

For communications professionals in southern Africa

SOUTHERN AFRICAN WIRELESS COMMUNICATIONS

SEPTEMBER/OCTOBER 2018

Volume 23 Number 3

- Are LEO satellites the best options for connectivity via space?
- How wireless tech is protecting people and rainforests
- Industry view: do you need next-generation Wi-Fi?



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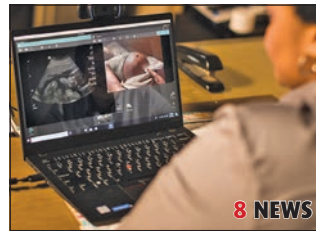
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Airbus brings professional communication to the next level

To improve the world of secure communications, Airbus has developed the Tactilon Dabat, a smartphone and Tetra radio in one. In just a few years time, hundreds of secure apps will be running on this device to make daily work easier for police, rescue teams, and security personnel in Africa.

Policemen and security experts know the situation: After a theft or robbery, investigators must hear witnesses and, if necessary, evaluate video recordings for days. Until there is a clear profile, valuable time goes by to find the suspect.

But this time-consuming routine could soon be over. By using a secure smartphone that also contains a Tetra radio, security services and the police would have the ability to shorten this tedious research to a few minutes. The Airbus "Tactilon Dabat" device offers for example the real-time application from Facewatch to synchronise real-time photos and videos of potential offenders with police and other databases. In only a blink of an eye, police officers could clarify who has committed the theft. Even policemen in the United Kingdom are already using this app and verifying biometric data.

Or think of the "secunet bocoa" application: police officers can not only check the identity cards of passers-by within a few seconds, but also verify biometric data. The officer takes the Tactilon Dabat camera and scans the suspect's ID card. Also, he puts the ID chip containing biometric information to the back of the Dabat. Within seconds, finger prints, facial shots, residence and ID data are reliably compared with police databases. As a result, the policeman can check whether or not someone is on the wanted list and detect if the ID card is genuine or not.

Greater security for business

For businesses, public safety, and security forces common broadband applications are not sufficiently secure and reliable. However, they could link broadband with secure narrowband (Tetra or Tetrapol) networks that comply with highest security standards. Airbus bridges both technologies with hybrid solutions combining secure narrowband networks with commercial broadband infrastructures. This allows the transmission of videos, photos and complex data. The Tactilon Dabat plays a pivotal role in this infrastructure.

"There are countless application ideas in the emerging world of communication for public safety and businesses. However, our customers require certified secure apps," explains Jens Thstrup, Head of Business Development of Secure Land Communications at Airbus. This is the reason why Airbus has created the application developer programme SmarTWISP in order

to grow its ecosystem. The objective is to gather and certify the most relevant apps for public safety organisations and industries. The aim of new apps is, for example, to accelerate rescue missions and to improve coordination between various security services of airports, the police or fire brigades. These applications incorporate existing databases, voice, video, Augmented Reality and geolocation.

Real-time group communications

Thanks to the Tactilon Dabat, policemen, investigators, and even social workers could be integrated in real-time group communication and organise themselves with essential information (videos, photos, data). They can easily coordinate their actions whether to prevent incidents or accompany large sports or other events.

The application ES-Core from Eye Solutions Ltd features a live video sharing function that is secure and supports external video sources, such as drones or vehicles. Even with little radio coverage, the transmission is of high quality. Moreover, footage can be stored as evidence or for the purpose of analysis. Clearly, this is a tool which helps police officers to deter or hunt down culprits. At the same time, paramedics could master operations at the scene.

Airbus wants to make sure that every application really facilitates operations for those who use the Tactilon Dabat. "We believe that policemen's daily work in Africa can be improved with meaningful applications," says Olivier Fischer, Account Manager Africa for Secure Land Communications at Airbus. First pilot trials in Europe have proved that end users in companies and public safety organisations are happy to carry fewer devices and have the option to process more tasks with only one device.

The delivery of the Tactilon Dabat will begin this year, and soon, public safety users will be able to test which applications work best for their everyday lives.



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The first trans-Atlantic link between Africa and the Americas goes live

The South Atlantic Cable System (SACS) is now open for commercial traffic.

On 26 September, Angola Cables announced that its system not only offers the first and fastest link between Africa and the Americas with the lowest latency, but that it will also provide a more direct routing for internet traffic in the southern hemisphere.

Manufactured and powered by NEC, it's claimed SACS is one of the most advanced submarine systems to go into commercial operation. It has been designed with 100Gbps coherent WDM technology on an end-to-end solution, and features four fibre pairs for a total design capacity of 40Tbps between Brazil and Angola.

According to Angola Cables, data transfers will be five times faster than existing cable routings, reducing latency between the two countries from 350ms to 63ms. Luanda will also connect to London and Miami with around 128ms latency. Angola Cables says these two major content hubs will position Angola as a strategic point to serve the trans-Atlantic region with low



latency and resilient connections.

It adds that given the onward connections to the recently completed Monet cable (also see *Wireless Business*, Mar-Apr 2018) and the West Africa Cable System, SACS will also offer reduced latency between Miami and Cape Town from 338ms to 163ms.

Angola Cables CEO António Nunes says that the commercialisation of SACS is "more than just a game-changer" when it comes to data connectivity and services between the two continents.

"By developing and connecting ecosystems that allows for local IP

traffic to be exchanged locally and regionally, the efficiency of networks that are serving the southern hemisphere can be vastly improved," says Nunes. "As these developments progress, they will have considerable impact for the future growth and configuration of the global internet."

VAST develops network tech for offloading and onboarding

VAST has come up with two technical innovations designed to enhance networks.

In September, the South African public Wi-Fi provider claimed to have developed the continent's first, true carrier-grade 'offload' network. VAST said the technology has been designed to seamlessly move traffic off mobile or enterprise network operators and onto its secure Wi-Fi network in order to free-up spectrum. The company added that traffic can be rerouted back on to the operator's network, equally seamlessly.

"The critical challenge of limited spectrum is evidenced in the number of 2G devices still in prevalent use, the lack

of progress on digital television migration, and the constraints in the roll-out of 4G and 5G services," says VAST's CTO, Khetan Gajjar. "This is impacting the ability of operators to provide mobile data at lower costs and is inhibiting South Africa's global competitiveness."

VAST has implemented the new system across its network of 2,500 high-density public Wi-Fi locations using two major platforms: *Accuris AccuROAM*, which provides authentication and authorisation services; and Benu Networks' *xMEG* gateways. The company says: "This enables

VAST CTO, Khetan Gajjar believes spectrum challenges are "inhibiting South Africa's global competitiveness".



scalable aggregation services that mask the Wi-Fi network elements as well as maintain the integrity of the security and management of the Wi-Fi network."

As well as the ability to 'offload', VAST says its technology also has a "unique" ability to accommodate multiple operators on the same network and simultaneously redirect traffic across multiple users.

Another advantage for users is said to be the opportunity to connect via existing devices as smartphones as old as five years will be compatible.

According to Déan Manefeldt, principal radio network architect at VAST, Wi-Fi's traditional obstacle is on-boarding users. He says: "By enabling this functionality, we can now offer our internet service providers a secure, seamless way of authenticating their customers using their individual SIM cards."

Meanwhile in early October, VAST unveiled *Hotspot 2.0*, an IoT platform designed to seamlessly onboard consumer devices to a wireless network.

It is designed to enable users to connect their mobile devices by utilising self-authorised, pre-provisioned authentication credentials for an "effortless and efficient" sign-up process.

VAST says *Hotspot 2.0* is also designed to enable non-interactive devices, such as TVs, digital billboards and embedded media players, to connect to Wi-Fi without human interaction. Point of sale devices can also be easily connected.

The platform is currently active in more than 2,000 locations across South Africa. VAST partnered with Cisco and Ruckus Networks in the technology rollout which is said to be a first of its kind in Africa.

Vishal Barapatre,
CTO,
In2IT Technologies



ON THE NETWORK

'Digital Twin' to revolutionise SA business

According to Wikipedia, the 'Digital Twin' is a digital replica of physical assets (physical twin), processes and systems that can be used for various purposes. It provides both the elements and the dynamics of how an IoT device operates and lives throughout its lifecycle.

The Digital Twin offers organisations the opportunity to make decisions, test strategies, plan, and streamline at a virtual level. According to a Gartner survey, almost 50 per cent of companies across China, Germany, Japan, and the US will use the Digital Twin by the end of the year.

While the concept is fairly new to the South African market, the Digital Twin could revolutionise the way many industries operate, providing a financially viable means to analyse and optimise operations. Businesses can leverage IoT endpoints to build a virtual, digital replica of their operations or assets. The data generated by IoT devices can be analysed in real-time to examine current operations, identify errors or areas of improvement, and make the necessary changes on a virtual level, testing their effectiveness without tampering with the physical entity or asset. In this way, organisations can assess the impact of a change, and tweak and adapt it as required, before implementing it on real-life operations.

But in order to work, the Digital Twin model relies on a highly integrated network of IoT devices from multiple sources, as well as a back end of effective data analytics, AI and VR platforms. For real-time benefits to be realised, a business needs a solid network of technology supported by fast, robust connectivity. The Digital Twin needs to be integrated into the business's digital strategy and become a part of it.

Sparkle helps SAEx extend trans-Atlantic reach

Mauritian company South Atlantic Express (SAEx) International is planning to expand its reach to the US East Coast using Sparkle's pan-American network.

The South African sponsored SAEx cable system is a phased project that will ultimately connect Asia and the Americas, via South Africa.

Under phase one, the SAEx1 system will run initially from Cape Town to a branching unit near to Fortaleza in Brazil where it will interconnect to a partner system providing onward access. SAEx International has recently announced that it will work with Sparkle, the international services arm of Italy's TIM Group, to provide connectivity from Brazil and then reaching the US East Coast with landing in New Jersey. Under the terms of the agreement, Sparkle will also provide interconnection facilities in Brazil as well as technical and sales support in both South and North America.

When SAEx1 becomes ready for service, expected during 1Q21, it will stretch across a total distance of around 14,720km (including branches). SAEx International says it will feature six fibre pairs with a minimum combined capacity of 72Tbps, and will be the only system connecting South Africa directly to the USA.

The system will then extend east



Top: the new project will first cross the Atlantic linking Cape Town to the US via Brazil, and then extend across the Indian Ocean in phase two.
Bottom: the cable aims to avoid potentially unstable areas.

and connect to the Indian Ocean via a second phase. Over a distance of around 13,900km, SAEx2 will link Cape Town, Singapore and India, with two further fibre pairs between Cape Town and Mtunzini. It will feature four branching units facing Mtunzini, Mauritius, Madagascar and Chennai in India. SAEx2 is due to go live in 2Q21.

According to SAEx International, its system will satisfy a number of crucial objectives, including providing strategic diversity for global customers

seeking to avoid, to the extent possible, narrow straits and difficult transits through potentially unstable areas or unreliable overland routes.

The company adds that South Africa is "uniquely positioned" at the confluence of two oceans and two hemispheres. It reckons the SAEx system will "maximise" this locational advantage by offering a "highly valuable and differentiated service" that captures a "significant" portion of East-West data traffic.

SatADSL and Avanti partner to launch commercial Ka-band broadband service

SatADSL claims it will bring cost-effective broadband coverage to communities and businesses in sub-Saharan Africa following the launch of its commercial Ka-band service.

Utilising Avanti's HYLAS-4 high throughput satellite, SatADSL says it will provide connectivity that ISPs will be able to "easily" offer to customers via its *Cloud-based Service Delivery Platform (C-SDP)*. The company says this includes VNO and voucher-based services that are not currently available via other Ka-band offerings in the region.

SatADSL says its aim is to

"significantly improve" the penetration of high capacity internet in the region, offering connectivity in regions barely covered by mobile operators and where fibre access remains unavailable. The new services are expected to be fully up and running by the end of this year.

The company's COO and co-founder Caroline De Vos says: "Providing fast, reliable and affordable connectivity is at the heart of what we do, and our latest solution empowers ISPs in Africa to cost-effectively provide satellite broadband to entire communities."

According to SatADSL, C-SDP

provides a complete OSS/BSS, carrier-grade, fully redundant platform to deliver satellite services via the cloud, eliminating the expense of deploying physical infrastructure. It reckons the PaaS solution enables satellite and teleport operators to readily offer any service, including pre-paid, post-paid, volume-based, customer VNOs, contention-based, multicasting, and more, independently of the communications technology used. *Do Low Earth Orbit satellites offer the best option for ubiquitous connectivity via space? Feature p18-22.*

TCCA sets out options for TETRA and LTE to co-exist



Francesco Pasquali, chair of TCCA's TETRA Industry Group, says TETRA needs connectivity to other bearers, particularly LTE.

