

For communications professionals in southern Africa

SOUTHERN AFRICAN WIRELESS COMMUNICATIONS

MARCH/APRIL 2018

Volume 22 Number 6

- Ka-band: the best option for broadband via satellite?
- RF technology: the key to smart city applications
- A network on wheels – the ultimate in mobile deployments

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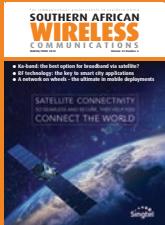
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Singtel is Asia's leading communications technology group, providing a portfolio of services from next-generation communication, technology services to infotainment to both consumers and businesses. For businesses, Singtel offers a complementary array of workforce mobility solutions, data hosting, cloud, network infrastructure, analytics and cyber-security capabilities. The Group has presence in Asia, Australia and Africa and reaches over 685 million mobile customers in 22 countries.

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Singtel

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SUBSCRIPTIONS:

Southern African Wireless Communications is a controlled circulation bi-monthly magazine. Register now for your free subscription at www.kadiumpublishing.com. Readers who do not qualify under the terms of control can purchase an annual subscription at the cost of £110. For more information and general enquiries please contact Suzanne Thomas at suzannet@kadiumpublishing.com or call +44 (0) 1932 886 537.

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Quika plans to launch world's first free satellite internet service

A new company has been set up to launch what's promised to be the world's first entirely free high-speed satellite internet for consumers in developing countries.

London-based Quika was founded by Alan Afrasiab, the CEO and president of global satellite networks and services provider, Talia Group.

Speaking during the launch of Quika in January, Afrasiab said: "We believe that left unbalanced, entire communities and regions will be abandoned by technological and economic progress. Quika will help bridge this digital and economic divide.

"The main reasons for people not using the internet are inequalities in relation to income and education, as well as the lack of infrastructure, relevant online content and services, plus relatively high costs of access and usage."

Quika's free service will be partially funded by advertising and through the subsidisation of the paid version which will be available on a pay monthly basis or via pre-paid plans. Prices have yet to be announced.

Paid services will include a variety of bandwidths designed for SMEs and local ISPs, and offer download speeds of 5-50Mbps and upload speeds of 1-3Mbps depending on the



Quika believes that the opportunities the internet provides shouldn't be limited by geography, culture, wealth or infrastructure. It will use GEO and LEO satellites to provide Ka-band services for free.

plan chosen. The free version will have fixed bandwidth offering download/upload speeds of 3Mbps/1Mbps.

Quika will use high throughput Ka-band satellites. It said that while data speeds will be fast, internet services provided by geostationary satellites mean an average latency of 638ms. This will make Quika unsuitable for applications such as online gaming or screen sharing. However in the future, the firm aims to utilise low-Earth orbit satellites that promise to reduce latency to under 100ms.

In the meantime, Quika has partnered with Isotropic Systems to develop a self-installing terminal to help bring broadband to consumers at no cost.

With offices in the UK and USA, Isotropic Systems is developing a terminal to support the satellite industry to 'reach beyond' traditional markets. It claims the fully integrated high throughput terminal will be the first to offer multi-service, high-bandwidth and low power.

The two companies said they will jointly develop an "out-of-the-box consumer web experience" that eliminates the need for skilled installation, and allows internet usage to be fully subsidised by advertising.

Isotropic said its optical technology will enable terminals that meet or exceed traditional VSATs at one-tenth the current cost. It claims that the

technology mitigates several key engineering challenges to deliver "seamless auto tracking, unlimited instantaneous bandwidth through true time delay, and a 90 per cent reduction in power consumption over conventional design". According to Isotropic, its technology automatically tunes the beam-pointing to maintain the precise accuracy over time that is uniquely needed for Ka-band systems to optimise the efficiency of the links in the service provider's network.

In a separate deal, Avanti Communications is also working with Isotropic to develop a self-installing terminal to expand its markets in Africa, the Middle East and Europe. A working prototype is expected in early 2019 and full scale production by mid 2020.

Quika will initially launch its internet services in Afghanistan and Iraq at the end of Q318 before launching in 27 countries in Africa at the end of the year. In the region of the continent they include: Algeria, Benin, Cameroon, Congo Republic, Côte d'Ivoire, DRC, Egypt, Ghana, Libya, Nigeria, Rwanda, Senegal, South Sudan, Togo and Tunisia. However, the company points out that its ultimate vision is to offer free broadband services globally.

Eutelsat plans LEO satellite for IoT connectivity

Eutelsat has commissioned its first LEO (low Earth orbit) satellite.

Nano- and microsatellite specialist Tyvak International, a subsidiary of US and Italy headquartered Terran Orbital Corporation, will build the spacecraft for the operator.

Eutelsat LEO for Objects (ELO) will be used to assess the performance of low Earth orbit satellites in providing narrowband connectivity for the IoT. According to the company, low Earth orbit is particularly well-suited for this. It says LEO offers a satellite link anywhere in the world, is complementary to terrestrial IoT networks, and does not impact the cost or the energy consumption of the objects.

ELO is scheduled for launch in 2019. It will backhaul information from objects located in areas



that are not served by terrestrial networks and offer redundancy on existing terrestrial network coverage.

Located on a sun-synchronous orbit between 500km and 600km in altitude, the satellite will collect data from connected objects across the globe equipped with the same omni-directional antennas already used by terrestrial IoT networks.

Data will then be transmitted daily to a ground station located in the Norwegian archipelago of Svalbard in the Arctic Ocean.

Eutelsat will work with Sigfox which runs a global narrowband network dedicated to the IoT. Sigfox will analyse the spectrum used by the satellite in ISM frequency bands, and process data from objects.

ELO will also test connectivity in other frequency bands. Eutelsat hopes that the synergies developed through the partnership with Sigfox, as well as with other strategic alliances in the telecom industry, should open up new opportunities in this fast-growing market.

"With the expansion of the Internet of Things, new services are being developed in a wide range of sectors including smart cities, the mining industry, agriculture and logistics," says Jean-Hubert Lenotte, chief strategy officer, Eutelsat. "By analysing the compatibility of LEO and connected objects, and working with recognised partners in the field, Eutelsat aims to provide an innovative solution which will meet the needs of future clients."

Bentley Walker to expand in Africa with HYLAS 4



HYLAS 4 lifted-off on board Ariane flight VA242 on 5 April. A series of pre-planned in orbit tests will now take place over the coming months before it goes live.

Bentley Walker is aiming to "significantly increase" its EMEA coverage with the help of Avanti.

The company has announced that it will start service roll out across Africa utilising its initial USD1m bandwidth commitment on Avanti's HYLAS 4 which was successfully launched by Arianespace on 5 April 2018.

The satellite's payload includes 64 active Ka-band fixed beams and four steerable beams. It aims to expand capacity over Europe, and East and Southern Africa, as well as provide new capacity across West and Central Africa. Latin America can also be targeted.

HYLAS 4 will extend Avanti's coverage to 1.7bn people across 118 countries, and support Bentley Walker's market expansion into West, Central and South Africa.

UK-based Bentley Walker is said to be the largest supplier and operator of VSAT networks outside of North America. According to an independent audit, the company has so far sold and brought online more than 40,000 VSATs.

In a separate deal, MainOne will host and manage Avanti's gateway Earth station (GES) at its MDXI data centre in Lagos. Avanti has already invested up to USD20m

in the Nigerian gateway as it aims to ensure that services from **HYLAS 4** are delivered efficiently in-country and interconnected with other networks, ensuring access is available to enable high-speed internet everywhere, including remote and rural locations. The satellite can also support 2G, 3G and 4G backhaul services.

MDXI GM Gbenga Adegbiji says: "Our engineers have already implemented a bespoke colocation solution to support the largest GES in the region with uninterrupted power, connectivity and security to ensure 24/7/365 operations."

DSA applauds ICASA for its TVWS regulations

The Dynamic Spectrum Alliance (DSA) says the Independent Communications Authority of South Africa's recent decision to publish its regulations on the use of TV white space spectrum marks a "huge step forward" in enabling affordable broadband across the country.

The alliance has been championing TVWS for several years now. Its members believe that it offers the strength in providing connectivity over large geographical areas through the use of dynamic spectrum access technologies.

"TV white space technology provides an alternative but complementary ecosystem to LTE technologies for bridging the

digital divide and inexpensively delivering broadband," says DSA president Kalpak Gude. "The two biggest barriers in South Africa, like much of Africa, are accessibility and affordability, so we congratulate [ICASA] for publishing its regulations, and it highlights how TVWS can play an important part of a national telecommunications infrastructure."

The next step for ICASA is to make its type approval process operational and the TVWS database commercially available as these are both necessary for commercial deployments to move forward.

The DSA says TVWS regulations are being considered in a number of other countries in Africa



DSA president Kalpak Gude says TVWS can complement LTE.

including Botswana, Ghana, Kenya, Malawi, Nigeria, Mozambique and Tanzania. "We believe South Africa's actions will spur more regulators in the region and around the world to move rapidly," says Gude.

TVWS technologies use unused or unassigned spectrum in the UHF and VHF bands and operate on a secondary basis without causing interference to primary users, such as television broadcasters.

ZICTA names fourth MNO for Zambia

The Zambia Information and Communications Technology Authority (ZICTA) has awarded a fourth mobile license to UZI Zambia Limited.

In its official notification, ZICTA announced that the operator has been granted a network license under the international market segment, and a service license under the national market segment with "associated resources" (see News, Nov-Dec 2017 issue).

While the sums due for the licenses have not been disclosed, UZI has pledged to invest more than USD350m and says it will create 450 direct employment opportunities to support its operations in the country.

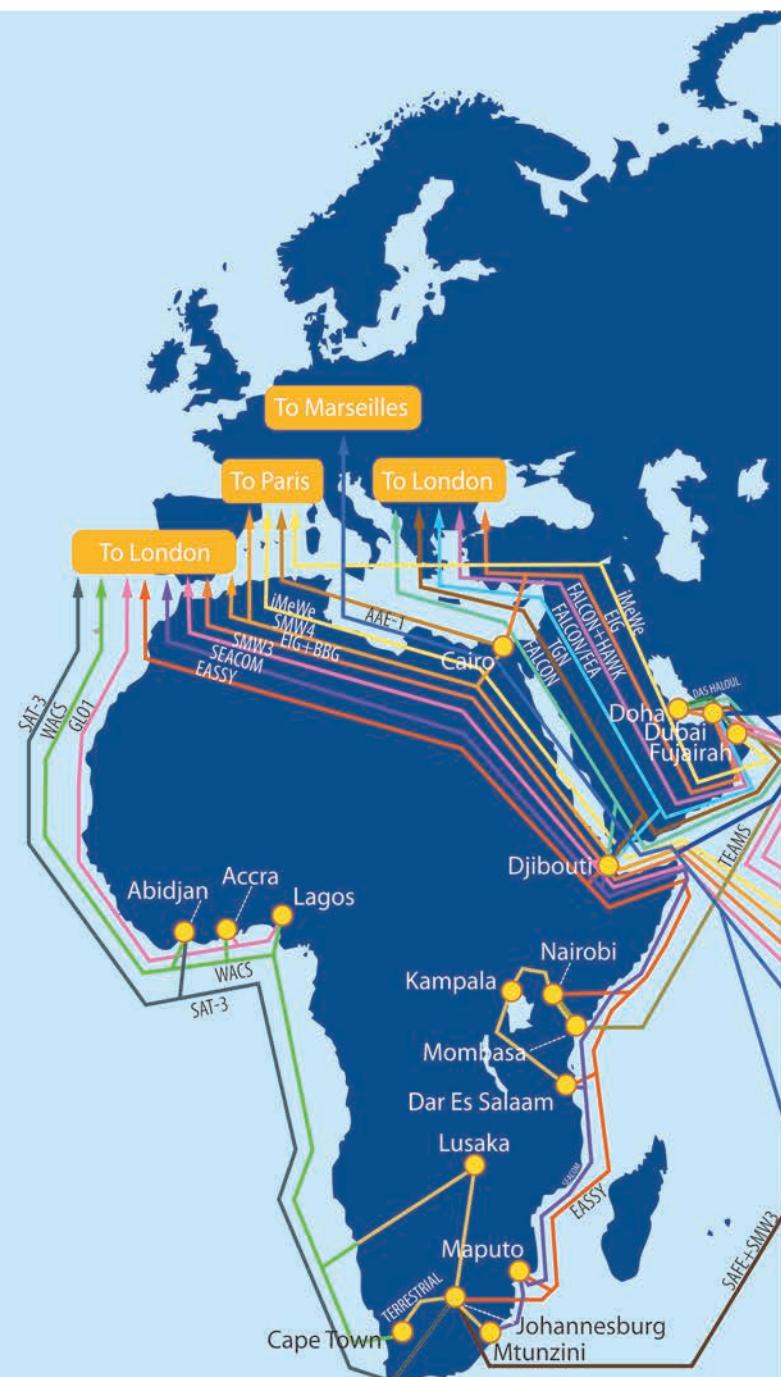
The company plans to deploy a nationwide network which will support 5G as well as LTE technologies. It will also implement 100 universal access sites in unserved and underserved areas.

UZI now joins MTN, Airtel and state-owned Zamtel in Zambia's mobile market. It was widely thought that Vodafone would be awarded one of the licenses after entering the country in 2016 but only as a provider of data services using TD-LTE. However at the end of March, Vodafone Zambia announced that it was set to launch VoLTE commercially within the next three months under a newly acquired license from ZICTA.

Uzi Zambia is a subsidiary of Netherlands-based Unitel International Holdings which also has a presence in Angola, São Tomé and Príncipe, Cape Verde and Portugal.

ZICTA's decision to award both licenses to the company has been questioned by some observers on social media who believe UZI does not have the same clout as bigger players in the telecoms space.

According to the authority, the licenses were granted after it carried out a technical and financial evaluation of the investment proposals that it received from applicants. ZICTA said it had received two proposals by the deadline of 18 December but did not reveal the identities of any other applicants.



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A dozen O3b satellites now in space

SES has successfully launched four new O3b satellites. They were sent into space on board an Arianespace Soyuz rocket from Kourou, French Guiana on 9 March.

The new spacecraft will join SES' existing constellation of 12 medium Earth orbit (MEO) satellites in May. They will be around 8,000km from the planet which is four times closer than their geostationary (GEO) counterparts.

As a result, it's claimed the satellites will deliver connectivity with a "low latency, fibre-like" performance.

Built by Thales Alenia Space, SES says the four new Ka-band satellites will enable it to meet the growing demand for bandwidth in the telecom, cloud, maritime, energy, and government markets. By augmenting its O3b fleet, the firm says it is scaling its "unique" ability to connect people, businesses,

and continents with high performance communications anywhere on Earth.

"This is the beauty of our MEO constellation," says Martin Halliwell, CTO, SES. "It can easily be scaled to respond to demand in an agile manner while beams can be allocated dynamically to where the demand is, and thus deliver low-latency connectivity where our customers need it. By augmenting our fleet, we will offer more

throughput, more coverage, and more capabilities to our customers."

This was the fourth O3b launch performed by Arianespace. The first 12 satellites were launched by three Soyuz launch vehicles in 2013 and 2014, and the company has been contracted to launch another quartet during the first half of next year.

Is Ka the best option for delivering broadband via satellite? Feature pp22-25.

Ecobank claims success for innovative banking app

Since launching a mobile banking app around 18 months ago, Ecobank claims it has now processed nine million transactions worth more than USD1bn across 33 African countries.

The app was developed as a single, unified financial services platform and enables any user to open an *Ecobank Xpress* account instantly on their mobile device.

Customers are able to transfer money instantly within Ecobank locally or across Africa using *Rapidtransfer*, a service that is claimed to be faster and more affordable than competing options. They can also make transfers to other local bank accounts, mobile wallets and to Visa cardholders.

In addition, the app offers convenient payments using Ecobankpay *Scan+Pay* through Masterpass, mVisa and Mcash, and offers options to pay utility bills, school fees, subscriptions, make

Group CEO Ade Ayeyemi said Ecobank's app usage has been growing at an average 700k new customers per month.



donations, buy airtime instantly and generate payment tokens for cardless ATM withdrawals or at an *Xpress* agent locations.

According to group CEO Ade Ayeyemi, Ecobank's strategic aim is to deliver "innovative, efficient and cost-effective" services to those who are typically outside of the formal economy. "Our app not only removes the barriers that have financially excluded so many Africans but offers next-generation functionality to help them send money, make withdrawals or pay for goods and services."

Orange plans to help citizens seize power in Africa

Orange is aiming to become a key player in the energy transition sector in Africa by providing services directly to the general public or as a wholesaler to public operators.

Orange already provides a service offering rural populations access to solar energy in the DRC and Madagascar. It has now introduced the service in Burkina Faso, and further launches are planned in Senegal, Mali, Guinea and Côte d'Ivoire.

