND – a 12.5 per cent increase from the 8.6 million users seen during 4Q17.

While MTN topped consumer complaints for the 1Q18, the operator also has the most subscribers in Nigeria and remains the country's leading mobile operator. According to NCC stats for May 2018, MTN has 66.4 million customers and a 41 per cent share of the country's GSM market.

# Arabsat to tighten security with SpaceBelt

Arabsat will work with the Cloud Constellation Corporation to market its space-based cloud data service in Africa, the Middle East, Europe and Central Asia.

Cloud Constellation has developed the *SpaceBelt*, a patented 'Data Security as a Service' (DSaaS) platform that has been designed to secure high-value and highly sensitive data assets. *SpaceBelt* provides storage in space as well as global, secure managed network services.

It uses a constellation of 12 low Earth orbit (LEO) satellites that are said to be networked with a redundant, self-healing optical ring for high availability. Cloud Constellation says the network communicates with secure access points located at enterprise, government and military facilities connected via GEO satellites. It adds that individual cloud storage satellites and constellations can be offered to address an organisation's storage and/or sovereignty requirements.

According to the company, Arabsat is the only satellite operator in the MENA region offering the "full spectrum" of broadcast, telecoms and broadband services. It plans to leverage Arabsat's market position and expertise in delivering *SpaceBelt* DSaaS to a broad range of customers throughout the region.

*LEO satellites – the best option for ubiquitous global connectivity? Feature pp22-25.*

# Kirusa eliminates "exorbitant payouts" to roaming partners

Kirusa has launched a new smartphone app which it claims can be easily and seamlessly integrated with a mobile carrier's existing infrastructure to circumvent current roaming infrastructure completely.

The company reckons a significant benefit of its *InstaVoice ReachMe* technology lies in eliminating "exorbitant payouts" to roaming partners and passing this advantage to frequent travellers. It reckons this will enable African carriers to offer low-cost roaming packages and plans to their subscribers.

According to Kirusa founder and CEO, Dr. Inderpal Singh Mumick, Africa is on the brink of a telecoms revolution, driven by data. He says that while subscribers are migrating to OTT services such as *WhatsApp* while they travel, apps like *ReachMe* are launched in partnership with carriers and are the "perfect" antidote to this problem.

"Roaming teams at mobile carriers have been experiencing a severe decline in revenue as well as attach rates over the years," says Mumick. "Expensive underlying roaming arrangements have resulted in pricing strategies that have [not appealed] to the masses. *InstaVoice ReachMe* disrupts this arrangement by leveraging cloud, to the benefit of operators and their subscribers."

# Thaicom expands Africa broadcast platform on Thaicom-6

Content delivery specialist Mediavision is expanding its broadcast platform in Africa with the help of Asian satellite operator Thaicom.

Mediavision's multiple channels per carrier (MCPC) platform provides broadcasters in Europe direct access to *Thaicom-6* (also known as *Africom-1)* which was launched in 2014 and covers Africa from 78.5°.

European and international broadcasters will also gain access to Mediavision's integrated solutions for linear and non-linear content distribution including IPTV.

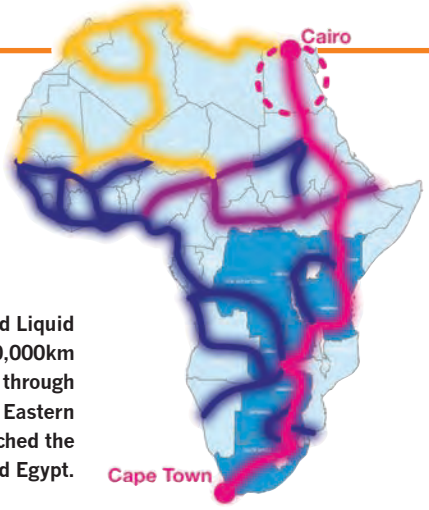
"Thaicom and Mediavision are working together to deliver innovative broadcast solutions that enable programmers to cost-effectively expand their distribution network into sub-Saharan Africa," said Thaicom CCO Patompob 'Nile' Suwansiri.

"Thaicom launched its MCPC broadcast platform for Africa in 2016. Now we will be able to provide European and international programmers with immediate access to the African market and TV households. Our African C-band MCPC platform on *Thaicom-6* is ideal for broadcasters to enter the African market."

Telespazio, a joint venture between aerospace companies Leonardo and Thales, will provide uplink services for the platform from its teleport facility in Fucino, Italy. With a site that covers 370,000m$^2$ and featuring 170 antennas, Thaicom says the facility is recognised as the "first and most important" teleport in the world for civilian use. Broadcasters will be able to contribute standard and high definition content from Europe to Africa via Fucino and *Thaicom-6*.

**With a huge site featuring 170 antennas, Telespazio's facility in Fucino is said to be regarded as the "first and most important" teleport in the world for civilian use.**

# ‘One Africa’ broadband network agreement




Telecom Egypt and Liquid Telecom will work together to complete the first fibre network stretching from Cairo to Cape Town.

Under an MoU signed in mid-July at the 2018 meetings of the African Export-Import Bank held in Abuja, Liquid will link its network from Sudan into Telecom Egypt’s network via a new terrestrial cross-border interconnection. This will bring together a 60,000km network that runs from Cape Town, through all the Southern, Central, and Eastern African countries, and has now reached the border between Sudan and Egypt.

The Cape to Cairo network, which is also known as the ‘One Africa’ broadband network – has been in the making for over ten years and serves some of the largest global companies with some of the fastest network speeds on the continent.

Strive Masiyiwa, founder and executive chairman of Econet which owns Liquid Telecom, says: “Completing our vision of building a single network running on land, all the way from Cape to Cairo is a historic moment for the company and for a more connected Africa. This network not only represents a remarkable engineering achievement that has overcome some of the most challenging distances and terrains on the continent, but it is also supporting the rise of Africa’s digital economies.”

As part of the strategic partnership, Liquid Telecom and Telecom Egypt will share network infrastructure and explore further areas of collaboration, including joint network services, a peering arrangement and a voice interconnection agreement.

In a separate development, Liquid has also partnered with AfriLabs to explore new ways to support local startups and promote sustainable innovation across the continent.

Founded in 2011 and headquartered in Nigeria, AfriLabs runs a network of 100 innovation centres across 30 African countries. These technology hubs serve as meeting points and communities for developers, entrepreneurs and investors, and are claimed to now have more than 200,000 community members.

AfriLabs and Liquid will launch a new series of joint programmes designed to accelerate growth within the region’s tech startup communities, ultimately helping to stimulate economic growth. *Telecom Egypt on the rise – Wireless Business, p15.*

**Under their deal, Telecom Egypt and Liquid Telecom will bring together a 60,000km network that runs from Cape Town, through all the Southern, Central, and Eastern African countries, and has now reached the border between Sudan and Egypt.**

# Mobile industry stakeholders "appreciate" role of OTT players

Adopting OTT services as part of the app economy and innovation needs to be encouraged, according to the Commonwealth Telecommunications Organisation (CTO).

In a recently published study, the CTO found that the majority of stakeholders recognise and appreciate the innovative nature of OTT services and do not want innovation to be stifled as such services offer numerous benefits to consumers.

However, it added that not all commonwealth countries have the scale, market and regulatory sophistication to take advantage of the app economy, particularly by building domestic digital businesses.

The CTO also said that given the widely acknowledged role of telecoms in promoting economic development, it is critical that markets focus on attracting infrastructure investment and ensuring MNOs can earn sufficient margins to sustain the rollouts and upgrades that underpin the app economy.

**Dr. Martin Koyabe, the CTO's acting senior manager of communications and membership, led the OTT report research team. He is seen here presenting the study findings at the CTO's ICT Ministers Forum 2018 held in London during June.**

Some of the key OTT challenges identified by the study include issues around licensing obligations, taxation, QoS/QoE, data protection, net neutrality, interconnection, and USF.

The CTO advises further consultation to involve all stakeholders at national level in the countries surveyed, but also at regional and international level, given that the issues raised are not peculiar to any specific state.

It recommends members use the report to create favourable ICT environment in terms of policies, regulations and legislations. It encourages countries to determine suitable frameworks through regional and international considerations; and the developing of national cyber security strategies, to include robust legal structures and governance.

# Tunisie Telecom launches its first 100G transit port

Sparkle, the International Services arm of TIM Group, has upgraded Tunisie Telecom's international IP transit connectivity through the activation of a 100G port at its Sicily Hub in Palermo.

The new port represents Tunisie Telecom's main trunk to Europe and will support increasing demand for digital content and advanced IP services in North Africa.

According to Sparkle, the Sicily Hub is located closer to North Africa, the Mediterranean and the Middle East than any other European peering point. As a result, it claims the facility offers better latency and enhanced application performances to customers.

Sparkle says the hub is also connected to all cables landing stations in Sicily, and adds that it is also served by *Seabone*, Sparkle's Tier 1-grade global IP transit service.

Tunisie Telecom is said to offer the largest mobile coverage in Tunisia and has more than six million users for its fully integrated services, which includes 4G mobile broadband to FTTH and FTTB, as well as cloud and IP-MPLS solutions for enterprises.

The telco also owns and operates a nationwide fixed and fibre network infrastructure which is complemented by what's described as an "extensive" submarine cable network allowing for direct and fully redundant connectivity with Europe, Africa and Asia.

# Bridging the digital divide with home-grown technology

A team of international researchers at the University of the Witwatersrand in Johannesburg (Wits) believe free space optics (FSO) will address the problem of bridging Africa's digital divide.

While FSO is not new technology, the Wits team believe innovations in 'sustainable' photonics technologies such as FSO links and solar-powered equipment provide developing countries with new cost-effective opportunities for deploying future-proof telecoms networks.

The new research is being coordinated by Professor Andrew Forbes from the School of Physics and Professor Ling Cheng of the Electrical and Information Engineering department.

Forbes says: "What we are doing is to incorporate two aspects not traditionally part of FSO: mode division multiplexing using several 'patterns' of light at once to increase the bandwidth; quantum security, so that we have a hybrid classical-quantum link."

**A prototype of the device that could connect remote places to fast, reliable internet is tested by the team at Wits University.**

PHOTO: WITS UNIVERSITY

Cheng adds that while existing FSO systems are able to comfortably sustain gigabit connection speeds over multi-kilometre distances, with further research and development into advanced digital signal processing and coding schemes, this may be increased "dramatically with relatively little expense".

The Wits team are concentrating on connecting communities with FSO links which they describe as a network of communication channels through air, much like Wi-Fi but much faster and with a longer reach. They are working towards a multi-hop FSO link that will cover tens of kilometres.

"Light holds tremendous promise for fast connections across medium distances," says Forbes. "Even Google, Facebook and SpaceX have exotic proposals for Africa that include drones and other aerial vehicles delivering connections in a blanket manner. We are working on point-to-point solutions with sustainable photonics that are home-grown."

The team says it has already made several technical advances and is about to embark on a commercialisation programme with a locally listed firm.

# Safaricom helps Kenyan farmers with Digifarm

**Digifarm depots offer farmers availability of inputs throughout the year, as well as access to technical advice from experts.** 

Safaricom has been expanding its *Digifarm* initiative across Kenya. Since launching the programme in October 2017, the company claims it now serves more than 670,000 farmers through 18 depots that have been opened across the country.

*Digifarm* is an integrated mobile platform that is designed to offer farmers convenient, one-stop access to a variety of services. These include discounted inputs and advice on input use, financing, and information on crops and animals. Safaricom says its aim is to encourage more smallholder farmers to "transition into an agribusiness by creating opportunities for them to access high quality inputs and sustainable markets".

Working in partnership with agricultural supply chain expert iProcure, Safaricom says it is helping thousands of farmers buy agricultural essentials such as high quality seeds, fertilisers, animal feeds and chemicals. They can purchase these via *M-PESA* or credit payable between 30 to 90 days depending on the individual's credit package.

In late June, the operator announced it had opened four *Digifarm* depots in Laare, Nkubu, Mikindori and Meru Town, all in Meru County. They followed the launch of a depot in Burnt Forest town, Uasin Gishu County, during the previous month. Farmers visiting the depots benefit from the availability of inputs throughout the year, especially during peak season, and access to advisory and technical information from experts stationed at each facility.

For loan processing, the service relies on a 'Big Data' model developed by FarmDrive to score farmers for financing, based on historical data on their farms. Previously, farmers have struggled to access financing as formal lenders lack the data to assess them.

"*Digifarm* leverages technology to tackle the challenges faced by farmers and to also empower farmers with solutions to grow their businesses," says Rita Okuthe, director, enterprise business, Safaricom. "The service is specially tailored to cater to the specific needs of farmers in each of the counties it is available in, providing localised information and discounted inputs."

The platform is also designed to improve the collection of agricultural data by registering farmers and allowing them to key in information such as the size of their holdings and the nature of their activities.

FarmDrive and iProcure were among five startups that qualified for Safaricom's USD1m early-stage funding to firms innovating around the mobile phone.

*Harvesting wireless technology – Wireless Users, pp27-29.*

## Al Yah 3 tests completed

After a tricky launch at the start of 2018 which saw it placed into the wrong orbit (*see News, Dec 17-Jan 18 issue*), *Al Yah 3* has now successfully completed in-orbit testing. At the end of May, Yahsat announced that its third satellite was ready to launch commercial services from 20°W. It is expected to go live in August. The company says *Al Yah 3* will offer Ka-band coverage to 19 additional markets across Africa and cover 60 per cent of the population, as well as 95 per cent of Brazil's population.

## Digital BSS for Djezzy

Algerian MNO says it has achieved an "important milestone" in its digital transformation programme with the implementation of a digital BSS platform. The new system, provided by Ericsson, uses cloud-based new software technologies and manages Djezzy's overall customer relationships. These include billing, pricing and commercial offers along with their customisation to anticipate subscribers' needs according to their consumption patterns.

## New Egyptian ICT minister

Amr Talaat has been sworn in as Egypt's ICT minister following Abdel Fattah el-Sisi gaining a second term as president in early June. Khaled El Attar, ICT infrastructure director at the Ministry of Communications and Information Technology, has been named as the deputy minister. Talaat began his career in ICT after joining IBM in 1988 where he held various managerial positions before becoming GM of IBM Egypt in 2010. He has a bachelor's degree in electrical engineering from Cairo University, a doctorate of business administration from the University of Paris, and an MSc in IT from the Illinois Institute of Technology.

# Sanku deploys IoT in its fight against malnutrition

Sanku (Project Healthy Children) is equipping 3,000 small flour mills across Africa with IoT services over the next four years to help provide nutritious fortified flour to millions of people.

Using Vodafone's global IoT SIM and *USB Connect* technology, the organisation is aiming to gain real-time, data-driven insights to help significantly scale its programme and improve efficiency.

Sanku says its uniquely developed dosifier technology enables small African flour mills in rural areas to fortify flour with key nutrients during the milling process in a way that is sustainable and cost-effective.