The TCCA (TETRA and Critical Communications Association) has set out options for what it describes as the "efficient co-existence" of LMR/PMR/LTE networks.

In its *TETRA Connectivity to LTE* white paper published in September, the association provides an overview of the different approaches to enabling TETRA/LTE interworking, with several methods described. The key issue addressed is interworking between the LMR/PMR and LTE worlds, particularly the interworking and evolution of PTT services, as group communications capability is the key service in LMR/PMR.

TCCA board member and chair of its TETRA Industry Group, Francesco Pasquali, says TETRA networks are expected to be operational for many years to come. He says: "TETRA will therefore need connectivity to other bearers, particularly LTE, to facilitate long term co-existence, safe migration from TETRA to LTE or as a hybrid communications solution."

The TCCA says there will be a standard available for interworking between TETRA and LTE that will meet the needs of critical communications users in the 2019 timeframe. But that standard will then need to be converted to products and implemented in LTE networks. The association believes that through using standards-based approaches, users will have the benefit of open competitive markets for their solutions and the ability to use products from different suppliers.

It adds that for those that need solutions now, there is a range of company-specific proprietary solutions that will give various levels of interworking and may in time conform to new standards.

"The deployed commercial LTE systems deliver very good, but best effort, service until hardened, updated to the latest 3GPP Release, and potentially having their area coverage expanded," states the TCCA.

3GPP has started standardisation work on the LMR/PMR/LTE interworking functions in Release 15, and the TCCA expects to have this functionality specified in Release

16 which is currently planned for completion by December 2019.

The TCCA goes on to point out that for interworking with another technology, 3GPP can only standardise half of the solution, and work is therefore

in progress in ETSI Technical Committee TCCE (TETRA and Critical Communications Evolution) to standardise the equivalent functionality needed by TETRA to achieve a workable solution.

It says that with there being a

"significant" gap between the release of standards and the availability of the associated functionality in products for operational use, it is not expected that there will be a full range of 3GPP compliant interworking solutions deployed until 2021/2022.

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Philips launches its app-based portable ultrasound system

Philips Africa has launched *Lumify*, its first app-based ultrasound system that promises to extend the reach of ultrasound applications to a broader network of healthcare providers using mobile technology.

Unveiled in Nairobi in mid-September, Philips says the system is an “entirely new way” of delivering ultrasound technology to healthcare providers and their patients.

Lumify is claimed to offer high-quality imaging on a compatible smart device through a subscription model. The device connects to a Philips’ ultrasound transducer, and users also have access to an online portal where they can manage their equipment and access support, training and IT services.

As a customised app-based solution, Philips says its system is designed to “seamlessly” integrate with patient



Lumify features a cloud-based collaborative platform that brings experts into an ultrasound exam, no matter the distance, as though they were in the same room

profiles and health system equipment using cloud-enabled technology.

First-generation *Lumify* transducers are now commercially available across East Africa. They include: the *L12-4* which supports a variety of clinical applications, including soft tissue, musculoskeletal, lung and vascular scanning; the *C5-2* which offers

abdominal with lung and gallbladder pre-sets and Ob/Gyn capabilities; and the *S4-1* which has presets for cardiac and FAST exams. All the applications and services are available through Philips’ new app-based portal.

“*Lumify* is designed to drive transformation in care delivery and digital health – a dynamic combination that can extend the reach of ultrasound in a remarkable way,” says Philips Africa CEO Jasper Westerink. “Clinicians as well as family doctors at small outpatient clinics can perform scans themselves, speeding up the diagnosis

process and possible treatments.”

The system also features Innovative Imaging Technologies’ *Reacts* collaborative platform. This connects clinicians around the world in real-time by turning a compatible smart device into an integrated tele-ultrasound solution, combining two-way audio-visual calls with live ultrasound streaming.

According to Philips, this easy-to-use and innovative integrated system enables clinicians to have a face-to-face conversation with colleagues. They can switch to the front-facing camera on their smart device to show the position of the probe, and can then share the ultrasound stream so that both parties are simultaneously viewing the live ultrasound image and probe positioning, while discussing and interacting at the same time.

In addition to clinicians seeking virtual guidance, Philips reckons *Lumify* with *Reacts* will also be a valuable tool for teaching institutions, emergency medical service providers, disaster relief providers and hospitals with satellite clinics.

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Intersat promises affordable satellite broadband connectivity

African regional VSAT services provider Intersat and satellite operator RascomStar will work together in an effort to offer affordable broadband connectivity across the continent.

The partners claim their strategic deal will see new Ku-band services launched at “ultra-competitive” prices across Africa.

Intersat has an administrative base in Dubai as well as regional headquarters in Nairobi. The company also says it has an established reseller and partners network in 32 African and several Asian countries.

As part of this latest agreement, Intersat will provide fully managed services from what’s described as its “state-of-the-art” teleport facilities in Belgium. The company

will use its iDirect hub to connect SMEs, NGOs, government, academic and financial institutions throughout Africa to the cloud.

Meanwhile, RascomStar will supply capacity via its *RQ1R* satellite which orbits at 2.9°E and is said to provide “unique” Ku-beam coverage across the continent.

Intersat reckons that its partnership with RascomStar demonstrates that it can readily adopt technologies to support its mission of providing affordable satellite connectivity in the region.

The company’s CEO Hanif Kassam adds: “In rural and underserved areas, VSAT is the best and quick-deployable solution for broadband access, helping in bridging the digital divide in Africa.”

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VSAT market “may be improving”, says C-COM

C-COM Satellite Systems reckons Africa's VSAT market may be looking up following orders worth around USD1.28m for its *iNetVu* antenna systems from various customers across the continent.

The Canada-based vendor says the systems have been purchased by several reseller partners in the region, and will be deployed by governments, military users and commercial customers in the banking and broadcast sectors.

“While C-COM has been active in Africa for a number of years, the mobile VSAT market has been slow to develop for economic reasons,” says Drew Klein, C-COM's director of business development. “These significant orders, from both new and existing C-COM integrators based in Africa, are an indication that market conditions in the region may be improving, and that highly reliable and cost-effective auto-acquire antennas like the *iNetVu* products are of high value.”

C-COM expects to deliver these orders over the next few months.

The company adds that it has more than 20 different Comm-on-the-Pause antenna models integrated with all major VSAT modem manufacturers and approved with most major satellite operators. It is also working closely with more than 500 active

dealers in more than 100 countries.

Furthermore, C-COM is working with a research team at the University of Waterloo and developing an electronically steerable, Ka-band flat panel antenna system based on phased array technology.



Satellite-based mobile banking in Africa using C-COM antennas.

First iDirect DVB-S2X network

Internet Solutions says it has launched Africa's first iDirect DVB-S2X network.

Currently live across more than 300 sites in Nigeria, the pan-African telecoms services provider hopes the network will enable it to expand into new markets, such as finance and energy, delivering “greater” satellite throughput efficiencies to its customers. It's claimed companies will benefit from cost efficiencies as they expand their sites, presenting more opportunities for smaller companies to enter the market.

The DVB-S2X network uses an iDirect *Universal Hub* chassis and the *iQ Desktop* remote. The vendor reckons it gives Internet Solutions a “significant competitive advantage” as demand from the region's markets continues to grow.

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Azercosmos launch



Azerbaijan's state-owned satellite operator Azercosmos has successfully launched its second satellite for Africa with the help of Intelsat. *Azerspace-2/Intelsat-38* left Earth on board an *Ariane 5* launch vehicle from Kourou, French Guiana on 26 September. Azercosmos will use *Intelsat-38* to offer services as *Azerspace-2* to meet the growing demand for DTH television, government and network services in sub-Saharan Africa, the Middle East, central and South Asia, as well as Europe. The satellite will orbit at 44°E and also provide Ku-band connectivity to Africa.

Talismanus connected



Telecom Namibia has launched what it says are the "first-ever modern services" at the rural settlement of Tallismanus in Namibia's Omaheke Region. It says around 6,300 residents in the constituency, which is around 240km east of Gobabis, can now access mobile and fixed voice and internet services following the construction of a high-speed fibre cable system stretching from Buitepos via De Hoek to Rietfontein and then Tallismanus. A converged 4G TDD/FDD base station services also went live.

Liquid joins Sigfox's IoT



Kenya is among five new countries that have joined Sigfox's global network. The IoT service provider will partner with Liquid Telecom to deploy and operate its network in the country. Sigfox says that by expanding the network infrastructure to provide national coverage and accelerating adoption through working with startups and students, Liquid will play a key role in the development of Kenya's IoT industry. The new additions bring the total number of countries currently in Sigfox's partnership to 50. In Africa, they also include partners in Mauritius, Reunion, South Africa and Tunisia.

Code Week helps deliver essential skills for 4IR

SAP is aiming to introduce coding skills to 600,000 young people across 36 countries following the launch of this year's *Africa Code Week*.

Since its inception in 2015, SAP claims its annual event has introduced coding skills to more than 1.8 million young Africans while facilitating the integration of ICT education in the school curriculum for more than 28,000 teachers and educators across the continent.

According to SAP Africa MD Cathy Smith, the so-called 'Fourth Industrial Revolution' is forcing a complete rethink of how education is approached, with a strong focus on lifelong skills development. She said: "By inspiring a new generation of African youth through digital skills development, and by empowering teachers and communities with digital teaching tools, we aim to accelerate digital literacy while ensuring a more inclusive and innovation-led workforce."

SAP adds that *Code Week's* mission is to empower 70,000 teachers by 2020. Every year between June and September, the company funds a series of "Train-the-Trainer" sessions to empower teachers with skills and materials that advance digital skills in the school curriculum. As part of this



South African telecoms minister Siyabonga Cwele said initiatives such as Africa Code Week are helping to develop local content which will drive demand for internet services.

PHOTO: LUCA PHOTOGRAPHY.CO.ZA

year's sessions which were organised across 20 countries, SAP says 500 teachers were trained in Ghana, 1,200 in Nigeria, 200 in Madagascar and a further 1,000 in Botswana.

Google is once again backing Africa Code Week as part of its own commitment to preparing 10 million people for tomorrow's workplace. It is supporting 53 non-profit organisations across 11 countries to empower teachers and inspire an estimated 80,000 students through computer science and coding workshops.

South Africa's telecoms minister

Siyabonga Cwele believes content is going to be a "key game changer" for the continent in the Fourth Industrial Revolution. Speaking at the event's launch in Johannesburg in early October, he said: "Initiatives such as *Africa Code Week* are helping to develop local content which will drive demand for internet services. Crucially, we are going to rely on partnerships with the private sector and other social partners to develop the digital skills the continent needs to be competitive in the Fourth Industrial Revolution."

Safaricom hopes fibre-based surveillance will help boost internet use

Safaricom has teamed up with the Kenya Alliance of Residents Association (KARA) to increase security in housing estates with pilot surveillance project launched in Ngei Estate phase 2, Langata, Nairobi County.

Through the partnership, Safaricom will sponsor a fibre connection and provide equipment that will be used for surveillance at the estate's two gates. The system will be fully powered by solar energy. Safaricom adds that the surveillance feed is accessible via an easy-to-use online portal that is supported by its cloud services.

As part of the initiative, the

company will also sponsor first aid and home safety training for a number of child caregivers on the Ngei estate.

Safaricom is keen to promote its FTTH and cloud services for applications such as home and housing estate surveillance. Steve Okeyo, the operator's director of regional sales and operations, says: "As we roll out Fibre to the Home in different parts of the country, we are looking to diversify our product offering and give customers a wide array of services."

Since announcing its FTTH initiative last year (see *News*, Aug-Sep



Safaricom says that it has so far laid more than 5,000km of cable as part of its FTTH rollout. Customers who sign-up for services benefit from free installation within 48 hours and a free router.

issue) Safaricom says that it has now so far passed more than 200,000 homes with more than 5,000km of cable currently laid. It says customers who sign-up for services benefit from free installation within 48 hours, a free router worth KES10,000, and "unlimited fast and reliable" internet.

Liquid Telecom delivers first Microsoft ExpressRoute

Liquid Telecom says it has delivered the first system for service peering in Africa to offer customers better performance, tighter security and lower latency.

Microsoft ExpressRoute is part of Liquid's CloudConnect platform and enables businesses to establish private connections to Microsoft Azure. Previously, customers could only access ExpressRoute via peering locations in Europe.

The Western Cape Government in South Africa is overseeing a major upgrade to communications infrastructure in the region. It has recently deployed Microsoft ExpressRoute and become the first customer with a direct private connection to the Microsoft Azure cloud that is exchanged locally in Africa.

A Western Cape Government spokesperson says: "Liquid Telecom's CloudConnect service has significantly increased the performance of our cloud services and will support the rollout of leading-edge cloud solutions to more of the region."