The *Orange Energie* kit includes a solar panel, a battery and accessories such as LED lightbulbs, phone rechargers, etc. The equipment is provided by partners (BBOXX in the DRC, D Light in Madagascar and Niwa in Burkina Faso) and is said to be quick and easy to set-up – all the user needs to do is install a solar panel on the roof and a control unit in the house. Orange offers a full guarantee that covers the entire installation, maintenance and repairs

in conjunction with technical partners.

Various daily, weekly or quarterly subscription packages are available. For example in the DRC, monthly subscriptions start at USD15. Payment via *Orange Money* makes it possible to automatically grant or re-establish the service remotely for the requested period. Orange reckons its service makes solar energy more widely accessible thanks to the flexibility of mobile payments.

The operator adds that a new milestone will be reached in the 1Q18 with the distribution of 12,000 *Energie* kits in West Africa. Orange says the next step will involve the "massive" deployment of the *Energie* service in other countries across its footprint, and the sale of several hundred thousand kits in the next five years.

The firm believes the energy sector represents a significant opportunity for its plan for diversification in Africa where power cuts are frequent.

Zambia gets cloudier with Gilat Telecom's help

Gilat Telecom (formerly Gilat Satcom) has been granted a license to provide cloud and fixed broadband services across Zambia.

The operator claims the new license will enable its local subsidiary to meet the rising demand from businesses who are looking for a higher-quality broadband service and a wider range of managed services than currently available from Zambia's existing operators.

Gilat Telecom Zambia has already opened an office in Lusaka and is now recruiting a local team. The company is also completing work on its PoP in the capital and expects to start

offering services shortly.

According to the company, customers will benefit from a range of value-added services such as a high-performance Wi-Fi package that promises to bring fast broadband to offices without the need to lay fibre to the building.

Among some of the other benefits is a priority-based traffic management system, a cloud PBX service to reduce the cost of all calls, and a data protection service that provides another level of security by storing all of an organisation's critical data in the cloud. Gilat says the data is automatically backed-up regardless

of where it is stored and is easy to restore. The firm adds that all of its cloud services are available using a 'service-as-you-go' model.

In a separate development, Gilat has also launched a new remote connectivity service for organisations that work in African areas with little or no network coverage.

It uses a terminal from Swedish firm Satcube that weighs just 8kg. Gilat says the device can be transported as hand luggage on a plane, and can be setup without any engineering expertise to connect to its global satellite network. Users then pay a monthly fee for connectivity



Gilat Telecom's new service for remote users features the compact and lightweight Satcube. It is designed to be as easy to set up and use as a smartphone.

with a variety of different packages available. The service provides speeds of up to 20mbps and uses Ku-band.

SMARTER BACKHAUL THE AVANTI KA-WAY

CHANGING THE ECONOMICS OF SATELLITE BACKHAUL WITH CARRIER-GRADE CONNECTIVITY

Mobile Network Operators (MNOs) are looking at cost-effective ways to extend and improve their networks, roll out LTE quickly and expand their existing services profitably into challenging rural and remote locations.

Avanti's Satellite Backhaul has been designed to unlock the limiting factors of trying to deploy traditional backhaul bearers, whilst delivering highly reliable 'carrier-grade' services. It is time to take a fresh look at what satellite backhaul can provide and particularly Avanti Communications' Ka-band network which was designed to meet the demands of MNOs.

Avanti is connecting GSM, UMTS and LTE cell sites today, with their disruptive HYLAS fleet of next-generation Ka-band satellites and dedicated ground infrastructure. Avanti is the leading satellite operator for Satellite Backhaul, delivering high bandwidth and seamless network integration. Its technology cannot only cut capex and opex costs but also deliver market-beating service levels that meet MNOs performance criteria.

In reality, satellite capacity is the simplest way to deliver reliable and affordable backhaul solutions, especially in rural and remote areas.

"Avanti offers some of the best service levels with 99.9+% availability."

Future-proof Smarter Backhaul

Avanti's Smarter Backhaul enables MNO's to deliver 2G, 3G and 4G coverage in areas where backhaul is unavailable, uneconomic or unreliable. It is also compliant with 5G standards. With Ka-band satellites having a much higher throughput than Ku or C-band, you can easily manage any future increase in demand without having to rethink your backhaul strategy.

Optimised Network costs of Operation

Backhaul costs are dramatically reduced with Ka-band technology: with higher throughputs, lower construction and installation costs. Additionally, minimal planning burden and Avanti's Ka-band allows you to react quicker and lower your total cost of ownership.

Carrier- Grade Network

Avanti's Smarter Backhaul reduces coverage black-spots and increases your reach with no compromise on speed and reliability. We deliver 'carrier-grade' capacity through our highly redundant and resilient networks thanks to our multiple data centres and Gateway Earth Stations. And with some of the best service levels possible with 99.9+% availability, you can rest assured we can help you connect your customers wherever they are.

Highly scalable and flexible

Avanti's Smarter Backhaul delivers connectivity when and whenever needed. It supports multiple backhaul scenarios, such as network extension and infill, backhaul backup and fast response capacity.

Avanti was the first to commercially deliver Ka-band Satellite Backhaul in EMEA. With the recent launch of its HYLAS 4 satellite, Avanti has become a leader of High Throughput Satellite solutions across Africa. Its end-to-end managed services are used by some of the largest Network Operators. With regional offices in Kenya, Nigeria, Tanzania and South Africa, it has the network integration expertise and superior satellite network to address MNOs mobile backhaul requirements.

"With the recent launch of HYLAS 4, Avanti has become a leader of High Throughput Satellite solutions across Africa."





Cassie Lessing,
CEO,
Strato IT Group

ON THE NETWORK

Mobile-first solutions driven by IoT growth

Two years ago, when we launched, South African businesses were slowly starting to adopt limited-scope mobile applications.

While the uptake was slow, these businesses did enjoy a significant enough lead over competitors and experienced the immediate benefits of a mobile-first approach. But this is starting to change. Adoption and innovation are increasing in parallel, closing the initial gap fast.

We are noticing a much deeper level of development within mobile apps, with businesses starting to push the limits of what these can do across the entire company.

Sitting behind this innovation and growth is the rise of the IoT. The total number of IoT devices is predicted to surpass mobile phones worldwide by the end of 2018, making it the largest group of connected devices. Exacerbating this phenomenon is that by 2021, there will be 7.7bn mobile broadband subscriptions, 9bn mobile subscriptions, and 6.3bn smartphone subscriptions. This makes mobile-first an inevitable enterprise strategy within the next five years.

While enterprise adoption of IoT and its implementation is growing at a rapid rate globally, the South African time to market is still very slow. There is a mix of businesses still delaying the overall decision to develop and implement a mobile business strategy, while others are trying to fit a mobile strategy into a five-year IT strategy.

Despite this, growth and continued development of enterprise apps is inevitable. Machine learning, AR together with IoT will continue to bolster enterprise mobility and the increased use of mobile apps. These technologies together with a cloud strategy will unleash immense potential for mobile app development."

SSL set to build AMOS-8

Spacecom's mission in Africa is gaining momentum with news that it has contracted SSL to build AMOS-8.

US-based SSL (Space Systems Loral) is now a subsidiary of Maxar Technologies and will develop AMOS-8 using what's claimed to be the world's most popular commercial communications satellite platform, the SSL 1300.

Scheduled for launch to 4°W by SpaceX in the second half of 2020, Spacecom says the new satellite will deliver "state-of-the-art" broadcast, broadband and data services to Africa, the Middle East and Europe. It says AMOS-8 will include flexible high power Ku- and Ka-band payloads with steerable antennas to enable customers to deliver various added value services. The satellite will be colocated with AMOS-3 and will be designed with a service life of at least 15 years.

In a separate development, Cobbett Hill Earthstation has entered into a long-term agreement for capacity on Spacecom's forthcoming AMOS-17 communication satellite.

An independent teleport based in the UK, Cobbett Hill will use the

spacecraft's C-band transponders to provide high throughput internet, voice, data and broadcast services to the growing communication markets in sub-Saharan Africa.

Cobbett Hill was one of Spacecom's first partners and the two companies have been working together now for more than 10 years.

Scheduled for launch during the second quarter of next year, AMOS-17 is specifically designed for meeting Africa's growing demands. With what it describes as "extensive" Ka-, Ku- and C-band services, Spacecom says its satellite will combine broad regional beams and high throughput spot beams to maximise service delivery and spectral efficiency from its 17°E orbital position.

The company claims AMOS-17 will be the "most technologically advanced" satellite to service Africa and will deliver a large variety of services from its "state-of-the-art" digital payload.

Ido Ginzburg, the company's VP sales North America, UK and Nordic, adds: "The satellite will connect Africa, Europe and the Middle East, creating a unique bridge



Cobbett Hill teleport will use C-band transponders on Spacecom's AMOS-17 to provide high throughput internet, voice, data and broadcast services to sub-Saharan Africa.

for furthering a new digital age in sub-Saharan Africa in which satellite services will be at the centre."

Clear Blue and Vanu team for unique 'power and coverage as a service' in Rwanda

Canada-based off-grid power specialist Clear Blue Technologies is helping Vanu to provide cellular coverage that will support up to a million customers in rural Rwanda.

Vanu grew out of what's described as "groundbreaking" research in software radio at the Massachusetts Institute of Technology. The company has since pioneered a wireless communications solution and a 'coverage-as-a-service' business model that is claimed to make it economically viable to provide telecom services to remote areas.

Clear Blue's *Smart Off-Grid* solution and service will provide the accompanying 'power as a service' to deliver reliable, wireless, clean managed power for the Vanu cellular base station. The company's system includes a hybrid controller, integrated communications network and the *Illumience* cloud software for full



Clear Blue's 'power as a service' will provide reliable, wireless, clean managed power for Vanu's base station.

remote control and management over the internet. It claims all this "slashes" maintenance time and costs by up to 80 per cent.

"Clear Blue's *Smart Off-Grid* system enables us to install our communications solutions in areas without grid power or skilled labour for ongoing system maintenance," says Vanu Group CEO Andy Beard.

"This assists in our objective to lower the cost per cell site to a level that permits sustainable service in sparsely populated areas."

Beard says Vanu's aim is to help MNOs extend coverage to rural communities in Rwanda, and that by working with Clear Blue in the future, it will roll out rural market solutions for operators worldwide.

MARS connects Indian Ocean islands

PCCW Global and Mauritius Telecom have partnered to construct and maintain a high-speed submarine cable connecting the Indian Ocean Islands of Rodrigues and Mauritius.

PCCW will work with Huawei Marine Networks to build the 700km Mauritius and Rodrigues Submarine Cable System (MARS) which will have a bandwidth design

capacity of 16Tbps. MARS will be ready for service in 2019 and PCCW will manage its operation.

With a population of around 40,000 people, Rodrigues is the second largest island in the Republic of Mauritius. The partners claim that the island's residents will not only benefit from vastly improved bandwidth and connectivity once

the new cable is live, but will also have access to a "rich portfolio" of digital applications, online services and content via PCCW's international network.

Frederick Chui, PCCW Global's SVP of global data sales, PCCW Global, says: "This project is very exciting for us because we are using our experience gained in

designing, building, and maintaining submarine cables around the world to assist another service provider, in this case Mauritius Telecom, to commission their own fully-maintained cable investment. This completely eliminates any risk in the development, maintenance and operation of what might otherwise have been a technically daunting project."

Connecting Africa and the world On-demand

WIOCC will deploy Epsilon's *Infiny* platform to provide customers in sub-Saharan Africa with on-demand connectivity to major global financial and communications hubs.

Service providers will be able to use the platform to access any of Epsilon's 90+ PoPs globally and gain direct connectivity to cloud and IXP providers. The company claims *Infiny* makes procuring and managing global connectivity simple with round the clock access to services via its intuitive web portal or APIs. Epsilon says users will be able to rapidly provision a suite of on-demand connectivity services via a web-based portal, APIs and iOS or Android mobile apps. They can choose from a range of services from port-to-port, port-to-cloud, port-to-internet exchange, SIP-trunking and inbound, last mile DIA and SD-WAN.

"Partnering with Epsilon further expands our capabilities, offering our customers more flexibility in accessing global hubs," says WIOCC CEO Chris Wood. "The African market wants network services that can support the cloud, matching the speed and accessibility of other ICT solutions."

Wood adds that WIOCC plans to deploy *Infiny* more widely across Africa.

Often described as "Africa's carriers' carrier" WIOCC is said to run a unique, diversity-rich, high-redundancy network – which brings together 55,000km of terrestrial fibre in Africa and investments in more than 60,000km of international submarine cable.

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MTC suffers outage

 Namibian celco MTC suffered an “operating system malfunction” in early April leading to network failures. As a result, 54,595 data subscribers and 56,877 SMS customers had their bundles terminated in error. MTC spokesperson Tim Ekandjo said all affected customers will be given their lost data allowances on top of their existing packages. They will be able to use the allowances for 24 hours to make up for the day that was lost due to the network outage which Ekandjo described as an “isolated incident”.

Cyber threat in routers

 Security experts at Kaspersky Lab have uncovered a sophisticated threat used for cyber-espionage in the Middle East and Africa that has existed since at least 2012. The malware, dubbed *Slingshot*, attacks and infects victims through compromised routers and can run in kernel mode, giving it complete control over victim devices. Kenya and the Yemen account for most of the 100 victims that have also been seen in Libya, Congo, Sudan, Somalia and Tanzania. Kaspersky Lab advises users of Mikrotik routers to upgrade to the latest software version as soon as possible to ensure protection against known vulnerabilities.

African-brand smartphone

 African firm Mara Corporation is promising to launch a unique and high-quality smartphone across the continent in the next few months. The *Mara X* will be launched as part of Google’s *Android One* portfolio and will run the company’s latest OS, *Android 8.0 Oreo*. It promises to be “extremely affordable” and feature a “carefully curated” set of pre-installed apps. The Mara Group began as a small IT business in Uganda and has since expanded to become a multi-sector investment company that now employs over 14,000 people across 25 African countries and three continents.

Standard Chartered sets up digital bank in Africa

Standard Chartered Bank has launched its first digital bank in Africa in Côte d’Ivoire.

By downloading Standard Chartered’s app, new clients can use their mobile devices to open an account. It’s claimed they can upload all verification documents and fully complete the onboarding process within 15 minutes.

“Our new digital bank was developed with our clients in mind,” says Jaydeep Gupta, Standard Chartered’s regional head of retail banking, Africa and Middle East. “We have taken into consideration the feedback received by our clients at each stage of the design process and

have incorporated innovative technology to allow them to execute all banking activities from a mobile device. This includes 70 banking services through the app.”

Gupta adds that clients will also be able to track and trace a request submitted – a first for Standard Chartered.

The bank launched the new service with the support of the Côte d’Ivoire government. Sunil Kaushal, Standard Chartered’s regional CEO for Africa and Middle East, hailed the achievement as a “key milestone” on the company’s digital journey, and that it underlines a commitment to investing and growing in the market.



As the bank’s digital ambassador, international footballing legend Didier Drogba (centre) became the first person in Côte d’Ivoire to open a digital account. He is pictured with Sunil Kaushal, Standard Chartered’s MEA CEO (left) and Côte d’Ivoire ICT minister, Bruno Nabagné Kone.

Plan International upgrades VSAT systems

Satcoms specialist ITC Global has been awarded a three-year contract renewal by Plan International for service to multiple sites in Africa.

Plan International is a non-profit development and humanitarian organisation that aims to advance children’s rights and equality for girls. ITC Global has been its communications provider on the continent for nearly 10 years.

The company will provide remote communications over the next three

years to 24 Plan International sites across Western and Central Africa. Services will include a customised VSAT network in addition to a full upgrade of existing system electronics used by the 2.4 metre antennas that are already in place at each site.

The upgrades will be carried out by local field technicians who work with Plan International’s team across the region. They will perform site visits for equipment replacement and general maintenance, enabled by ITC

Global’s local presence in Burkina Faso, Ghana, Guinea, Nigeria and DRC. The field electronics refresh is expected to be completed later this year, all while being backed by ITC Global’s round-the-clock network monitoring and support for the entire contract lifecycle.

This latest contract follows ITC Global’s recent deals with multiple NGOs covering connectivity needs for more than 80 sites across Africa and the Middle East.

Omantel Wholesale and DE-CIX partner for global peering and interconnection

Omantel Wholesale has partnered with DE-CIX to simplify and accelerate the speed at which local, regional and global service providers connect to the latter’s worldwide internet exchange points.

According to Omantel Wholesale, the partnership is part of its global strategy for enabling transformation and innovation with ultra-low latency networking. The company is a member of the *Asia Africa Europe-1* (*AAE-1*) cable consortium and offers connectivity from South East Asia to Europe via the Middle East. (Also see News, Jun-Jul 2017.)

Customers that connect to

Cloud growth is driving demand, says Omantel Wholesale VP Sohail Qadir.



Omantel Wholesale’s global network can use DE-CIX exchanges to peer, interconnect, and optimise cloud and content for end users. The partnership includes connectivity to DE-CIX IXPs in Marseille and Frankfurt, as well as Istanbul, Hamburg, Munich, Dusseldorf and New York through DE-CIX’s *GlobePEER Remote* service.