However, the organisation says that while it takes 25 mills to fortify enough flour to feed 125,000 people, these can only be monitored by a single worker at any one time.


**Sanku says its unique dosifier enables micro mills in rural areas to fortify flour with key nutrients during the milling process.**

But using Vodafone's IoT SIM now connects the same worker to 100 mills which will fortify flour for 500,000 people. The worker receives alerts remotely and in real-time when the mills run out of flour or require maintenance.

Vodafone adds that its in-country roaming reaches the most remote areas, allowing access to up-to-the-minute information on maintenance, power supply and machine tracking via GPS. Furthermore, *M-Pesa* is being used to enable millers to securely make and receive payments on their smartphones.

Sanku and Vodafone are rolling out the IoT technology to local mills in Tanzania and Rwanda, and plan to implement it across Eastern and Southern Africa where Sanku also runs projects in Kenya, Malawi, and Mozambique.

The organisation adds that its dosifier currently helps provide fortified flour to around a million people and that IoT will help it reach 100 million people by 2025.

## Intelsat joins Smart Africa alliance

Intelsat has become the latest firm to join the Smart Africa alliance.

Established in 2013 following a manifesto pledge by seven African heads of states, Smart Africa is a commitment to accelerate sustainable socioeconomic development on the continent. The initiative is geared towards connecting, innovating and transforming Africa into a knowledge-based economy.

Smart Africa was endorsed by the African Union in 2014 and is also supported by a number of high-profile private sector partner organisations.

"Satellite technology has played an integral role in providing broadband connectivity throughout Africa," says Dr. Hamadoun Toure, executive director of the Smart Africa secretariat. Intelsat has worked tirelessly over the past four decades to ensure that the people of Africa have access to high-quality, affordable and reliable broadband connectivity."

Intelsat CEO Stephen Spengler adds that while much has been accomplished, more needs to be done. "It is only by working closely with local governments, partnering with other stakeholders throughout the ICT landscape and sharing our knowledge through training, that we will be in a strong position to provide all of Africa with high-quality, affordable broadband connectivity."

**Intelsat CEO Steven Spengler says more needs to be done to ensure people in Africa have access to high-quality, affordable broadband**

## SEACOM upgrades its subsea cable system

SEACOM has upgraded its key submarine network system from its Southern and Eastern African coastline landings into Europe at a total capacity of 1.5Tbps.

The current upgrade is adding 500G of new capacity on the system, after a previous upgrade of 500G in 2015 (*see News, Apr-May 2015 issue*).

The upgrade increases available capacity in SEACOM's key markets: Kenya, Tanzania, Mozambique and South Africa. The company claims the solution will allow it to deliver requirements for high-capacity connectivity in very short timeframes and provide for future demands.

The latest deployment is also based on 100Gbps coherent DWDM technology. SEACOM says this will provide room for it to quickly add more capacity as required.

According to the company, the upgrade falls in line with its focus on driving the development of the African internet and "opening the broadband tap" for the continent's service providers and business users.

"Connectivity services in Africa are booming due to the growing needs of business IT users, the rise of cloud-based services, and growing requirements for the processing and storing of personal data," says SEACOM CTO Claes Segelberg. "This latest upgrade enables SEACOM to meet those demands, and to provide our customers with scalable solutions for the future."

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# ITC says Hytera has infringed Motorola Solutions' patents

On 3 July, the US International Trade Commission (ITC) announced that Hytera Communications had infringed four of Motorola Solutions' patents.

The ITC's Notice of Initial Determination follows its lengthy investigation of the patent infringement complaint filed by Motorola on 29 March 2017 against Hytera (*also see Wireless Business, Dec 2017-Jan 2018 issue*).

In the complaint, Motorola alleged that Hytera is unlawfully importing and selling two-way radio equipment and systems and related software and components that infringe four of its patents.

As part of the ruling, administrative law judge Mary Joan McNamara found that all four of Motorola's patents are valid, Hytera has infringed them, and that Motorola met the legal requirement of showing a "technical domestic industry" on three of the four patents (US patent numbers 7,369,869, 7,729,701 and 8,279,991).

The judge recommended an exclusion order preventing Hytera from importing "certain infringing products" into the US, and a cease-and-desist order preventing further sale and marketing of such products.

The commission is scheduled to issue a Final Determination by 6 November 2018.

Mark Hacker, Motorola Solutions' general counsel and chief administrative officer, said: "Judge McNamara's ruling validates our allegations, upholds the integrity of our intellectual property, and rebukes Hytera for its unscrupulous and unlawful behaviour in wilfully infringing Motorola Solutions' patents. While we consider the Initial Determination an important step, it is only one component of our global efforts to address Hytera's systematic, brazen and egregious theft and infringement of our intellectual property."

The ruling is a blow for Hytera which has been embroiled in various legal disputes with its US-based critical comms rival. In a statement issued online, the company said: "Hytera is disappointed with this initial determination. We will ask the commission to review and reverse this decision. We believe our products do not infringe our competitor's asserted patents and will seek to demonstrate this to the commission."

The statement went on to point out that Motorola Solutions had originally asserted seven patents in its complaint but later withdrew three of them. It also said that McNamara only found a "limited" number of claimed infringements in the four remaining patents.

According to Hytera, the judge also determined that none of Motorola Solutions' products have used one of the four remaining patents. As a result, it said that its US rival does not satisfy the "industry requirement" as to that patent, and that Judge McNamara did not therefore find a violation of the statute.

Hytera believes that since the ITC has yet to issue its final decision, there is currently no ban on the importation or sale of its products.

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### Telecom Egypt on the rise

Telecom Egypt (TE) reckons it is back on track to deliver on its business objectives and meet its guidance for the full year, following positive results for 1Q18 (*see Latest Results table, p17*).

Group chief executive Ahmed El Beheiry said: "This quarter's KPIs demonstrate the company's ability to sustain operational growth reflected in a double-digit growth in revenue, and a high single digit growth in EBITDA. "Retail has led our revenue growth and we owe a large share of it to data services in both ADSL and mobile broadband."

As well as retail services, El Beheiry said TE continues to focus on its existing wholesale segments to secure a continuous revenue stream. Here, he said the company secured an 18 per cent growth in revenue of which 79 per cent is attributable to international customer support services. He described this as "stable" YoY performance despite the declining trend of international traffic globally.

The chief executive added that the aim was to position the company as one of the region's largest total telecom operators. "Hence, the [board of directors] approved the acquisition of *Middle East and North Africa* submarine cable in order to reinforce Telecom Egypt's footprint in the submarine cable business."

Other main events highlighted for the quarter included the signing of an agreement to settle all historical legal disputes with rival mobile operator Etisalat Misr. The wrangles related to international call service. In January, TE paid USD48m to Etisalat Misr to mitigate an exposure of more than USD140m. Prior to signing, Telecom Egypt had already booked EGP1bn in provisions relating to the court case.

In February, TE also renewed its transmission and infrastructure services agreement with Vodafone. The new agreement raises Vodafone Egypt's minimum committed revenue to Telecom Egypt to EGP2.37bn over the three-year agreement which started January 2018.

The Egyptian incumbent also signed an agreement with Orange Data to provide bitstream services for three years. The agreement formalises the existing relationship with Orange to use Telecom Egypt's fibre network through a new pricing mechanism based on capacity utilisation that allows TE to capitalise on the expected growth in the data market.

### US government lifts ZTE ban

The US Department of Commerce has lifted the trade ban it imposed on ZTE earlier this year.

On 13 July, secretary of commerce Wilbur Ross announced that the Chinese company has placed USD400m in escrow at a US bank. Shortly after the deposit, the department lifted the denial order on ZTE pursuant to a June settlement agreement that included the harshest penalties and strictest compliance measures ever imposed in such a case (*see Wireless Business, Apr-May issue*). The escrow funds are in addition to the USD1bn penalty that ZTE paid to the US Treasury in June.

"While we lifted the ban on ZTE, the department will remain vigilant as we closely monitor ZTE's actions to ensure compliance with all US laws and regulations," said Ross.

The firm will be required by the new agreement to retain a team of special compliance coordinators selected by and answerable to the department's Bureau of Industry and Security (BIS) for a period of 10 years. Their function will be to monitor, on a real-time basis, ZTE's compliance with US export control laws.

The new agreement once again imposes a denial order that is suspended, this time for 10 years, which BIS can activate in the event of additional violations during the probationary period.

The USD1.4bn paid under the new settlement agreement are in addition to the USD892m in penalties ZTE has already paid to the US government under a March 2017 agreement. The company also has replaced its entire board of directors and senior leadership teams.

### Smartphone sales see decline in EMEA markets

The value of smartphone markets in EMEA hit record levels during 1Q18 despite a slowdown in unit shipments, according to IDC.

In mid-June, the market-watcher said the total value of smartphone sales across the region was USD29.967bn while unit volume was 86.523 million.

IDC said that as well as continuing to contract in Western Europe, the smartphone market is also "surprisingly" shrinking in Africa. Here, it said that the continent was down 4.4 per cent while the Western European smartphone total dropped to 29.213 million in the quarter, 8.2 per cent lower that the year before. But the firm added that the Middle East and Central Europe markets were both up at 1.5 and 5.6 per cent, respectively.

"Overall mobile phone shipments in EMEA declined year-on-year in unit terms, and it may well be that the market is beyond the peak levels registered in 2017," said Simon Baker, programme director, mobile devices, IDC CEMA. "This is because the resurgence in feature phones in emerging markets, mainly in Africa,

seen from the second half of 2016, is now beginning to ebb. The 1Q18 feature phone market was the smallest in six quarters."

According to IDC, the top five smartphone brands in Africa are Samsung, Tecno, Itel, Huawei and Infinix, while the top five feature phone brands include Itel, Tecno, Nokia, Alcatel, Samsing and X-Tigi.

All eyes are now said to be on Xiaomi as it prepares for an IPO and continues its global expansion. According to Marta Pinto, senior analyst at IDC Western Europe, the Chinese vendor's expansion has largely been in markets with open distribution. She says: ""Xiaomi's expansion has largely been in markets with open distribution and its approach often involves opening own brand shops. It is not used to focusing on operator relationships."

IDC predicts that Africa's mobile phone market will reach around 218m units in 2018 of which around 45 per cent will be smart devices. That figure is forecast to hit 50 per cent in 2022.

### IoT platform market enters "consolidation phase"

The total number of connected IoT sensors and devices is set to exceed 50bn by 2022, according to Juniper Research. And in a separate study, Berg Insight forecasts that the IoT platform market will be worth USD4.9bn during the same period.

In *The Internet of Things: Consumer, Industrial & Public Services 2018-2023* report published around mid-June, Juniper Research says the number of connected IoT sensors and devices will grow from the 21bn estimated in 2018 to more than 50bn in the next four years.

The firm predicts that a substantial proportion of the estimated 46bn industrial and enterprise devices connected in 2023 will rely on edge computing. "IoT at the edge dramatically increases project scope and value," says research author Steffen Sorrell. "However, it must be noted that work around standardisation, interoperability and how to manage the decentralisation of data processing remain in development."

Juniper also forecasts that consortium-run blockchains or similar distributed ledger technologies, such as IOTA, will play an important role in delivering future IoT events or payment transaction management.

However, it also points out that both approaches presently lack true decentralisation offered by public blockchains, a key requirement for end-to-end trust. The firm believes opportunities for blockchain technologies in the IoT will remain limited until such issues were resolved.

As part of its research, Juniper names the top five IoT vendors as: IBM; Microsoft; Intel; Bosch; and Nokia. While it notes that IBM's breadth of services and investment in its *Watson* platform has "paid off", it reckons Microsoft's "tremendous growth in the enterprise cloud space, its IoT edge services and AI prowess highlight an increasingly compelling offer in the market".

Meanwhile, in its report also published in mid-June, Berg Insight said that the global market for IoT device management and application enablement platforms reached USD 1.1bn in 2017. Growing at a CAGR of 36.2 per cent, the analyst expects total market value to reach USS 4.9bn in 2022.

Berg noted that the IoT platform market is crowded and hosts a multitude of players spanning from small startups to major companies in the technology and industrial sectors. It said these companies have developed offerings that typically have a specific focus on a set of capabilities, often related to their core businesses.

"GE and PTC spearheaded the effort of promoting IoT in the industrial sector on a broader scale," stated the firm. "While GE has shifted focus to mainly provide solutions rather than its *Predix* platform alone, PTC has emerged as the leader in the space.

It added that Software AG's *Cumulocity* IoT business and the wireless IoT module vendor Telit have also built "strong" positions in the industrial sector. For example, Software AG's platform has been selected by Siemens to complement its IoT operating system *MindSphere*, while Wind River leverages Telit's technology in its *Helix Device Cloud* as part of a strategic partnership. (Editor's note: towards the end of June, global private equity firm TPG Capital announced the completion of its acquisition of Wind River from Intel.)

According to Berg, additional providers with high involvement in the industrial sector include Bosch, IBM, SAP, Oracle, Exosite, Device Insight and Altair Engineering.

The company goes on to state that in 2017–2018, major cloud infrastructure vendors Amazon, Microsoft and Google continued to invest heavily in their IoT offerings to drive growth in their cloud businesses. It believes the involvement of the cloud infrastructure providers will, over time, lead to "commoditisation" of some services currently offered by vendors in the IoT platform market and result in further specialisation of providers.

## NEW APPOINTMENTS

| Date | Name | New employer | New position | Previous employer | Previous position |
|---|---|---|---|---|---|
| 27/3/18 | Jean-Yves Charlier | – | – | VEON | CEO – resigned |
| 27/3/18 | Ursula Burns | VEON | Executive chairman | VEON | Chairman, supervisory board |
| 10/4/18 | Reshaad Sha | Liquid Telecom | CEO, South Africa | SqwidNet | CEO |
| 11/4/18 | Ike Dube | Altron | MD for Rest of Africa | MTN South Africa | Head of business risk management |
| 26/4/18 | Jean-Claude Tshipama | Eutelsat Communications | Head of Broadband in Africa | Canal+ DRC | CEO |
| 7/5/18 | Paul de Leusse | Orange Group | Deputy CEO for mobile financial services | Indosuez Wealth Management | Deputy CEO |
| 21/5/18 | Rolland Johns | CSG | CFO | CSG | Chief accounting officer |
| 31/5/18 | Maria Varsellona | Nokia Corporation | President, Nokia Technologies | Nokia Corporation | Retains her previous position as chief legal officer. Replaces Gregory Lee who is leaving. |
| 31/5/18 | Never Ncube | Dandemutande | CEO | Dandemutande | CFO |
| 1/6/18 | Jonas Bogoshi | BCX (Business Connexion) | CEO | Dell EMC | Country manager |
| 18/7/18 | Ahmad Mokhles | Liquid Telecom | Group COO | Airtel Nigeria | COO |

## INVESTMENTS, MERGERS, ACQUISITIONS

| Date | Buyer | Seller | Item | Price | Notes |
|---|---|---|---|---|---|
| 30/5/18 | Telecom Egypt | Chinese financial institutions | Long-term financing | USD200m | Huawei facilitated providing competitive financing conditions to Telecom Egypt to finance the rollout of 4G, & the deployment of transmission & core networks. Facility is for 48 months with a grace period of 24 months. Financial institutions include Bank of China, & China Export & Credit Insurance Corporation (Sinosure). |
| 31/5/18 | Ericsson | European Investment Bank | Credit facility | EUR250m | Agreement will support R&D activities for 5G & is in line with Ericsson's focused business strategy. The disbursement can be made in any currency that is widely traded on forex markets, & the credit facility will mature five years after disbursement. |
| 6/7/18 | Sterlite Tec | Metallurgica Bresciana | Company | EUR48.7m | Metallurgica designs & manufactures precision optical fibre & specialised copper cables. Sterlite hopes its all cash acquisition of the Italian firm will "significantly" expand its European market presence. |

Berg Insight IoT analyst Fredrik Stålbrand believes M&A activity has risen sharply in recent times, and that the market has now entered a consolidation phase. He said: "Some level of fragmentation in the market is expected to remain due to lack of standards, but also due to specific requirements in industries characterised by mission critical applications such as automotive, healthcare and manufacturing, as well as in the critical infrastructure industries."