Liquid says it is the only Microsoft partner providing an ExpressRoute service across eight African countries on its own fibre, including South Africa, Zimbabwe and Kenya. David Behr, Liquid Telecom's group chief product officer, says: "[Our] CloudConnect service is strongly positioned to be the highway that links businesses to a whole host of leading local and global cloud services."

The company adds that it will also be able to offer ExpressRoute directly to the Azure cloud in Africa when it goes live in data centres in South Africa later this year. As a result, Liquid says it will be able to guarantee the performance of the link end-to-end in a SLA by routing all traffic within Africa. It adds that this will translate into "significantly" reduced latency, and that all data residing in the South African Azure data centres will be PoPI (Protection of People Information) compliant.

In the fast lane: South Africa's Western Cape Government has become the first customer on the continent to deploy an ExpressRoute, enabling cloud traffic to be exchanged locally.



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Joint venture to provide satellite broadband services across Africa

Hughes Network Systems and Yahsat have agreed to form a new joint venture to provide commercial Ka-band satellite broadband services across Africa, the Middle East and south-west Asia.

The two companies plan to work together to provide unserved and underserved communities with reliable, high-speed internet services.

While Hughes has bought a 20 per cent stake in the joint venture for USD100m, Yahsat has not disclosed the value of its investment.

Yahsat will provide capacity from its *Al Yah 2* and *Al Yah 3* satellites – the latter finally began commercial

services in July following a problematic launch at the start of the year (see *News, Dec 17-Jan 18 issue*). Yahsat said the satellite was already supporting MVNO users and five new markets, and that the impact of the delay was covered by its insurance agreement. The company did not reveal any further details or figures here.

The satellites will leverage Hughes' *JUPITER* system which is designed to optimise large-scale high-throughput satellites. The company will also supply its OSS/BSS platforms.

Initially, the venture will focus on direct-to-premise services to homes and SMEs, and to community centres

and schools that are served under local government programmes.

In parallel, the two companies said there will be an increased focus on community hotspot solutions to make satellite-enabled broadband more accessible to many more users across the footprint covered by Yahsat's two satellites.

In addition, the partners say their venture will also aim to capitalise on the "accelerating transition" towards Ka-band based backhaul and carrier solutions from mobile network operators.

Completion of the transaction is subject to customary regulatory

approvals and closing conditions, and is expected to occur later this year.

Yahsat CEO Masood M. Sharif Mahmood reckons his company's track record and experience in operating the *YahClick* broadband service, combined with Hughes technology and experience, are a "winning proposition to unlock the mass market potential of satellite broadband services across the region".

When asked if this latest partnership affects Yahsat's deal with Eutelsat and its *Konnect Africa* initiative (see *News, Feb-Mar 2017*), Mahmood said the deal was still live and that Eutelsat remained an "important customer".

MzansiSat promises "superfast" satellite internet with "competition-shattering" pricing

Cape Town-based Mzansisat believes satellite connectivity is the only way to give the continent's citizens equal access to high-speed internet. It says the technology offers low upfront and running costs and "extremely high" reliability, giving independence from existing infrastructure.

The company's mission is to launch an African owned geo-stationary broadband satellite to provide cost-effective, high-speed, reliable internet that is "unhindered by telephone line locations or wireless hotspots, or any other ground-based facilities".

MzansiSat CEO Bart Cilliers says: "We have been working on this concept since 2013 with the primary goal of connecting South Africa to the world through new infrastructure anchored by the first South African owned and operated telecoms satellite."

MzansiSat claims its concept will have the ability to deliver cheap and ubiquitous broadband capabilities. But so far, the company has not publicly announced any specific details about its business model, partners, technology details, financing, etc.

The firm is currently gathering information as well as garnering interest for its venture following attendance at the ITU Telecom World conference held in Durban

in September, as well as the recent Africa Aerospace and Defence Expo. It is hoping to receive public sector buy-in to launch its first satellite, *MzansiSat-1*, and debut its offering to the African market in 2022.

However, Cilliers says the biggest challenge his company faces is securing the legislative and political approval needed to launch. "Once this box is ticked, superfast, super-cheap satellite internet offering competition-shattering pricing and military grade encryption can be a reality, ensuring greater access to technology and the opportunities that come along with it."

"While the infrastructure required to provide the service has the potential to lay the basis of a new African economy, consumers will not be required to pay for this infrastructure – members of the public will just be paying for their own connection service," he explains.

MzansiSat CTO Bernard Greyling adds that the infrastructure surrounding the company's concept will not only support South Africa's national broadband development framework but will also act as a foundational "breakthrough" in terms of providing a new way of sharing applications and services with the African public.

SatADSL secures further deals for its cloud-based platform

A new partnership between SatADSL, iSAT Africa and APT Satellite promises to offer

affordable broadband across Africa.

Under the agreement, VSAT services provider SatADSL will provide its *Cloud-based Service Delivery Platform (C-SDP)* to enable iSAT to offer new products including voucher services, *VNOFlex* and congestion-based services.

APT will provide capacity via *APSTAR-7* located at 76.5°E. This covers Africa and the Middle East with C- and Ku-band services, and also includes Asia, Europe, Australia and China in its footprints.

iSAT is the latest service provider to connect to the *C-SDP* which, says SatADSL, is now being used by 77 Africa-based partners.

In a separate deal, Marlink will also use the platform to extend voucher-based and congestion-based services to customers.

For SatADSL, the agreement enables it to link directly to Marlink's technology platform to provide high bandwidth C- and Ku-band VSAT services across its coverage footprint.

"By securing this partnership and combining our *C-SDP* with Marlink's expertise, we will be able to provide our breadth of services worldwide for the first time," says Michel Dothery, CCO and co-founder of SatADSL. "This will open up our services to new markets, helping to bridge the digital divide by providing cost-effective satellite solutions in areas currently underserved by terrestrial networks."

These latest signings for SatADSL's cloud platform follow

agreements with Global Telesat and RascomStar announced earlier this year (see *News, May-June*).

Asteroid and NAPAfrica sign IXP cooperation agreement

Asteroid and NAPAfrica have signed an MoU to work more closely and collaborate on developing African internet interconnection.

Their agreement focuses on promoting peering and local interconnection, with an emphasis on IXPs as an essential part of the internet ecosystem.

Netherlands-based Asteroid operates neutral IXPs worldwide and has partnership agreements with other operators to deliver local interconnection. Meanwhile, NAPAfrica runs IXPs in South Africa and says it has more than 500 networks connected.

This MoU highlights the commitment of both parties to not just collaborate, but to also share knowledge and experience with others in the region about the advantages of Internet eXchange Points and peering.

NAPAfrica and Asteroid believe in promoting local peering and building strong local communities, and see their role in educating and spreading awareness of local interconnection, as one that fits well within their missions.

Community building and sharing of best practices has proven to be fundamental in improving local

peering and creating successful IXPs. Nurani Nimpuno, CCO at Asteroid, says: "We believe that Africa holds great potential for Internet growth, but there are still real challenges to solve in terms of in-country interconnection. IXPs can play a key role in boosting that, and at Asteroid we want to play a positive role in that development. NAPAfrica with their amazing reputation and experience is an obvious partner for us to work with."

Mobile money is big business for Orange

Orange says mobile money is now one of its top growth drivers in Africa.

This year marks the 10th anniversary of *Orange Money* which was first launched in Côte d'Ivoire. Since then, the operator says the service has been rolled out across 17 African countries and currently has around 40 million customers. It claims *Orange Money's* "accelerating" growth and sales rose 60 per cent from 2016 to 2017, and that the value of transactions carried out on the platform reached EUR26bn last year.

As a result, Orange says mobile money is now one of the group's top growth drivers in Africa, particularly in Côte d'Ivoire, Mali, Burkina Faso,

Senegal and Cameroon. In some countries, it says the service gives close to 50 per cent of users access to banking services in areas with low levels of bank usage.

The company is now expanding its platform by offering lending and savings services directly via mobiles. As part of an initial launch in early 2018, these services are currently available through partners to Orange customers in Mali and Madagascar.

Orange adds that international transfers are another strong area of development.

ThinKom partners with Telesat and SES to test Ka-band phased array antenna system

ThinKom Solutions and Telesat will jointly develop a Ka-band enterprise user terminal for Telesat's planned low Earth orbit (LEO) constellation of satellites.

As an initial step in the process, ThinKom's *ThinAir Ka2517* phased array antenna system will be used for over-the-air testing on Telesat's phase 1 LEO satellite over the next few months. Telesat hopes this will validate that ThinKom's Ka-band aero antennas, which currently operate on geostationary satellites, meet all of the LEO system requirements.

The two companies will then collaborate on the development of a new Telesat LEO-compliant enterprise terminal for terrestrial applications. They claim the new terminal will be "cost effective" while delivering "high-performance" connectivity for applications including mobile backhaul, Wi-Fi hotspots, isolated cable and DSL networks, and remote institutions.

According to ThinKom chairman and CTO Bill Milroy, his company's patented phased-array architecture provides rapid switching speeds without the drawbacks typical of electronic scanning antennas in terms of limited instantaneous bandwidth, poor low look-angle performance, high power consumption and lower aperture efficiency. He says: "Our proven antenna technology has the versatility to support an integrated LEO constellation solution offering gap-free pole-to-pole coverage with automatic beam switching, rapid outage recovery and network optimisation for different geographical regions. This means we can offer a fast-track path to commercialisation of a fully interoperable, multi-orbit solution in the near term."

Canada-based Telesat's existing space fleet consists of

16 geostationary satellites but in January 2018 it launched a phase 1 LEO satellite that is currently undergoing commissioning and orbit-raising. The company says its LEO constellation will offer a low latency, high throughput global broadband service with an initial constellation of around 120 satellites planned by 2021. It claims this will deliver an "unsurpassed" combination of capacity, speed, security, resiliency, latency and low cost. It goes on to boast that its constellation will accelerate 4G/5G expansion, and bridge the digital divide by bringing fibre-like high-speed services into rural and remote communities.

"ThinKom's new terminal, combined with the revolutionary value proposition of Telesat's LEO constellation, will unlock new satellite communications market opportunities with better value economics for service providers and their customers," says Michel Forest, director of engineering, Telesat.

"Easy to deploy, cost effective, and agile beam antenna technology are key requirements for our Telesat LEO constellation, which will be able to allocate bandwidth seamlessly and instantly where it's most needed."

In August, ThinKom completed

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
5/8/18	Ali Al Hashemi	Thuraya	CEO	-	GM, Yahsat government solutions – will continue in this role following the completion of Yahsat's controlling stake in Thuraya
5/8/18	Ahmed Al Shamsi	Thuraya	Advisor to CEO	Thuraya	CEO
5/8/18	Marcus Vilaça	Thuraya	CTO	-	Also continues his role as Yahsat CTO
5/8/18	Shawkat Ahmed	Thuraya	CCO	Yahsat	CCO & advisor to CEO
10/9/18	Jean-François Fontaine-Boullé	Cambium Networks	Director of hospitality sales – EMEA	Quadrige Worldwide	Global accounts director
9/10/18	Joachim Fischer	Vertiv	Channel sales director, EMEA	NEC	GM for sales, DACH

INVESTMENTS, MERGERS, ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
7/9/18	Various investors	Yoco	Series B funding	NA	Yoco launched in 2015 as a specialist company providing mobile points of sale in South Africa, enabling merchants to accept card payments using a smartphone or tablet. It has now raised a total of \$23m following this latest round of funding. Investors include Partech, FMO, Quona Capital, Velocity Capital & Orange Digital Ventures.
2/10/18	Vista Equity Partners	Fortissimo Capital	Starhome Mach	Financial details withheld	Vista will merge Starhome with its existing portfolio company, interconnect business optimisation specialist Telarix. It's claimed the merger will create the "first & only" end-to-end technology solution provider enabling telcos to "optimise global connectivity in the digital transformation era". Combined company will be headquartered in USA & led by current Telarix CEO Marco Limena. Starhome Mach CEO, Itai Margalit, will become president of roaming & clearing services.



ThinKom's ThinAir Ka2517 phased array antenna system will be used for over-the-air testing on Telesat's LEO satellite over the next few months. Aero terminal connectivity has already been successfully demonstrated using SES' O3b MEO satellites.

the first ground test of its Ka2517 antenna. The demo took place at the company's facility in California in collaboration with SES subsidiary O3b Networks.

The test involved a Ka2517 aeronautical antenna mounted on a vehicle that was used to acquire successive O3b MEO satellites at a 13° elevation. ThinKom says its antenna successfully tracked the satellites for 30-minute periods as they traversed from west to east.

ThinKom said the test is a precursor to a flight test, expected to take place before the end of this year. This will be the first in-flight demo of the company's antenna communicating through a non-geostationary constellation and aims to show the ability of the system to auto-track and perform seamless beam switching through aircraft roll, pitch and yaw motions.

Arabsat aims to boost HTS services

Arabsat has signed a new multi-million euro contract expanding its long-term partnership with Newtec.