Omantel Wholesale claims its geographic location and more than 20 subsea cable relationships enable it to create solutions that directly impact upon how its customers and their clients experience cloud, content, and their applications and services.

The company’s VP Sohail Qadir says: “Growth in cloud and content is driving demand for enhanced quality of experience for end users around the world. This partnership will enable service providers to simplify how they connect to peering exchanges and create a ‘one-stop shop’ for customers using the *AAE-1* cable system.”

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UK government can offer billions in support of African infrastructure

The UK's Department for International Trade (DIT) says it can facilitate billions of pounds in lending and guarantees to help African countries deal with a chronic lack of basic infrastructure.

The DIT in Africa has a presence in 21 countries across the continent and can enable the provision of these facilities through its export credit agency arm, UK Export Finance (UKEF). Loans can be extended in the local currencies of nine African countries for projects ranging from transportation, mining and general construction. For example, UKEF has

the ability to support infrastructure projects in South Africa (up to GBP4bn), Kenya (up to GBP1bn) and Nigeria (up to GBP750m). All projects must include at least 20 per cent UK content as well as meeting all other lending criteria.

Africa is said to be the second-fastest urbanising region in the world behind Asia, with estimates showing that more than half of its projected 2.2 billion people will live in cities in the next 30 years. However, according to data compiled by the US-based Brookings Institution, 319 million people across sub-Saharan Africa

have no access to reliable drinking water, 620 million have no access to electricity, while only 34 per cent of Africa's people have adequate road access. The World Bank estimates the chronic infrastructure backlog to be about USD93bn a year in the sub-Saharan region alone.

"There is enormous scope for Africa to boost its exports to the UK and indeed other parts of the world if it can address its infrastructure backlog," says Emma Wade-Smith, the UK's trade commissioner for Africa. "Research shows that in the long term, trade is better than aid, and without adequate

infrastructure it will be very difficult for Africa to boost its ability to buy and sell with the rest of the world."

The DIT has established the Africa Infrastructure Board, which brings together UKEF, the Department for International Development, as well as UK infrastructure and mining firms that are already active in the region. Its ambition is for UK government and industry to work together to identify major infrastructure projects across Africa that can benefit from the UK's extensive expertise in the fields of finance, engineering and governance, as well as health and safety.

Angola Cables gaining momentum with SACS

The *South Atlantic Cable System (SACS)* has made landfall at Fortaleza on the Brazilian coast.

Currently being built by Angola Cables, SACS will be the first direct link between the Americas and Africa, and promises faster routing with higher capacity.

The cable arrived in Brazil on 22 February. It is now entering the final phase of completion and is expected to be fully operational by the third quarter of 2018.

SACS will link to the 10,556km *Monet* submarine cable system to provide onward connectivity to the US. Angola Cables is also an investor in *Monet* and recently signed a backhaul deal with FiberLight LLC to provide extended connectivity, starting with the Miami region and later expanding to other locations. FiberLight currently owns more than 1,900,000 miles of dense fibre optic infrastructure and a backbone of more than 26,000 PoPs that cover a growing footprint of US metro areas.

Angola Cables operates two fibre optic pairs within the *Monet* system, one transmitting data from Fortaleza to US shores and the other carrying traffic to São Paulo. The company's CEO Antonio Nunes said: "The link-up with FiberLight will allow Angola Cables to deliver reliable, high-graded services beyond the *Monet* cable termination point of MI3 Equinix and the data centre in Boca Raton at Equinix's MI1 colocation facility in Miami."

Equinix's MI1 is also known as the NAP of the Americas (NOTA) and is the key gateway for internet traffic between the US and Brazil.

In a separate deal announced in early March, Mauritius registered IOX Cable and Angola Cables have signed a joint provisioning agreement aimed at developing and enhancing their respective network capabilities and services across the Americas, Africa, Europe and India. By partnering with Angola Cables, IOX is said to be consolidating its position by extending its network to Europe, South America and North America for the benefit of its customers through cable systems operated by Angola Cables.

"The sharing of services between the complementing routing of the IOX Cable System and SACS will seamlessly connect customers and businesses across Asia, Africa and the Americas," said Nunes. "This is a win-win partnership as it fuels expansion and growth for both our companies, more importantly though, it provides an information bridge that has the potential to accelerate and stimulate socio-economic investment and development between these important geographies."

Satellite capacity pricing continues to fall amidst oversupply

Satellite capacity prices have fallen for a third straight year, according to a new study published by Northern Sky Research (NSR).

In its *Satellite Capacity Pricing Index, 4th Edition (Q1 2018)* report

released in mid-March, NSR revealed that on average, capacity price declines for 2016-2018 ranged from 32 to 57 per cent across various applications and regions. According to the research firm, the road ahead "appears unclear as greater supply enters the scene, demand lags in some markets and competition intensifies".

NSR stated that while operators are now deploying strategies such as vertical specific market entry partnerships and framework agreements on discounts, these haven't stopped the impact of the widening gap in supply-demand economics. It added that this trend is exacerbated by competitive sales positioning by operators in each region. NSR reckons that despite expecting to see smaller price decreases in 2019, the industry must wait longer for them to bottom out.

"With video hotspots facing pressure from both global pricing declines and OTT opportunities for non-streaming content, along with consumer broadband over Ka-band HTS consistently in the USD150 per Mbps per month range, the chances of recovery remain uncertain," said NSR analyst and report author Gagan Agrawal. "However, with capex per Gbps for new satellites marking new lows, declining lease prices come as a blessing to service providers in data and mobility, so they can fund expansion of their businesses and create mini telco businesses backed by satellite in the scaling process."

Agrawal believes that the satellite operator segment is also likely to

take advantage of this downstream opportunity where managed services are expected to represent 15 to 25 per cent of the entire business portfolio in the next three to four years.

Critical comms for transport market forecast boom over next few years

Total critical communications revenues associated with transport will be worth more than USD3bn by the end of 2020, says IHS Markit.

According to the analyst, public safety and security organisations represent the largest adopters of critical communications globally, accounting for around 38 per cent of PMR deployments in 2017.

However in aggregated terms, IHS says business critical sectors – the 'non public safety sectors', including buses, trams, metros, trains, ports, airports and utilities – make up the largest combined worldwide market for critical comms.

Within that market, transportation accounts for the largest share of deployments, and the firm projects that as the world economy continues to strengthen, business critical sectors will continue to gain prevalence in this global ecosystem.

The Asia Pacific region is forecast to experience the largest growth of critical comms technologies, followed by the Americas and Europe and the Middle East. IHS believes the market is being fuelled by the need to promote security, ensure personal safety and create business efficiencies.

Robin Davis, chair of the TCCA's

(TETRA and Critical Communications Association) transport group, says: "We have seen continued growth in the adoption of TETRA technologies in the transport market over a number of years as users transition from analogue radio systems to secure digital ones. Live information and data enables better operational decisions to be made, whether that is on vehicles or on platforms."

"Suppliers supporting the adoption of the transport user base are innovating with the latest technologies to provide some pretty amazing solutions to support multi modal transport networks and smart cities."

Developing markets spearhead mobile growth

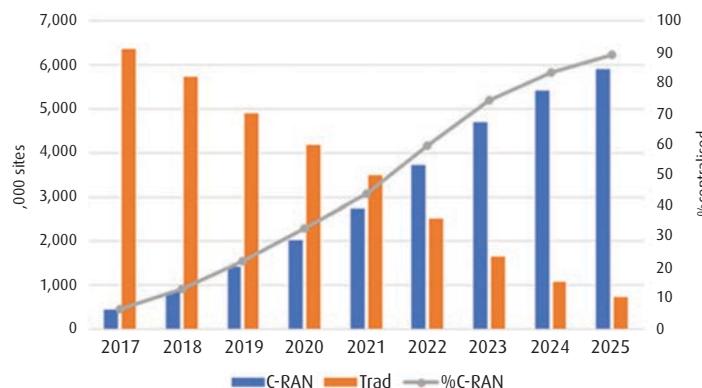
The mobile industry signed up its five billionth unique mobile subscriber last year and is forecast to add almost another billion by 2025, according to GSMA Intelligence.

In its *Mobile Economy* report published in February, the association's research arm said there will be 5.9 billion subscribers over the next seven years, which is equivalent to 71 per cent of the world's expected population by that point. The GSMA believes growth will be driven by developing countries, particularly Bangladesh, China, India, Indonesia and Pakistan, as well as markets across sub-Saharan Africa and Latin America.

The report also said that in under a decade since the first commercial 4G networks were launched, LTE is on track to become the world's leading mobile network technology by next year and to account for 53 per cent of global connections by 2025.

According to GSMA Intelligence, the mobile ecosystem accounted for 4.5 per cent of global GDP globally in 2017, a contribution equivalent to USD3.6tn in economic value added. It says this contribution is forecast to reach USD4.6tn or five per cent of GDP by 2022 as countries around the world increasingly benefit from the improvements in productivity and efficiency brought about by increased take-up of mobile services and M2M/IoT solutions.

Furthermore, the report said that in 2017, the wider mobile ecosystem supported 29 million jobs (directly and indirectly) and made a substantial contribution to the funding of the public sector; almost USD500bn was raised through general taxation while spectrum auctions brought in USD25bn.



Centralised or virtualised site installed base versus traditional.

SOURCE: RETHINK RESEARCH

Full RAN virtualisation will take a decade and could delay 5G

It will take operators ten years to achieve full virtualisation of the RAN once they begin the process, says Rethink Technology Research.

In its cloud RAN (C-RAN) deployment forecast 2017-2025, the analyst said that the move to a fully virtualised, cloud-based radio access network is being held back mostly by the lack of interoperable standards. "This is one of the main things preventing C-RAN from happening earlier, and most shipments will not start until this has been ironed out, a process that could take another three years before shipments break the three million a year barrier," stated Rethink.

As a result, the company believes centralised and virtualised macrocells and microcells will be deployed at a CAGR of 23 per cent between 2017 and 2025. And although these will overtake new deployments of conventional cells in 2019, it said most of these deployments will still be centralised rather than fully virtualised. Once operators start to deploy RAN VNFs, usually conforming to ETSI NFV specifications, Rethink reckons there will be a sharp acceleration of growth in the number of C-RAN sites, adding that full C-RANs will remain rare until mid-2020.

"There is now a major dilemma for operators between simply using centralised RAN or going for a fully virtualised RAN," said the firm. "The former is simpler and delivers some efficiencies; the latter is very difficult and disruptive to implement, but we believe will revolutionise cellular economics."

According to Rethink, the two key barriers have been availability of fibre and the vendor "stranglehold" on the CPRI (common public radio interface). It said that this has meant most early

availability of affordable, high quality fibre and the need to use the CPRI. It claimed that the latter has been controlled by a small group of vendors that implement it in semi-proprietary ways. "This raises high barriers to entry for alternative equipment providers, such as those supported under the Facebook Telecom Infra Project, and threatens MNOs with lock-ins and high prices. It also makes many C-RANs economically non-viable because of the high cost of low latency fibre and CPRI."

Qualcomm rejection of Broadcom proposal leads to bitter dispute

US president Donald Trump has intervened in the war of words that has been raging between semiconductor device makers Qualcomm and Singapore's Broadcom. Their dispute follows a proposed takeover bid from Broadcom that was announced last year and would have become the biggest merger ever in the technology sector.

In early November 2017, Broadcom proposed to acquire Qualcomm in

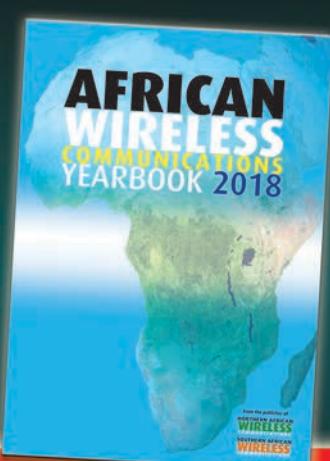
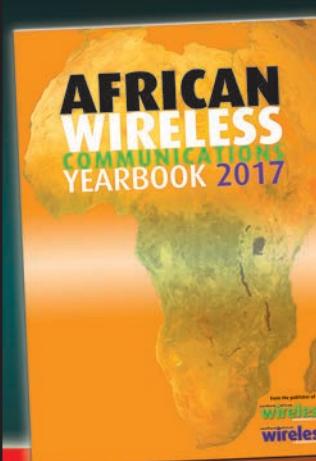
C-RANs have had to be very localised.

"It is essential that new emerging standards, preferably from the IEEE, take hold to open up the ecosystem and accelerate adoption," said the analyst. "Operators which support full C-RAN will have a far easier, cheaper task to implement 5G. However, the process of virtualising the RAN may delay 5G upgrades."

Rethink added that the biggest barriers to all types of C-RAN are related to fronthaul, mainly the

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a transaction valued at USD130bn. Under the proposal, Qualcomm stockholders would receive USD70 per share consisting of USD60 in cash and USD10 per share in Broadcom stock.

Around two weeks later, Qualcomm's board unanimously rejected the offer, describing it as an "unsolicited proposal". Tom Horton, the company's presiding director, said: "After a comprehensive review, conducted in consultation with our financial and legal advisors, the board has concluded that Broadcom's proposal dramatically undervalues Qualcomm and comes with significant regulatory uncertainty."

In December, Broadcom notified Qualcomm of its intention to nominate 11 independent individuals for election to Qualcomm's board. Broadcom president and CEO Hock Tan said: "We have repeatedly attempted to engage with Qualcomm, and despite stockholder and customer support for the transaction, Qualcomm has ignored those opportunities. The nominations give Qualcomm stockholders an opportunity to voice their disappointment with Qualcomm's directors and their refusal to engage in discussions with us."

However, Qualcomm rejected the 11 nominees and described Broadcom's action as a "blatant attempt" to seize

control of its board. The company also expressed concerns about the regulatory issues surrounding the proposal, and what it said were the absence of commitments by Broadcom to resolve those issues, its lack of committed financing, and the uncertainty surrounding its transition from Singapore to the US.

Broadcom reacted to this in an online statement issued in January 2018: "Qualcomm has once again made intentionally vague statements regarding 'regulatory challenges' that are simply unfounded, misleading, and a disservice to Qualcomm stockholders. Qualcomm's rhetoric is vague for a reason – because it is not grounded in reality."

The company went on to say that there were no antitrust issues concerning the proposed transaction, and that it had "extensive experience" of completing complex acquisitions and had begun the process of gaining regulatory approvals as well as "redomiciling" to the US by May 2018.

In early February, Broadcom improved its offer. Qualcomm stockholders would now receive an aggregate of USD82 per share consisting of USD60 in cash and the remainder in Broadcom shares. This was also rejected by

Qualcomm. It said the proposal "materially undervalues" Qualcomm and falls "well short" of the solid regulatory commitment the board would demand given the significant downside risk of a failed transaction.

At a meeting between the two companies that took place on 14 February, Qualcomm continued to express concerns regarding the potential risks of the proposed transaction, despite Broadcom including an USD8bn regulatory reverse termination fee and six per cent per annum of net dividends in the event of a failed transaction.

By now, Broadcom was seeking the election of six rather than 11 nominees to Qualcomm's board and wrote to stockholders urging them to vote for this at Qualcomm's annual shareholders' meeting that was due to take place on 6 March 2018.

But two days before this, Broadcom claimed it discovered that the meeting would be delayed. According to the company, Qualcomm had "secretly filed" a request with the Committee on Foreign Investment in the United States (CFIUS) at the end of January 2018 to initiate an investigation. "It should be clear to everyone that this is part of an unprecedented effort by Qualcomm to disenfranchise its own

stockholders," claimed Broadcom.

In its response, Qualcomm said: "CFIUS has determined that there are national security risks to the United States as a result of and in connection with the transaction proposed by Broadcom.

"Broadcom's dismissive rhetoric notwithstanding, this is a very serious matter for both Qualcomm and Broadcom. Broadcom's claims that the CFIUS inquiry was a surprise to them has no basis in fact. Broadcom has been interacting with CFIUS for weeks and made two written submissions to CFIUS."

In compliance with the committee's order, Qualcomm said its shareholders' meeting and election of directors would be delayed for at least 30 days pending a full investigation into Broadcom's acquisition proposal.

However, in mid-March the White House stepped into the row and ordered Qualcomm to immediately and permanently abandon the proposed takeover saying that it could threaten US national security. According to reports, US officials also feared that the takeover could result in Chinese companies such as Huawei gaining a global lead in 5G development.

INVESTMENTS, MERGERS, ACQUISITIONS

Date	Buyer	Seller	Item	Price	Notes
28/2/18	EXFO	Astellia	Company	EUR25.9m	Canada-headquartered EXFO is acquiring 97.44% of Astellia's share capital & at least 95.07% of the voting rights. It reckons the purchase of the French company creates "a new global force in network test, monitoring & analytics".
16/3/18	Nokia	Unium	Company	NA	Nokia has now completed its acquisition of Seattle-based Unium. The firm's specialist software is claimed to provide operators with an intelligent mesh Wi-Fi solution that constantly optimises in-home Wi-Fi connections through self-learning & self-healing capabilities.