### CETel partners with SatADSL

CETel and SatADSL have joined forces under a partnership which they claim will deliver "cost-effective" virtual network operator flex services across Africa and the Middle East.

The two companies plan to deliver an expanded range of services in Ku- and C-band across the region. SatADSL will provide CETel with its Cloud-based Service Delivery Platform (C-SDP) which it described as a "complete OSS/BSS carrier-grade, fully redundant platform". It says this will enable CETel to deliver cost-effective VNO flex services to serve customers in the enterprise, energy, mining, construction, CSP, maritime, government and NGO sectors.

SatADSL co-founder and CEO Thierry Eltges said: "We have extensive knowledge of the African market and experience of overcoming the challenges of connecting remote areas that will boost CETel's offerings even further.

"Our *C-SDP* platform also complements CETel's tailored approach to providing flexible connectivity across challenging sectors in some of the most remote areas of the world."

CETel says it provides a full range of fixed and mobile satellite services from its own teleport based near Cologne in Germany. The company claims to offer turnkey solutions and value added services over Ku- and C-band to ensure reliable connectivity across the world.

MD Guido Neumann says the tie-up with SatADSL will complement CETel's product and services portfolio with volume-based vouchers and flexible, cost-effective VNO services.

"This will enable us to keep costs low and service quality high," he said. "The demand for these services is growing in Africa, and thanks to SatADSL's solutions, we can guarantee access to reliable and constant connectivity via satellite across a range of industries."

### Vodacom Group in ground-breaking ZAR17.5bn BEE ownership deal

As part of what is believed to be the largest ever black economic empowerment (BEE) transaction in South Africa's ICT sector, Vodacom Group will pay out up to ZAR17.5bn (USD1.31bn) to its black investors.

The deal will see the BEE partners exchange their current interests in Vodacom South Africa for a shareholding of between 5.8 and 6.25 per cent in Vodacom Group. The company has agreed terms with Royal Bafokeng Holdings (RBH), Thebe Investment Corporation, YeboYethu (an existing BEE partner) and a newly formed staff scheme. The combined interests will be consolidated into a new YeboYethu BEE structure that will own shares in the group.

This transaction, which remains subject to regulatory and shareholder approvals, will replace and build on the ZAR7.5bn Vodacom SA BEE ownership scheme that was concluded in 2008 and anticipated to unwind on 8 October 2018, ten years after its implementation.

The existing transaction, comprising a 6.25 per cent shareholding in Vodacom SA held by YeboYethu, RBH and Thebe, has benefitted more than 102,000 YeboYethu investors and 8,500 current and past Vodacom SA employees.

The new BEE transaction, in which the YeboYethu shareholding will be substantially increased, will be funded through a combination of third party and vendor financing, reinvested equity of ZAR4.5bn from the existing BEE partners and facilitation from Vodacom Group. It has a 10-year funding term, extending the relationship between Vodacom Group and YeboYethu, as its BEE partner, for at least the next 10 years, with the possibility to extend beyond that period.

4,637 Vodacom SA employees will participate in a new staff scheme funded by the group to the value of ZAR3.5bn. They will own approximately 20 per cent of YeboYethu.

"Our original BEE deal has delivered significant value to our BEE partners. Its unwind will deliver approximately ZAR7.5bn of value, or 6.7x the original capital our BEE partners invested into the 2008 transaction," says Vodacom Group CEO Shameel Joosub. "A shareholder that invested the minimum ZAR2,500 in 2008 will unlock approximately ZAR16,000 of value through this deal."

He adds that part of this value will be returned to existing BEE shareholders in the form of an upfront special dividend of ZAR3bn. "[This] provides substantial liquidity for our partners and amounts to 2.7x the original capital they invested into the 2008 deal. A shareholder that invested the minimum ZAR2,500 in 2008 will receive circa ZAR6,000 in cash."

Vodacom says it is one of the pioneers of social transformation through ICT and is a Level 3 B-BBEE contributor. BEE was established by the ANC government After South Africa transitioned from apartheid in 1994. It aims to address the inequalities of the apartheid era by redistributing assets and opportunities to black and "coloured" South African citizens that were not available to them under white rule.

## LATEST COMPANY RESULTS

| Date | Company | Country | Period | Currency | Sales (m) | EBITDA (m) | EPS (units) | Notes |
|---|---|---|---|---|---|---|---|---|
| 23/4/18 | Maroc Telecom | Morocco | 1Q18 | MAD | 8,994 | 4,482 | NA | 5.6% growth in consolidated revenue due to "sharp" increase of activities in mobile & fixed markets both in Morocco & subsidiaries. First quarter of 2018 characterised by payment of MAD275m for licenses in Côte d'Ivoire & Gabon. Mobile revenues in home market up 2.7% from MAD3,275m in 1Q17 to MAD3,364m for 1Q18. |
| 26/4/18 | Orange Group | France | 1Q18 | EUR | 10,082 | 2,605 | NA | 1% QoQ increase in revenues mainly driven by: France, which reported growth for the fourth consecutive quarter (+2.1%); Spain, where growth remains steady (+4.3%); & Africa & Middle East which is up 6.2%, following an increase of 5.2% in the 4Q17. |
| 3/5/18 | Motorola Solutions | US | 1Q18 | USD | 1,468 | NA | 0.69 | YoY sales increased 15% driven by growth in all regions. Around $49m of revenue growth was related to acquisitions, including $22m from the acquisitions of Airbus DS Communications & Avigilon. |
| 10/5/18 | Telecom Egypt | Egypt | 1Q18 | EGP | 4.8 (bn) | 1.5 (bn) | 0.40 | Consolidated revenue increased 15.4% YoY. Now has 2.9m mobile customers – a 27% rise from the 2.3m reported in 4Q17 – & claims "above market average" mobile data penetration. |
| 14/5/18 | Eutelsat | France | 3Q17-18 | EUR | 337 | NA | NA | Revenues down 3.3% like-for-like (-7.4% reported). Earnings (at constant currency & perimeter) expected to return to slight growth from FY 2018-19 onwards; EBITDA margin (at constant currency) expected above 76% for FY 2017-18. |
| 14/5/18 | Helios Towers | UK | 1Q18 | USD | 89 | 42 | NA | Earnings increased 7% from USD83m in 1Q17. Company reports YoY increase in tenancies of 4% to 13,063 (1Q17: 12,617). In February 2018, the group's Managed Services division was awarded a 15-year contract with the newly merged Airtel-Tigo business. |
| 15/5/18 | IHS | Netherlands | 1Q18 | USD | 85,293 | 52,099 | NA | Compared to USD101.9m in 1Q17, income decreased by 16.3% for the Nigerian towerco. It says decrease driven primarily by adoption of the NAFEX rate which resulted in translation of NGN360.3=USD1 during the quarter, compared to NGN305.1=USD1 in 1Q17. Added 425 lease amendments and 87 tenants during the period. |

# Convergence

## The Potential of Hybrid

## Narrowband & Broadband Networks

## Hytera LTE-PMR Convergence: The potential of hybrid network

Basically PMR technologies, like DMR and TETRA, are voice and narrowband data. So with traditional PMR devices, customers can enjoy widely-used typical PMR functionalities, such as group calls and dynamic assignment of resources, and image transfers as well. But nowadays they are far from enough for customers who are looking for broadband offers, like video and more interactive applications, especially those from the public safety and emergency services sectors.

Indeed, LTE, based on 3GPP standard, has the potential to revolutionize the PMR industry, but the feasibility of LTE network infrastructure in the critical communications world has long been debated. The reason is that instant and reliable communications lies in the coverage and resiliency of the network, especially in remote and rural areas.

The convergence between PMR and LTE technologies becomes the first choice. Hytera is a global provider of a full portfolio of LTE-DMR/TETRA convergent communications solutions and embraces the convergence in terms of devices, infrastructure and applications.

Regarding to devices, Hytera officially announced at 2017 CCW in Hong Kong the multi-mode terminals that can work simultaneously over narrowband and broadband networks, and also can communicate with smartphones and interphones.

Regarding to infrastructure, Hytera convergence solution supports connectivity to various PMR networks and also provides access to comprehensive data functionalities over broadband network. By far, Hytera LTE-PMR convergent networking solution has been in commercial use in several provinces and cities in China.

Regarding to applications, Hytera SmartOne Dispatching System allows seamless scheduling and management of resources for users across multiple networks. To crack down criminal events, the SmartOne System provides “Swift 110” to make sure that the police officers can arrive at the crime scene within one minute.

When natural disasters occur, the infrastructure fails and the power grid stops working. To deal with that, Hytera provides customers with emergency communication products.

The IBS (integrated Base Station) integrates the functions of three parts: eTC (enhanced Trunking Core), BBU (Baseband Unit) and RRU (Remote Radio Unit). In emergency situations, iBS can be deployed on the communication vehicles with the power supply, ensuring communications network coverage.

To satisfy the needs of video transmission, Hytera offers iMesh, a high-performance ad-hoc wireless solution based on 5G technology. That allows communications to be set between each two points.

When the distance between two points exceeds the signal range, Mesh will automatically select other nodes as its relay transmission. As an emergency communication device, Mesh is designed to quick response and work without installation. Through Mesh link, 10 HD real-time video stream can be transmitted simultaneously. At present, Mesh has been widely used in public safety and emergency rescue all over the world.


Jayden Chen
Director of Hytera Francophone Africa
**E-mail:**
jayden.chen@hytera.com


“I believe Hytera has led the field moving in to the LTE-PMR hybrid era. In line with the fast development of infrastructure in francophone African regions, Hytera innovative convergent solution enables our customers to improve connectivity and data analytics by facing increasingly complex and demanding communications situations, especially in mission critical moments.”

## Excellence Through Convergence: A Hybrid LTE Network for limitless communications potential

For the foreseeable future then, the best option for PMR end user organizations looking to harness broadband multimedia services is to deploy a hybrid network.

Taking the example of a power utility company again, a PMR system provides a resilient voice network to direct its field staff. The PMR system ensures that the user organization does not have to rely on the limitations of mobile phone networks, especially in an emergency situation.

It also allows managers and other staff who do not have a radio to communicate with staff equipped with PMR terminals via their mobile devices.

Staff can gain access to databases and back office systems away from the office or control center, while real-time location apps combined with mapping facilities make it easier to manage and co-ordinate resources in the field. Images, video clips or streamed video can be sent to and from personnel in the field.

New PMR/LTE multi-mode devices with large display screen, such as the new Hytera Multi-mode device, means staff do not have to carry two separate device to access the best in modern voice and data technology. Converging different types of communication networks makes a lot sense. It enables businesses to benefit from both technologies-retaining the field-proven resilient voice technology of DMR and TETRA, while accessing new fast 4G LTE broadband technology, which is becoming a necessity in an increasingly data-driven world.


Hytera

www.hytera.com

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# IP-based capability accelerates interconnection of TETRA networks

The ETSI standard for the TETRA Inter-System Interface (ISI) has been revised and now includes IP connectivity.

The ISI is the mechanism that enables separate secure TETRA networks to interconnect. For example, first responders need communications continuity if working in regional or national cross-border areas.

Up until now, interconnection of individual TETRA networks via the ISI required a dedicated E1 link. According to the TCCA (TETRA and Critical Communications Association), this can be expensive and sometimes impossible to lease because providers no longer support circuit switched connections.

To ensure that the new IP option for ISI is included in interoperability process testing and certification, the TCCA's ISI working group has been working in parallel with the ETSI revision process. The group has written new ISI TETRA interoperability profiles (TIPs) which form the basis for testing.

Each TIP is based on ETSI TETRA standards. They primarily constitute a clarification of the standards and may impose limitations in order to achieve a range of fully compliant and interoperable TETRA equipment available to the market.

TCCA contracts Istituto Superiore delle Comunicazioni e tecnologie dell'Informazione), an Italian Ministry of Communications lab, as the independent certification authority responsible for supervising the testing sessions.

The new TIPs are now available in the members' area of TCCA's website. *www.tcca.info*

# Inseego unveils new range of IoT devices


Inseego has launched a new line-up of industrial-grade 4G IoT solutions as part of its *Skyus* product range.

The firm says its expanded portfolio includes gateways, routers and USB devices that provide "affordable, reliable and secure" cellular connectivity for fixed or mobile deployments.

For quick, plug-and-play deployments, Inseego claims the globally certified *Skyus SC* series of devices offers a lower cost USB connectivity solution built to withstand extremely harsh operating environments.

Packaged in industrial grade aluminum, the devices are available in LTE Cat-M1, NB-IoT, Cat-1 and Cat-4 variants, and include features such as an onboard app for space and connection management. Inseego reckons the *Skyus SC (pictured left)* simplifies the integration needed to provide basic connectivity to any IoT custom computing solution or as a primary or failover solution. It adds that the solution is well suited for use in agriculture, manufacturing, metering and enterprise SD-WAN environments.

For deployments that rely on a combination of cellular, Wi-Fi, Bluetooth networking and GPS for tracking purposes, Inseego says the *Skyus 100* series edge gateways (*pictured*) target numerous IoT use cases and enable seamless machine connectivity with a wide variety of equipment.

The platform is said to offer numerous connectivity options and industrial-grade reliability at an economical price point. The initial offerings feature Cat-1 and Cat-4 LTE speeds with GPS and a 12-hour backup battery to address specific IoT applications.

They include the *Skyus 110* family which offers various LTE Cat-1 gateways with Wi-Fi, Bluetooth, Ethernet, USB and four-pin interfaces to enable use cases with low data demands.

*www.inseego.com*

# Compact APs can squeeze into most enclosures

Ruckus Networks has launched two new 802.11ac Wave APs designed to provide Wi-Fi coverage in space-constrained sites and hard-to-reach areas.

