Q2 2015
Volume 8
Number 2

# south asian wireless COMMUNICATIONS

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- How satellite is helping India deal with a shortage of doctors
- Fibre – faster, greener and connecting more people?

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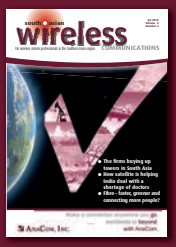

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# ICT industry mobilises its forces to support relief work in Nepal

On 25 April, Nepal's capital Kathmandu and its surrounding areas were hit by 7.8 magnitude earthquake. In the days that followed, more than 100 major aftershocks were felt around the region, and on 12 May the country was struck again by a second powerful quake that measured 7.3.

Nepal's Home Ministry recently confirmed that 8,583 lives have now been lost as a result of the disaster which has been described as the deadliest in the country's history. Entire villages have been wiped off the map and, according to some estimates, the reconstruction bill could come in at more than USD6bn – that's around a third of Nepal's annual economic output.

In the meantime, the relief efforts continue and the ICT community has been playing its part in supporting rescue teams on the ground.

The Vodafone Foundation has a team working alongside Télécoms Sans Frontières in Kathmandu and is deploying its portable mobile network equipment to connect relief workers and local people. Powered by generators, the *Instant Network* consists of an antenna, foldable mast, an industrial computer and a cellular base station to provide coverage within a one kilometre radius.

Vodafone has also developed a smaller version of the system which is being deployed for the first time. The *Instant Network Mini* is an 11kg "network in a backpack" that can be set up in just 10 minutes. Within a radius of 100 metres, it can connect up to five mobile phone users and enables text messages to be sent to thousands of people to provide crucial information following a disaster.

The *Instant Network Mini* has been taken to the Kathmandu Valley where it is being used to help aid workers communicate, support local operators who are trying to re-establish mobile communications, and is enabling people to contact their families and friends.

The Vodafone Foundation added that it has a team of volunteers on standby to deploy additional *Instant Network* equipment, including a new 3G version of the system, if needed.


Main photo: Vodafone Foundation's portable *Instant Network* has been used in Africa and has now also been shipped to Nepal. The generator-powered system consists of an antenna, foldable mast, computer and cellular BST. Inset: a member of the American Red Cross' IT emergency response unit sets up a satellite system in Dhunche using capacity donated by Intelsat.

## Satellite operators donate capacity

Intelsat has donated its satellite services to organisations working in the region. The American Red Cross and the International Federation of Red Cross and Red Crescent Societies are utilising capacity on *Intelsat 906* which is linked via the *IntelsatOne* terrestrial network at the operator's teleport in Germany. The network supports internet and VoIP services to remote hospitals in Nepal, providing field aid workers with connectivity.

Separately, Intelsat is also supporting a network established by Team Rubicon, a disaster response organisation that unites the skills and experiences of military veterans with first responders. Team Rubicon has sent several emergency response teams to Nepal who have brought vital medical supplies.

Spacecom is directing more capacity to the country via its *AMOS-4* satellite, and is offering free capacity to emergency responders throughout the affected areas. The firm is also adding capacity for SNG operators in the region to enable them to quickly resume their businesses.

Orbiting at 65°E, *AMOS-4* features eight Ku-band transponders of 108MHz and four high-power Ka-band transponders of 216MHz, each with steerable beams.

As one of the private partners in the Emergency.lu platform, SES is providing satellite connectivity to replace damaged telecoms infrastructure in the most severely affected region between Kathmandu and Pokhara.

Emergency.lu is a public-private partnership between the Luxembourg government, SES Techcom Services, Hitec Luxembourg and Luxembourg Air Ambulance. The platform consists of satellite infrastructure and capacity, communication and coordination services and ground terminals. Its aim is to offer rapid as well as long-term deployment and transportation of equipment to a disaster area within the first 12 to 20 hours.