LATEST COMPANY RESULTS

Date	Company	Country	Period	Currency	Sales (m)	EBITDA (m)	EPS (units)	Notes
16/2/18	Eutelsat	France	1H17-18	EUR	696.6	544.6	NA	Earnings down 7.7% compared to six months for December 2016. CEO Rodolphe Belmer says: "First half results were in line with our expectations, with the decline in revenues mostly reflecting, as in the first quarter, an unfavourable comparison basis in FY17."
20/2/18	Cell C	South Africa	FY17	ZAR	15.7 (bn)	7.8 (bn)	NA	Total revenue grew 7% from ZAR14.6bn for FY16. Total subscriber growth up 6% to reach 16.3 million. Data revenue increased 29% & data usage rose by 90% YoY. Current active data customers increased to 12.6 million.
22/2/18	VEON	Amsterdam	FY17	USD	9,474	3,587	NA	Group revenue for 2017 increased 6.6%, partially driven by consolidation of Warid in Pakistan and positive effect from the RUB appreciation against the USD. Reported EBITDA increased 11% while underlying EBITDA decreased 0.4% organically to USD 3,675m. The FY17 underlying EBITDA margin was 38.8%, a decrease of 0.9 percentage points YoY, missing the FY17 target of flat to low single digit accretion, due to margin pressure in Russia, Algeria & Bangladesh.
23/2/18	SES	Luxembourg	FY17	EUR	2,035.0	1,324.2	0.80	Reported revenue down 1.6% & -5.2% YoY. Outgoing CEO Karim Michel Sabbagh said 2017 was a year of transformation as the company established two market-focused units, SES Video & SES Networks. He added: "Business performance was below our expectations as the market remained challenging throughout 2017, compounded by some fleet health issues."
26/2/18	Intelsat	US	FY17	USD	2,149	1,629	NA	Net loss of USD178.7m. CEO Stephen Spengler said 2018 targets are to capitalise on better performance & economics associated with the services delivered by the Epic high-throughput fleet which will be completed later this year with the launch of the Asia Pacific-oriented <i>Horizons 3e</i> . Company also plans to launch <i>Intelsat 38</i> in 2Q18.

Orange and Apigate to launch digital API hub

Orange and Apigate, a subsidiary of Malaysia's Axiata Digital, are partnering to strengthen their respective API hubs as part of their mutual ambition to advance global digital transformation.

The companies said that their new joint hub, *Bizao*, will draw on their respective geographical strengths across Africa, the Middle East and Asia to deliver a suite of APIs to businesses. They claimed this will provide a "streamlined and efficient" method of accessing customers via a single entry point across regions. The partners added that under their proposed collaboration, APIs can be delivered to international and local companies alike, resulting in consolidation of traffic and expansion of reach.

Apigate will deliver a digital enablement hub to the soon-to-be launched *Bizao*, as well as a hub-to-hub connection of the two operators' API platforms to facilitate a single technical, commercial, and financial integration.

Axiata Digital chief executive Mohd. Khairil Abdullah said: "This partnership marks an important milestone

for the API businesses, where two major telecom operator groups are collaborating to expand their reach across each other's footprint."

Orange said its tie-up with Axiata symbolises its vision to partner businesses from the smallest startups to the largest organisations in order to help them seize all the opportunities presented by the digital age.

Ericsson off-loads most of Media Solutions business

Ericsson has partnered with One Equity Partners to further develop its Media Solutions business.

At the end of January, Ericsson concluded the review of strategic opportunities for the business which it began in March 2017. The company evaluated different opportunities for the units, including partnerships, divestments and a continued in-house development, based on what generates the best long-term value.

One Equity Partners (OEP) is a private equity firm said to have a "deep expertise" in media and telecom investments. OEP and Ericsson will form an independent company with the latter retaining a 49 per cent shareholding. The

Swedish company says this structure will establish Media Solutions as a "leading independent video technology company with strong and committed financial support driving continued investment in innovation and growth". The terms of the transaction remain confidential.

Media Solutions employees and contractors, as well as specified assets and liabilities, will transfer to the new company upon closing which is expected in Q318, subject to customary closing conditions and approvals.

Over the last several years, Ericsson says it has transformed its Media Solutions' products with what it says is a cloud-enabled, standards-based, integrated end-to-end roadmap. The overall mission has been to advance video service delivery with state-of-the-art infrastructure and software.

Angel Ruiz will continue to lead Media Solutions as CEO.

Rohde & Schwarz, Unigroup Spreadtrum & RDA to set up joint test lab

Rohde & Schwarz and fabless semiconductor company Unigroup Spreadtrum & RDA are to establish a joint operator test laboratory in China

as part of an MoU signed in February.

The two companies say they will focus on wireless communications and test concepts to better serve their common customers, including the three Chinese network operators and other global operators that Rohde & Schwarz (R&S) has been serving for many years.

R&S will provide technical consultancy and product support in the test lab. It will then collaborate with Unigroup Spreadtrum & RDA on testing for network operators around the world. The partners say their common goal is to enable chipset solutions that better fit global operators' requirements.

Unigroup Spreadtrum & RDA had already been working with R&S for 2G, 3G and 4G. R&S will now support Unigroup in 5G sub-6GHz and mmWave chipset design and development. The companies say this will ultimately accelerate 5G chip prototyping, and will further optimise 5G manufacturing and hasten the technology's time to market.

Further cooperation between the partners will look at automotive electronics and cellular and non-cellular IoT applications.

NEW APPOINTMENTS

Date	Name	New employer	New position	Previous employer	Previous position
5/2/18	Nahaat Mahfoudh	Zantel	Head of business & wholesale	Cumii International (Econet)	Commercial executive
12/2/18	Steve Collar	SES	President & CEO	SES Networks	Replaces Karim Michel Sabbagh who will step down in April 2018 to "spend time with his family & pursue new interests".
12/2/18	Andrew Browne	SES	CFO	03b Networks	Replaces Padraig McCarthy who has announced his retirement & will step down in April 2018.
13/2/18	Jeff Garte	Globecomm	CFO	Hibernia Networks	SVP of corporate development
15/2/18	Aamir Hafeez Ibrahim	VEON	Head of emerging markets	VEON	Jon Eddy, VEON's previous head of emerging markets, is stepping down. Ibrahim will now oversee the company's businesses in Algeria, Bangladesh & Pakistan while remaining CEO of Jazz in Pakistan.
22/2/18	Mickey Mashale	Vodacom	Chief sales officer for Vodacom Business	Vodafone Global Enterprise	Managing executive & head of sub-Saharan Africa region
5/3/18	Alioune Ndiaye	Orange	CEO for MEA	Sonatel Group	Director general
5/3/18	Bruno Mettling	Orange	Non-executive chairman for MEA	Orange	CEO for MEA
5/3/18	Helmut Reisinger	Orange Business Services	CEO	Orange Business Services	EVP international
5/3/18	Hugues Foulon	Orange	Executive director in charge of strategy for the group & cyber security	Orange	Director to the chairman & CEO, & secretary of executive committee
5/3/18	Mari-Noëlle Jégo-Laveissière	Orange	Deputy CEO of the group & CTIO	Orange	Senior EVP, innovation, marketing & technology
5/3/18	Jérôme Barré	Orange	CEO wholesale & international networks	Orange	Executive director, HR
12/3/18	Cathy Smith	SAP	MD, SAP Africa	Cisco	MD for sub-Saharan Africa
12/3/18	Luis Jiménez Tuñón	Eutelsat Communications	Global EVP, data business line	Various	Technology entrepreneur & board director
15/3/18	David Sumi	Siklu	VP of marketing & product management	Proxim Wireless	SVP of engineering
15/3/18	Gerard Halimi	Siklu	VP of sales, rest of world	ECI	African market director
27/3/18	Chris Bowen	Digi International	VP of sales, EMEA	Macronix International	VP worldwide automotive & GM of Macronix Europe
5/4/18	Richard Staveley	ip.access	CEO	Stratto	Co-founder & CCO
6/4/18	John-Paul Hemingway	SES Networks	CEO	SES Networks	EVP of product, marketing & strategy

We offer a complete portfolio of cutting-edge products



Hytera Communications Corporation Limited – leading global provider of innovative professional mobile communications solutions

Hytera Global

Hytera Communications Corporation Limited is a leading global provider of innovative professional mobile communications solutions that improve organizational efficiency and make the world safer.

Following the Sepura acquisition, Hytera owned Sepura, Teltronic, Norsat, PowerTrunk, Sinclair etc, has around 9000 personnel serving customers in 120 countries and regions, including governmental organizations, public security institutions, and customers in

utilities, transportation, oil & gas and other sectors.

Sepura

Sepura Group became part of Hytera Communications Corporation Limited in May, 2017. Established as Sepura in 2002, and with over 100 years of history in Cambridge, U.K., Sepura is a leading provider of TETRA products and solutions for organizations worldwide. Sepura brings to Hytera Group a wealth of technological capability and industry knowledge in the TETRA space, and

the capacity and remit to deliver the next generation of mission critical broadband-enabled terminals.

Teltronic

For over 40 years, TELTRONIC, a subsidiary of Hytera Communications Corporation Limited, is a world leader in the design and manufacturing of missioncritical radio communications. With the combined objectives of innovation and the highest quality, TELTRONIC provides complete wireless communications solutions for a variety

of sectors including public safety, public transport, oil & gas, utilities, mining, industry and others.

Devoted to turning leading and mature technologies into solutions that our customers can count on for problem solving, Hytera promotes the integration of communications with managerial excellence. What we are looking for is the solution that works for today and tomorrow.

With a focus on Research and Development since its inception, Hytera invests around 15% of its revenue in

R&D. Nearly 40% of employees work in the R&D function. There are 10 R&D centres globally, in Shenzhen, Dongguan, Harbin and Nanjing in China, Bad Munder in Germany, Cambridge in UK, Zaragoza in Spain and Vancouver and Toronto in Canada, collaboration to keep Hytera at the forefront of communications technologies.

WE BELIEVE

Together, we can make cities safer. We will realize this vision through continuous **innovation, dedication to customer values**, and sustainable **contributions to the communities** where we operate.

We will continue to leverage our technology leadership and a global team of professionals to **enable cities with on demand mission critical communications** in all scenarios, from daily command and control to emergency response, disaster relief, and anti-terrorism efforts.

Respond & Achieve

We provide **on demand mission critical communications** in the most challenging environments.

Our experienced teams are proud to have supported government agencies and commercial organizations around the world facing increasingly complex and demanding situations. We offer a full portfolio of PMR and Integrated Command & Control solutions to increase customers' **situational awareness, collaboration and response rate**.

Petrochemical | Power | Forestry | Public Health & Education

We provide energy solutions to customers from over 50 countries and regions, and serve over 90% of China's new petrochemical projects and 50% of China's new forestry PMR projects.

Hotel | Supermarket | Property | Enterprise

We are a brand of choice for global high-end property, hotel and customers from other commercial sectors, and our products and solutions sales rank No. 1 for ten consecutive years in China.

SOCIAL RESPONSIBILITY

We believe we can make cities safer together with our eco-system. We realize this vision through continuously contributing our technologies and expertise to assisting with disaster relief efforts and to supporting those in need around the world.

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www.hytera.com

JMA claims indoor wireless first with fully virtualised RAN

JMA Wireless claims its *XRAN* adaptive baseband platform is the first virtualised RAN built as 100 per cent software that is designed to scale to commercial networks on off-the-shelf server technology.

XRAN has been developed to provide all of the RAN functions necessary for complete LTE mobile and IoT connectivity, and integrates with JMA's *TEKO DAS* platform via high capacity fibre connectivity. According to the company, this eliminates costly layers of analogue equipment and cabling,

significantly reducing the footprint, power and cooling requirements.

JMA reckons this unique combined solution provides an entirely new approach for wireless systems in corporate and commercial buildings, large venues, and highly densified urban areas.

By leveraging embedded intelligence, the company says *XRAN* can increase or reduce site capacity based on how many mobile devices are present. Its adaptive baseband functionality applies

resources to sites when and where they are needed to "dramatically" increase utilisation efficiency.

JMA also claims its platform "significantly reduces" opex by providing IT-centric orchestration and policy-based operational tools. It says configuration, policy setting and monitoring are founded on web-centric interfaces to provide easy visualisation and streamlined workflows.

The firm adds that *XRAN*'s operations platform is compliant with 3GPP and industry standard



north-bound interfaces, and can therefore integrate with existing OSS and BSS within the network.

Regardless of where it is deployed, JMA says *XRAN* takes advantage of central operations and elastic resource intelligence, enabling operators to capitalise on the best economics for backhaul or fronthaul connectivity, as well as the benefits of cloud economics.

jmawireless.com, xran.com
Analyst warns full RAN virtualisation will take a decade – *Wireless Business*, p15

Helping extract the most from location-based services

Intersec says its *Geo-Intelligence Suite* represents a major step forward towards helping telcos in gaining the maximum benefits of end-to-end location-based offers.

The new suite is based on Intersec's *Fast Data Analytics* platform and features a complete array of location-based solutions. These include *GeoInsights* which provides demographic studies for smart cities, transport planning, geomarketing and billboard audience monitoring, among others. There's also *GeoReach* for location-based advertising, enabling brands to trigger ads based on their audiences' locations, as well as *GeoTrack* for IoT tracking and asset management, insights and business processes.

Other features include: *GeoSafe* for connectivity to public warning

systems; *GeoHub* which enables third-party applications to leverage location events; and *GeoTravel* which can be used to customise customer engagement before, during and after roaming abroad.

Intersec claims its unique location-based approach lies in the combination of a number of factors which include: traditional active queries with passive collection of signalling traffic; the orchestration of both methods; the ability to narrow location to subcell levels; the ability to store location information into a historical database; and to work on all technology networks, including Wi-Fi.

The firm adds it will be developing additional products to offer off-the-shelf use cases to its customers, as well as a data marketplace.

www.intersec.com

Advantech Wireless releases solid-state power amplifiers

Advantech Wireless Technologies has launched a new 3.2kW Ku-band outdoor modular satellite solid-state power amplifier (SSPA).



The firm says its new modular *Summit* systems are designed to be used as direct replacements of older generation Klystron vacuum tube or TWT (traveling-wave tube) amps. Advantech says the all outdoor ruggedised systems offer very high power and wide bandwidth to allow operation over the entire Ku-band spectrum with multiple carriers and "outstanding" linearity.

The systems are said to feature built-in redundancy with soft failure mode, and are able to operate simultaneously on both polarisations or on a single polarisation with double amount of power.

Advantech says the new design

concept is in response to the higher power and wider bandwidth demand of traditional large teleports while at the same time reducing opex. It reckons that the new amps are ideal for large DTH teleport uplinks. The company adds that without using expensive filter combiners, its system is ready today to support new higher modulation and error correcting codes, as specified in DVB-S2X, or higher data rates. Combined with a high gain antenna, its says the system can completely saturate all transponders on any satellite.

www.advantechwireless.com

GCF certifies LTE devices for critical communications

The Global Certification Forum (GCF) is extending its certification scheme to critical communications devices. The required test cases are expected to be finalised by 3GPP RAN5 during 1Q18, paving the way for Mission Critical Push-to-Talk (MCPTT) over LTE device certification to start later in the year.

In response to demand from public safety authorities for access to secure wireless broadband communications, 3GPP is developing specifications to deliver a variety of mission critical



capabilities over LTE networks.

MCPTT provides enhanced voice-based PTT communication based on the 3GPP Evolved Packet System.

It leverages Group Communication System Enablers and Proximity-based Services, and is part of Release 13 of the 3GPP specifications. Mission Critical Video over LTE and Mission Critical Data over LTE have already been standardised within Release 14, while further enhancements are being developed for Release 15. These additional features could also be brought within the scope of GCF certification in response to requests from members.

In an MoU that was updated earlier this year, the GCF and TCCA (TETRA and Critical Communications Association) have committed to work together in areas related to 3GPP Mission Critical Services.

The GCF has also extended its membership categories to now include virtual network operators which will make certification accessible to MVNOs including public safety network providers.

www.globalcertificationforum.org

B24 is “first affordable radio” in unlicensed 24GHz band

Mimosa Networks reckons the *B24* is the first affordable gigabit-speed radio in the unlicensed 24GHz band.

The wireless backhaul solution is said to be engineered for a number of urban applications including microPoP backhaul, rooftop-to-rooftop connections for enterprise, campus and multi-dwelling units, as well as video surveillance or smart city connectivity.

Mimosa says the *B24* delivers speeds of up to 1.5Gbps IP throughput, automatically allocating traffic dynamically as needed. It claims the radio offers “superior reliability” for backhaul links of up to 3km, and leverages

proprietary Spectrum Reuse Sync (SRS) technology. This is said to allow up to eight collocated *B24s* to share the same channel, on the same tower or rooftop, each running at 1Gbps.