They include the *E510* which is said to be the industry's first embeddable enterprise AP. Ruckus says it features an innovative two-element design that minimises the aesthetic or physical impact at deployment sites such as outdoor digital signage, street furniture, kiosks, lighting fixtures and stadium seats. Measuring just 21 x 14.2 x 3.3cm, it's claimed the base unit can "squeeze into most enclosures", including cylindrical light poles, to expand the reach of any Wi-Fi network.

The *E510* is equipped with Ruckus' weatherproof *BeamFlex+* antenna module. The company says this "diminutive" 17.5 x 8 x 8cm module is built for outdoor stealth placement and can be positioned up to three metres away from the radio. It adds that with 2x2:2 spatial streams, MU-MIMO support, and a data rate of up to 867Mbps, the *E510* delivers "sustained throughput for demanding users and applications".

Meanwhile, the new *M510* offers mobile Wi-Fi with LTE backhaul for expanded coverage and redundancy. It is designed for use wherever supported LTE service is available, and is said to be ideally suited for use on buses, trains and in temporary locations where Ethernet connectivity is absent, unreliable or cost-prohibitive. Ruckus adds that the device can be used anywhere WAN) redundancy is desired.

According to the firm, the *510*'s integrated LTE modem allows network designers to create Wi-Fi hotspots at will, and to implement redundant backhaul to improve Wi-Fi service reliability and/or to help ensure that SLAs are maintained. Sustained downlink throughput is said to be up to 150Mbps when using LTE backhaul.

*www.arris.com*

# 'Unique' ULTRAMAX antenna features multiple Wi-Fi ports

Airgain has released an antenna which it claims is the first of its kind to include six dual-band Wi-Fi ports inside a single enclosure.

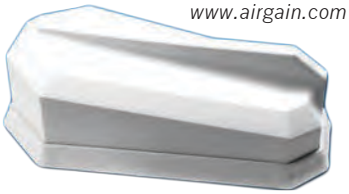
The company says its *ULTRAMAX* MIMO 9-in-1 antenna will help improve public safety and fleet solutions with enhanced Wi-Fi capability. It is equipped with nine ports and features 6x6 MIMO Wi-Fi, dual LTE, and multi-GNSS technology antennas to provide support for full HD streaming video as well as other high bandwidth applications.

With a single compact footprint, Airgain reckons the *ULTRAMAX* promotes ease of installation, avoiding multiple mounting and cable entry points associated with existing solutions.

It says the antenna includes high rejection GNSS technology with coverage for multiple satellite systems including GPS, GLONASS, Galileo and BeiDou.

The company adds that the *ULTRAMAX* MIMO 9-in-1 is the only single unit antenna that complements Cradlepoint's *IBR1700* fleet router, and supports all six of its Wi-Fi ports.

*www.airgain.com*



# Rapid Deployment Solution aims to save time and money

Webb Industries has developed a telecoms mast which it claims does not require concrete or any excavation, and has a very low environmental impact.

The South Africa-based RF ancillary equipment specialist says its *Rapid Deployment Solution* (*RDS*) has a load capacity of 8m² over the top 10m which makes it possible for multi-customer use, and that it can be reused, relocated and erected on almost any site, both urban and rural.

Webb says that while a standard greenfield site takes 21 days or more to complete, an *RDS* mast that is, for example, 36m in height, can be fully

deployed in three days, resulting in a significant price and 'time to market' advantage.

The *RDS* includes a 7.2m x 7.2m base substructure, tower, fencing, universal equipment cabinet, all underground ducting, full-site earthing and an aircraft warning light system. "In essence, all that has to be done is to bring power to the site, draw the cable through the ducting sleeve, and the system is ready to go," says the firm.

It adds that the solution saves on rigging and installation costs due to short time spent on site, and that erection is quick and easy without the need for a crane.

Webb says there are further cost advantages because there is no concrete used in the structure's foundation which consists of a steel platform base that is filled with suitable compactable material.

*www.webb.co.za*

# LAN tester upgraded for 5GHz demand

IDEAL Networks has introduced a new dual band USB Wi-Fi adapter for its *LanXPLORER* Pro network troubleshooter and also upgraded it with updated software.

The vendor says the USB antenna offers enhanced functionality to support both 2.4GHz and 5GHz Wi-Fi testing in accordance with the 802.11a/b/g/n/ac international test standard.

IDEAL claims the free software updates have also improved Wi-Fi testing capabilities and accuracy by enabling the *LanXPLORER Pro* to display new RF parameters such as signal strength (dBm) and signal to noise ratio. The company reckons this makes the tester an effective, time-saving tool for integrators and technicians that need to test all their devices and have the Wi-Fi access they need.

As well as testing Wi-Fi, IDEAL says the multifunction *LanXPLORER Pro* also offers a wide range of network diagnosis capabilities, from testing the copper and fibre cables that serve the wireless APs, to troubleshooting problems in Ethernet devices that may be reducing network performance.

The new software update also includes an extended list of wiremap templates for common Ethernet cable types including Cat6A/7A/8 and non-Ethernet cable, such as Profinet 4 and ISDN. IDEAL says user-defined custom wiremap templates are also available for "maximum versatility and accuracy" when testing proprietary cabling systems.

The *LanXPLORER Pro* can be used with the company's free *AnyWARE* app. This is designed to enable technicians to quickly and easily share pass/fail test results with clients. IDEAL says detailed PDF and CSV reports can also be transferred via the app or shared with colleagues off site to improve collaboration and productivity and reduce network downtime.

*www.idealnetworks.*

# Qualcomm claims first with 5G New Radio

Qualcomm Technologies says it has introduced the industry's first 5G NR (New Radio) solution targeted for small cells and remote radio head (RRH) deployments.

The company says the new *FSM100xx* builds upon its existing *FSM* platform for 3G and 4G small cells, and will support 5G NR in both mmWave and sub-6 GHz frequencies. The device also includes a software defined modem, and is designed to enable original OEMs to reuse both software and hardware designs across sub-6 and mmWave products to comply with future 3GPP releases.

Qualcomm says the *FSM100xx* supports various options for interface splits between a central unit and the RRH, providing OEMs and operators with the flexibility to use a 5G RAN architecture.

According to the firm, small cell densification, which is already under way for 4G, is also expected to be a critical component of 5G network deployments. Given the propagation characteristics of 5G NR's higher frequencies (especially mmWave), it says solutions are needed to support delivery of uniform 5G experiences, especially indoors where most data is consumed.

The *FSM100xx* has been designed to scale and address outdoor small cell performance requirements, such as support for MIMO implementation and multi-gigabit throughput, as well as support indoor requirements such as compact form factor and PoE.

The solution is expected to begin sampling in 2019 and Qualcomm is already working with early access customers.

*www.qualcomm.com*

## Also look out for...

# Successful tests for C-COM's phased array Ka-band antenna

C-COM Satellite Systems has successfully tested its 16x16 subarray phased array antenna using 4x4 transmit and receive building block modules.

The Canada-based company has been working on a research project to develop a fully electronically steered phased array mobile satellite Ka-band antenna since 2016 (*also see feature, Guaranteeing a great reception, Feb-Mar 2017 issue*). Its panels have been developed and tested in partnership with the Centre for Intelligent Antenna and Radio Systems (CIARS) at the University of Waterloo in Ontario.

CIARS director and research team leader Professor Ali Safavi-Naeini says: "Measured lab results have demonstrated the high performance of the small modular scalable intelligent transmit and receive antenna modules and validated our simulation model for larger panels. We also achieved good beam steering up to 70° from a boresight, a significant achievement."

C-COM explains that the developed system uses a unique adaptive control technique in such a way that a prescribed quality of polarisation can be guaranteed over the entire scan range.

Furthermore, it says the beam-processing unit and the antenna intelligent module can generate more than one radiation beam simultaneously and support multi-beam-tracking. C-COM says this is functionality "highly desired" in emerging LEO mobile networks.

The company goes on to say that by utilising a unique blend of low-cost but flexible/reconfigurable hardware and highly intelligent software, the modular technology platform developed at CIARS provides the most cost-effective evolution path towards any antenna system configuration with prescribed performance for a wide range of low-end to high-end applications.

It adds that the platform can be "easily" extended to the rapidly emerging mmW 5G and complex radar systems.

# A new horizon for satcoms?

## Will low Earth orbit satellites offer the ultimate in connectivity from space? RAHIEL NASIR finds out.

On 25 June 2015, a high-profile industry group unveiled a new satellite mission which promises to completely bridge the digital divide by 2019. In the famous Faraday Lecture Theatre at the historic Royal Institution of Great Britain in London, the heads of Airbus Group, Bharti Airtel, Hughes Network Systems, Intelsat, Virgin Group and Qualcomm revealed what was hailed as a "ground-breaking global communications system" based on a fleet of microsatellites that will orbit the Earth at low altitudes.

The companies are among the first round investors backing tech entrepreneur Greg Wyler's OneWeb venture which is working on putting 900 microsatellites into space, starting with the first 10 towards the end of 2018 (*see News, Jun-Jul 2015*).

Wyler is no stranger when it comes to pioneering telecoms. He helped to create some of the first networks in Rwanda when he owned Terracom Communications during the early 2000s. In 2007, he founded O3b Networks (now owned by SES) which has created what is often described as a 'fibre in the sky' trunking network using satellites that are placed in medium Earth orbit (MEO). But unlike O3b's fleet which orbit the planet at an altitude of just over 8000km, or more conventional geostationary (GEO) satellites which are around 36,000km away, OneWeb will place its spacecraft into a low Earth orbit (LEO) of just 1,200km.

Since OneWeb made its announcement three years ago, several other companies have also been developing LEO programmes that aim to provide ubiquitous and affordable connectivity from space. Fleet Space Technologies, Global IP, Kepler, LeoSat, Sky Space and Global, and Telesat are some of the companies that feature prominently here. But the names of the major GEO satellite players are conspicuous by their absence. So if LEO space technology is the answer to bridging the digital divide once and for all, why have the more established operators never invested in it?

Speaking at the OneWeb launch event in 2015, Intelsat CEO Stephen Spengler said: "We have a different focus, and a very large installed base of customers that we are serving with our GEO fleet. The bulk of the applications can be supported very well from GEO and so we're going to continue with that as the core of our strategy."

So why is Intelsat part of the initial consortium of investors that has backed OneWeb to the tune of around USD2bn? Indeed, it even tried to merge with the firm earlier in 2017, although the proposed deal collapsed (*see Wireless Business, Jun-Jul 2015*).

"We can't do the poles effectively," said Spengler. "So what a LEO system does is that it allows us to work with our mobility customers and give them pole to pole, high-performance coverage."

Intelsat's plan is to integrate its GEO satellites with OneWeb's LEO fleet, connecting customers from pole to pole on what it claims will be a "seamless" basis.

Spengler also said that working with OneWeb will also give Intelsat another layer of capacity in some cases, such as helping to ease the congestion that can occur with spot beam systems. "And there are going to be certain situations where the low latency of a LEO system will be beneficial. We don't believe latency is an issue across the broader set of applications, but in certain applications it's going to be beneficial for certain customers so we'll be able to bring that to the equation."

### Who's interested in LEO?

When it comes to some of the other big names in the satellite industry, SES is clearly now committed to MEO and acquired all of the remaining shares in O3b for USD730m in August 2016. And following a request for its views, a Eutelsat spokesperson told us: "We do not have interest in LEO communication". This contradicts an announcement Eutelsat made in March 2018 which stated that the company had commissioned its first low Earth orbit satellite (*see News, Apr-May*). Eutelsat has so far not responded to a request for further clarification here.

Meanwhile, Ken Betaharon, EVP and CTO of ABS (Asia Broadcast Satellite) appears almost dismissive of the LEO satellite providers when he says: "Except for a small portion of the current traffic which may be latency sensitive, there is no need for a LEO system, especially if

[the operator's] business plan entails competing with GEO systems and provide the same services. A GEO system can do it all at a much less cost than a LEO solution both in terms of the satellite cost and the ground segment cost (user terminals). So why bother?"

Why bother indeed, especially when the idea of LEO satellites is not new and has been tried before without much success. During the 1990s, Teledisc had ambitious plans to launch 840 satellites at an altitude of 700km. Globalstar and Iridium also had similar plans. But the programmes cost billions of dollars and did not take-off commercially.

So why has there been renewed interest in LEO missions during recent years?

Perhaps the best companies to answer that question are those that are investing in the technology today, such as US-based LeoSat Enterprises. Working with Thales Alenia Space, the company plans to manufacture and launch a constellation of up to 108 Ka-band high-throughput satellites (HTS). These will be interconnected through laser links which according to LeoSat, effectively creates an optical backbone in space which is about 1.5 times faster than terrestrial fibre backbones. LeoSat expects to begin its launch in 2021 with full deployment expected in 2022.

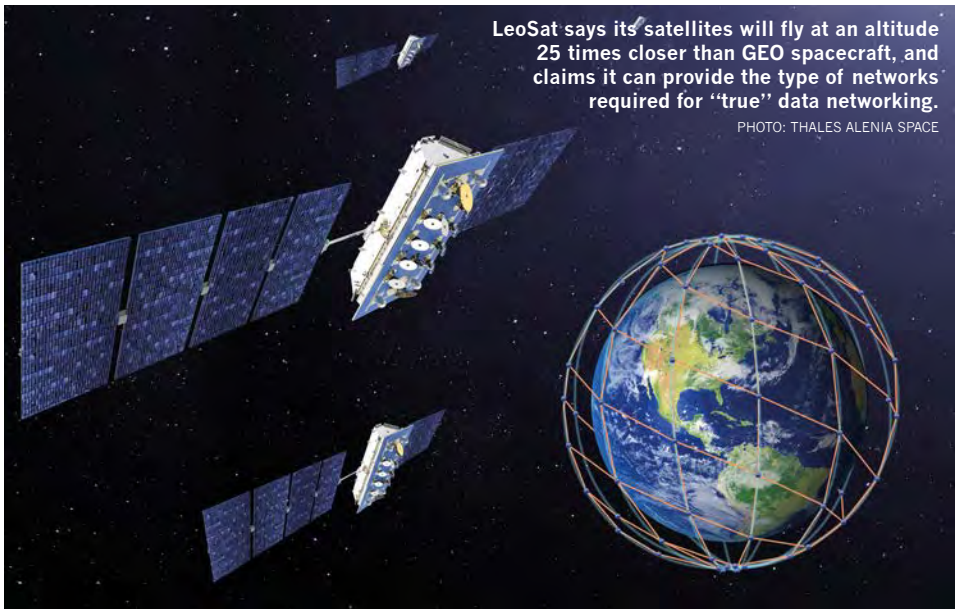
CCO Ronald van der Breggen believes that with the continuing growth of the data market worldwide, the satcoms sector is looking to deploy LEO solutions that will enable telecom and satellite operators to complement their current portfolio with suitable capabilities for future demand.