The companies say their agreement will enable the launch of new high throughput satellite (HTS) services in Africa and the Middle

East, including enterprise and VNO services, IP trunking and mobile backhaul for 3G and 4G services.

Under the partnership, Arabsat will deploy Newtec's *Dialog* platform as well as various DVB-S2X wideband modems. The specific modem used for each customer will depend on the market being served.

Once launched, the new services will use Arabsat satellite capacity, with the initial hub expected to be installed in Europe by the end of October.

Arabsat CEO Khalid Balkheyour says: "Expanding our partnership with Newtec in this way will help us meet rising market demand for high-throughput and high-performance services, pushing the boundaries of what is available today."

CETel and Türkmen Hemrasy team up

CETel has signed a cooperation agreement with satellite operator Türkmen Hemrasy CJSC which operates *TürkmenÄlem52°E*.

Orbiting at 52.0°E, the satellite not only covers Turkmenistan but also Central Asia, Iran, Turkey, North Africa and most of Europe. It carries 38 Ku-band transponders and is specifically designed for communications and broadcasting.

It's claimed the satellite's east and west beams provide "major opportunities" for companies operating in its coverage zone.

CETel says the aim of the cooperation is to "mutually create a business environment that helps customers proceed with their communications requirements on fixed satellite services".

The two companies will offer their joint services and expertise to enable what they claim will be the "effortless" management of end-to-end connections, including backhaul, regulatory requirements, and local field support.

CETel adds that customers will mutually benefit from having a strong satellite operator in the region with "ideal" coverage, paired with a WTA full-certified teleport located in the heart of Germany.

MD Guido Neumann says: "The region of Turkmenistan is of particular interest as it carries vast amounts of mineral resources. Also, Turkmenistan with the desert of Karakum which covers 80 per cent of the country, necessitates rural communications based on satellite."

IN BRIEF



Towards the end of September, Avanti announced it had signed a seven-year wholesale capacity lease agreement for its *HYLAS* fleet with what it says is a "major" international satellite service provider. Avanti did not name its customer but said the deal is worth USD84m over the period

of the agreement which is expected to begin in the third quarter of its next financial year which ends 31 December 2019.



Liquid Telecom is supporting young entrepreneurs at the Westerwelle Startup Haus Kigali through its high-speed internet and Microsoft Azure cloud services. The company reckons this will help the facility become a "major driver of innovation, further positioning Kigali as a tech hub in the region". Run by Westerwelle Foundation in partnership with Evonik Foundation, the Startup Haus offers a range of services to entrepreneurs such as events, advisory services and professional development workshops. It also includes a makerspace providing machines such as 3D printers, a laser cutter, etc.



Intelsat's indirect wholly-owned subsidiary, Intelsat Jackson Holdings, has priced a private offering of an additional USD700m aggregate principal amount of its 8.5 per cent senior notes due 2024. They will be sold to investors at an issue price of 100.75 per cent of par plus accrued interest from 19 September 2018. Intelsat Jackson intends to use the net proceeds from the sale of the additional notes to fund the repurchase or redemption of all of its outstanding 7.5 per cent senior notes due 2021 (excepting those that are not redeemed or repurchased under the latest offering). Intelsat Jackson expects to use any remaining net proceeds for general corporate purposes.

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
8/8/18	MTN	South Africa	1H18	ZAR	62,777	22,335	1.75	Reported improved constant currency results for the period, & broadly delivered on its medium-term targets. Service revenue growth accelerated while EBITDA margins increased. MTN particularly noted 38.6% YoY growth in second quarter EBITDA in Nigeria & 8.6% increase YoY in South Africa. In Ghana, second quarter EBITDA was up 13.6% YoY after the introduction of the management fee from 1 May 2018.
21/8/18	Cell C	South Africa	1H18	ZAR	7.8 (bn)	2.4 (bn)		Company says it's on track to deliver "substantial growth" & despite "difficult" economic conditions. Total active subscriber base grown by 600,000 customers to 16.3 million, resulting in 5% total YoY revenue increase. Service revenue increased 11%, from ZAR6.2bn to ZAR6.9bn. EBITDA increased 16% to ZAR2.4bn.
28/9/18	Avanti Communications Group	UK	FY18	USD	29.9	4.7	0.30	Unaudited interim results for 12 months ended 30 June 2018 show earnings increase of 23% from \$24.3m in 2017. Kyle Whitehill, who started as CEO in April, said: "The restructuring of the balance sheet and the launch of <i>HYLAS 4</i> has given Avanti the platform for growth."

R&S unveils first Bluetooth Low Energy signalling test solution

Bluetooth Low Energy (BLE) has emerged as a major transmission technology for IoT.

But according to Rohde & Schwarz (R&S), when drafting the BLE test specifications in 2010, the Bluetooth Special Interest Group did not specify an over-the-air signalling test mode, only one that was direct and non-signalling.

The company says it now offers a solution for this with the world's first platform for BLE RF signalling tests under realistic conditions.

R&S says its solution makes it possible to determine the RF

characteristics of a BLE device via a Bluetooth OTA link or over a wired connection to the antenna. With this approach, it says users can, for example, measure the level, modulation and receiver characteristics of individual or all data channels for frequency-hopping transmissions, which are typical of Bluetooth.

The company also offers an advertiser testing option for its *CMW* series of wireless connectivity testers to measure the RF parameters of advertiser channels. It says the BLE signalling functionality enhances

the BLE direct test mode and the BLE advertiser mode. With these functionalities, R&S claims it is now possible to solve even complex measurement tasks in development, production and for OTA applications.

The *CMW* platform has been designed to deliver the full range of Bluetooth RF tests, including *Classic*, *LE* and the latest standard, Bluetooth 5.03. Along with signalling tests and tests in direct test mode, R&S says the platform enables diverse audio tests on Bluetooth Basic Rate/Enhanced Data Rate links. www.rohde-schwarz.com



Livewire helps reporters make solid connections

Livewire Digital describes *SilverBlade II* as a lightweight small-footprint unit that "seamlessly" bonds cellular and Wi-Fi services. It is designed to provide a highly resilient internet connection for broadcast professionals to deliver low latency live and file-based media from cameras, laptops or mobiles.

SilverBlade II features Livewire Digital's *Razorlink* technology which, it's claimed, aggregates and bonds internet bandwidth across 3G, 4G, Wi-Fi, DSL and satellite networks to "significantly enhance" data transfer rates for fast delivery of video content.

The company adds that connection dropouts – a key issue for TV crews on the move – are managed seamlessly by *RazorLink* which automatically migrates to alternative networks and optimises the connection so



users can make take advantage of all the available bandwidth.

SilverBlade II is said to be "highly cost-effective" as broadcasters pay a one-off purchase fee and then use their own SIMs.

Support for global cellular modems is also an integral part of the unit. Livewire says unlocked modems enable the use of any service provider, reducing costs and increasing flexibility. www.livewire.co.uk/products/silverblade

AP offers wireless and wired Gigabit connectivity

Zyxel Communications says its new *NWA1302-AC* access point makes it more practical to deliver reliable, high-speed wired and wireless internet to every user in every room.

The device is said to integrate "cutting edge" AP technology and a Gigabit switch with PoE. Zyxel says it eliminates the need for network switches as users deploy one device in each room they want to connect.

The *NWA1302-AC* also features the company's *NebulaFlex* management system. This offers standalone mode or cloud-based control. In standalone mode, it handles traffic autonomously which, according



to Zyxel, eases the burden in staff. If necessary, the AP can be switched to cloud-based mode to give an administrator complete control over from any browser via the *Nebula Cloud Centre*.

The vendor adds that the unit has a smart antenna and beam-forming technology which dynamically customises signal direction for each individual device. It says this creates

the best path to deliver Wi-Fi signals while mitigating interference from neighbouring APs.

Zyxel says the *NWA1302-AC* can be mounted on a wall, outlet box, desktop or out of sight behind a table, all in minutes and without the need for any additional kits. www.zyxel.com

Wi-SUN launches certification for Field Area Networks

The Wi-SUN Alliance has announced its Field Area Networks (FAN) certification programme.

According to the alliance, FANs include communications infrastructure for very large-scale networks and enable devices to interconnect within a single common network.

Through the programme, Wi-SUN will certify products based on their compliance to a communications profile derived from applicable

open standards and their ability to interoperate with other alliance certified products.

It's claimed FAN certification offers utilities, cities and service providers adaptable multi-service networks that will help ensure interoperability today and for future generations. Wi-SUN says it will also reduce the time needed to evaluate new products, as behaviour, performance and

interoperability are well defined.

Other key benefits of the programme include eliminating single-vendor lock-in, and encouraging the development of a global ecosystem of standards-based products, reducing the risk and costly impact of stranded assets.

Wi-SUN says its certified products are "rigorously" tested by an authorised third-party test lab to ensure the devices work together effortlessly and securely for rapid

time to market. It says certified devices include a digital certificate to authenticate entry to a Wi-SUN FAN network, significantly reducing vulnerability to cyber security threats.

Under a separate agreement, Wi-SUN has selected GlobalSign to provide certificate authority services to alliance member companies. Wi-SUN members plan to announce certified products later this year. www.wi-sun.org

Comprion claims first with M2M SIM for RSP testing

Comprion believes the future will see an increasing number of machine-to-machine devices with an eSIM. As a result, the company has developed a test eSIM (also known as test eUICC) for the M2M architecture to ensure that switching to another mobile operator and the related remote SIM provisioning (RSP) work reliably.

Comprion says its *Test eUICC M2M* enables MNOs and infrastructure suppliers to test the interoperability of the included components in the eSIM machine-to-machine environment during product development and integration.

According to the firm, running RSP functions is protected by credentials that are normally not known to the user. Comprion says that as the *Test*



eUICC M2M is personalised with test certificates and test keys, it allows technicians to set up an RSP test infrastructure. This means that defined procedures for the remote provisioning and management of the embedded UICC can be executed in a test environment.

As well as testing M2M device interoperability, the *Test eUICC M2M* can be used for functional testing of the subscription managers (SM-DP

and SM-SR), as well as verification of SIMalliance profile definitions.

Comprion says it comes with a pre-loaded test profile that has been created in accordance with the company's long-standing experience in the field. The profile includes the 3G test algorithm.

Comprion adds that the profile's file structure can be scanned and updated via remote file management (the keys needed for this are provided). Moreover, it says different profiles can be loaded to the card for testing purposes by means of the respective eUICC standard procedures.

The *Test eUICC M2M* is removable and comes in the 3FF format (mini-UICC). www.comprion.com

Also look out for...

Tests 'prove' TETRA as good or better than GSM-R

Siemens has worked with critical comms specialist DAMM to successfully implement and test an open and interoperable TETRA packet data solution which complies with the demands for *ETCS L2 (European Train Control System Level 2)*.

The tests were mainly focused on bandwidth requirements and the reliability of data delivery. They were performed according to UNISIG Subset-093 (PS version) – the communication requirement specification for ETCS describing the worst-case conditions for ETCS communication.

Siemens decided to use packet data as this service is said to provide scalable and sufficient bandwidth for ETCS level 2. Furthermore, unlike circuit-switch service, the data are fully interoperable between vendors of a train-borne OBU (onboard unit) and a wayside RBC (radio broadcast centre) along the rail track.

The partners say the tested solution provided two dimensions of interoperability – firstly, the interoperability between TETRA vendors who have completed interoperability tests for packet data; and secondly, the interoperability between OBU and wayside RBC vendors secured by the use of standard *ETCS L2*, which is also specified for GSM-R packet data. Within the solution tested the standard was kept. The main change was the replacement of the GSM-R hardware with TETRA equipment. In this way, the two companies say the safety integrity level was maintained between both the train-borne OBU and wayside RBC.

It's claimed the test results proved that data transmission quality in both directions was always above requirements of the standard and that TETRA delivered equal or even better results than a GSM-R system.

Siemens Mobility spokesperson Sven Hagenbuck says: "Thanks to the easy integration based on a pure IP interface and the longer life time expectation of TETRA systems, this solution can be beneficial or an alternative wherever GSM-R is not mandatory due to authority regulations."

PTToC radio utilises LTE and Wi-Fi

The *PNC370* is Hytera's first broadband radio that focuses on Push-to-Talk over cellular (PTToC). The company says the device is "extremely easy and convenient to use" over existing WLAN and mobile networks and claims it offers "excellent" in-building coverage via Wi-Fi.

It's claimed that the new radio is also the "ideal" solution for various broadband solutions. Hytera says it features PTToC services and *Android*-based apps that are adapted to meet users' needs, and can be managed remotely from a central platform.

An open API is also available for third-party providers to develop and adapt their own apps.