For redundancy and flexibility, concurrent Ethernet and fibre connections are supported – according to Mimosa, this is a feature that has never been available in products with similar price points.

The vendor adds that in video surveillance applications, the radio offers the “highest quality” video over a wireless backhaul. It adds that the *B24*’s compact design means it can be placed at

surveillance locations without fibre, thereby eliminating the cost and rights-of-way access required here.

www.mimosa.co



G+D integrates M2M and consumer SIM cards for connected car users

G+D Mobile Security has unveiled an eSIM management enabled solution that will allow car owners to download their private mobile subscription to a second SIM which is soldered into the vehicle’s telematics box.

While M2M-SIM cards are already a common feature in most modern and connected cars, access and usage of this integrated card is limited to eCall and other telematic services provided by the car-maker.

G+D Mobile Security has worked with BMW, Intel, Deutsche Telekom and AT&T on a system that will allow car owners to use their existing data

plans and to access information services by using their vehicles as the mobile device. Phone calls can be received/placed via the in-car infotainment system under their usual number. After an initial eSIM-based registration process with the mobile operator, car owners can then also use their data services in the car.

The integration of the consumer SIM card and the car user’s mobile subscription is achieved via *AirOn*, G+D’s eSIM management solution which supports both M2M and consumer applications, and enables the download of eSIM profiles over-



the-air. According to the firm, the solution enables new application opportunities for telcos, car manufacturers, car OEMs and end users. It claims several devices can be connected with the network in an easy and fast way, while the “highest security and scalability is provided by the user-friendly service platform”. www.gi-de.com/mobile-security

Next-generation broadband gateways

ARRIS International has introduced what it says are two future-ready next-generation broadband gateways that offer flexible network migration.

The *NVG578* is a customisable PON (passive optical network) gateway that promises to deliver the scalability service providers need as they evolve their networks to meet the demands of new services and faster speeds. This includes today’s GPON speeds, as well as next-generation XGS-PON and NG-PON2 speeds of up to 10Gbps symmetrical.

On the wireless side, the *NVG578* supports Gigabit Wi-Fi with options

to offer 802.11ac and upgrade to .11ax in both dual-band and tri-band configurations.

ARRIS says the device also makes smart-home integration easy, thanks to optional IoT radio support. It reckons service providers get the connectivity, reliability and longevity that is now expected from a hub supporting the rapidly growing number of smart-home devices.



The second device is the *NVG558*. According to ARRIS, this is an advanced fixed wireless broadband gateway that supports triple-play services thanks to integrated technology that can deliver LTE and 3.5GHz CBRS. It says the unit also has potential to support future 5G services.

Both platforms offer Docker container support and also feature *HomeAssure*, ARRIS’ intelligent Wi-Fi solution that extends coverage and is said to simplify the end-user Wi-Fi experience. www.arris.com

Also look out for...



Vodafone displayed its 4G lunar base station at Mobile World Congress in February.

Vodafone to set up LTE network on the Moon

Vodafone plans to create the first 4G network on the Moon. Berlin-based PTScientists is working with the mobile operator’s German division and car-maker Audi to achieve the first privately-funded lunar landing next year.

In collaboration with Nokia, Vodafone will create a network that will connect two Audi-designed lunar rovers to a base station in the Autonomous Landing and Navigation Module. Nokia Bell Labs says it will create a space-grade ‘Ultra Compact Network’ that will weigh less than one kilo, the same as a bag of sugar.

The 4G network will enable the lunar vehicles to communicate and transfer scientific data and HD video while they carefully approach and study NASA’s *Apollo 17* lunar roving vehicle that was used by the last astronauts to walk on the Moon in December 1972.

Vodafone testing indicates that the base station should be able to broadcast 4G using 1800MHz spectrum and send back the first ever live HD video feed of the Moon’s surface. This will be broadcast to a global audience via a deep space link that interconnects with the PTScientists server in the Mission Control Centre in Berlin.

PTScientists CEO and founder Robert Böhme says: “This is a crucial first step for sustainable exploration of the solar system. In order for humanity to leave the cradle of Earth, we need to develop infrastructures beyond our home planet.”

“The great thing about this LTE solution is that it saves so much power, and the less energy we use sending data, the more we have to do science.”

The Mission to Moon is due to launch in 2019 from Cape Canaveral on a SpaceX *Falcon 9* rocket in 2019.

The rise and rise of Ka-band satellites over Africa



With many of the latest satellites for Africa developed specifically for Ka-band, DR. NICOLA DAVIES and RAHIEL NASIR find out if that's the best option for enabling broadband connectivity from space.

At the World Economic Forum held in Davos in January 2018, the UN's Broadband Commission launched yet more targets to bring online the world's 3.8 billion people who are still not connected to the internet. It has set what it describes as seven "ambitious yet achievable" targets in support of *Connecting the Other Half* of the global population over the next few years.

By 2025, the commission says:

- ◆ All countries should have a funded national broadband plan or strategy, or include broadband in their universal access and services definition.
- ◆ Entry-level broadband services should be made affordable in developing countries, at less than two per cent of monthly gross national income per capita.
- ◆ Broadband/internet user penetration should reach 75 per cent worldwide, 65 per cent in developing countries, and 35 per cent in least developed countries.

Other targets include ensuring more people have sustainable digital skills, boosting connectivity for small businesses, and achieving gender equality across all targets.

None of this will sound particularly new – the UN has been setting similar targets since the turn of the century, first with its millennium development goals which were then followed up in 2015 with the sustainable development goals.

And yet, according to the UN's own statistics, billions of people around the world still lack any kind of internet access. Out of the 47 nations defined as "least developed countries" by the ITU, 28 are in Africa while the others are located mainly in Asia, the Pacific, and the Middle East.

Of course, resources are scarce in these countries. And as is well documented, severe weather and terrain often further inhibit the installation of the infrastructure needed to advance a developing nation. But there are technical solutions to help both overcome these challenges as well as support targets for universal

broadband connectivity. And arguably, the best possible solution involves the use of satellites.

The world is a "connected village"

With the demand for affordable broadband connectivity increasing, many operators have been focusing on developing and launching satellites that feature Ka-band payloads.

Ka-band spectrum operates in the upper frequencies (26.5-40GHz) which allows for greater bandwidth than C-, L-band or Ku-bands. While Ku also operates at a higher speed, much of the bandwidth is already taken up, leaving little access to the average consumer.

Ka utilises smaller and cheaper equipment, making it an ideal choice for consumer internet use. While airlines have leveraged Ku-band spectrum for several years, they are beginning to harness technology that also supports Ka in order to give passengers internet access during flights.

While C-band frequencies (which operate

within 4-8GHz) are less focused this makes them less susceptible to weather changes. A less focused signal also lends itself to greater coverage. However, while broadband via satellite using C has been available for many years, the dish is much larger, making it awkward to transport and install in remote areas. These dishes are also somewhat more expensive.

Nonetheless, although Ka may be regarded more popular at the moment, Patrick Van Niftrik, SES' EMEA VP of spectrum management and development, says that we would not be where we are today as a society without C-band. In a blog posted in 2015, he wrote: "The world became a connected village first and foremost thanks to satellite, and it started with C-band."

Martin Jarrold, chief of international programme development at the Global VSAT Forum (GVF), adds that C-band continues to serve an extremely important purpose, and points out that UN organisations use the spectrum for vital public safety functions, disaster relief efforts, humanitarian and development programmes.

Furthermore, Ka frequencies have often been dismissed due to the potential of fading in stormy weather. Eran Shapiro, director of business and technology ventures for Spacecom, says: "C-band remains the band of choice due to its greater effectiveness in relation to rain fade and greater geographic reach."

Researchers continue to work towards addressing the rain fade issue, and one such advancement involves the use of adaptive coding modulation (ACM). By automatically strengthening and adjusting the coding and modulation of the satellite and therefore providing 'uninterrupted service', rain fade becomes less of a problem, according to frequency control specialist Bliley Technologies.

While one of the advantages of leveraging Ka is the use of a smaller antenna, researchers have also found success in using larger antennas to combat rain fade in certain situations. Additionally, satcom services provider Link Communications Systems says rain fade can be avoided by using antennas in pairs as part of the ground infrastructure (but it also notes that interestingly, rain fade doesn't continue to decrease with the addition of more than two antennas).

Compared to other spectra used by satellites, Ka frequencies have only been available for a relatively short amount of time. The GVF suggests that the band wasn't even utilised for commercial purposes until the 1970s.

Superbird A1 was the first satellite to support Ka-band technology. It was developed by Sky Perfect JSAT and was launched in December 1992 to cover Japan. *Superbird A1* has since been retired. It was not until 1999 that a commercial communications satellite that used Ka was orbited. Developed by Asia Broadcast Satellite, *ABS 7* was positioned to support services in Afghanistan/Pakistan and the Middle East, and continues to function today.

Since then, all of the mainstream satellite

The view from JUPITER

Hughes has developed JUPITER technology which it uses as the foundation of its own Ka-band systems to support a wide range of applications and markets. DAVE REHBEHN shares the company's wisdom and experience about how Ka could be king.

Hughes claims to be the world's largest Ka-band system operator. The company – which is also credited with inventing commercial-use VSATs in the mid-1980s – says that as booming demand for HDTV and broadband in many regions exceeded Ku-band capacity limits, the industry moved into the much higher frequency Ka-band. But the early generation Ka satellites traded coverage for capacity and could only generally support only a few Gbps total capacity if used for data communications.

"Consider a typical satellite that supports a payload of 24 C-band transponders (36MHz each) and 24 Ku-band transponders (36MHz each)," says Hughes. "The total of 48 transponders means that the satellite supports a total of 1.7GHz of capacity. Assuming that a 36MHz transponder translates to about 70Mbps of data, then this 1.7GHz of capacity would achieve a little over 3Gbps of capacity when used for data communications."

Enter the high throughput satellite (HTS). According to Hughes, these achieve greater capacity through the implementation of multiple spot beams such that frequency can be reused. These spot beams are separated from one another by a combination of frequency and polarisation and are also smaller. This then enables a greater overall number of beams and thus a higher level of frequency reuse.

As an example, the company describes an HTS design that employs 60 spot or user beams. "If each of these beams has 500MHz of forward channel capacity and 500MHz of return channel capacity (a typical Ka-band allocation), then the satellite is able to deliver 60GHz of capacity throughout the footprint of these 60 beams. As can be seen, through frequency reuse, an HTS design is able to achieve considerably more GHz as compared to a conventional satellite without frequency reuse, in this particular case more than 30 times the amount of spectrum."

Hughes continues by saying that many HTSs utilise Ka-band frequencies for the simple reason that the orbital slot allocation for other bands has long been exhausted. It says that while it's extremely difficult to obtain commercially viable Ku-band slots from the ITU, Ka-band slots are generally under-used.

operators have launched spacecraft with Ka-band missions, and there have also been several relative newcomers who develop, build and launch satellites that exclusively use the spectrum.

Ka keeps coming

Around 48 satellites are presently scheduled to launch around the world between 2018

The company adds that another important benefit of Ka is the availability of greater amounts of spectrum versus Ku. It says that while a typical Ku satellite might operate across 750MHz of spectrum, a Ka satellite might operate across 1500MHz or more of spectrum for the gateway feeder beams alone.

But Hughes goes on to state that just because the industry can make 100+ Gbps satellites does not mean that every operator should be planning to deploy such large capacity spacecraft. The company believes that a partial payload or even a dedicated Ka-band payload but with a smaller satellite mass (and thus lower capacity) may be attractive to service providers for a variety of reasons. These including: a small geographic coverage area; anticipated slow fill rate, thereby reducing the need for immediate deployment of a lot of capacity; and lower capex compared to the cost to launch a dedicated satellite.

On the issue of rain fade, Hughes points out that this was also an issue when Ku-band was first popularised. As a result, the company says its JUPITER technologies have been developed with a "rich" set of features to mitigate attenuation due to atmospheric moisture. These include forward and return channel mitigation techniques that offer a number of features such as: uplink power control at the gateway stations; satellite automatic level control; adaptive coding and modulation of the forward channel; use of larger antenna to generate higher EIRP; dynamic symbol shifting; amongst others.

"It should be noted that Ka-band has already been widely and successfully deployed in high rain areas," says Hughes. "[Our] experience has been that Ka-band availability in the range of 99.7per cent can be achieved, even in high rain fade areas, such as Florida."



Dave Rehbehn is VP of international sales and marketing at Hughes Network Systems. The above article contains extracts from his white paper "The View from JUPITER: High-Throughput Satellite Systems" which was first published in 2013. All information used with kind permission from Hughes Networks Systems.

and 2020. Of these, 24 support Ka-band, and include dedicated birds for the region such as *HYLAS 4* from Avanti Communications.

Avanti launched its first satellite in 2010, but its first African orbiter came two years later with the launch of *HYLAS 2*. Both carry Ka-band payloads, as does its third Africa satellite which is currently being constructed under a joint venture with the European Space Agency

and will consist of eight beams within a single steerable antenna capable of covering an area the size of Southern Africa.

In the meantime, Avanti has just launched *HYLAS 4* (see *News*, p6). The hybrid propulsion satellite features part traditional chemical orbit raising, part electric orbit raising and electric station keeping which means it will reach geostationary orbit in just 10 days, saving around 90 days of electric orbit raising. Avanti says *HYLAS 4* was therefore able to reach its on station location by mid-March 2018. It adds that the launch configuration also provides a “lower mission risk profile”, and means it is able to carry sufficient fuel to support up to 19 years in orbit.

The firm adds that the new Ka satellite doubles the capacity of its existing fleet and covers more than 35 countries across the globe. The addition of *HYLAS 4* will also see Avanti complete its coverage across Africa, in addition to having the capability to cover Latin America. “These markets can be reached through the satellite’s four steerable beams which can be placed anywhere across the Earth’s disc visible from the orbital slot of the satellite,” states the company.

Yahsat is another operator committed to Ka-band. On 26 January 2017, the UAE-based company confirmed the successful launch of its third satellite, *Al Yah 3*. It said that the mission experienced some challenges during the launch stages, which resulted in the satellite being inserted into an orbit that differed from the flight plan. But Yahsat pointed out that the satellite is “healthy and operating nominally,” and that a revised flight plan will be executed in order to achieve the operational orbit and the original mission.

Like Avanti’s *HYLAS 4*, *Al Yah 3* will also expand Ka-band coverage across Africa as well as establish a presence for Yahsat in Latin America. The hybrid electric propulsion satellite is due to begin delivering commercial services later in 2018. It promises to bring Yahsat’s commercial Ka-band coverage to an additional 19 new markets in Africa and reach 60 per cent of the population, as well as cover more than 95 per cent of Brazil’s population.

After experiencing two tragedies over the last few years – first with the loss of *AMOS-5* in 2015 (see ‘Rocket Power’ feature, Jan-Feb 2016), and then with *AMOS-6* exploding on the launch pad in 2016 (see *News*, Sep-Oct 2016) – Spacecom plans to launch a new satellite in early 2019. *AMOS-17* is specifically designed for Africa and will operate from 17°E to expand coverage across the continent as well as the Middle East and Europe. Spacecom says it will offer “extensive” Ka-, Ku- and C-band high throughput satellite services, combining broad regional beams and high throughput spot beams to maximise throughput and spectral efficiency. The firm claims *AMOS-17* will be the “most advanced” satellite over Africa, and deliver “unique” service capabilities that are not possible on traditional satellites.

Another company aiming to make its satellite debut in Africa is Global IP. Its first high capacity satellite, *GiSAT-1*, is currently being built by Boeing and when it is launched at the end of 2018, the company claims the 150Gbps spacecraft will be larger than all the other Ka satellites located over Africa combined.

The loss of *AMOS-6* created a problem

Martin Jarrold,
Chief of international
programme
development,
Global VSAT Forum



“HTS offers enormous advantages to many of the world’s developing regions, including Africa and South Asia, in terms of meeting consumer broadband service demand.”

for Eutelsat – together with Facebook, it was planning to use capacity on the satellite for its ‘Konnect Africa’ broadband initiative. Since then, Eutelsat has launched Konnect Africa as a separate broadband service business and has contracted to lease capacity on Yahsat’s *Al Yah 3*.

Set up by Eutelsat in 2015, Konnect Africa’s ambition is to provide affordable broadband connectivity across sub-Saharan Africa. It launched commercial services in June 2017 and is currently developing partnerships in nine African countries. Last November, the company unveiled its *SmartWIFI* hotspot service to enable retail outlets as well as healthcare centres or schools to become a connectivity point and digital gateway for the surrounding population. Eutelsat claims users will be able to connect to the internet from a distance of several hundred metres around the hotspot, and that access can be extended to several kilometres via off-the-shelf Wi-Fi repeaters.