He goes on to point out that two major established GEO operators have now invested in LeoSat: Hispasat, the Spanish national satellite operator along with Asia's largest operator SKY Perfect JSAT. He says: "Both companies believe that LeoSat's system design, combining satellite and networking technology to provide an MPLS network in space, is a departure from existing solutions and is a key opportunity to opening up new markets and delivering business growth."

Canada-based Kepler is another recently established company that is building plans to gradually deploying a constellation of 140 LEO nanosatellites while delivering store-and-forward data backhaul and IoT services worldwide.

Mina Mitry, CEO, Kepler

"Radiation events are much frequent at higher altitudes and can be incredibly damaging to electronics."



LeoSat says its satellites will fly at an altitude 25 times closer than GEO spacecraft, and claims it can provide the type of networks required for "true" data networking.
PHOTO: THALES ALENIA SPACE

CEO Mina Mitry believes that the space industry in general has seen "incredible growth" in past years, and that the standardisation of nanosatellites has significantly influenced how LEO spacecraft can be built and deployed.

"Since off-the-shelf components used for LEO are significantly cheaper and the availability of launch vehicles available is multiplying, we see now how access to space is remarkably being re-defined. This is making it easier for new entrants to access the space market through rapidly deployable nanosatellite constellations, providing a diverse array of new services and applications."

Mitry says the reason the more established operators have not invested in LEO is simply because it is not their business. He also suggest that they lack the skills to do so.

"To operate in LEO, you require a certain expertise that is not easy to transfer from GEO since these two orbits have different complexities and challenges. The technologies are fundamentally different – mostly inherent to the design and operation aspects – and require a specific body of knowledge to successfully compete at each orbit.

"Moving to a LEO system means that a GEO operator would need to take time and resources away from their mainstay business. When you have quarterly earnings reports, investor calls, and a plethora of demanding customers, the opportunity cost for investing in a new capability is simply too great to bear.

"With small satellites you can ride-share to orbit, the radiation environment is more forgiving, and cost of launch is cheaper. This drives down cost, meaning you can build more satellites that are rapidly refreshed."

Frederick Morris,VP of satellite operators market vertical with satellite technology specialist Comtech EF Data, agrees here. He says GEO satellites are generally large, designed for long life, and are therefore expensive to manufacture and launch, which limits the numbers being built. But LEO and MEO satellite constellations can have anywhere from two dozen to 6,000 satellites driving scale, which is always good for economics.

In addition to the individual cost savings from volume production, Morris says the cost of a line of software code has also plummeted, making the much more complex control (compared to GEO) of LEO constellations far more feasible than before. "With the enhancement in satellite technology and the enhancements in launch capability, what was once considered science fiction is now becoming science fact and the potential user benefits becoming realisable."

## Reaching high with low orbit satellites

Kepler's Mitry reckons LEO satellites offer "significant" advantages over their GEO counterparts for certain applications. "Naturally, each orbit has its own unique set of characteristics that pre-define the type of service and coverage it can offer. GEO satellites are particularly good at supporting direct broadcast and fixed connectivity services. MEO and LEO satellites instead are far more suitable for delivering mobile satellite services, including IoT services.

Mitry says LEO satellites orbiting at less than 2,000km mean considerably less latency than those in geostationary orbits that are much further away. Because LEO satellites fly closer to the planet, he says they do not suffer from the signal path losses of GEO satellites, and can therefore be used with smaller antennas and less power on the ground.

He also points out that in general terms, the higher the orbit the harsher the radiation environment, and the more effort needs to be put into ensuring that the spacecraft's electronics can survive. "This not only drives up development effort but means GEO electronics lag behind their terrestrial counterparts in terms of performance. Radiation events, such as single event upsets or latch-ups, are much frequent at higher altitudes and can be incredibly damaging to electronics. In the lower radiation environment of LEO, small satellites can use commercial off-the-shelf components, again reducing the costs and improving the performance."

Mitry also highlights the fact that GEO satellites are designed to have a lifespan of around 15 years,

largely owing to the buyback period needed to recuperate the original investment. But he says the typical service life expectancy of small satellites is under 3-5 years which makes it easier to upgrade technology with the latest advancements.

LeoSat's der Breggen believes current GEO satellite solutions remain "suboptimal" for data. "Broadband and data applications benefit from low-latency communications, which is where LEO constellations provide an advantage over geostationary satellites. For data communications, the LeoSat constellation can even outperform fibre on inter-continental networks. For example, current fibre latency for New York City-Tokyo is 175ms – the LeoSat solution is below 100ms."

The issue of latency comes up time and again during conversations about LEO.

For instance, ABS' Betaharon agrees that while LEO satellites offer some advantage in terms of latency, this is only required for a very small portion of current traffic and is a "huge disadvantage" in terms of the cost.

He also says LEO systems may have an advantage over GEO for providing service above and below arctic circles where very few people live and in some very specific targeted markets. Hence, as part of their universal service obligations, he says some governments may invest in LEO satellites to provide services to their citizens living in remote areas, citing Canada-based Telesat as an example. "Considering that very few people live in the extreme northern part of Canada (80 per cent of the country's population lives within 80 miles of the US border), this does not make financial sense. But for a government helping its people and targeting some specific markets, it does make sense."

Telesat's fleet currently consists of 16 GEO satellites as well as the Canadian payload on *ViaSat-1*. In January 2018, it launched a phase 1 LEO satellite that is currently undergoing commissioning and orbit-raising. The company says its LEO fleet will offer a low latency, high throughput broadband service with an initial constellation of around 120 satellites planned by 2021.

Morris explains that a LEO satellite hop can be approximately 40ms while a GEO hop can be around 550ms. "This sounds as if there would be no question that if latency forced a choice to be made, it would be LEO over GEO. However, there are satellite configuration differences within the proposed LEO constellations, and it has to do with whether there are inter-satellite links (ISLs) between satellites or not.

Andrey Kirillovich, director of integration services and projects, RSCC

"The effectiveness of such a system and its advantage over GEO by adding coverage over the poles is questionable."


**OneWeb's first round investors include some big name ICT and tech players. Shown here at the company's launch in 2015 are (from left to right): Dean Manson, EVP, general counsel and secretary, Echostar (Hughes Network Systems); Stephen Spengler, CEO, Intelsat; Richard Branson, founder, Virgin Group; Sunil Bharti Mittal, founder and chairman, Bharti Enterprises; Greg Wyler, founder, OneWeb; Tom Enders, chief executive, Airbus; Dr. Paul E. Jacobs, former executive chairman, Qualcomm.**

"If the constellation has ISLs, then a ground station can connect to another ground station or gateway station by a hop up to the satellite, then over to a satellite covering the geography of the other end of the link, and down to the ground station. SpaceX's Starlink, Telesat LEO and LeoSat have ISLs in their constellation designs."

Without ISLs, Morris says the signal must go from ground station to gateway, to possibly a terrestrial link to another gateway, then up to a satellite covering the destination, then down to the end point station. "This type of constellation configuration, with multiple hops, can have implementations that can have close to the same latency of a single GEO satellite hop."

Andrey Kirillovich, director of integration services and projects, for the Russian Satellite Communication Company (RSCC), also plays down LEO's latency advantage. He says that while latency is essential for response time critical applications in corporate networks and verticals or online gaming, he agrees with Betaharon above and says that in terms of the overall satellite service provider business, such traffic does not exceed 10-15 per cent.

Kirillovich adds: "New 5G mobile network features also will not run smoothly on LEO, as the 5G standard requires latency around 1ms, and this can be achieved only on ground. So the benefit of LEO systems is really questionable, while the disadvantages are great in number. They include numerous launches, need for constant renewal of the satellites in space, and the main bottleneck – the absence of a proven, mass production and easy use steerable antenna. As of today and even in the near future, the cost of a non-GEO terminal will be too far from GEO costs, purely because of the RF part."

He acknowledges that LEO satellites also offer another major advantage over their GEO counterparts in terms of offering true global coverage. But he goes on to ask, at what cost?

"[LEO] coverage is continuous and achieved by hundreds or even thousands of satellites. Many of them will, most of the time, cover oceans with no customers there. So the effectiveness of such a system and its advantage over GEO by adding coverage over the poles is questionable. It may be effective, but for regional use, or in certain verticals only."

On top of all this, Caroline De Vos and Fulvio Sansone, co-founders of satellite services provider SatADSL, point out that LEO satellites are also perceived to be in motion by a user on Earth, so terminals need to be able to connect to a moving object in the sky. They say: "This means the use of either omnidirectional or tracking antennas is necessary. The former can only use lower frequency ranges and are therefore limited in bandwidth and efficiency which means higher communications costs, while the latter is, until now, based on motorised, mechanically moving dishes which are costly and bulky.

"Additionally, the user terminal and its antenna need to be able to cope with handover between one satellite fading out of view below the horizon and another one rising over it. These challenges can only be economically addressed by using a new generation of antennas based on flat-panel electronically steerable elements. Such technology is still at its infancy, and it is not yet possible to have low-cost mass-produced electronically-steerable flat-panel antennas with satisfactory performances."

Morris amplifies their points when he says that as LEO satellites rise and set, the time that an individual one is visible may be between 10 and 25 minutes. "So that traffic is not interrupted, it is likely that there would be two antennas at the Earth station location, one online and one off-line, where they hand-off traffic as a 'new'

satellite rises and an 'old' one sets."

For Morris, connecting with moving satellites implies more complex and currently more expensive ground segment equipment. He reckons this may initially limit LEO's use to markets where the benefits of low latency can command a premium price.

Others may not agree here, especially with companies such as AddValue, Hughes Network Systems, Isotropic and Kymeta who are all making significant in-roads into developing the ground technologies that will be needed to support LEO constellations and applications.

## It's all about the app

For SatADSL, the most important advantage of GEO satellites over LEO and MEO comes when you need to transfer a single content to many users in real-time. "This is the case with linear, real-time television" say De Vos and Sansone. "This is the killer application of GEO satellites and, at least for these types of applications, GEOs are here to stay."

Kirillovich is likely to support this argument, and says GEO constellations have the added advantage of having a track record that spans more than half a century. "They have been changing and adapting to the market, starting from 16m antennas working in C-band in the past and now reaching 0.6 cm antennas working in Ku- or Ka- bands, with RF costs below USD100.

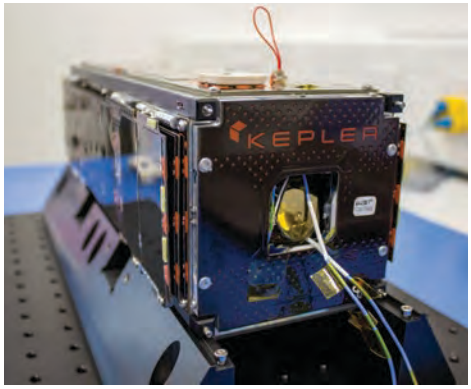
"GEO has always produced an innovative response to market challenges – the latest response for better throughput requirements was GEO HTS, which can accommodate hundreds of Gbps or even a Tbps on a single satellite.

"In combination with GEO wide beam satellites, GEO HTS can also provide almost global coverage and a massive throughput delivering true broadband connectivity to the places where it is needed. To reach global coverage, you need to launch just three GEO satellites. In LEO you will need hundreds of them."

Ultimately perhaps, the industry should not be arguing about LEO versus GEO and the prospect of a looming 'format war' in space. What's clear is that each orbital sector is good for different applications

Caroline De Vos, COO and co-founder, & Fulvio Sansone, CTO and co-founder, SatADSL

"Linear, real-time television is the killer application of GEO satellites and, at least for these types of applications, GEOs are here to stay."




**Kepler successfully launched its first satellite, KIPP, in January 2018. It will launch two more proof of concept spacecraft before rolling out its 140 satellite GEN1 constellation in 2019. Each CubeSat will be around the same size as a loaf of bread.**

Kepler's Mitry admits that the ground segment for LEO always needs some tracking mechanism, whether it be mechanical or electrical. While this makes LEO satellites less suitable for fixed applications, he says they are "very suitable" for mobile applications which, regardless of LEO or GEO, need ground antenna tracking.

LeoSat's van der Breggen lends his weight to the argument and says: "GEO satellites are mostly used for communications connectivity for remote regions where fibre cannot reach and for broadcast applications. So GEOs are superior for broadcast but inferior for data, hence they are losing to fibre all the time. For data communications, the simple answer is that GEO constellations cannot beat LEO or MEO.

LEO constellations such as LeoSat, at an altitude 25x closer than GEO, have many advantages when it comes to throughput, latency and true global coverage and can provide the type of networks required for true data networking.

"LeoSat's solution means that satellite, rather than being considered as a last resort for data networking, can become superior again and the solution of choice, reclaiming its position and staying relevant in tomorrow's world which is about data, not video."

When fully operational, van der Breggen claims LeoSat will provide point-to-point data connections to and from anywhere on Earth without the need for any terrestrial landings or transport. Combining what he describes as "advanced" on-board routers with inter-satellite laser links, van der Breggen says LeoSat will provide low-latency and gigabit per second data delivery which is "ultra-secure and extremely resilient", thanks to its gateway independent meshed-network data-connectivity from transmitter to receiver.

"The unique features of LeoSat's system – ubiquity, low-latency, speed and cyber security – are ideal for a number of applications, such as: enabling global 4G and 5G satellite connectivity for cellular operators; providing the bandwidth required for energy, maritime or financial sector operations; delivering secure networks for government and defence communications; ensuring critical emergency communications; and enabling internet access and connectivity for remote communities.

Meanwhile in January, Kepler successfully launched *KIPP*, its first spacecraft. "Today, *KIPP* is the only provider of pole-to-pole high-capacity Ku-band satellite services," says Mitry. "We deliver store-and-forward communication services to remote customers that lack access to terrestrial networks and have bandwidth constraints with its current satellite providers. As we roll out our constellation we will incrementally service other markets as well, such as M2M and IoT."

Kepler's second spacecraft, *CASE*, is scheduled for launch later this year. Mitry explains that each spacecraft is approximately the size of a loaf of bread and built based on the standardised CubeSat form factor.

"These sister satellites will perform a technology demonstration mission of the performance of our low Earth orbit communication system. We are launching our third satellite, *TARS*, next year. *TARS* will expand upon the capabilities of *KIPP* and *CASE* and deliver narrowband connectivity services for IoT devices."

*TARS* will be the final prototype prior to Kepler's roll out of its *GEN1* constellation beginning in 2019. It will establish the capacity and performance required from the company's future constellation of 140 satellites.