The *PNC370* is designed to combine the advantages of PMR communications with all of the available broadband networks in its surroundings. Hytera says it offers individual and group calls, emergency calls, as well as quick call setup with "great" audio quality. A built-in GPS function means that position detection and scheduling is possible, while the real-time clock enables call history to be displayed.

Battery capacity is said to guarantee a long operating time and can be charged using a micro-USB interface as well as an optionally available six-unit charger. www.hytera.com



cTU claimed to be smallest mmWave radio

Siklu has added a compact terminal unit to its *MultiHaul* series of point-to-multipoint millimetre wave radios. It says the new *cTU T201* is a self-aligning mmWave radio that is ideal for low profile installations anywhere.

The firm says the *cTU T201* condenses *MultiHaul*'s "rich" feature set into a device that measures 6.5 x 3.1 x 1 inches – roughly the size of an *iPhone X*. Siklu claims that makes it the smallest mmWave radio currently available on the market.

Available in multiple colour options, the device is said to enable installation everywhere, eliminating costly site preparations and long cable

runs. Siklu says this, coupled with the self-alignment and auto-provisioning features, allows technicians to complete field-installs and commissioning in under 15 minutes per link.

"Thus, the *cTU* reduces the TCO for Gigabit connectivity to new levels and provides a return on investment often measured in months by offering an unbeatable Gb per dollar," states the firm.

It adds that service providers will benefit from using the radio for 5G fixed wireless access applications on the same mmWave wireless network simultaneously for delivering multi-gigabit connectivity. The *cTU*



T201 is also supported by Siklu's *SmartHaul WinDE* application, a SaaS application for automated network design for its point-to-point/multipoint radios. www.siklu.com

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 planet 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 (*also see News, May-Jun 15*). Wyler is no stranger when it comes to pioneering telecoms. He helped launch some of the first networks in Africa when he owned Terracom Communications in Rwanda 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 orbits the planet at an altitude of just over 8000km, or 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 players 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, May-Jun 2017*). “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 in an effort to connect customers globally and seamlessly.

Spengler also believes working with OneWeb will give Intelsat another layer of capacity in certain cases, such as helping to ease the congestion that can occur with spot beam systems. “And there are going to be some 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, Mar-Apr 2018*). 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. (However since then, Iridium has gone on to develop its *NEXT* programme. Here, it has already successfully launched 65 LEO satellites and expects to have a total of 75 in space by the end of this year. Of these, 66 will be operational and 11 will be spares.)

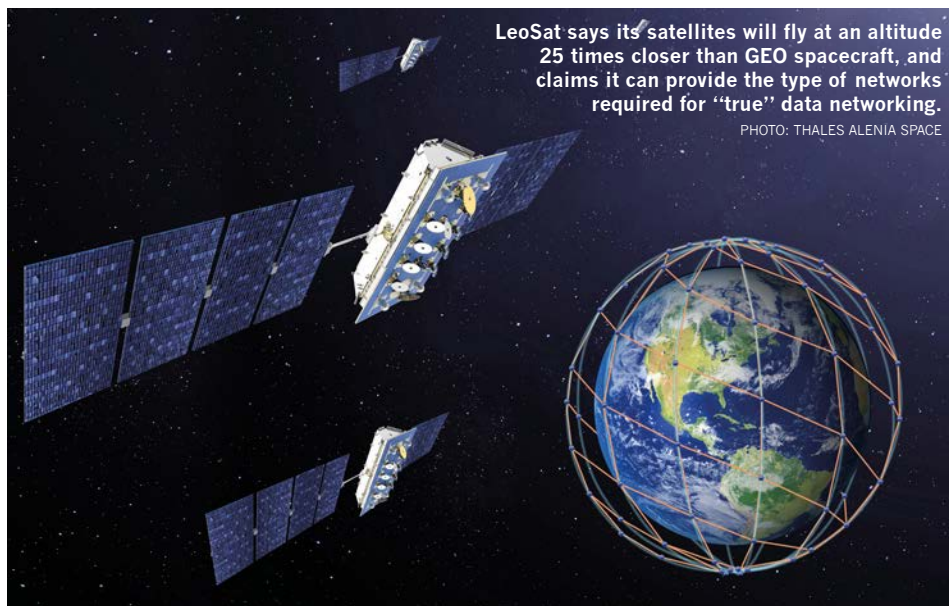
So why has there been renewed interest in LEO missions during recent years? Perhaps the best companies to answer this are the ones who are investing in the technology today, such as US-based LeoSat Enterprises. Working with Thales Alenia Space, LeoSat plans to manufacture and launch a constellation of 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 companies have now invested in LeoSat: Hispasat, the Spanish national satellite operator, and SKY Perfect JSAT, Asia's largest operator. "Both believe that LeoSat's system design – combining satellite and networking technology to provide an MPLS network in space – is a departure from existing



"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

solutions and a key opportunity for opening up new markets and delivering business growth."

Canada-based Kepler is another recently established company that plans to gradually deploy a constellation of 140 LEO nanosatellites while delivering store-and-forward data backhaul and IoT services worldwide. Its 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. He says: "Since off-the-shelf components used for LEO [satellites] are significantly cheaper and the availability of launch vehicles is multiplying, access to space is now remarkably being redefined. 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 reckons the reason the more established operators have not invested in LEO is simply because it is not their business. He also suggests 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 are becoming realisable."

Reaching high with low orbit satellites

According to Kepler's Mitry, 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 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. However, ABS' Betaharon says 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 agrees that LEO systems may have an advantage over GEO for providing service in some very specific targeted markets, such as above and below the Arctic Circle where very few people live. 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



"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.

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.

Comtech EF Data's 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.

"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, when it comes to the satellite service provider's overall business, such traffic does not exceed 10-15 per cent.

In addition, Kirillovich says new 5G mobile network features will not run smoothly on LEO, as the 5G standard requires latency around

1ms, and this can be achieved only on the ground. "So the benefit of LEO systems is really questionable, while the disadvantages are great in number. They include numerous launches, the 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."

While acknowledging that LEO satellites offer a major advantage over their GEO counterparts in terms of offering true global coverage, Kirillovich goes on to ask at what cost? Echoing ABS' point above, he says: "[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



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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

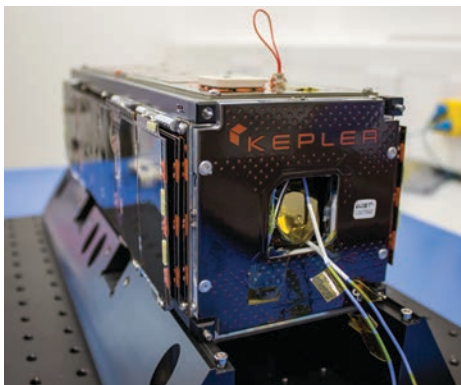
For SatADSL, the most important advantage of GEO satellites over LEO and MEO comes when you need to transfer a single content to many users in real-time. “This is the case with linear, real-time television” say De Vos and Sansone. “This is the killer application of GEO satellites and, at least for these 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 0.6m 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



“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.

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

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’s described 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.”

In January, Kepler successfully launched its first spacecraft, *KIPP*, which Mitry claims is the only provider of pole-to-pole high-capacity Ku-band satellite services. “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,” he says. “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 LEO communication system. We are launching our third satellite 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.

Meanwhile, 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 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. He says RSCC’s main target for its HEO satellites – named *Express-RV* – will be mobility users (trains, buses and ships). “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,” he concludes. ■



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Community Observers testing the ForestLink system in Cameroon send data via the ForestLink app on their smartphones, but when cellular connectivity isn't available they use Rock Seven's RockBLOCK devices which use Iridium's Short Burst Data service.

From protecting rainforests to securing factories, wireless tech is often the only way to help create rapid reliable security networks.

The world's two largest rainforests, the Congo Basin and the Amazon, are under threat from illegal extraction activities, according to the Rainforest Foundation UK (RFUK). It says that unfortunately, national and local authorities have long lacked the means and mechanisms to deal with these illegalities which destroy ecosystems and undermine both the forest and indigenous peoples' livelihoods.

As a result, RFUK is now actively working with both national and local authorities with its *ForestLink* real-time monitoring system. Rather than relying on external or third-party monitoring personnel, *ForestLink* is used by 'Community Observers' who actually live in the rainforest and act as watchdogs, alerting national civil society organisations and law enforcement agencies of suspected illegal activities via a bespoke smartphone app.

"Our *ForestLink* system evolved out of our community mapping work in the Congo Basin," says Élodie Barralon, real-time monitoring coordinator at RFUK. "We've already used GPRS technology to help communities map their rights across approximately seven million hectares of rainforest. We realised that by using a smartphone and a satellite uplink, local communities could not only map their territories, but could also send alerts of illegalities to protect their natural resources and livelihoods."

After *ForestLink* alerts are sent to a secure database, they are analysed by NGOs and governments. Pending further details from Community Observers that help verify alerts, independent civil society

organisations notify the appropriate authorities.

When GPRS isn't available, the system uses technology from UK-based satellite tracking and communication systems specialist Rock Seven. Its *RockBLOCK* and weatherproofed *RockBLOCK+* devices use Iridium's *Short Burst Data* (SBD) service to enable reliable information transfers from remote areas where there may not be other means of communication.

The *ForestLink* system is currently used to address a wide range of threats that include illegal logging and mining activities as well as oil spills. Working with local partner organisations, the Rainforest Foundation has trained more than 50 communities in the DRC, Ghana, Cameroon and Peru to use the system.

"Community Observers interact with the *RockBLOCKs* mostly through the *ForestLink* app," says Barralon. "We designed the system this way to really keep the focus on data collection, while we try to make the transmission aspect as seamless and simple as possible."

It's claimed that thousands of alerts have already been sent by the observers, resulting in legal action against extractive industries. Barralon says: "In Cameroon last year, information provided by monitors led to a shipment of illegal timber being seized by the government. Additionally in Peru this year, alerts sent by one indigenous community led to a dramatic police raid on an illegal mining camp in the Madre de Dios region. The police task force seized and destroyed the mining vehicles on site and arrested several suspects."

Barralon believes that RFUK has "successfully empowered" local populations by giving them the ability to secure and take control of their natural resources as well as their individual and collective rights. Longine Boubok, a Community Observer from Cameroon, backs this up and says: "With the *ForestLink* system, I know that by using just a mobile phone I can record an illegality anywhere in the forest. With this project, I think the community will really see a change. We're not just doing it for ourselves, we're doing it for children too."

ForestLink system is now active in four countries across two continents with *RockBLOCK* ensuring that there is high availability for data transfer anywhere. Barralon adds that each local context requires its own unique approach. "That's why it's so important to keep updating and improving *ForestLink*, and securing global connectivity to make sure it responds effectively to the diverse needs of its users around the world."

Surveillance with no strings attached

With more than 3,000 clients across the continent, the Endeavour Africa Group describes itself as one of the region's leading business solution providers. Its security division designs, installs and maintains fully integrated electronic security solutions, including video surveillance systems.

In 2016, Endeavour was approached by an unnamed African company to provide a video surveillance solution covering a six kilometre perimeter at each of its three different factory sites.

Endeavour's plan included 150 HD IP cameras to be installed on poles (two per pole) along the perimeter. But connectivity soon became a concern, as Datta Wajapey, technical manager for projects at Endeavour, explains: "Our extensive range of CCTV cameras offers a valuable security and loss prevention solution but requires an increasingly reliable connection. Our original proposal was to deploy cables to connect the cameras. However, we knew that such a cable system would be expensive and time consuming to install, and require future maintenance."

Once copper cables were determined to be unfeasible for this high-profile project, Endeavour contacted Cambium Networks for a wireless connectivity solution.

A hub-and-spoke comms architecture was selected at each of the client's three factory locations. The three clusters would be interconnected with high-speed wireless backhaul links.

At each site, Cambium's ePMP wireless broadband distribution network solution was necessary to connect the 75 subscriber units using multiple access points installed on high-rise buildings. After considering the available options, Endeavour selected the vendor's ePMP Force 110 point-to-point radios to provide the 130Mbps backhaul links as an infrastructure to interconnect the APs. Eight 8 ePMP access point modules with GPS synchronisation equipped with 120° sector antennas were also deployed at each location to provide the distribution access hub connectivity, while ePMP subscriber modules were installed to provide 6-10 Mbps throughput at each of

the pole locations that were equipped with two megapixel cameras.

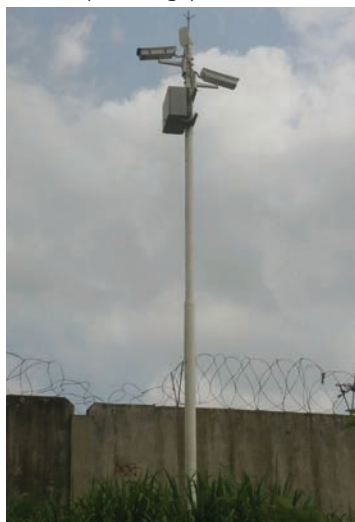
Because there were multiple cameras at the pole locations, two Fast Ethernet ports were required for connecting the cameras to the radios. Wajapey says the aux port on the subscriber modules helped to eliminate the need for a switch at each pole and also provided relay to cover blank spots.