Users can access the new service through vouchers or mobile payment schemes. Eutelsat adds that *SmartWIFI* also comes with a unique local data storage system, enabling users in remote areas to access smart digital content free of data charges, including online courses and education programmes, sports and entertainment.

Away from Konnect Africa, Eutelsat’s upcoming launch schedule for 2018-2019 includes four new satellites of which three will serve Africa while the fourth will use the company’s *Quantum* beam technology and offer flexible coverage. Two will offer Ku-band transponders. The company has also recently announced the development of its first low Earth orbit nanosatellite although this will use narrowband technology for IoT applications (see *News*, p5).

Going low

Clearly then, the future of broadband using satellite technology centres around leveraging Ka-band technology. So where does that leave a new generation of satellite companies that plan to put hundreds of low Earth orbit micro

FROM 2017

Benin, Burundi, Cameroon, Congo, Côte d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Gambia, Ghana, Kenya, Lesotho, Nigeria, Rwanda, Senegal, South Africa, Swaziland, Tanzania, Togo, Uganda

FROM 2019

Angola, Ethiopia, Madagascar, Malawi, Mozambique, South Sudan, Zambia, Zimbabwe

Set up by Eutelsat in 2015, Konnect Africa’s aim is to bring affordable broadband connectivity to sub-Saharan Africa. It is currently developing partnerships in various countries on the continent where it will offer services via Yahsat’s *Al Yah 3* which was launched in January 2018.

satellites into space to create a clustered, mesh network that will cover the planet?

Since one of the major purposes of utilising LEO satellites is to enable remote connectivity, the ground equipment needed to pick up lower frequencies such as those in C-band will need to be large. This is likely to make such equipment difficult and expensive to install in remote areas.

Although forthcoming LEO missions from the likes of Leosat, OneWeb, and Sky Space and Global have a lot to offer, the GVF's Jarrold says several factors need to be considered for their success.

Firstly, and as highlighted above, he reiterates that Ka-band may not be fast enough for online games or interactive programmes. Secondly, while LEO satellites require less power and are less expensive to produce, more of them must be deployed to create and support a reliable network. Thirdly, he points out that when a LEO satellite moves over the ocean or across an unpopulated area, the opportunity to generate revenue diminishes.

Another factor to consider is that because so many satellites are required, the process of synchronising them could present an issue. Furthermore, engineers will need to focus their energies on utilising those satellites already in orbit in addition to developing new satellites to add to the network.

Ultimately however, while LEO satellites have the potential to change the market landscape, the GVF says the technology will be "complementary" to traditional (GEO) HTS systems. Jarrold says: "Each has advantages over the other, with innovation in both of these space-based technologies continuing as the demand for availability and quality of services delivered to customers grows."

Spacecom's Shapiro is likely to support this view when he says: "We should not base our businesses on one technology, rather, we should spread our risks."

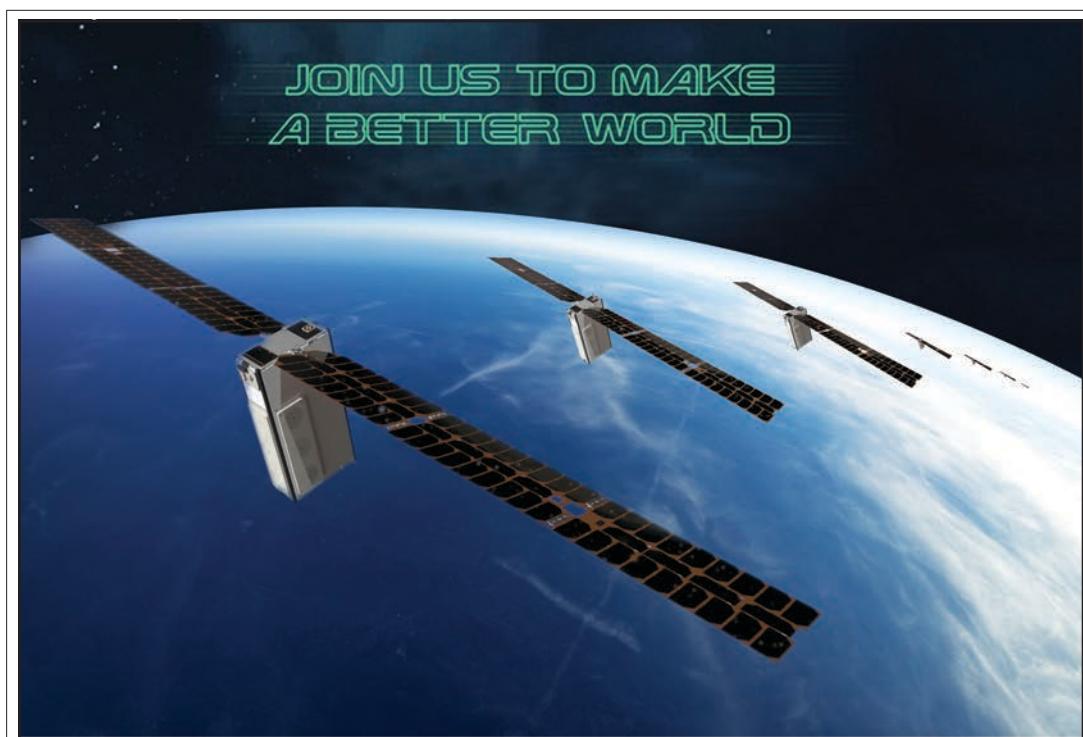
Technology continues to evolve and when satellites are developed Shapiro says they need to be versatile enough to support any advances that take place from construction to launch. And they need to be upgradable as well. Like others within the industry, Shapiro believes that if engineers focus on making a variety of bandwidths faster and more reliable through their satellite technology, there will be more options for the consumer.

Jarrold is quick to point out that frequency should not be the only factor considered when it comes

to delivering broadband via satellite. "In this respect, HTS offers enormous advantages to many of the world's developing regions, including Africa and South Asia, in terms of meeting consumer broadband service demand," he says.

The cost of engineering HTS systems has come down, and the product reliability continues to increase. Furthermore, satellite companies will continue engineering structures to serve a variety of consumers, including the military, humanitarian organisations, as well as the average consumer. Consequently, the technology will continue to improve to support all bands.

At the end of the day, the choice of high frequency spectra like Ka- or Ku-band, or a lower frequency like C, is going to depend on the needs of the consumer. At this point, the pros and cons to each spectrum are dependent on how they are utilised. As Shapiro concludes: "Those who have the means and can afford to invest in a new ground terminal and technology, may likely go for a DTH Ka-band-based satellite broadband service. Enterprise and service operators who need to quickly expand their business and assure high service availability will continue with C-band." ■



Until recently nano-satellites have been predominantly used for earth observation but with advancements in miniature space technology their capabilities have become increasingly sophisticated. The Sky and Space Global model delivers connectivity services at a fraction of the cost of traditional satellite communications providers.

After having 3 operational satellites in space, Sky and Space Global is building a constellation of 200 nanosatellites, which will deliver affordable connectivity to all markets in the equatorial belt by 2020. This means education, critical communications, healthcare, finance, utilities and a host of other potential users throughout equatorial Africa, Latin America, South East Asia and parts of Australia will have access to this alternative, cost effective connectivity solution.

Providing affordable connectivity is key for driving digital inclusion and economic growth in the developing world and for tackling poverty and improving healthcare, education, utilities and other core services. Sky and Space Global aims to achieve this by providing the following applications and more:

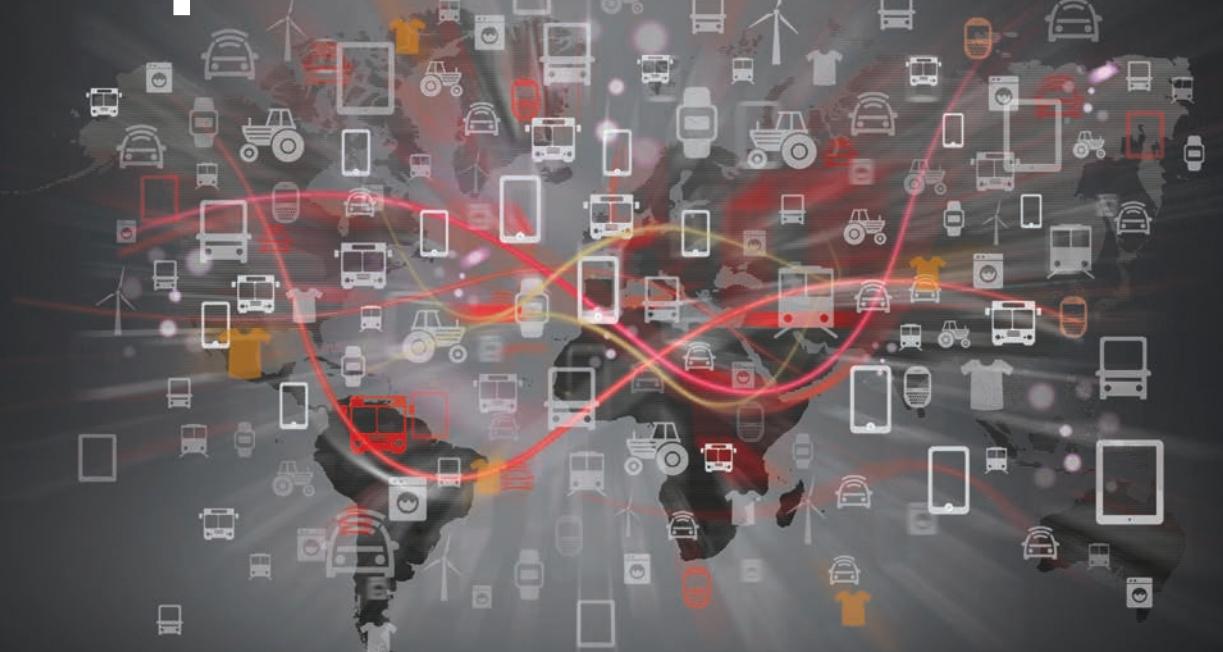
- | | |
|---|---|
| 1. Telemetry | 2. Rural Telephony and messaging |
| 3. Global calls | 4. Vehicle tracking |
| 5. Fleet management | 6. POS devices |
| 7. ATMs | 8. Security alarms |
| 9. Emergency response | 10. National electricity network monitoring |
| 11. Water meters and electricity meters | 12. Water pipeline monitoring. |
| 13. Gas stations control | 14. Animal tracking |

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How wireless radio frequencies enable the IoT



When it comes to implementing an RF-based solution in IoT architecture, Amphenol RF says the quality of the connectors used will go a long way to determining how well the solution will perform.

PHOTO: GSMA

Due to the wireless nature of applications in the Internet of Things, RF components are positioned to be an integral part of the network infrastructure, as AMPHENOL RF explains.

T

he Internet of Things is delivering the promises of greater efficiency, improved production, enhanced and new services, as well as deeper levels of control and data acquisition for city planners, city managers, agriculture, manufacturing and consumers.

The widespread availability of wireless connectivity is fuelling the growth and success of IoT solutions. And because such solutions typically rely on resources distributed over wide geographical areas for system operation, RF-based infrastructure is ideal.

The benefits of the IoT are well documented, and as well as being used to deliver optimised use of existing infrastructure, solutions also promise:

- ◆ Decentralised access to legacy databases to facilitate self-service by stakeholders in various instances such as license renewal and registration
- ◆ Integration of AI for semi-autonomous operation of manufacturing, agricultural and urban processes
- ◆ Acquisition of larger volumes of more detailed

data to support continual process optimisation

While IoT solution architecture includes both software and hardware components, let's focus on hardware.

Widely distributed hardware resources are used to provide the localised control, communication and data acquisition capabilities required for effective operation. These resources can include: existing Wi-Fi networks; smart or internet capable devices such as sensors and environmental monitors; hubs collecting input from several wireless and wired devices; and additional devices required to manage the efficient flow of communications and commands, including internet and other network servers.

Challenges of IoT implementation

Smart city IoT solutions are designed to improve utilisation of capital investments including optimisation of traffic flows on highways, light rail and public transportation management, provision

of online services from existing systems, etc.

However, impediments to deploying smart city IoT solutions can include:

- ◆ Establishing locations for the distributed devices
 - ◆ Gathering the necessary permits required for co-location on or in existing utility infrastructure
 - ◆ Implementing the solution quickly and cost effectively
 - ◆ Operating and maintaining the deployed solution
- Meanwhile, smart agriculture IoT solutions address water management, monitoring environmental variables relating to soil, plant health, water and heat stress of animals, monitoring animal health, managing livestock feeding on a per animal basis through RF tags, integration of weather data for crop management, links to commodity markets, and use of distributed or mobile devices. Impediments here can include:
- ◆ Distances between IoT hardware components
 - ◆ Lack of existing utility infrastructure (poles, cell service, etc.)
 - ◆ Harsh operating environments

The idea of Industry 4.0 might be considered more akin to smart agriculture than smart cities because of the harsh environments encountered in many situations and the potential for significant distances between hardware components.

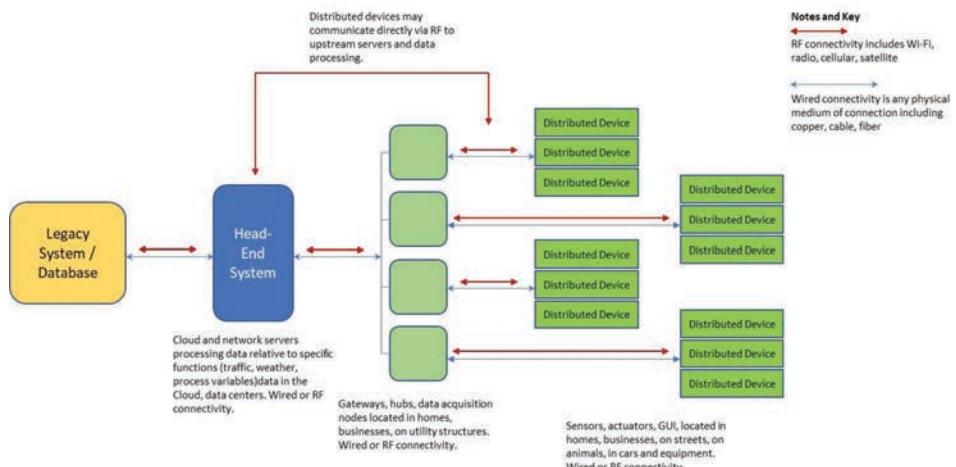
Consider, for example, mining, refining, and chemical production operations. These situations typically occupy sizeable areas and many of the process components are located outside. Structures for attaching wires may be widely separated or be unsuitable for direct attachment.

Furthermore, IoT components can be exposed to the weather as well as dusty, caustic or corrosive environments that can impact hardware life and functionality.

Regardless of the IoT application, RF provides an optimal solution in many, if not the majority of, cases.

Wired solutions, on the other hand, bring a number of issues. For instance, running additional wire (copper, fibre or coaxial) on poles requires permits and permission from the host utility. Adding wires may also necessitate a loading study to confirm the ability of the poles to handle the extra wire's weight, weight from icing on the new wire, as well as wind loading. What's more, co-location on utility poles and other facilities typically incurs an ongoing, periodic fee.

Meanwhile, underground wiring involves expensive excavation and repair of disrupted



Simplified IoT architecture and connectivity.

surfaces. If the wiring breaks, it must be repaired by qualified crews, and if it is underground, the cost and delay is significant.

On top of all this, there may actually not be any poles available when it comes to smart agriculture deployments, and going underground is rarely practical.

Solutions that are based on RF are ideal for a number of reasons: there are fewer co-location requirements; they are easier to maintain (a failed unit can often be put back into service with a board replacement); they provide architectural

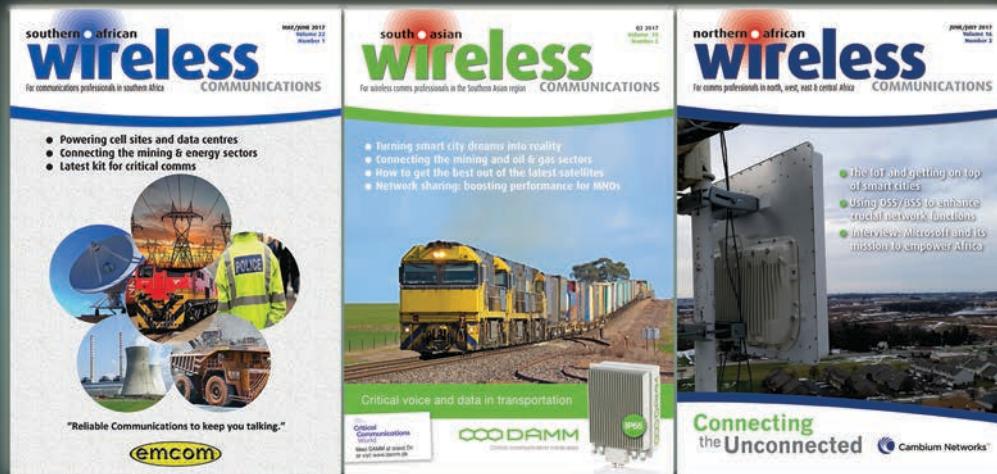
design flexibility and support 100 per cent wireless or hybrid approaches; and they create the infrastructure for connecting mobile distributed devices carried on vehicles and farm equipment.