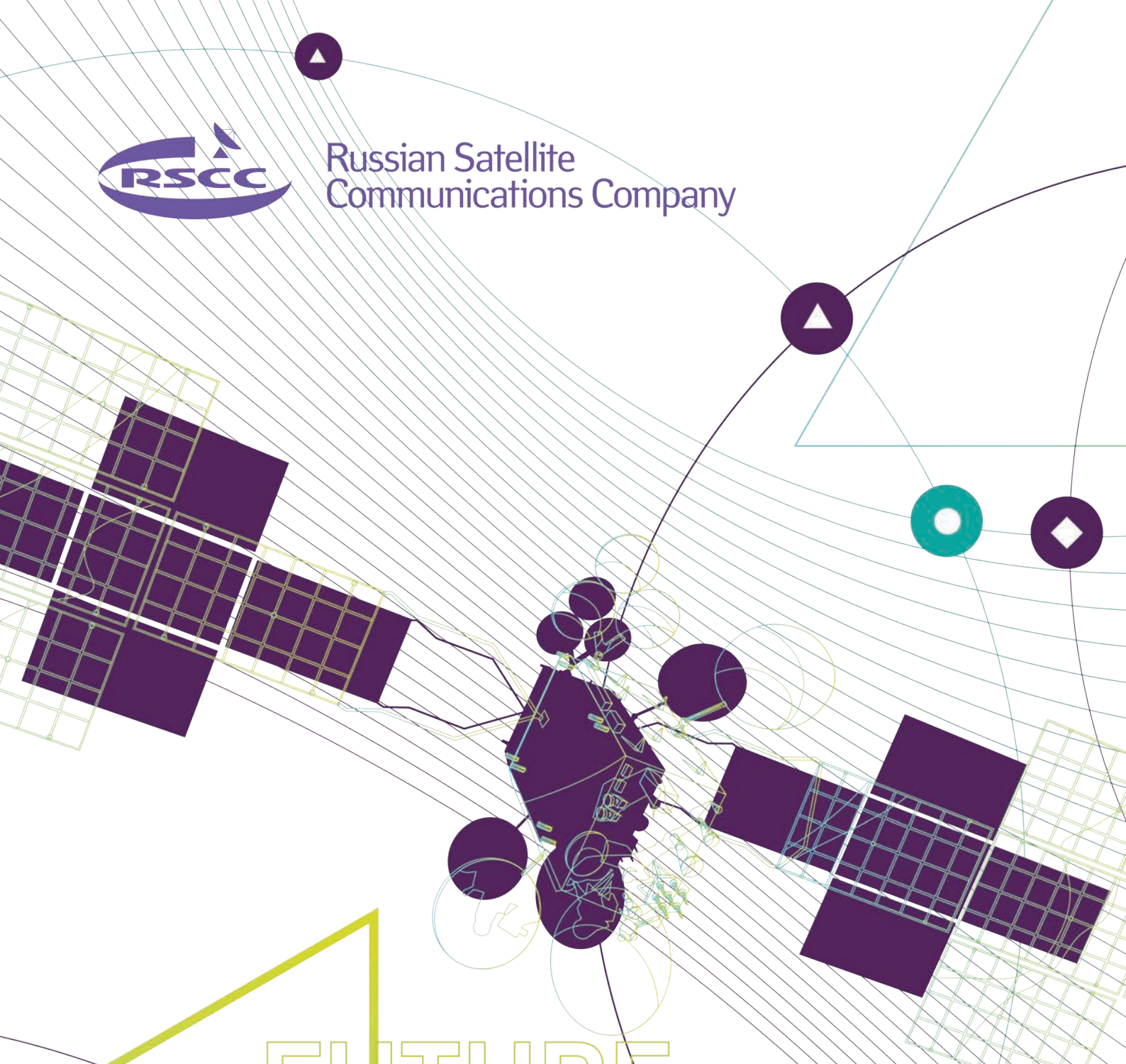
In the meantime, SatADSL is keeping an eye on the LEO market and says its customers are certainly interested in the platform. De Vos and Sansone say the company has developed a *Cloud-based Service Delivery Platform* which enables it to be technology, frequency, satellite and orbit agnostic. "If and when operators are able to fulfil the promises they make, LEO will be an additional opportunity for SatADSL to provide high-quality services. We're working to ensure our platform can seamlessly integrate with future LEO constellations with the objective of adding LEO-based services to our portfolio – just as soon as bandwidth will be made available by LEO operators."

And despite RSCC's passion for GEO, the company has not dismissed the possibility of using other orbital planes. While the operator's fleet is still relatively new, having been renewed in 2013-15, Kirillovich says non-GEO spacecraft will be a part of the development strategy by 2023.

"Non-GEO has got only one advantage over GEO – coverage on the poles and a better elevation angle at northern latitudes. RSCC's primary domestic market is Russia where the majority of territory is located above parallel 50N, so the elevation angles from GEO are below 30°. Taking this into account, RSCC plans a regional constellation of four satellites at highly elliptical orbit (HEO), which provides ideal elevation angles over Russia."

Kirillovich says RSCC's main target for its HEO satellites – named *Express-RV* – will be mobility users (trains, buses and ships). He believes that a non-GEO constellation can offer supplementary support to a GEO operator and improve the quality of services for customers in certain vertical markets, such as mobility. "Undoubtedly, if any of the new mega [LEO] constellations come into being, they will be a good add-on to the GEO offerings in the market – but only on a secondary basis to fill the gaps." ■

Russian Satellite
Communications Company



FUTURE

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# Reaping the rewards of wireless tech

One Acre Fund provides credit facilities to more than 600,000 smallholder farmers in Burundi (pictured), Kenya, Malawi, Rwanda, Tanzania and Uganda.
PHOTO: ONE ACRE FUND

## How farming communities and those working in Africa's agricultural sector have been benefitting from wireless communication systems.

One Acre Fund (OAF) provides farmers with credit facilities to purchase essential supplies, such as seed and fertiliser, along with training in modern agricultural techniques that help improve crop yields. After first starting in Kenya in 2006, the organisation says it now serves more than 600,000 smallholder farmers across Burundi, Malawi, Rwanda, Tanzania and Uganda.

But until recent years, farmers could only make their loan repayments using cash. They gathered once a week at group meetings to hear their loan balances and pay their instalments. The cash was given to an OAF field officer (FO) who took the funds to a district office where they were deposited in banks. Statements were then reconciled at two different times with receipts before loan balances were updated. The whole process took around two weeks.

All of this presented a number of challenges.

For instance, as OAF grew, the task of processing and reconciling large amounts of cash became increasingly difficult. Each district employed a bookkeeper and a treasurer who worked full-time to count cash and reconcile it with receipts. The revenue and the receipts often did not match, requiring double-checking and more counting. In the meantime, OAF could not deploy its revenue for up to two weeks.

FOs also had to spend significant amounts of time collecting and holding cash, which limited their ability to provide agricultural education. Officers also became targets for robbery as they were known to carry large amounts of cash.

Furthermore, the large and frequent cash collections also created a temptation for some farmer group leaders, FOs and others, which led to significant levels of repayment fraud.

These were some of the factors that were restricting OAF's effectiveness and programme growth. So in 2014, it shifted loan payments at the FO level to mobile money. The officers still collected cash from farmers, but instead of delivering it in person to district offices, they remitted it via Safaricom's *M-PESA* service.

While this solved the cash-counting problem, reconciliation still took too long, and client funds remained vulnerable to theft or misuse. Working with Citibank's Kenya and Inclusive Finance units, OAF started piloting a system where farmers could make direct mobile loan repayments in an effort to reduce leakages and increase farmer confidence in the programme.

In March 2016, OAF's 208,000 farmer clients in Kenya received supply packages that included enhanced maize seed, fertiliser and tree seeds, as well as other products such as solar lights or stoves. Each farmer had made a KES500 (USD5) deposit at the end of 2015, and then began making payments on their nine-month loans. FOs gave farmers step- by-step instructions on how to make mobile bill payments. OAF says the *M-PESA*-based system proved quick, effective and 100 per cent satisfying for all farmers involved. Instead of waiting for weekly meetings, they can now make repayments whenever they have funds.

And the service is free for farmers, thanks to a flat rate Citibank and OAF negotiated with Safaricom. OAF was able to absorb fees on all bill payments because of the savings made from digitising payments, which in turn eliminated customer fees.

Field officers also now have more time available for farming education as they spend less time on repayment processing. What's more, OAF's reconciliation and revenue process has been considerably streamlined. Instead of taking around 16 days as with the previous system, payments are now processed and credited toward a client's balance within two to four days. Farmers receive SMS notifications confirming their payments together with their updated balances.

OAF says perhaps the most dramatic impact has been on misappropriation of funds. In 2015, the organisation identified 50 cases of repayment fraud which cost it KES1.8m (around USD17,500). In 2016, it says the number of cases fell to 24, and the value lost was "just" KES293,000 shillings (less than USD3,000).

While *M-PESA* has existed since 2007, OAF says one of the reasons it did not get rid of cash sooner was a lack of rural mobile money agents who could transform cash into e-money. But as the increasing volume became evident,

Safaricom responded by adding agents in rural areas who could operate closer to farmers, attend farmer meetings, and help to expand the digital payments ecosystem.

In August 2016 alone, OAF says it received 327,198 payments on *M-PESA*, with an average amount of just USD10. One full-time agent said OAF had "significantly improved" his business, with more than 100 farmers providing liquidity balance through their regular cash-ins.

The organisation says its entire system is now automated and is well positioned for deployment in other countries. OAF adds that it is introducing digital solutions to efficiently scale programmes in other countries, including Rwanda, Tanzania and Zambia.

## IoT helps to solve African water crisis

A clean and fresh water supply is essential for all communities, and especially those whose livelihoods depend on farming.

According to non-profit organisation The Water Project, 783 million people worldwide still don't have access to clean water. Furthermore, while water systems are continuously installed, 65 per cent are said to break within the first two years as there is no sustainable method of maintaining them.

eWATER aims to provide a sustainable solution by using mobile technology for the transparent and accountable collection of user fees to ensure sustainable maintenance. It has developed a pre-payment smart tap that fully integrates mobile money, IoT and NFC technologies to manage the provision of clean, low-cost water, which is accessible round the clock.

Whilst a solar powered pump, filtration system, tanks and local water distribution system is being installed or repaired, eWATER trains local engineers to maintain the system and upgrade communal taps. The upgrade includes replacing handpumps or leaky unreliable outlets with a smart card reader, communications hub and solar powered electronic valve.

To use the new tap, anyone can present an eWATER NFC tag. Upon reading the tag, the valve will open, allowing the flow of clean fresh water. Tags are available from local shops and can be charged with credit using a smartphone that includes NFC functionality. Since many eWATER customers may not have a smartphone, the system has been designed to allow anyone in the village to become a local distributor for eWATER credit. This is likely to be a shopkeeper who will purchase water credit in bulk using the integrated mobile money platform (*eWATERapp*). Anyone can then purchase water credit from the seller for cash, by touching their *eWATERtag* to the seller's phone.

**Left: eWATER's solar powered smart tap fully integrates mobile money, IoT and NFC technologies. Right: the tap dispenses clean fresh water after reading a user's pre-paid eWATER NFC tag.**

To make sure its system was working and maintained, eWATER required a method of collecting functionality information from the taps to ensure repairs could be made as quickly as possible. It needed a communications system to give confidence to investors and their global team that 100 per cent of the usage and performance data would be communicated to the servers in a timely manner. Even more important was to provide every customer with the confidence that the taps were working and able to supply clean fresh water whenever needed.

Scalability was also essential. Fundamentally, the taps need to be installed wherever a community requires them and so reliable wireless communication was essential and without the need for any additional infrastructure to be installed and maintained.

While eWATER has skills and experience ranging from system architecture and the design of electronics and software, its engineers realised that to get the level of IoT connectivity needed, external expertise was required. The company turned to UK-based global IoT specialist Eseye. It delivers what's described as "highly secure and resilient" cellular data services through its *AnyNet* SIMs. Eseye says its modules provide "unique" zero-touch, highly secure, remote device provisioning with the ability to roam across more than 440 worldwide mobile networks.

Customising its *Hera 100 Communication* node, and working closely with eWATER's engineering team, Eseye says it was able to get trial units in the field within weeks. The company says water flows that had only been visible after site visits through collected historic data, can now be viewed in real-time. It adds that water flow information can even be updated as a customer is still filling their water tank.

Using Eseye's IoT technology, the taps are connected to *eWATERcare*, a cloud-based application that receives information on the tap's functionality, flow rates and sales in real-time. This allows any unusual behaviour to be highlighted and passed to the local maintenance engineer who can quickly visit the affected tap to carry out repairs.

160 eWATER systems have now been installed in Tanzania, Ghana and Gambia serving 25,000 people. Eseye says the solutions it has helped provide mean they have access to clean water 24/7 by ensuring maintenance companies receive up-to-date information on the state of the taps, and so can repair them promptly.

Over the next five years, eWATER forecasts that up to 10 million people will benefit through the installation of 100,000 more taps. The company says it has several more contracts in the pipeline which, in Africa, include Sierra Leone.

## Crop monitoring from space

Food insecurity is a continuous challenge in South Africa. Despite the agricultural sector being responsible for around seven per cent of formal employment and being crucial to the country's overall socio-economic stability, the industry is faced with increasing uncertainty and low investment incentives. Key challenges include population growth, limited water availability and droughts, as well as other environmental factors such as pest damage and disease.

The country's farmers are increasingly looking for new monitoring capabilities, as it is often difficult to acquire the right near real-time information on crop conditions.

According to Airbus, using a satellite-based solution offers several key strengths, such as objectivity, wide area coverage and frequent data updates. Recent developments in the capabilities of satellite instruments support this approach, as they allow frequent, wide area observations to be made with improved spatial and spectral resolutions, enabling images of greater detail and better quality to be captured from space.

Working with the South Africa National Space Agency (SANSA), with part-funding from the UK Space Agency, Airbus has designed and implemented the *Crop Watch for Africa* system.

As well as stimulating economic and societal benefits in South Africa (and more widely across southern Africa), the partners' main goal was to develop and demonstrate a set of stress assessment tools that use satellite data and agronomical information to optimise the monitoring of field crop areas in both irrigated and dry land production systems.

*CropWatch* project activities included three key steps:

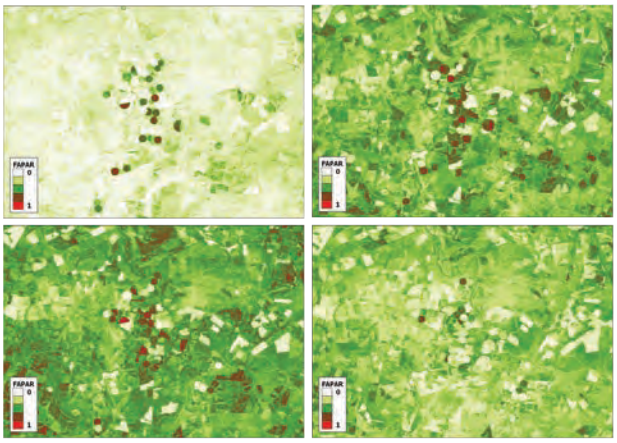
- Acquisition of optical satellite images of two areas of interest in South Africa taken at frequent repeated intervals
- Implementation of an automated production workflow to enable routine generation of a range of biophysical parameters – such as the moisture content of vegetation – from the satellite images
- Development and implementation of an integrated model which combines the biophysical parameters (generated from satellite images) with complementary non-satellite datasets to enable crop stress to be modelled

South Africa has a number of invasive species which pose a threat to the production of healthy crops. These pests can cause up to 100 per cent damage.