He continues by saying the network was swiftly deployed and immediately started to provide round-the-clock HD video surveillance at each factory. "Not only was the installation rapid, but the connectivity has been extremely reliable

with excellent throughput," says Wajapey. "Each subscriber module was able to transmit up to 10Mbps to its access point without any breaks."

"Each radio provides two ports for camera connectivity, and there is no need to use a switch at each pole. Furthermore, the PTP links saved many potential costs involved in the laying of OFC needed for backhauling."

Overall, it's claimed the wireless network system "easily outperforms" the copper cable alternative for Endeavour, with Cambium's ePMP distribution network solution operating at 2.4GHz and 5GHz with 100Mbps throughput in a 20MHz channel. ■



Endeavour installed 150 surveillance cameras but could not use cables to connect them because of concerns over costs and maintenance. Cambium Networks provided a wireless connectivity solution.

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

Asset Tracking & RFID

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



We are now looking for distributors throughout Africa

Commercial Fleet Management

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

Public Transit & Bus Management

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

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

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

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

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

Remote Monitoring & Surveillance

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

Mining & Exploration

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

Smart Cities & Smart Highway

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

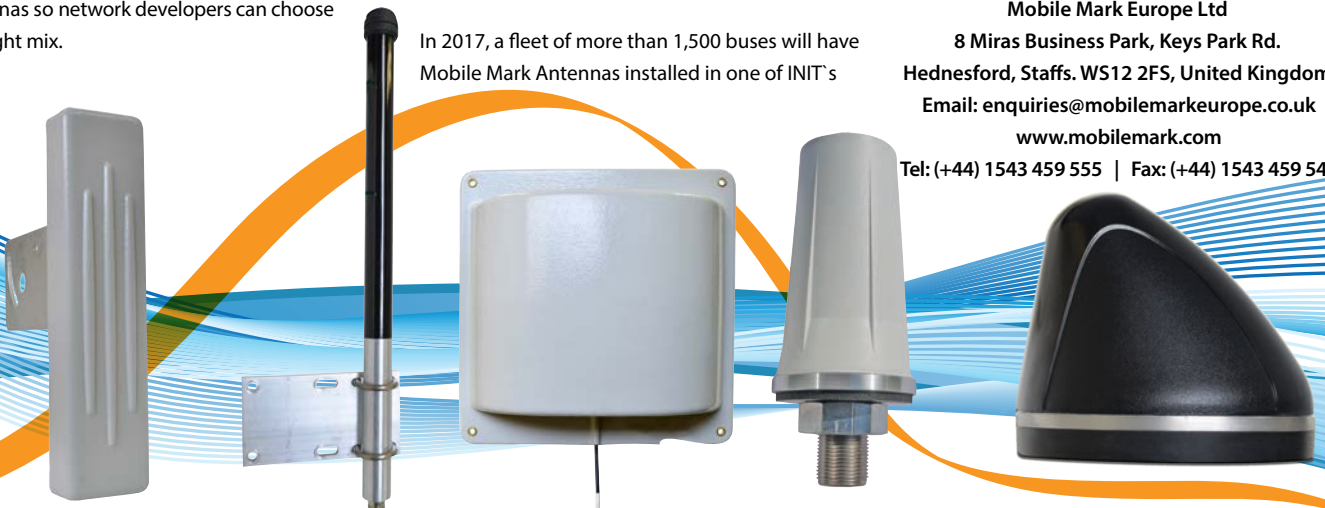
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Seeing Wi-Fi in a new light



With the new 802.11ax Wi-Fi standard on the horizon, KEVIN WEN wonders if it offers any real advantages over Wave 2.

802.11ac Wave 2 is the latest Wi-Fi standard. When its predecessor, the now widely adopted 802.11ac Wave 1, first launched in 2011, it brought a host of advantages for businesses and consumers alike. Improved power management, higher capacity and lower latency provided a higher performance network and made Wave 1 the gold standard it is today.

In many respects Wave 2 builds upon the success of its predecessor, whilst also bringing additional feature benefits for business networks, particularly for enterprises that transfer large volumes of data.

That said, Wave 2's performance boost looks less significant when compared to those of the next generational leap, 802.11ax (ax).

Due in 2019, demos show a five to 10 times performance improvement over Wave 1 and four times over Wave 2. So is the upgrade to Wave 2 worthwhile or should you hold out for ax?

Most business owners aren't networking experts and it would be easy for them to assume that the extra MHz of bandwidth and Gbps of throughput that ax will offer over Wave 2 as essential for their companies. However, to write-off Wave 2 in favour of the promises of ax could, in many situations, prove a lost opportunity.

Wave 2 versus ax – the numbers game

While Wave 2 is not as huge a leap forward as 802.11ax aims to be in a couple of years' time, that doesn't mean it's not worthwhile. Chief

amongst the significant additions is support for MU-MIMO. This enables Wave 2 access points to send and receive data to and from multiple devices simultaneously, providing a significant boost in efficiency. As such, MU-MIMO improves the overall connectivity experience by distributing data more efficiently. Simultaneous smartphone, tablet and laptop use is already prevalent in the modern workplace, so this extra capacity is a real bonus.

802.11ax will significantly up the ante with OFDMA (orthogonal frequency division multiple access), an ugly acronym that means that rather than having multiple channels, each one is chopped up into hundreds of smaller sub-channels with different frequencies. What this boils down to is that up to 30 clients can

share a channel rather than having to take turns broadcasting and listening on each.

Although Wave 2 accommodates channel widths up to 160MHz (a dramatic increase over Wave 1 which topped out at 80MHz) ax's wider and multiple channels significantly boost throughput. For example, if we assume the throughput is increased by 4x with 160MHz channels (a conservative estimate), the speed of a single 802.11ax stream will be 3.5Gbps. This compares with 866Mbps for a single 802.11ac connection. That's a significant boost, and one that's hard to ignore.

To ax or not to ax?

It's difficult to not get excited by the advances that 802.11ax promises over the existing Wave 2 standard. However, before you plan for an ax deployment upon its release, it's best to consider why these features have been developed – and whether they're necessary for your business.

Ax has been designed to deal with incredibly high-density networks. Its super high data rate and bi-directional MU-MIMO capabilities make it ideal for very dense indoor and outdoor environments, such as conferences, apartment blocks and hotspots. Unless your enterprise network fits the mould of one of these use cases, it is unlikely that you will see significant benefits from ax.

Wave 2 is available now and, since its initial launch in 2016, we have seen the pricing of supporting chipsets dropping to a point where they are actually more cost effective than their predecessors.

For smaller businesses still using a/b/g/n gear and in need of an upgrade, my advice is don't hold out for ax. The speed boost provided by Wave 2 will almost certainly be significant enough to see you through the foreseeable future.

Six surges to expect from 802.11ac Wave 2:

It's a gateway to gigabit: the GbE offerings from Google Fiber, AT&T GigaPower, and Verizon Fios all run on cable. Wave 1 for wireless never quite got to Gigabit speed. Wave 2 will open the door for gigabit Wi-Fi because its physical rate (PHY) is much higher, and that affects the ultimate data transfer rate. To put that in context, the PHY rate of Wave 1 peaks at 1.3Gbps. Wave 2 reaches the heights of 2.34Gbps. Even if it reaches half of that potential, it's still going to beat 1 Gbps.

MU-MIMO: Wave 2 can multitask so it supports

A BRIEF HISTORY OF 802.11AX

October 2016: Quantenna Communications announced the first 802.11ax chipset. It supports eight 5GHz streams and four 2.4 GHz streams.

January 2017: Quantenna adds a second chipset with four streams in each band.

March 2017: Qualcomm unveils 802.11ax debut chipset.

June 2017: Broadcom and Marvell follow.

August 2017: Asus introduces first 802.11ax router with 4x4 MIMO in both bands and throughput of 1.1Gbps on 2.4GHz and 4.8Gbps on 5GHz.

Huawei announces an 802.11ax access point that uses 8x8 MIMO and is based on Qualcomm hardware.

January 2018: Aerohive Networks debuts family of 802.11ax access points based on Broadcom chipsets to start shipping mid-2018.

March 2018: Draft 802.11ax standard published

March 2019: Final standard for 802.11ax expected

July 2018: First pilot projects due to begin.

July 2020: Mass adoption expected (terms and conditions apply)

more channels. This means that the spectrum is used more efficiently for multiple connected devices, and devices can more easily get on and off of the network. It's similar to the difference between a single bank teller who can only see one person at a time as long as they pay by cheque, and four multi-tasking bank tellers who offer a range of easy transaction methods.

Support for MU-MIMO is crucial since all businesses and homes have multiple connected devices and this resolves most of the headaches for network admins.

Strong performer: in addition to a faster PHY rates, Wave 2 widens the channel to 160MHz, a considerable improvement on Wave 1's options of 20MHz, 40MHz and 80MHz. This makes it easier to handle large files.

Wave 2 also has an extra spatial stream, up from Wave 1's three. According to the Wi-Fi Alliance, device speeds rise in proportion to the number of spatial streams.

More flexibility and more wiggle room: Wave 2's support of additional 5GHz channels is one of its most powerful boosts. If designated for Wi-Fi use, these channels could cater for more users and devices on the network. Around 65 per cent of devices are dual band (source: Wi-Fi Alliance) so they can use both the 2.4GHz and 5GHz frequencies.

It's already compatible with leading devices: The Wi-Fi Alliance has already certified five products for Wave 2 interoperability – they include devices from Broadcom, Marvell Avastar, MediaTek, Qualcomm and Quantenna.

The second wave: while wi-fi.org lists 24 products with 802.11ac Wave 2 feature compatibility, few are hardware-related. Adoption is likely to ramp up, and supporting products will follow with more Wave 2-enabled hardware which is expected to hit the market by the end of the year.

The case for 802.11ax

Whether you're in a conference, sports arena or other public space, complete strangers will all ask each other one thing: *is the Wi-Fi down or just very slow?* That's not great for the branding of a commercial venue such as a hotel. These days, customers expect good Wi-Fi, and hotels are often judged by the quality of their wireless network.

As stated above, 802.11ax (or High-Efficiency Wireless) promises a four-fold increase in average throughput per user. As well as being designed specifically for high-density public environments, like trains, stadiums and airports, the forthcoming standard will also help the IoT.

Ax is good for mobile data off-loading too. So CSPs can off-load wireless traffic to a complementary Wi-Fi network when the local cell reception is poor or if there is a massive influx of mobile phone users in any given cell – such as the presence of delegates at a conference centre attached to a hotel.

802.11ax could be finalised as early as June 2019 because vendors are very excited by the prospect of a high-value upgrade product. Non standard chipsets have been shipping since last year and the first 802.11ax routers are on

Wave 2 versus ax

Wi-Fi standard	Frequency operating range	MU-MIMO	Number of simultaneous MU-MIMO transmissions	OFDMA	Energy usage
802.11ac (Wave 2)	5GHz only	Downlink transmissions only	4	No support	Power intensive
802.11ax (ax)	2.4GHz & 5GHz with 12 possible channels	Full duplex from multiple sources	8	Uses multiplexing with OFDMA, giving it random access, dynamic fragmentation & spatial frequency re-use. Results in greater efficiency	Uses 'target wake time'

sale at reassuringly expensive prices. Some early adopters will use these non-standardised products in the hope they can perform a firmware upgrade at a later date that keep them compliant when the standard is ratified.

The problem experienced by many of these Wi-Fi 'power users' (such as the aforementioned conference centres and crowd pullers) is that bandwidth is shared among endpoint devices. Often, APs can have overlapping coverage areas. This causes complications with end users as they move between APs which is frequent with crowd behaviour.

The current system is based on the old shared Ethernet model of Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA). This requires endpoints to listen for an all-clear signal before transmitting. In the event of interference, congestion or collision, the endpoint goes into a back-off procedure, waits for the all-clear, then transmits. But in a crowded stadium, a busy airport or a packed train with hundreds or even thousands of end users attempting to stream video at the same time, the system loses efficiency and performance suffers.

Ironically, this was dismissed as primitive more than 20 years ago, and advanced systems such as desktop ATM and Token Ring promised to overcome the issues. But Ethernet fulfilled an immediate requirement and was the cheap

**Kevin Wen,
European
president,
D-Link**



option, so people bought it rather than the expensive specialist offerings such as ATM and Token Ring. Ethernet, won the mass market because it gave immediate payback before Token Ring could gain momentum – an allegory that is worth bearing in mind when comparing Wave 2 with ax. It's a moot point, as we shall see, whether this is a like-for-like comparison.