The perfect connector for optimal RF performance

More devices than ever before are being sold with a wireless connectivity capability. This additional capability is an acknowledgement of the flexibility RF provides, and is a response to widespread

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availability of radio frequency systems that provide internet access for cloud-based control and data analysis.

This rapid growth can put engineers at a disadvantage if they do not have RF experience or lack a track record of integrating RF capable components in their designs. Amphenol RF claims to be the largest RF connector provider globally, and the company says engineers and installation technicians should be able to address a number of key issues when deploying wireless connectivity solutions such as:

- ◆ Does the RF device's PCBA (printed circuit board assembly) use through board or surface mount components? Which connector is best suited for the situation?
- ◆ Are the PCBA launch geometries (antipads, trace widths, and gaps) optimised to handle the project frequency?
- ◆ What type of antenna connection is preferred to meet initial cost requirements and ease of future maintenance?
- ◆ What type of data and command communication is required in terms of quality, packet size, and speed?
- ◆ Where will the RF device be mounted – in an enclosure, corrosive environment or harsh weather environments?
- ◆ What are the RF frequency and quality requirements?
- ◆ Are the antennas mounted internally or externally?
- ◆ What type and form factor of antenna is being used? How far is it from the RF Hardware?
- ◆ How many distributed devices will be connected to a single antenna? Is a multi-port connector or single connector more applicable?
- ◆ Can the design utilise pre-configured, off-the-shelf assemblies or is a custom connector more beneficial?

Table 1 (*above right*) is taken from an article review written by Judith Sobotie¹ regarding the Padova, *ITALY Smart City* project. The table illustrates the complexity of a smart city technical architecture in terms of integrating the various components into a properly functioning IoT solution. It lists communication options, data timing, packet sizes, and more.

It is crucial for engineers to select the right connector for each layer in any proposed

Service	Network type(s)	Traffic rate	Tolerable delay	Energy source	Feasibility
Structural health	802.15.4; Wi-Fi and Ethernet	1 pkt every 10 min per device	30 min for data; 10 sec for alarms	Mostly battery powered	1: Easy to realise, by seismograph may be difficult to integrate.
Waste management	Wi-Fi; 3G and 4G	1 pkt every hour per device	30 min for data	Battery powered or energy harvesters	2: Possible to realise, but requires smart garbage containers.
Air quality monitoring	802.15.4; Bluetooth and Wi-Fi	1 pkt every 30 min per device	5 min for data	Photovoltaic panels for each device	1: Easy to realise, but greenhouse gas sensors may not be cost effective.
Noise monitoring	802.15.4 and Ethernet	1 pkt every 10 min per device	5 min for data; 10 sec for alarms	Battery powered or energy harvesters	2: The sound pattern detection scheme may be difficult to implement on constrained devices.
Traffic congestion	802.15.4; Bluetooth and Ethernet	1 pkt every 10 min per device	5 min for data	Battery powered or energy harvesters	3: Requires the realisation of both air quality and noise monitoring.
City energy consumption	PLC and Ethernet	1 pkt every 10 min per device	5 min for data; tighter requirements for control	Mains powered	2: Simple to realise, but requires authorisation from energy operators.
Smart parking	802.15.4 and Ethernet	On demand	1 min	Energy harvester	1: Smart parking systems are already available on the market and their integration should be simple.
Smart lighting	802.15.4; Wi-Fi and Ethernet	On demand	1 min	Mains powered	2: Does not present major difficulties, but requires intervention on existing infrastructures.
Automation and salubrity of public building	802.15.4; Wi-Fi and Ethernet	1 pkt every 10 min for remote monitoring; 1 pkt every 30min for in-loco control	5 min for remote monitoring, few seconds for in-loco control	Mains powered and battery powered	2: Does not present major difficulties, but requires intervention on existing infrastructures.

Table 1: services specification for the Padova City project

solution. Amphenol RF can help by offering an extensive array of technical product and product application data in addition to its engineering capabilities. One example is the availability of ANSYS HFSS 3D component models (see figure 1 below) for many Amphenol RF connectors. These free downloadable files allow engineers to test a PCB connector's performance in their PCBA design with an extremely high degree of accuracy. These files eliminate the need for building prototypes to determine performance, reducing both development costs and time.

When it comes to implementing a RF-based solution, the quality of the connectors used will go a long way to determining how well the solution will perform. Regardless of the type required, a reliable, durable, high-performance connector is a necessity for optimisation of RF signal transmission. Proper connector specification and procurement is critical.

Examples of end use applications

Prefabricated wireless modules that incorporate Amphenol RF connectors are commercially available. These modules are designed to provide engineers with compact, functional sources of wireless and RF connectivity including Wi-Fi,

ZigBee, and Bluetooth. The modules are frequently part of the reference designs that engineers utilise to speed development of their own products.

RF connectors are designed into a PCBA to facilitate connection of antennas, support the frequency and impedance of the solution, and protect against environmental conditions (IP67 or IP68 spec connectors).

Pre-configured cable assemblies are designed to provide affordable, proven antenna connectivity to antennas located outside the electronics case or inside larger hardware cabinets. They are also ideal for prototyping hardware designs.

Custom cable assemblies can be engineered and manufactured to solution specific requirements that existing, off-the-shelf alternatives cannot satisfy. For instance, Amphenol RF can manufacture cable assemblies that: incorporate any connector configuration; use any cable type including those that are ruggedised and armoured; support hybrid RF/digital solutions; support ganged connectivity; comply with IP67 and IP68 protection.

Every RF device has an antenna and nearly every antenna needs a connector. Amphenol RF connectors employ the most advanced materials and production methods without compromising manufacturing efficiency and productivity. The company's connectors' role in the IoT ecosystem is fundamental to the proper functioning of IoT solutions by providing sound, reliable, durable, and high performance connection to antennas and delivery of the RF signal with minimal loss and distortion. ■

The above feature is based on the article *Amphenol RF enables the Internet of Things*, first published in January 2018. All content and material is published here with kind permission of Amphenol RF.

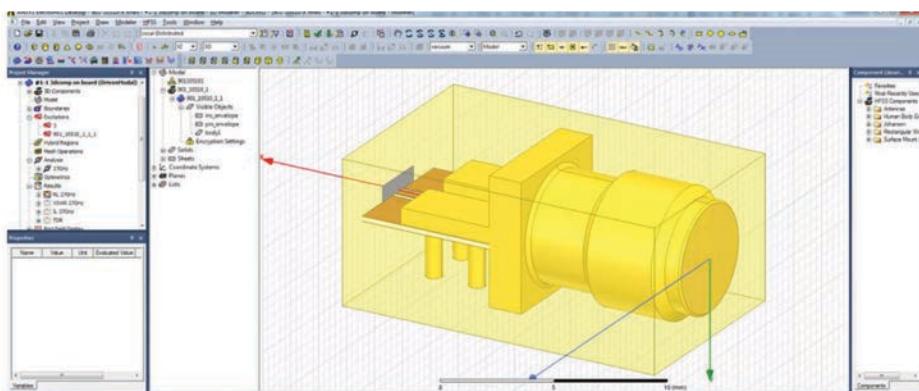


Figure 1: Amphenol RF's ANSYS HFSS 3D component model is available for many of its range of connectors.

¹ http://www.etcis.ipfw.edu/~lin/CPET581-InternetOfThings/1-Lectures/2-5-2016-PaperPPT-slides/IoTResearchDirection_JS.pdf with her review being taken from the following source: A. Zanella, N. Bui, A. Castellani, L. Vangelista and M. Zorzi, 'Internet of Things for Smart Cities', IEEE Internet of Things Journal, vol. 1, no. 1, pp. 22-32, 2014.

Moving Wireless Forward

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

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

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

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

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

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

Asset Tracking & RFID

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



We are now looking for distributors throughout Africa

Commercial Fleet Management

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

Public Transit & Bus Management

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

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

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

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

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

Remote Monitoring & Surveillance

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

Mining & Exploration

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

Smart Cities & Smart Highway

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

Let us know how we can help

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

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Creating a truly mobile network



Connectivity to cell towers – which can be few and far between in remote areas – could be further hindered by any number of things, ranging from distance to rugged terrain or extreme weather conditions.

DAVA BAUMANN discusses how connectivity can be re-imagined using portable cell towers and kinetic mesh network architecture.

With the number of connected devices, sensors and ‘smart’ technologies on the rise, industry leaders are in a unique position to modernise their working environments and gain a number of never-before accessible skills, including real-time visibility into the status of people, equipment, and operations of their organisations.

However, with this new toolbox of skills and technologies, organisations find themselves faced with another dilemma: the need for a robust, reliable and mobile network that can keep up with these demands 24/7.

It is the operators of large worksites that are often forced to watch productivity slow to a halt as cellular and other ‘make-to-break’ traditional networks struggle to keep up with such new and dynamic operations. Connectivity to cell towers – which can be few and far between in remote areas – could be further hindered by any number of things, ranging from distance to rugged terrain or extreme weather conditions. Reliable connectivity issues can leave operators feeling trapped and their fleet stranded, limiting productivity and putting organisations in difficult positions.

What operators need in this day and age is a completely mobile network – a ‘cell tower on wheels’, to synonymously move or have the ability to become one with the fleet.

Instant connectivity with total mobility and scalability

Operators in remote and/or sprawling industrial environments don’t always have enough existing

cell towers (or any towers at all) located within their range, and it can take an enormous effort to have one installed in a new location.

But what if, instead of being statically tied to one site, the cell tower had the ability to get up and drive directly to the place you needed it, moving with ease to rapidly expand coverage to that area across the entire fleet and area of operation?

These cell towers on wheels could also spread as far and wide as a site requires, flexibly augmenting or creating infrastructure *ad hoc* to provide ubiquitous coverage across growing operations – no matter how far out they span.

And as more connected people, devices and machines are added to the expanding site, new cell towers would simply roll in to provide the increased network support required, as well as work with the nodes installed on the numerous moving assets the organisations have.

With the roving connectivity of a cell tower on wheels, the many moving assets that make up an industrial site – from equipment to vehicles to people – could take robust connectivity with them as they travelled. The tower would simply follow along, dodging line-of-sight issues caused by rugged terrain and seamlessly connecting hot zones to allow operators to maintain unwavering connectivity to, communications with, and control over all the ‘things’ that power more efficient and productive operations.

Giving the network the ability of ‘wheels’ means that even outer-edge communications would be completely reliable and provide a previously impossible connection directly to a control centre.

Kinetic mesh: the key to IIoT and digital transformation

Industrial operators can kickstart their organisation’s journey to digitisation by deploying a kinetic mesh network topology. This type of network allows for multiple nodes to connect, broaden and strengthen the network where necessary. With the nodes essentially acting as compact, rugged, transportable, mini cell towers, virtually anything in the organisation’s infrastructure can be turned into networking equipment.

In comparison to a regular cellular network, which has limited cross communication, a kinetic mesh network can communicate peer-to-peer seamlessly via numerous instantaneous connections. These form an adaptable, dynamic network that has the ability to provide reliable wide-range communications practically anywhere.

Without the need to trade-off one feature for another, kinetic mesh networks provide unwavering bandwidth at high-speed, complete mobility, true mission critical reliability and scalability – a true future-ready network.

Building a reliable network starts with reliable hardware, and with the introduction of IIoT applications, they need more from their networks and they need it now. From rising bandwidth demands to an increase of cyber security concerns, the need for unwavering communications are at an all-time high. For example, devices connected via Wi-Fi experience a three to five second disconnect as they move between access points.¹ This slight break in transmission can make or break mission critical situations, with essential data being lost

or interrupted. The potential benefits that kinetic mesh networks bring when it comes to digitising industrial organisations are limitless, and due to the nature of the mesh network topology, there are numerous ways it can be used to transform a company's daily operations.

For example, kinetic mesh's 'predictive maintenance' feature gives companies the ability to visualise a problem and respond before it happens, minimising maintenance costs by up to 30 per cent and eliminating complete breakdowns of equipment by nearly 70 per cent, significantly reducing capex and opex. Furthermore, automation of machinery or other previously manual processes and monitoring equipment and methods can boost productivity by as much as 30 per cent.²

Organisations are catching on

Oil and gas field environments are already tempestuous and unpredictable enough, even before throwing network and connectivity issues into the mix. Rapid developments in technology are disrupting organisations' current operating models and pushing for change, forcing companies to update their thinking when it comes to technology. Changing the way organisations think when it comes to realising new tech and shifting the focus from simply implementing a gadget or wearable here and there to a total overhaul of network infrastructure should be viewed as a necessity, not a burden.

Today's oilfield operators must manage remote wells across hundreds of square miles of rugged terrain, manually retrieving information from each individual wellhead and

reporting back to the command centre weekly. This process is long, tedious and potentially unsafe for employees, and furthermore, the data collected on each weekly trip is virtually redundant once it reaches the command centre.

Digital technology adoption is offering a way forward, helping industry leaders move from caution to optimism in the coming years. According to Deloitte,³ 77 per cent of oil and gas organisations surveyed in 2017 are either exploring or designing their organisations with the future in mind. The fastest growth areas of digital investment in the sector are predicted to be in AI, robotics, drones, and wearables. And it is with this growth that organisations can expect increases in production by at least 20 per cent, with features such as remote wellhead monitoring installed.⁴

With 89 per cent of oil and gas professionals believing mobility will revolutionise their operating environments,⁵ kinetic mesh networks give operators the unwavering and secure connectivity needed to access and act on ever-increasing volumes of data, thus ensuring that productivity is maximised throughout inevitable market swings. Automation of processes and machinery, precision drilling, wellhead communications, automated drilling and pumping, drones for surveillance and inspection, together with production control and reporting are the key areas of interest for a successful transition into the digital age.

Like oil and gas organisations, mining companies can also reap the benefits of kinetic mesh in their impending digital transformations.

In an industry where short periods of operational downtime can cause millions of dollars in losses, mining operators must be

**Dava Baumann,
VP of global
marketing,
Rajant
Corporation**

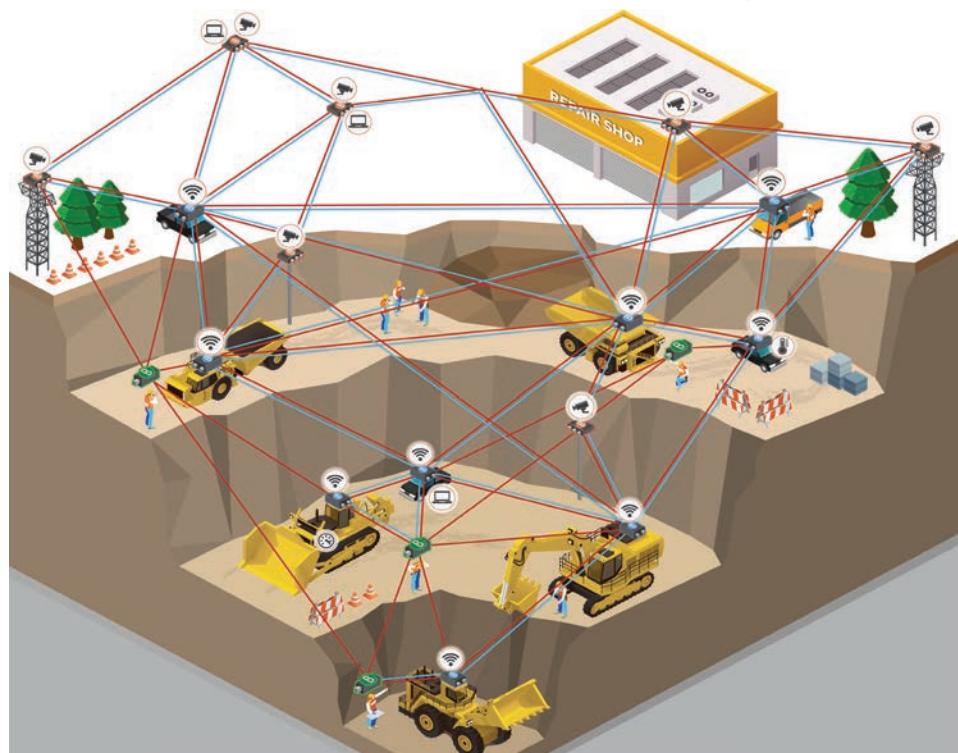


empowered to continuously monitor, manage and control their fleets of high-value equipment, vehicles and personnel wherever they roam. Kinetic mesh networks are proven to stand up to the extremes of mine environments, and effectively connect sprawling open pit and underground mining operations.