*Crop Watch for Africa* provides a portal to valuable information and features a crop stress assessment tool that uses satellite imagery to optimise monitoring of both irrigated and dry-land productions.

All data within the project (with the exception of field boundaries and 'ground truth' information) was derived from satellite imagery, with the DMC Constellation tasked to provide the primary dataset.

The DMC Earth observation satellite is a 22m spatial resolution multispectral spacecraft. Its



**Crop Watch uses high resolution time series images provided by the DMC Earth observation satellite as well as other spacecraft. The imagery is then analysed using Airbus' Overland software. The four photos here show the change over time in the fraction of absorbed photosynthetically active radiation (FAPAR) of crops and surrounding vegetation.**



640km sweep across the planet is said to enable it to acquire significantly larger images than other satellites of similar resolution – ideal for wide area agricultural monitoring. Its fast revisit time is another key strength, allowing the delivery of a dense time-series. The European Space Agency's *Sentinel-2*, *SPOT 6* and *SPOT 7* satellites, together with the US government's *Landsat-8* provided additional imagery to complement the DMC Constellation time series.

After pre-processing by the Airbus team, satellite imagery was analysed using *Overland* software. Developed by Airbus, this tool bulk processes a range of optical imagery in what's claimed to be a "highly automated" fashion. The company says its software is able to calculate and output several biophysical parameters, including fraction of green leaf cover (analogous to NDVI), leaf area index, fraction of absorbed photosynthetically active radiation, and chlorophyll-a. Soil parameters, such as fraction of soil cover and surface humidity were also generated.

These datasets were subsequently added to the time series and provided to SANSA, where additional processing was applied to output and map information on crop anomalies: areas where growth is not progressing as expected.

This collaborative approach, with parts of the processing chain belonging to both organisations, is said to have allowed SANSA to benefit from Airbus' satellite and processing capabilities, whilst also having the flexibility to adapt the system to provide bespoke products specific to the agency's requirements.

By providing reliable, wide area observations at a suitable frequency, the DMC Constellation can observe trends and changes in crop phenology and condition over extensive areas. Monitoring threats to food production using satellite imagery has allowed South African farmers to make more informed decisions on the health of their crops, therefore mitigating any negative effects and improving their overall yield.

The next step is to look at how to effectively distribute the *CropWatch* products, with customers likely to include government departments, agricultural businesses (such as banks and insurance companies) and financial institutions. The products are likely to be made available online, with a browser front end and processing based in the UK and South Africa.

Airbus claims that the results of the project should ultimately enhance the sustainability and resilience of the South African agri-business sector, and support improved food security and social stability in the country.

Airbus developed *CropWatch* for Africa with the help of funding from the International Partnerships in Space Programme (IPSP). Set up in 2014, this was a two-year, GBP32m pilot programme established and led by the UK Space Agency. Its aim was to open opportunities for the UK space sector to share expertise in real-world satellite technology and services overseas, and develop international partnerships for mutual benefit.

Separately, Avanti Communications also received an IPSP grant and worked with several partners including SANSA for its *SBAS-AFRICA* project.

The South African government's agricultural policy aims to drive efficiencies across the sector's value chain by increasing production, therefore supporting rural economic transformation.

According to Avanti, some of the country's largest farms already use high accuracy GPS services to control input costs and maximise production. However, these services are expensive, leaving many small and mid-size farms unable to afford them. A solution was therefore needed to provide a cost-effective GPS service that could increase productivity and cost savings for farmers.

Providing accuracy up to a metre, satellite-based augmentation systems (SBAS) services can be used to improve precision farming activities and tractor guided operations. While many GPS systems are already fitted to agricultural vehicles that can receive SBAS signals, Avanti says new systems can be purchased for a minimal cost.

*SBAS-AFRICA* provides satellite-based augmentation systems (SBAS) leveraging the operator's *HYLAS 2* Ka-band orbiter which, says the company, guarantees reliable high performance data communications for the infrastructure. Farmers can take advantage and switch to a free signal.

It's claimed that the *SBAS-AFRICA* project has the potential to deliver ten per cent cost savings on fuel, fertiliser and pesticides. SBAS services can also be used in conjunction with drones to survey land and monitor crops, and valuable agricultural equipment and machinery can be tracked.

Overall, it is estimated the use of SBAS could generate an additional 170,000 tonnes of cereal crops per annum, cost savings of ZAR300m (USD22.5m), and increased sales of ZAR200m (USD15m).

## DMR connects Nigerian farms

Flour Mills of Nigeria (FMN) was incorporated in 1960. Throughout its history, the company claims to have remained at the forefront of wheat milling in Nigeria, and its shares are now listed on the country's stock exchange. Today, FMN is said to have a rated milling capacity of more than 8,000 metric tons used to provide flour and other wheat-based products per day, making it one of the world's largest single site mills.

The company owns extensive milling infrastructure to maintain its competitive advantage. In northern Nigeria, it has three farms located in Niger State: Sunti Golden Sugar estate, Sunflag and Kaboji. Sunti Golden Sugar and Sunflag are around 30km apart, while Kaboji is located further away at around 120km.

In 2014, Sunti and Sunflag farms asked for a solution that could enable them to communicate and cover their operational areas. Any solution would have to provide a minimum signal coverage distance of about 30km away from the bases on each farm.

In May 2014, a system was deployed on both farms that featured Hytera's DMR *IP Site* connecting solution, *RD98X* DMR repeater station, and 20 of its handheld DMR radios that included *PD60X* and *PD78X*. A microwave radio link from Cambium Networks was used to connect *IP Site*.

Hytera says coverage was exactly what the users had anticipated, and in January 2015 they increased the number of radios in use to more than 40 units. Two months later, Kaboji was invited to join the network to enable overall communications between all three farms. The system was therefore extended with one Hytera *RD98X* repeater system and 20 *PD60X* radios.

According to the vendor, DMR products provide enhanced voice quality even at the edge of the farms. It adds that the *PD60X* and *PD78X* radios are strictly compliant with IP67 standards, and claims that even under harsh environments such as heavy rain and dust, the devices radios "work well and provide outstanding performance".

Hytera also says that with the application of TDMA technology, a single *RD98X* repeater supports two traffic channels with the same frequency. Compared to an analogue system, its says DMR helps users save frequency resources and reduces total ownership cost. ■

**Flour Mills of Nigeria employs more than 12,000 people such as this worker seen here at Kaboji, one of three farms it runs in Niger State. The company says agriculture was the mainstay of Nigeria's economy before oil was discovered, and at one time it accounted for almost 70 per cent of the country's GDP.**

# LTE: a game changer for the mining industry

**LTE is emerging as a popular choice for providing connectivity in the mining industry because of its inherent qualities such as low latency, ultra high-speed data and interoperability with existing technologies.**

## LTE technology provides robust communications deep underground in mines, and enables improved efficiency and safety, as LUX MAHARAJ explains.

The mining industry is a significant driver of economic development in certain African countries. For example in South Africa, it accounts for seven per cent of the country's GDP or ZAR312bn in value terms, and directly employs around 460,000 people, with a further 4.5 million dependent on the industry.

However, the mining sector is facing a number of challenges. With increasing excavation, mineral deposits on the upper surfaces are getting used-up, and now the miners are forced to dig deeper to find new seams. Unfortunately, the deeper they mine, the higher the safety concerns. In South Africa, 86 workers lost their lives in mining-related accidents in 2017 compared to 73 in 2016. Clearly, there is a need to enhance safety measures in order to protect the miners.

Further, the industry needs to digitise and automate its processes to enhance operational efficiency and bring down expenses. Fluctuating commodity values mean that the mining companies are continuously under pressure to bring down the prices. Automation and better management of operations will help the firms in improving their returns.

To ensure the safety of the miners and assets, and also to digitise and automate the operations the mining industry needs to use the latest and the best-in-class communication technology. The traditional LMR (land mobile radio)-based communication system, which transmits only voice and not data, is incapable of meeting the connectivity needs of a modern-day mine. With ubiquitous voice and high-speed data coverage, companies will be able to better manage their operations as well as enhance the safety of their workers in any corner of an underground or open mine.

### Hitting gold with 4G

LTE is emerging as a technology of choice to enhance communication systems in mines. With a peak data transfer rate of 100Mbps (download) and 30Mbps (upload) together with low latency, LTE is best suited to meet the mining industry's evolving connectivity needs.

Many service providers in Africa have now launched

LTE networks, including those in South Africa who introduced the technology some time back.

It is perhaps hard for 4G consumers to think of LTE as a robust and secure technology that plays a key role in saving miners' lives, given the fact that many commercial network users have often faced problems like call drops and inadequate coverage.

However, the fact is that the 4G network used by you and me is vastly different from the 4G private networks that are deployed specifically for the mining companies. While commercial 4G networks are used by millions of subscribers, LTE for mines is deployed in a much smaller area for fewer users. The performance of your commercial 4G network is thus not a reflection of the 4G network that is deployed for the mining industry.

LTE is proving popular as a connectivity technology for mining firms because of its inherent qualities such as low latency, ultra high-speed data and interoperability with existing technologies. These qualities meet the mining industry's requirements for mission-critical operations and enable it to benefit by adopting automated applications to improve overall management of the mining operations.

According to ABI Research, the mining industry globally is forecast to spend more than USD2.9 billion, or 1.5 per cent of total mining capital expenditure, on private wireless broadband networks by 2022. LTE stands to attract a significant chunk of this investment primarily because it will enable firms in the mining industry to deploy networks that provide high-speed mobile broadband connectivity in remote and harsh areas of underground or open mines.

LTE signals transmit better than other wireless technologies especially in challenging locations like the inside of a mine. LMR- or TETRA-based communication systems are unable to track the location of the miners or 'things'. Furthermore, these legacy systems are unable to transmit data and video in real- time, which is a key requirement in unfortunate cases of disaster.

LTE, on the other hand, enables the tracking of people and vehicles to an accuracy of 1cm. The mining industry is also on the threshold of adopting digitisation, and LTE systems aid this transition, enabling enterprises to be future-ready.

4G mobile technology also provides better coverage in both indoor and outdoor environments, which ensures better connectivity to miners who spend a considerable amount of time underground.

## Private and safe

Private networks built on LTE technology can provide end-to-end solutions to the mining industry and help it in its push for automation. The technology comprises base stations, mobile core network and associated voice solutions, plus handsets and modems. With this technology, mining companies can create a whole communication infrastructure that can help in the automation of all the processes, from inside the mines to ports.

Coupled with virtualisation and software-driven technologies, LTE allows mining companies to build application-specific networks which score high in terms of privacy, security, and reliability.

The deployment of private LTE network is already paying dividends for many mining companies. For example in 2017, South Africa-based Gold Fields installed a private LTE Network in one of its mines in Australia. The deployment helped the company to improve its safety standards and efficiency.

An improved communication system reduces risk and enables a safer mining operation. Location tracking and remote monitoring of operations plays a key role in bringing down mining accidents. This is possible with LTE technology which ensures reliable tracking and real-time monitoring of the different aspects of mining operations.

LTE enables a number of IoT use cases, which help the firms execute operations without manual operations. For instance, a fleet of vehicles can be managed remotely by a single operator, thus leading to improved safety and greater mining efficiency.

In addition, LTE-powered 'Bring-Your-Own-Coverage' (BYOC) technology can be a lifesaver in the event of an accident.

In BYOC technology, the LTE base-station can be put in a miner's backpack or a truck ensuring connectivity in the deepest and furthest corner of the mine. LTE gives real-time access to the miners' locations, thus making it easier to reach them in case of a problem. Better connectivity which enhances their safety brings down response time in case of an emergency, and can literally be the difference between life and death.

The concept of BYOC is a step ahead from a basic private LTE network. While current solutions are bulky, expensive and difficult to deploy, an LTE-powered BYOC solution – with its self-organisation, self-healing and self-configuration


**Parallel Wireless Converged Wireless System can act as a small cell in a hetnet system and can be used in vehicles to support 'Bring Your Own Coverage' capabilities.**


capabilities – is ideally suited to meet the mining industry's growing needs. It is not just easy to deploy and manage, but the self-optimisation and traffic prioritisation capabilities ensure that the user is always connected.

## 'The Internet of Mines'

The IoT can enable Africa's mining industry to adopt automation and improve production efficiency. According to Inmarsat's *The Future of IoT in Enterprise* report published in May 2017, 70 per cent of mining businesses globally believe that the IoT will provide them with a significant advantage against their competitors. This is especially relevant if one considers that mining firms are under constant pressure to bring down their operating costs since there is a constant pressure on margins.

Using IoT-enabled applications can help the mining industry to better manage the transportation and autonomous infrastructure. Further it can also help in increasing speed across the mining process and thus helping the mining firms to improve production by reducing the average cycle time.

Mining is a labour-intensive industry. It is often a challenge for the mining companies to find trained staff to stay in harsh and remote locations for a longer period of time. Automation of the processes can enable them to bring down dependence on human resources. Automation of processes can further help the mining companies to carry out round-the-clock operations and also enhance overall security of the mining operations.

Since LTE networks use low frequency spectrum bands to offer data and voice services, they allow a better propagation than any other available technology. LTE technology enables a robust IoT connectivity allowing the mining industry to leverage the benefits of automation.

LTE networks allow the use of IoT sensors and devices to monitor, operate and collect data throughout the mining site. A number of IoT applications, including emergency notification system, remote management of mining machinery, air quality monitoring, access control systems, among others, can be installed for an improved management of the mines. BYOC is also helping digitisation of the mining industry by supporting IoT devices and automation.

LTE is revolutionising the mining industry by boosting automation and digitisation and, in doing so, it is making the industry much safer and operationally efficient. For a country like South Africa, where mining forms such an essential part of the economy, faster adoption of LTE-powered communication system for mining industry can only spur economic growth. ■

# Orange claims cloud RAN trial first

Orange has completed a network trial in Poland to validate the benefits of cloud-optimised RANs for the smooth evolution to 5G technologies.

It's claimed that the trial, which was carried out on a live network carrying commercial traffic, was the first of its kind in Europe that used an operator's own infrastructure.

It took place from March to the beginning of May with radio sites in the city of Chelm. The virtualised part of the baseband was running around 70km away in a data centre in Lublin.

Orange used its *NGPop* cloud infrastructure together with Nokia's equipment such as the *AirScale* virtual cloud base station for 4G and 5G.

Orange says it worked with Nokia to test cloud RAN technology to prepare for the eventual introduction of a distributed cloud architecture for 5G. Nokia claims *AirScale* provides capacity where needed and paves the way for 5G access technology as part of a multi-layered architecture.