For example, 802.11ax offers potentially greater performance, of a magnitude out of proportion with the benefits of Token Ring over Ethernet. In addition, it greatly extends the network coverage and, being more energy efficient, extends the battery life of each device using it.

Performance is the headline selling point. It can deliver a single stream at 3.5Gbps but, crucially, it has also adopted OFDMA multiplexing technology which it took from LTE. This allows it to send four simultaneous streams to a single endpoint. In theory, this creates a potential bandwidth of up to 14Gbps.

Modus operandi

The ax standard takes a variety of well-understood wireless techniques and combines them to make big boosts to existing models. As well as multiplexing from LTE mentioned above, it also uses beamforming techniques that ensure that streams are aimed more accurately at their target antenna. These incremental improvements mean that 802.11ax is back-compatible with 802.11ac and 802.11n.

Another technique ax adopts is QAM. This creates a 40 per cent increase in throughput because it enables more data to be transmitted per packet. It also makes for more efficient use of the available spectrum resources. This is how ax creates broader channels and splits those channels into narrower sub-channels. The result is the endpoints have more channels to use, making it easier for them to get a clear channel without collisions or interference.

Downloads from the AP to the end user have improved too. Early Wi-Fi standards only allowed one transmission at a time per access point. When Wave 2 adopted MU-MIMO techniques, that allowed those same access points to send up to four streams simultaneously. However, 802.11ax can offer eight simultaneous streams, each of which uses beamforming technology to sharpen its aim. ■

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ITU to look at ICT technologies beyond 2030



The ITU has launched a new research initiative to identify emerging and future ICT sector network demands beyond 2030 and the advances expected of IMT-2020 (5G) systems.

It has set-up the *Technologies for Network 2030* focus group which is open to all interested parties and will guide the global ICT community in developing a future vision. This will include new concepts, new architecture, new protocols as well as new solutions that are fully backward compatible, so as to support both

existing and upcoming applications.

The ITU says these ICT use cases will span new media such as holograms, a new generation of AR and VR applications, and high-precision communications for 'tactile' and 'haptic' applications in need of processing a very high volume of data in near real-time. Focus group chairman and VP of future networks at Huawei, Richard Li, says: "Supporting such capabilities will call for very high throughput in the range of hundreds of gigabits per second or even higher."

The ITU adds that its group



A newly set-up focus group will look at new use cases for applications such as holographic communications which the ITU believes will have a big part to play in industry, agriculture, education, entertainment, etc.

will also strengthen and leverage collaborative relationships with other standards development organisations such as ETSI, Association for Computing Machinery's Special Interest Group on Data Communications (ACM SIGCOMM), and the Institute of Electrical and Electronics Engineers'

Communications Society.

The union's secretary-general Houlin Zhao says the focus group's work will provide network system experts around the world with a "very valuable" international reference point from which to guide the innovation required to support ICT use cases through 2030 and beyond.

Thailand nationwide TETRA to support over 200,000 users



Motorola Solutions is supporting the installation of a nationwide digital communications network in Thailand.

State-owned CAT Telecom operates the country's telecoms infrastructure and will provide government agencies, emergency services and other critical enterprises with access to the mission-critical TETRA network.

The shared operator system is described as "highly scalable", and when complete, it will have capacity to serve more than 200,000 users.

Deployment is said to be well under way with CAT utilising Motorola



CAT Telecom operates Thailand's telecoms infrastructure. It will provide government agencies and other critical comms users with access to the TETRA network provided by Motorola Solutions.

Solutions' broadband enabled push-to-talk platform. The vendor reckons this will enable seamless communication



between radio users and other workers via smartphones, tablets, desktop computers and other devices.

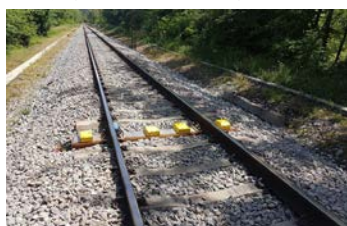
Motorola says its system will also deliver next-generation capabilities including location services to pinpoint radio users and other resources in the field, providing improved response to large-scale events.

"Any country experiencing significant growth in infrastructure, innovation, education and skills requires an advanced communications system," says Marcel Verdonk, Motorola Solutions GM for emerging Asia. "This TETRA system will support Thailand's continuing investment in infrastructure modernisation as well as job creation through its construction."

IoT management system keeps railway on track



Slovenian Railways says its new IoT-based Incident-Response Management (IRM) system has already detected



The system detects overloaded freight wagons as well as wheel irregularities that can destroy railway track geometry.

several potential hazards just weeks after being installed.

Implemented by local ICT specialist Iskratel, the IRM system is based on a modular concept and has a customised graphical interface for train dispatchers' operational processes. The company claims it provides "clear" error notifications and "easy" management of unexpected events, offering operators pre-defined scenarios and measures for effective actions.

Iskratel says its IoT-based solution operates in real-time, measuring heat from axles and brakes to

avoid excessive temperatures that can lead to damage of rolling stock and even derailment. The firm installed the system for Slovenian Railways in August, and in early September the Slovenian Ministry of Infrastructure reported that it had already detected four alarms, all due to overheated train wheels caused by locked brakes.

The IRM also features a track weighting system that detects overloaded freight wagons that can cause fractures of rolling stock, while a flat wheel detector system senses wagon irregularities that can

destroy railway track geometry.

In the event of an emergency, Iskratel says its solution immediately alerts the operator with key visual and acoustic information, showing the exact alarm location, alarm type, train number, direction, speed, total composition length and number of axles.

The company adds that before taking any action, the system automatically provides clear guidance to successfully monitor and resolve the situation. Damaged vehicles can also be detected by the system, ensuring quick removal of the vehicle and the risk of fire it poses.

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Drones carry crucial medical supplies

 AT&T and Softbox have conducted proof of concept trials to see how drones can be used to safely deliver temperature-sensitive medicines in areas affected by natural disasters.

UK-based Softbox provides specialist temperature control packaging to the pharmaceutical industry. In late August, it was announced that an LTE-connected drone carrying Skypod – Softbox's thermal-insulated packaging system which includes a smartbox powered by AT&T's IoT technology – successfully completed demonstration flights. The trials took place in locations across Puerto Rico in collaboration with pharmaceutical company Merck.

AT&T's IoT technology tracks the Skypod with data viewed on a web and mobile app dashboard. The data includes the box's near-real time external and internal temperatures and



A flying Smartbox From AT&T and Softbox shows how the IoT can help safely deliver vital medicines in a crisis.

its location. The dashboard can flash alerts to help drive appropriate action – for example, it will send an alert if there is a change to the temperature range of 2°C to 8°C. It will also send an alert if the drone goes outside of defined geofencing parameters.

Furthermore, during daylight, light exposure data helps signal if the payload has been tampered

with by determining if the package is open or closed.

AT&T's various control centres connect and manage the Skypod's sensor data transmission, and the web and mobile app reporting dashboard. The drone is also connected to the AT&T network, providing a communications path for flight plan and telemetry data between the

drone and ground control system.

Softbox worked with the AT&T Foundry to develop its Skypod from a prototype that started out as a connected flask. The foundry is a network of innovation centres that collaborates with startups, technology providers and enterprises to move ideas to market faster through rapid prototyping. It moved the IoT sensors that track temperature and location from the lid of the original prototype and integrated them into the smartbox.

AT&T is keen to work on projects that showcase what it describes as the "IoT for Good". After Hurricane Maria hit Puerto Rico last year, the company deployed the Flying COW (Cell on Wings), a mobile site on a drone. It was the first time a drone had been used to connect residents with their mobile phone services after a disaster.

Mesh wireless network opens world of IoT at Antwerp Gateway

 One of Europe's largest and busiest container terminals has a new wireless backbone network that uses Rajant's *Kinetic Mesh* technology.

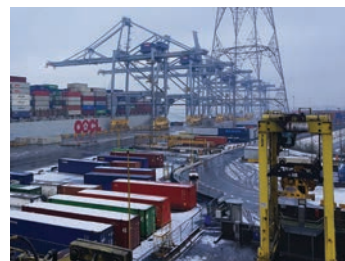
As well as dealing with around 3,000 trucks every day, DP World's Antwerp Gateway in Belgium is said to handle 2.5 million containers and almost 950 ships every year.

Its wireless network was deployed by UK telco BT and is designed to provide secure and resilient connectivity for not only 900 employees but also the growing demands of connected devices.

These will help DP World Antwerp to analyse and optimise processes and operations, such as the movement of vehicles around the terminal.

Rajant says its mobile, scalable and "highly reliable" *Kinetic Mesh* system enables always-on communications so that critical applications can be accessed in real-time and in the "most cost-effective" way.

The firm says its solution provides DP World Antwerp with a flexible meshed wireless backbone network that offers security, resilience and high bandwidth. It's claimed the system dynamically adapts



DP World's Antwerp Gateway reportedly handles 2.5 million containers and almost 950 ships annually, along with 3,000 trucks every day.

to accommodate connectivity for moving vehicles, and overcomes

obstacles within an ever-changing environment including the presence of containers or large ships.

"The container industry and global supply chain is undergoing huge changes enabled by digital technology," says Patrick Putman, chief information and innovation officer, DP World. "Working together [with BT], we have successfully completed a wireless backbone solution that creates an infrastructure for future IoT deployments, opening up the possibilities of automation and artificial intelligence. It is our backbone for growth."

Google to use Ruckus WiFi to power hotspot rollouts



Google will use Ruckus' technology for its Wi-Fi hotspot initiatives in India, Indonesia and Mexico.

Google Station is claimed to be a high-speed, high-quality public platform for service providers. It aims to give service providers an easy set of tools to roll out Wi-Fi hotspots in public places and high-traffic locations such as airports, malls, universities, railways and mass transit stations.

The platform is offered to providers free of charge with a revenue share

based on their ability to monetise the service.

Google says it uses smart, data-backed tools to choose where networks should be designed and deployed. The company adds that it also provides operations and quality assurance support to reduce deployment and operations costs, as well as analytics to improve and enhance services.

Google Station supports select APs from major vendors and industry-standard network architectures. It has already been implemented in

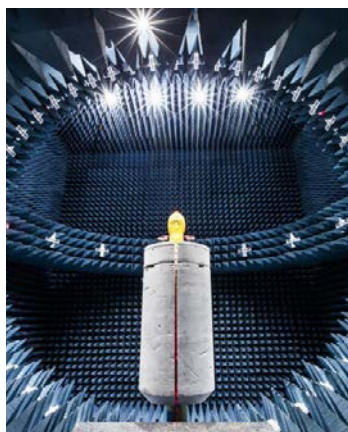
locations in Nigeria and Thailand, and is now being rolled out in India, Indonesia and Mexico where it will be supported by Ruckus.

Under the terms of the deal, the wireless infrastructure vendor will provide devices and technologies enabling carrier-grade networks at the hotspots. It will supply its *SmartZone* controller which can manage both virtual deployments of *SmartZone* as well as indoor and outdoor Wi-Fi access points.

Ruckus reckons these hotspots will deliver high-performance


Wi-Fi using its patented adaptive antenna *BeamFlex* technology for increased connectivity performance and range, better signals and maximised power efficiency.

"Deploying *Google Stations* with Ruckus technologies is an important step to connecting the next billion users," says David Shapiro, chief business officer of the *Next Billion Users Initiative* at Google. "Ruckus networks are simple to install and operationally cost efficient, enabling us to be up-and-running in no time."



The facility is equipped with various chambers and systems, including an SAC 5 chamber for testing EMC and RF in the wireless range.

TÜV Rheinland opens wireless lab in Sweden

 Globally testing service provider TÜV Rheinland has opened a wireless laboratory in Lund, Sweden.

Located at the heart of a technology cluster of research and development companies, manufacturers and integrators, the facility is the first of the European TÜV Rheinland Wireless labs to specialise in IoT products.


TÜV Rheinland Sweden MD Anders Nordlöf says: "On a total of 900 square meters, spread over six individual laboratories, customers will find the entire spectrum of wireless testing options such as Sigfox, LoRa, NB-IoT, ZigBee, 3GPP (2G/3G/LTE), Wi-Fi, Bluetooth, mmW (RADAR) up to current 110GHz and eCall."

He adds that the facility is also equipped with OTA, FAR chambers and SAR systems, and covers both short range and long range radio technologies. There is also an SAC 5 chamber for testing EMC and RF in the wireless range.

In addition to Sweden, TÜV Rheinland also has wireless laboratories in Germany, Italy, Japan, South Korea, China, Hong Kong, Taiwan, India, the USA and the Netherlands.

Stefan Kischka, VP of wireless/IoT at TÜV Rheinland, says: "The laboratory in Lund is one of the milestones with which we are expanding our global commitment to wireless technologies and which will take us a further step forward in fulfilling our *TÜV Rheinland Wireless Strategy 2020*."