For example, an industry model for an open pit mine producing 80,000 tons of ore per day estimates the cost of the required machinery to be in excess of USD47.5m.⁵ These high-value assets must be carefully managed to ensure uptime is always optimised, which in turn will maximise production. By placing nodes directly on these vehicles, shovels and pumps, the organisation can seamlessly link them together – gaining real-time information from each asset's applications on status, efficiency, maintenance needs, and more, even as they move across the rugged landscape.

In 2017, fleet automation and optimisation were the key trends in the mining industry, with Deloitte estimating in its annual trend report that approximately 35 per cent of current mining positions in South Africa will be completely automated by 2037.⁶ By analysing real-time data with analytical engines, mines can often improve their processed mineral yields by three to 10 per cent within months. Using self-driving technology in mines can result in a 15 to 20 per cent increase in production, as well as reduced costs in fuel and maintenance.⁴

Autonomous equipment, aerial surveillance and inspection, automated positioning systems, M2M communications, and production reporting are only some of the potential applications that kinetic mesh networks could support in mines across the world. They have already been implemented in some of the largest mining operations around the world to reliably cover people and assets across all remote sites. And so far there is no sign of any slowdown – globally, 69 per cent of mining firms say they are looking at remote operation and monitoring centres, 29 per cent at robotics, and 27 per cent at unmanned drones.⁶ ■



A kinetic mesh network topology features multiple nodes that basically act as transportable mini cell towers. Virtually anything in the organisation's infrastructure can be turned into networking equipment. Giving the network the ability of 'wheels' means that even outer-edge communications would be completely reliable and provide a previously impossible connection directly to a control centre.

¹ <https://www.mbtmag.com/article/2016/07/your-network-infrastructure-ready-iiot>

² Industrial IoT Survey 2017, MindBrowser & The IoT Magazine

³ <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/human-capital/us-cons-og-hc-trends-industry-report.pdf>

⁴ <https://www.rajant.com/moving-assets/>

⁵ <https://www.rajant.com/applications/mining/>

⁶ <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Energy-and-Resources/gx-er-tracking-the-trends-2017.pdf>

World's first cloudAIR trial is completed on live network in Egypt



Huawei says it has completed the world's first verification of its CloudAIR GL15MHz spectrum sharing solution on Etisalat Misr's network in Cairo.

Since launching 4G services in Egypt in 2016, Etisalat now has 3.4 million LTE subscribers. As users increasingly migrate to LTE, Huawei says effective allocation of spectrum resources to handle growing data traffic has become a priority for the operator.

According to the vendor, its

CloudAIR GL15MHz system accelerates the full convergence of multi-band and multi-RAT networks, increasing both LTE data rate and cell capacity available at 1800MHz. It claims the platform enables dynamic spectrum sharing between GSM and LTE with "unprecedented" overlap between the two technologies, and also promises a smooth transition to LTE as well as increasing spectral efficiency.

CloudAIR uses proprietary algorithms and is said to ensure that

scattered spectrum resources are fully utilised to deliver higher data rates and better user experience. It does this by increasing flexibility in the resource block and spectrum allocation used by LTE. Compared to LTE 10MHz, Huawei says the system increases average user throughput by 20 per cent on downlink, while peak throughput reached 92Mbps. It adds that compared to GSM 5MHz and LTE 15MHz without the *CloudAIR* feature, the GSM KPI

remains stable without degradation.

"Spectrum allocation is static in the traditional refarming solution, which results sometimes in low utilisation rate" says Etisalat Misr CTO Khalid Murshed. "In comparison, *CloudAIR* supports more efficient spectrum sharing between GSM and LTE. That has helped to boost spectral efficiency and improve the overall experience of 4G users in Cairo."

The system will now be deployed on the operator's entire network in Egypt.

OBS wins ICT contract for world's tallest building



Orange Business Services (OBS) has won a consulting contract to design the ICT infrastructure and smart services for the Jeddah Tower, currently being constructed by the Jeddah Economic Company in Jeddah, Saudi Arabia.

Due for completion in 2020, the tower will be the world's tallest building at 1km (3,281ft). Its 200 floors will include a 200-bed hotel, offices, flats and shops. Dubbed a "vertical city", it is located in Jeddah Economic City (JEC) 12 miles north of Jeddah and between Mecca and Madinah on the Red Sea coast.



Planned for completion in 2020, the 1km Jeddah Tower will cost around USD1.23bn to build.

JEC aims to become the sustainable new northern district of Jeddah and the focus of economic growth

along the coast, a destination for business, housing, tourism, leisure, entertainment, retail,

medical centres and government offices and services.

OBS says it will make extensive use of digital technologies for smarter living and working. It will create a blueprint for the ICT infrastructure of the tower, from the plan and design, to the build and run phases.

The firm is working on a number of smart city projects in Saudi Arabia. They include the King Abdullah Financial District being built by the Al Ra'idak Investment company, which is the largest of four smart cities in Saudi Arabia being built with a total investment of over USD70bn.

Airport introduces first cloud-based flight display system



Gatwick is said to have become the world's first major airport to introduce a cloud-based Flight Information Display System (FIDS).

While legacy FID systems require software to be loaded on a separate PC behind the screen to run them, Gatwick's 1,200 cloud-based screens now connect via a web browser from any operating system. It's claimed this takes up only 3Mbps of bandwidth which makes the new real-time system "extremely" fast and responsive to updates, a key benefit in times of disruption.

The new VisionAir FIDS was developed by AirportLabs and went live in mid-2017.

The system can run natively on smart TVs which is said to save on infrastructure and maintenance

costs. It is also said to offer flexibility and can be run from a mobile device without the need for any software to be installed. Content can be managed collaboratively with other organisations, such as airlines and ground handlers, and different types of content can be hosted depending on requirements (disruption, weather, advertising, etc.).

Furthermore, unlike legacy FIDS,

Gatwick says its new system is more robust to network blips or power failures with mobile battery power and 4G backup available if required. It also includes a fully independent management interface that supports operation completely independent from any airport infrastructure or system if required.

The system also has awareness of screen positions with respect to



The airport's 1,200 cloud-based screens now connect via a web browser from any operating system.

the airport layout and can target appropriate messaging depending on the situation, and can control backlighting to help reduce energy consumption where possible.

"The solution we now have in place is resilient, flexible and low cost with highly optimised data transfer," says Gatwick CIO Cathal Corcoran. "We are transforming the way airport information is communicated and will soon allow passengers to interact with chatbots using Facebook Messenger, WhatsApp and other popular apps."

Corcoran adds that Gatwick is also exploring the use of the IoT for improving situational awareness and machine learning for accurately predicting flight departure times. Last year, the airport also became the world's first airport to deploy AR wayfinding.



Police tackle city traffic thanks to hundreds of new radios

 Milan's police service has been equipped with 1,750 new TETRA radios to aid road safety.

The radios were supplied by Hytera's German subsidiary Hytera Mobilfunk and its Italian partner Telecomunicazioni Professionali.

On the congested road network in the Milanese metropolitan area, tailbacks, accidents and traffic problems are said to be a continuous challenge. Hytera reports that officers of the Polizia Locale di Milano have their hands full controlling and monitoring the traffic, and that smooth, fast communication is critical to both ensure the safety of all road users as well as to be able to act quickly and effectively in the event of an incident.

The city police force has replaced all of its radio equipment with Hytera's TETRA portable and mobile digital radios. Handheld radios make up 1,350 of the new devices that have been supplied. This includes the lightweight and slim (23mm) Z1p that features 3W power, GPS, encryption, duplex calls and a man down feature. Hytera says the device complies with IP67 for resilience and that it continues to be operational after immersion in a metre of water for 30 minutes.

In the patrol vehicles, there are now 350 MT680 Plus mobile radios (*pictured above*). With 10W of transmit power, the device also offers group call, PSTN calls, emergency button and 16 programmable keys. Police motorcycles have also been equipped with new TETRA radios.

The new radios are said by Hytera to have passed their first major test when crowds were attracted by the Pope's visit to the city.

Viasat launches 'fastest' satellite internet service



Households in the US can now benefit from what is said to be the world's fastest satellite internet service, a claimed 100Mbps.

Viasat is offering unlimited plans at USD65-USD150 per month – after three-month discount deals – with unlimited VoIP calls to US and Canadian numbers at an additional USD29.99 per month.

The company, which uses its ViaSat-2 satellite system for the service, offers free installation for a satellite dish, modem and router. In addition, Viasat says the service will

be expanded to aircraft over North America, the Atlantic and western Europe as well as to business and government. And it says the planned launch of its ViaSat-3 satellite – which is currently under construction – will offer a service to billions of people globally.

Viasat's chairman and CEO, Mark Dankberg, says the ViaSat-2 service helps to bridge the digital divide in the US, giving customers new choices.

Features of the new offering include a home gateway with built-in Wi-Fi and two Gigabit Ethernet

ports so that everyone in the building can connect wirelessly. It also has a phone port, eliminating the need for a separate ATA (analogue telephone adaptor).

Viasat says its future ViaSat-3 system will offer global coverage with just three satellites. The first is expected to go into service in 2020 for the Americas, with the second – covering satellite for Europe, the Middle East and Africa – expected to launch about six months later. A third satellite is planned for the Asia Pacific region.

Peruvian villages go online for first time



Remote settlements in Peru have been connected with mobile broadband for the first time.

The deployment is a technology pilot and part of a project called *Internet Para Todos* developed by Telefonica with equipment from US company Parallel Wireless.

To keep costs down, the service uses mostly off-the-shelf components and open standards. They include a converged wireless system (CWS), a low power base station made with commonly-available components which integrates 3G and 4G access in the same form factor.

The pilot also features the *Parallel Wireless HetNet Gateway (HNG)* which is said to be a carrier-grade software platform that enables an open network architecture by using standard-based and open interfaces between network components to simplify network management and integration of new RAN products.

Parallel Wireless says the deployment used the full SDR capability of wireless open RAN technology to provide data and voice services over both 3G and 4G technology to thousands of clients.

It adds that the pilot has validated

the maturity of these technologies to provide a cost-effective connectivity in low density areas, getting a voice growth of 12 per cent per month and Circuit Switch Fall Back (CSFB) success call rate of 99 per cent.

According to the vendor, intelligent packet processing delivered more than 10GB per settlement of daily 3G and 4G data traffic and each cell availability was 99 per cent.

Parallel Wireless also claims that the service, available globally and deployed on six continents, offers the lowest total cost of ownership to connect the unconnected.

Space weather global comms impact study

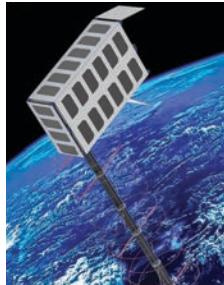


In what has been hailed as a world first, a new experiment to study the effects of space weather on global communications is being launched by the UK and US governments.

The Wideband Ionospheric Sounder CubeSat Experiment (WISCER) uses specially designed shoebox-sized satellites known as 'CubeSats'. These have been designed to help scientists study the Earth's upper atmosphere and find out how it impacts radio frequencies through space.

The project is being coordinated in the UK by the Defence Science and Technology Laboratory (DSTL), an executive agency sponsored by the Ministry of Defence. Dr. Mike O'Callaghan, space programme

The WISCER project uses shoebox-sized satellites known as CubeSats.



manager at the laboratory, said: "We're trying to find out how the ionosphere might affect us when we communicate. For example, are signals weaker during specific space weather conditions? It's important to understand the effects and how it might impact our communications around the world, specifically with military operations."

The WISCER project forms part

of a joint programme with the US Naval Research Laboratory. Plans are now in place to launch two CubeSat satellites during 2020-21, each with a UK and a US payload.

The UK payload will contain a WISCER antenna and waveform generator that will transmit a signal to a bespoke ground signal receiver, assessing the impact of the ionosphere on the signal. The US payload will measure how electron density changes with altitude. The collaboration is said to offer the opportunity to generate data cost effectively, with both countries potentially sharing results.

In the UK, Thales Alenia Space has been awarded a GBP1.5m contract to build the WISCER payload and ground signal receiver.

5G launches in Qatar

 In what it says is a world first, Ooredoo Group has launched 5G, initially for business customers, in its home country of Qatar. Using its 3.5GHz spectrum, the operator claims speeds of 2.3Gbps – twice that of the current 4G network – with 3.5ms latency. Ooredoo says the launch is part of its *Evolution to 5G* network modernisation programme, and that it plans to roll out the service across its global operations that include Southeast Asia, the Middle East and North Africa where it runs networks in Algeria and Tunisia.

New group for wireless

 Two industry groups have combined in a bid to make radio networks more open, maximise the use of off-the-shelf hardware, minimising proprietary equipment, and specifying APIs, interfaces, and driving standards. The founding members of the Open Radio Access Network (ORAN) Alliance are AT&T, China Mobile, Deutsche Telekom, NTT Docomo and Orange. They say it will extend the efforts of the C-RAN Alliance and the xRAN Forum into a single operator led effort that will innovate quickly to meet expectations.

Free Wi-Fi on board

 Passengers on board Finnlines' ships can now benefit from Wi-Fi thanks to equipment installed by Telenor Maritime. The connectivity platform includes 3G, Ka-band VSAT and mobile broadband backhaul in a bid to enhance the customer experience on board. Particular emphasis was put on covering areas such as cabins and other previously non-covered sections on the ship. The service is available on Finnlines' roll-on roll-off passenger vessels which operate between six ports in three countries. Kielo Vesikko, head of passenger services, line manager, says moving from a free to paid service was a "smooth" process.

Researchers simulate living conditions of Mars



Scientists have recently completed a four-day project in the harsh desert of southern Israel to simulate living conditions on Mars.

Six researchers occupied a mock space station powered by solar panels and linked to an off-base operations and control centre. The daily routine, food and communication was the same as it is expected to be during a real planetary mission, including wearing a space suit when venturing outside. They ate mostly freeze dried food and drank three litres of water per day.

Spacecom and the Desert Mars Analog Ramon Station (D-Mars) jointly carried out experiments in which



Aerial view of the Desert Mars Analog Ramon Station (D-Mars).

Spacecom's AMOS-7 satellite provided the communication links. There were simulated blackout periods where, from Earth's perspective, Mars passes almost entirely behind the Sun.

The aim of the experiment – conducted with the Austrian Space

Forum (OeWF) – was to test aspects of long range interplanetary space communications as well as examine challenges and issues that arise from manned planetary missions.

The site of the project, near the Ramon Crater, was chosen for its similarities to the surface of Mars, including its geology, aridity and isolation.

One of the participants, Guy Ron, a nuclear physics professor from the Hebrew University in Jerusalem, says: "D-Mars is half about the research, and the other half is about the outreach. A major part of this project is getting public interest and getting students interested in space."

Air Alliance offers 5G service from your seat



Airline passengers will be able to use their smartphones and tablets in the air as easily as they do on the ground, says a new non-profit industry group.

Called the Seamless Air Alliance and announced at Mobile World Congress in February, it aims to cut costs with working groups which will develop open standards for third-party manufacturers and for billing and deployment.

The five founders – who are

encouraging others to join – include US airline Delta, Airbus, Bharti Airtel, Sprint, and OneWeb. The latter has struck a deal for Airbus to build a fleet of low-Earth orbit communications satellites with the first set for launch later this year.

The alliance says that when the project is operational passengers' devices will seamlessly connect via satellite, through their current mobile operator, for 5G quality without the need for login or credit cards.

It says the goal is to create an improved passenger experience to enable the same level of connectivity they experience in their living room anywhere they fly. The alliance claims the project will also "significantly" reduce costs while creating a "smooth, positive user experience". It adds that the internet experience itself will be as good as, and in many cases better than, the home experience, including low latency, high speed, and a gate-to-gate continuity of service.

Vodafone introduces 4G mini mobile mast



Vodafone UK claims it has achieved an industry first with the successful trial of a new 4G mini mobile mast.

The operator said customers in the village of Porthcurno and on the local beach can now experience 4G data speeds of more than 200Mbps as well as a "strong" voice signal.

Situated on England's southern coast in the county of Cornwall, Porthcurno is significant in the history of telecoms as it served as a major international submarine cable station, and the beach was the landing point for Britain's first submarine telegraph cables in 1870.

Vodafone's telescopic mini mast is just eight metres high when extended to its tallest point, and is around half the height of the shortest standard mast. It can be painted to blend

in with its environment in Areas of Outstanding Natural Beauty.

Unlike other mobile masts, Vodafone said the mini mast does not require a large technology cabinet to house the power supply and electronics.

The mini mast is also said to be much quicker to install, taking around six months to become fully operational – that's around a third of the time it takes to install a standard mast, according to the company.

The mini mast has been introduced to address 'not-spots' and hard-to-reach coverage areas such as small villages and business parks.

Vodafone spokesperson said that it uses the same output of power as a traditional mast for the actual radio equipment. But she added: "However, a mini mast has less such radio

equipment and is therefore more focused on a particular area, whilst a traditional mast may cover a larger range, with greater numbers of cells."

The spokesperson said it was difficult to specify the mini mast's actual reach as this very much depends on the local environment, geography, etc.



Vodafone said the mini mast was installed in "significantly" less time than full-sized versions.

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