**Nokia's AirFrame data centre platform features pre-integrated racks with ultra-dense servers (pictured), high performance switches, and software defined storage.**

According to the vendor, its base station architecture splits baseband processing functionality across the cell sites and data centre. Time-critical functions are performed at the cell site and connected via Ethernet fronthaul. Nokia says this allows the operator to use its existing transport network, while centralised software hosted at the data centre "cost-efficiently" performs non real-time functions.

The company claims its cloud base station provided "equally strong" network performance on both its reference cloud infrastructure as well as on Orange's own cloud environment.

# Nashua Mpumalanga rolls out free public Wi-Fi

In what's claimed to be a South African first, Nashua's franchise in Mpumalanga has launched a free public Wi-Fi service in Nkangala District Municipality.

Since 1 May 2018, every resident and visitor to all six local municipalities in the district has been able to sign up for 250MB of free data per device absolutely free of charge. They have a month to use the data and can then sign up for another 250MB at the beginning of the following month.

Nashua says that if users run out of data during the course of the month, they will be able to purchase an additional 1GB for ZAR90 (USD6.80). It says that's a "significant saving" compared to MTN's ZAR160 (USD12.11) or Vodacom's and Cell C's ZAR149 (USD11.27).

Mtho Xulu, a director at Nashua Mpumalanga who is spearheading the project in collaboration with Nkangala District Municipality, says: "This is a completely greenfield project but it's also only just the start. Our goal is to ultimately roll out the offering to the entire province."

Xulu describes the initiative as a "proper" public-private partnership with a genuine developmental goal. He says that while other "so-called" free public Wi-Fi offerings such as those offered in Tshwane are actually funded by ratepayers, the Nkangala free public Wi-Fi offering is entirely privately financed by Nashua Mpumalanga.

According to the firm, data costs in South Africa are among the highest in the world. It says: "These high costs are shackling economic development at a time when the country desperately needs to grow its economy in order to increase inclusivity and address crippling unemployment."

# Telenor Group to coordinate pan-European 5G project

The EU has given Norway's Telenor Group coordination responsibility for its new project to accelerate the uptake of 5G.

The 5G Verticals *INNovation Infrastructure* (*5G-VINNI*) initiative comprises 23 partners including major operators, academia and industry vendors. It is designed to ease uptake of 5G in Europe by providing an end-to-end facility that validates the performance of new technologies, and explore solutions for vertical industries such as public safety, e-health, shipping, transportation, media and entertainment, and automotive.

The EUR20m project will be run for three years at four main sites located in Norway, UK, Spain and Greece. In addition, experimental sites will be established in Germany and Portugal. Open APIs will be provided in order to ensure easy access to the *5G-VINNI* facility.

The facility in Norway will be run by Telenor Research, Telenor Norway and Telenor Satellite. It will be hosted in two locations: Kongsberg, the first city where Telenor will pilot 5G in Norway; and another unnamed site in the greater Oslo area. Ericsson and Huawei will supply 5G radios and core, Cisco will deliver a distributed IoT data fabric service, while Nokia will provide the virtualisation platform and end-to-end orchestration.

VP of Telenor research Patrick Waldemar will manage the project. He says: "Being one of three large-scale test platforms for Europe, 5G-VINNI will help propel the development of 5G. Our aim is to make it as easy as possible to utilise and test the platform and we now call on industry players to engage with the project."

# Internet of Things helps to make truck tyres smart

Continental claims it is helping to make the world's roads safer with Vodafone's support through a new digital tyre monitoring platform that uses the IoT.

The *ContiConnect* platform is currently deployed in Malaysia and Thailand, as well as in North America with more markets in Asia and Europe to follow in 2018 and next year.

*ContiConnect* is connected to Vodafone's mobile network. Special Continental sensors continuously monitor tyre pressure and temperature data and transmit this information to a receiver unit. This then sends the data in real-time to a central web portal where a software program analyses it. It sends alerts via e-mail or SMS to fleet managers if tyre pressures or temperatures deviate from the defined value, and suggests corrective measures where necessary.

**Fleet managers can check truck tyre pressure and temperature levels from anywhere in the world using Vodafone's mobile network and ContiConnect.**

According to Continental, the regular data streams that are sent to the managers help them plan tyre changes and maintenance far more efficiently, improving the operational performance and lifespan of the tyres.

It adds that pressure monitoring also contributes to protecting the environment because tyres that are operated at optimum pressure save fuel and reduce a commercial vehicle's CO2 output.

For example, the company says a tyre operating at just 80 per cent pressure uses around 0.9 litres more fuel for every 100km. Over an average distance covered of 120,000km per year, that adds up to 1,080 litres more fuel consumed for each tyre.

# Afghani ISP to deploy Isotropic's terminals

Neda Telecommunications has ordered 2,000 of Isotropic System's innovative broadband terminals to extend its national network in Afghanistan.

Neda was founded in 2003 as the country's first licensed ISP and then moved into wireless broadband services. It's claimed the company quickly established itself as Afghanistan's leading ISP with a presence in most major cities and plans for further rollouts.

Neda is working with Isotropic to develop self-installing, all electronic scanning terminals to extend its single channel per carrier (SCPC) broadband capabilities for enterprise, government and consumer users nationwide.

Isotropic says it will deliver an "out-of-the box consumer web experience" for Neda that eliminates the need for skilled installation, and allows for remote repointing to alternative satellite capacity services when required. The firm says maintaining precise pointing accuracy is uniquely needed for Ka-band systems to optimise the efficiency of the links in the service provider's network.

Isotropic has come up with a high throughput terminal that bends light to create new structures and highly adaptable form factors. It says this results in 90 per cent lower power consumption compared to conventional designs and fewer active feeds. The company adds that most importantly, the terminals are expected to be manufactured at 75–90 per cent lower cost than conventional phased-array and flat-panel antennas.

"The innovation that Isotropic Systems provides is allowing us to install the flexibility to work with the best available capacity options at every point in time," says Neda CTO Artem Belotski.

"[We] recognise the advancements of HTS, creating sweeping changes across the industry; our strategy is to embed Isotropic Systems technology into the network to allow ourselves the freedom to offer customers the best capacity at highly affordable pricing."

# UK's "smartest" street showcases IoT

Mosley Street in the city of Newcastle, north-east England, is said to have become the UK's smartest street following an IoT deployment to showcase the possibilities of smart city technologies.

The project combines live and historic data on the street from several sources, including Newcastle University's Urban Observatory which is said to house the UK's largest set of real-time urban data.

The smart city applications being showcased include: using data trends to predict whether drivers will be able to find a parking space; using predictive analytics to enable power companies to manage energy consumption more effectively and improve safety with lighting; collecting and analysing environmental data to help find the causes of pollution; amongst others.

All of the applications are facilitated by the *Cisco Kinetic for Cities* (*CKC*) platform which is said to securely connect data from all kinds of devices, sensors, cameras, applications, etc., in an open standards-based infrastructure.

Connexin has designed and built the infrastructure to support the solutions in Newcastle. It has integrated sensors and cameras onto the network, providing a dashboard via *CKC* where data can be tracked and monitored.

Other partners include Mayflower which has supplied its *Central Management System* to provide remote control, monitoring and energy measurement of street lighting over a wireless interface (ZigBee/GPRS).

As the integration and AI partner for the project, Quantela will utilise its *Atlantis* platform to deliver descriptive, predictive and proscriptive analytics for domain specific and cross domain use cases.

**There are five of Clarity's AQ air pollution sensors deployed across the city as part of the IoT showcase.**

In 1879, Mosley Street became the world's first street to be lit by an incandescent lightbulb. According to Cisco, it will now achieve another feat as the UK's smartest street.

# Nationals hit a home run with DAS

A new wireless network can now support more than 41,000 spectators at Nationals Park, home to the Major League Baseball (MLB) team, the Washington Nationals.

MLB sponsor T-Mobile led the effort to ensure that previous communication issues would be resolved by using JMA Wireless' *TEKO* distributed antenna system (DAS). This has replaced two older DAS networks that were not meeting the growing needs of the venue's staff and patrons.

JMA says the newly expanded 24-sector wireless system was deployed throughout the venue within 65 days during the off-season, and has several new capabilities including MIMO functionality and faster LTE speeds.

According to the vendor, *TEKO* is designed to support four carriers along with multiple bands ranging from 700MHz to 2.5GHz, as well as LTE, CDMA, EVDO and UMTS. It says the modular platform completely fits into the room at the head end, ensuring the minimum amount of valuable onsite real estate is used for housing technical equipment.

JMA worked with New Jersey-based indoor wireless infrastructure specialist Multipath Communications Group on the deployment which included the installation of more than 400 antennas. Additional antennas were required in the upper seating areas, and to meet stringent requirements, JMA says it provided smaller, customised antenna enclosures that were approved by the MLB.

# DAMM provides comms for Maldives force

The Maldives National Defence Force (MNDF) will use a mission-critical communication system from Danish TETRA specialist DAMM.

The company will supply a TETRA network that will cover more than 300km$^2$ and nearly 1,200 islands, grouped in 26 atolls. The system will be used by the country's coastguard, marine corps, special forces, service corps and engineer corps for mission-critical tasks such as security and rescue operations, and border patrol.

The MNDF is responsible for defending the security and sovereignty of the Maldives. Due to the country's location in the Indian Ocean, many of the force's activities take place at sea, making their operations expensive and logistically challenging.

**The Maldives National Defence Force will use a DAMM TETRA network that will cover nearly 1,200 island grouped in 26 atolls.**

With an IP65 encapsulated TETRA base station, DAMM says it offers a system that is "ideal" for the Maldives' climate which is characterised by high heat and salty air.

The firm has supplied the equipment in collaboration with its system partner Waves Group. UAE-based Waves specialises in delivering mission-critical communications to customers in the public safety, military, transport, utilities and commercial sectors.

# Space debris mission starts

A spacecraft that will demonstrate a range of technologies to clean up space debris has now been deployed from the International Space Station. The RemoveDEBRIS mission will perform four experiments, including the first harpoon capture in orbit and a net that will be used on a deployed target. The team will also test a vision-based navigation system that uses cameras and LiDaR technology to observe CubeSats that will be released from the main spacecraft. RemoveDEBRIS will also deploy a large sail that will drag space junk into the Earth's atmosphere where it will be destroyed (*see World News, Aug-Sep 2017 issue*).

# Dominating broadband

Fibre and cable are dominating the global broadband market, according to Point Topic. It says that as at the end of 2017, the technologies serviced 77 per cent of fixed subscriptions worldwide. Point Topic research director Dr. Jolanta Stanke believes customers across most regions increasingly prefer faster broadband services delivered over fibre and cable platforms as opposed to ADSL. She adds: "This trend will continue as more bandwidth-hungry young consumers become paying decision-makers, even though superfast 4G and 5G mobile broadband services will compete for their wallets."

# 4G launch in Bangladesh

Grameenphone has launched 4G in selected areas of Dhaka and Chittagong, marking the beginning of its nationwide rollout of LTE services in Bangladesh. In mid-February, the operator said 4G was now available in the Basundhara, Baridhara and Gulshan areas of Dhaka, along with Dampara, Khulshi and Nasirabad in Chittagong. It added that it planned to roll out its network in the "fastest and widest manner" possible, and cover all district headquarters in six months.

# True promises IoT coverage across Thailand

True has proclaimed itself as an Internet of Things leader and says its narrowband network will cover Thailand in the third quarter of this year.

The telco started testing its NB-IoT network in 2016. The company claims it has conducted a study on how to find the right technology and build the "most integrated and comprehensive" ecosystem for IoT services, coupled with the "strength" of the TrueMoveH 4G+ network which offers nationwide coverage.

True says it now has NB-IoT base stations in 928 administrative districts, and that its LTE Cat-M1 IoT network is being expanded to cover the whole country later this year. The company adds that its IoT platform is strengthened by partnerships with leading global players such as China Mobile, Ericsson, Huawei, OceanConnect, OneNET, amongst others.

True currently has more than 120 affiliates covering a wide range of smart services for health, home, office and lifestyle. It has also established a research community to expand knowledge to support manufacturers, product developers as well as startups. This includes labs at 12 major universities, the Huawei Open Lab, open spaces at Siam Square, and the True Digital Park which is expected to be completed in late 2018.

Songtham Phianpattanawit, IoT MD at True Corporation, says: "From now till 2020, the global IoT market is expected to grow at an average rate of 28.5 per cent annually, and there will also be a heavy investment in a number of IoT related businesses like hardware, services and IoT network under the Thailand 4.0 policy. As a result, many sectors pay more attention to using IoT technology moving forward."

# Police in Paraná join Brazil's TETRA network

The Federal Highway Police (Polícia Rodoviária Federal, PRF) in Paraná state, Brazil, has joined the TETRA communication system that Teltronic is currently deploying. The nationwide network comprises 600 base stations and offers coverage to twelve different states as well as the main Federal District.

Teltronic says its system gives Paraná State PRF higher security thanks to the use of encrypted technology that makes it difficult for outsiders to intercept communications between the officers.

At the official opening of the new PRF unit in the city of Cascavel in western Paraná during early May, Brazil's public security minister Raul Jungmann said that the arrival of digital radio to police communications was "a significative advance in integration, technology and operational capabilities". Jungmann was the first to use the new system with a radio call to public security national secretary, Carlos Alberto dos Santos.

**The TETRA network has been described as ''a significative advance'' in the police's operational capabilities''.**

Separately, Teltronic says the state of Acre on the border with Peru and Bolivia also has a new digital radio system that enhances communication quality for users. Acre Public Safety delivered the digital radios to both civilian and military police in the area, as well as to the fire department.

# Tenda extends Wi-Fi reach with Nova mesh

Tenda Technology reckons the days of boosting Wi-Fi using powerlines and extenders are finished thanks to its *Nova MW3* mesh system.

The China-based equipment maker, which was founded in 1999 but is only now beginning to expand into other regions such as Europe, is hoping to bring its so-called "smart" Wi-Fi system to the masses in Ireland following a recent deal with Dublin-based distributor and integrator, EurAsia.

Tenda says the *Nova MW3* is a 1200Mbps dual band distribution mesh system and claims it can provide whole house Wi-Fi coverage as well as a fast and stable internet connection. The company says a pack of three units provides up to 300m$^2$ coverage, while a pack of two provides up to 200m$^2$.

It add that *MW3*s are compliant with IEEE 802.11v and IEEE 802.11r seamless roaming protocols, and also support automatic network optimisation and automatic routing selection. Tenda says they create a self-healing mesh network that uses Wave2 MU-MIMO technology that enables the use of multiple devices at the same time without any lag, interference or signal dropouts.

Users can customise and manage the network with features such as parental control, guest access and UPnP, using a dedicated app that can be downloaded onto *Android* and *iOS* devices.

"The Nova MW3 brings smart Wi-Fi technology to every home user and modern smart home," says Jason Zhao, general manager of Tenda UK&RoI. "We're demonstrating that the era of powerlines and extenders is over, as Mesh WiFi is now available at better value with a better experience."

**It's claimed that three Nova MW3 units provide robust, reliable and fast Wi-Fi coverage across homes of up to 300m$^2$.**

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