Vodafone sends real-time 3D holograms in 5G demo

 Vodafone has conducted the first live holographic call using 5G.

At a public demonstration held in the UK in September, Stephanie Houghton, captain of Manchester City and the England Women's football teams, interacted in a 3D, real-time communication with Vodafone enterprise director Anne Sheehan who was more than 190 miles away at Vodafone's HQ in Newbury.

Also taking part was 11-year-old Manchester City and Lionesses fan Iris from Surrey. Despite the distance, she was able to be in the 'same room' as her idol Houghton thanks to the use of a Microsoft *HoloLens* VR headset connected via 5G.

This latest development follows the success of Vodafone's first UK test of 5G spectrum across a live network in April 2018. As from October 2018, the operator plans



Despite being more than 190 miles away, 11-year-old Iris was able to use 5G and a VR headset to realise her dream of being with her idol, Manchester City and England Women's captain Stephanie Houghton. Pictured right is Vodafone enterprise director, Anne Sheehan.

to switch on 5G trials in the first of its city test beds, following end-to-end testing at its lab in Newbury. Manchester and Birmingham, which are in north-west and central England respectively, will be the


first of seven test cities to go live.

The operator adds that it will also roll out 5G to popular UK holiday destinations such as the coastal resort of Cornwall and the Lake District during 2019.



Kannur International will be the largest airport in Kerala which will become the only Indian state to have four international airports.

DAMM TETRA helps secure Kerala airport

 DAMM Cellular Systems will provide a mission-critical secure communication system at Kannur International Airport Ltd. (KIAL) in India.

KIAL will be the second greenfield airport in the southern Indian state of Kerala. Covering an area of 2,000 acres, it will be the largest airport in Kerala which will become the only Indian state to have four international airports.

The facility is said to be being built with "state-of-art" infrastructure and is due to become operational in 2018. During its first year of

commercial operation, KIAL is expected to be used by around 1.65 million international and 160,000 domestic passengers.

Consort Digital is DAMM's regional partner in India and will be supporting the delivery of the entire project to the airport. It will deploy the Denmark-based PMR specialist's *TetraFlex* voice and data radio communication system which will be used by all airport operations and maintenance users to safeguard passenger safety.

According to DAMM, its platform offers a fully IP-based solution and

decentralised architecture. It says compliance with the open TETRA standard ensures multi-vendor subscriber terminal support, while there is also provision to integrate into smartphones for designated users using the *DAMM TetraFlex* push-to-talk application.

Other key features of *TetraFlex* are said to include integrated voice and data logging solution for storage and playback, gateways for interconnection to PBX and conventional networks, and "easy" integration, installation and commissioning.

Gilat and GSS partner

 Gazprom Space Systems (GSS) and Gilat Satellite Networks have signed a contract worth around USD18m to provide broadband connectivity across Russia. Gilat will deliver its multiservice platform and user terminals to operate over GSS' Yamal 601 Ka-band satellite which is due to launch in 2019. Its 32 beams will be lit up using two Gilat SkyEdge II-c gateways that will be installed in Siberia. GSS and Gilat have also agreed to jointly develop communication projects such as IFC and railway transport.


UK develops spaceports

 The UK is building its first spaceports and plans to develop both vertical and horizontal launch sites. Sutherland on the north coast of Scotland has been selected as the first vertical launch site. It will be developed using initial government funding of GBP2.5m, and plans to use a combination of proven and innovative rocket technologies. Scotland is said to be the best place in the UK to reach in-demand satellite orbits with vertically launched rockets. Commercial vertical and horizontal launch demand is said to be worth a potential GBP3.8bn to the UK economy over the next decade.

Hytera signs Alagoas deal

 Hytera will expand the TETRA network across Alagoas state in Brazil. As well as new infrastructure, the USD6.5m deal also includes a four-year maintenance contract. Hytera first delivered TETRA infrastructure, terminals and a dispatcher for the state's public safety users in 2014. The newly signed equipment contract includes 31 sites with the vendor's DIB R5 base station. Hytera says this has a maintenance-free, space-saving design and can be installed on walls, antenna masts or in tunnels. It is also designed to offer low power consumption and passive cooling.

Ontix to end mobile 'not-spots' in central London

 Ontix is promising to deliver "world class" wireless service to residents, businesses and visitors across the heart of London.

The wireless laaS provider says that following a competitive tender, it was awarded a 10-year concession contract giving it exclusive rights to deploy small cells on Westminster City Council's street furniture and lampposts. Ontix claims this will provide "next-generation" wireless infrastructure to mobile operators and other wireless network operators.

A pilot wireless small cell network will be deployed in Trafalgar Square in November. This will be available for all operators to trial. A rollout across the wider Westminster borough is then expected to continue during 2019, spanning many of the capital's most popular tourist attractions.

Ontix says that in recent years, pressure on legacy network infrastructure in central London has been growing, with operators struggling to access enough suitable rooftop sites to deploy the macro



Ontix is deploying a pilot small cell network in Trafalgar Square in November. Traffic will be backhauled using the company's hybrid Metrohaul transmission network.

cells they have been using to date.


As part of its 10-year partnership with the council, the company will also use its hybrid Metrohaul platform to build a high capacity, neutral-host backhaul network to deliver 5G-ready connectivity for all operators. This will also be available as part of the small cells trial.

Ontix says this will feature a dark fibre core that will connect its fibre nodes in rings. Using the latest wireless equipment, the company

says it will then provide high capacity, resilient connections from each fibre node to multiple small cells.

Ontix goes on to claim that unlike the traditional managed fibre links used by mobile operators, its costs will be lower and time to market will be shorter because it does not need to install fibre to every small cell. It adds that solution will also be resilient because its fibre will be deployed in independent 'rings' that will allow traffic to be rerouted if one ring is cut.

DAS hits the right chord at Haus der Musik

 Staff and visitors at the new Haus der Musik (House of Music) Innsbruck in Austria will always be connected thanks to its distributed antenna system (DAS).

Due to open its doors in early October 2018, the venue houses nine cultural institutions and musical training centres across an area of around 12,900m², making it one of the largest buildings in the state of Tyrol.

Working in partnership with MVNO Innsbrucker Kommunalbetriebe, system integrator Iconec installed JMA Wireless' TEKO DAS to enable cellular coverage throughout the at the Haus der Musik while still maintaining its design aesthetics.

JMA says the building presented many challenges with its complex structure spanning seven levels, including two located underground.

For the first phase of the wireless system, the company says it used its iBwave simulation tool to design an "intelligent and aesthetically elegant"



The Haus der Musik is scheduled to open in October 2018 and will be one of the largest buildings in the state of Tyrol.

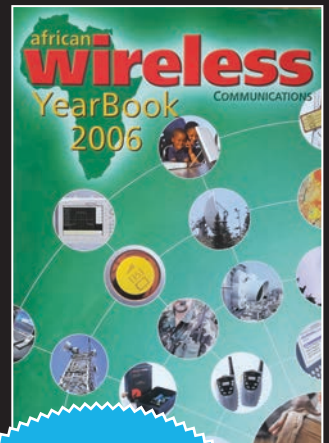
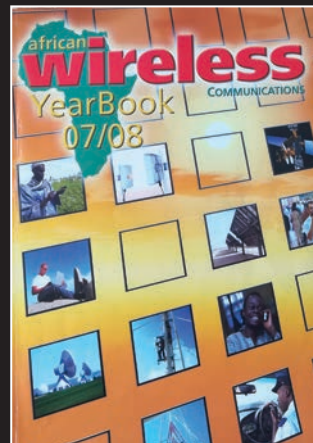
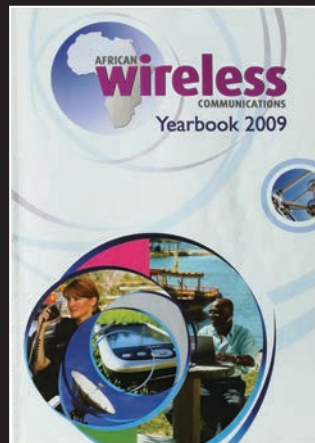
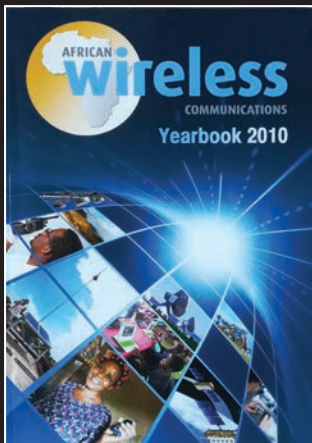
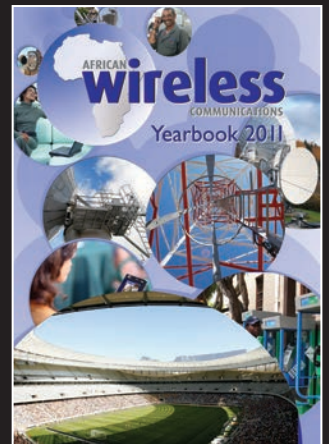
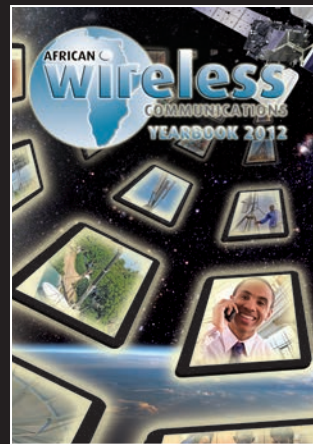
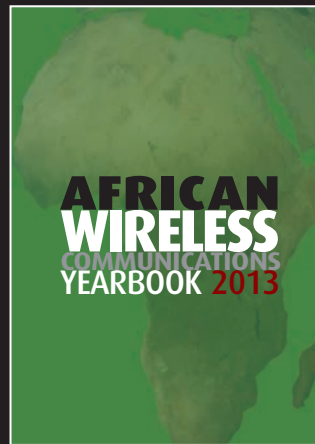
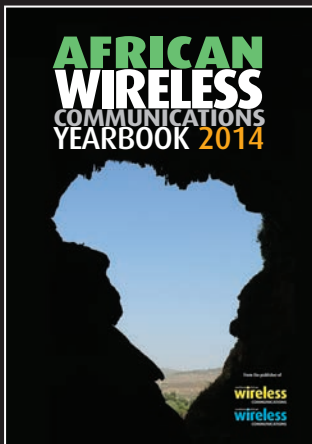
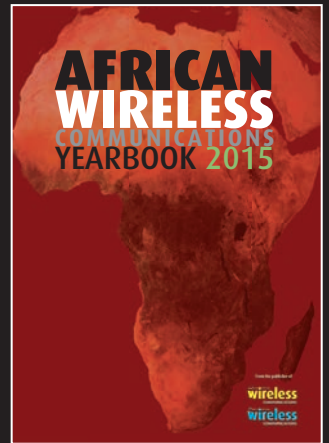
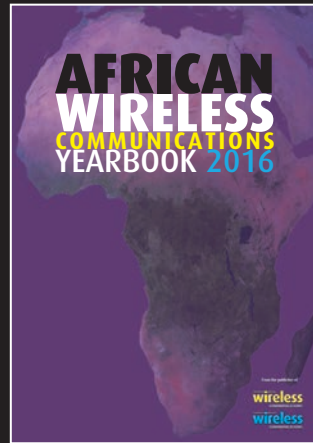
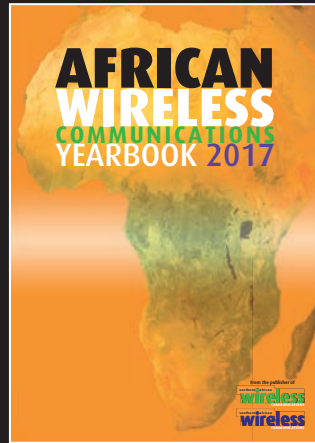
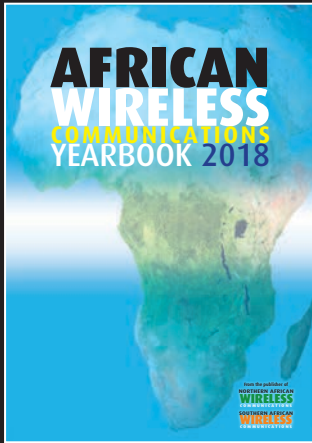
system while ensuring smarter planning, streamlined designs and seamless deployment plans.

JMA continues by saying TEKO will enable in-building wireless communications with one sector supported by four low power remote units. Each of these is connected back to the master unit

via a single optical fibre which will transport five bands – 800MHz, 900MHz, 1800MHz, 2100MHz and 2600MHz – and will provide support for three mobile operators.

The vendor also claims that with its innovative capabilities, TEKO is up to 50 per cent less expensive than competitor offerings.

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