Emergency.lu services are providing connectivity to humanitarian responders in Nepal and are being implemented in collaboration with the Emergency Telecommunications Cluster led by the World Food Programme. One *Rapid* deployment kit is already on the ground and operational, and two additional kits were recently redirected to Nepal from Vanuatu which suffered a devastating cyclone in March.

Other emergency communication equipment that has been sent to Nepal includes 35 satellite phones, 10 *Broadband Global Area Network* terminals, plus solar panels and laptops from the ITU.

Indonesian telco Indosat has also donated mobile VSAT hardware. Working with NGO Yayasan Air Putih, the company's data communications specialists have deployed an emergency internet connection that offers up to 1Mbps bandwidth via C-band capacity on the *Palapa* satellites. Bandwidth can be upgraded as necessary.

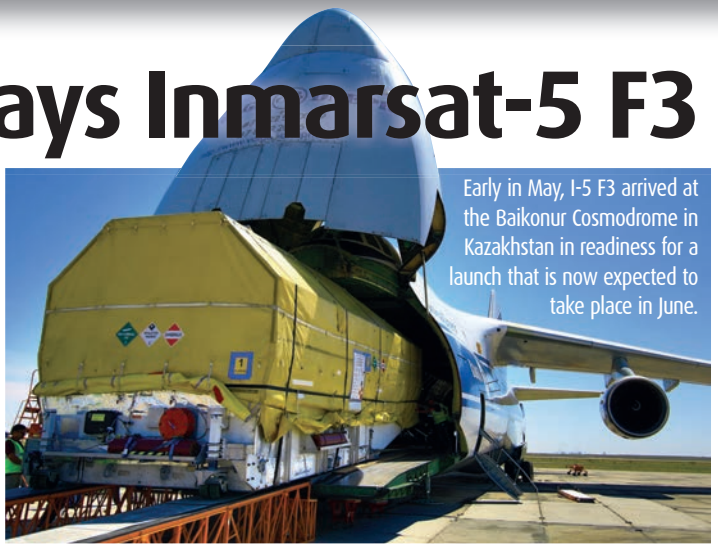
# Launch failure delays Inmarsat-5 F3

The launch of *Inmarsat-5 F3 (I-5 F3)* has been delayed following ILS' failure to launch the Mexican Government's *Centenario* satellite.

*I-5 F3* was due to take off from the Baikonur Cosmodrome following the launch of *Centenario* on 16 May. But according to Inmarsat's launch partner, International Launch Services (ILS), the *Proton Breeze M* rocket carrying *Centenario* suffered a "disabling anomaly" at just over eight minutes into its flight, resulting in the loss of both satellite and rocket. A Russian State Commission has begun the process of determining the reasons for the failure.

"This is the third time our *Global Xpress* programme has suffered launch delays because of Proton launch failures," said Inmarsat CEO Rupert Pearce. "Although in the past *Proton* has returned to flight within a few months of a launch failure, it will not be possible to determine the length of the delay in the launch of *I-5 F3* until the cause of the *Centenario* launch failure is established."

At the time of writing, ILS's website stated that *I-5 F3* will now be launched in June. Inmarsat said the delay is expected to have a small negative effect on its 2015 revenue and earnings, and suspended its guidance of an 8-12 per cent CAGR in wholesale MSS revenues over 2014-16.



Early in May, I-5 F3 arrived at the Baikonur Cosmodrome in Kazakhstan in readiness for a launch that is now expected to take place in June.

*I-5 F3* will be Inmarsat's third satellite to support its much anticipated *Global Xpress (GX)* service. The company is investing USD1.6bn in the development and delivery of *GX*, which it describes as the world's first globally available mobile broadband service. It has been designed to deliver broadband speeds up to 100 times faster than the firm's *I-4* constellation.

# Indonesia Super 4G is first ever LTE SON deployment

BOLT!, the operator of the first TDD-LTE network in Indonesia, is said to have significantly improved the performance of its 'Super 4G' network with the deployment of a self-organising network (SON) platform from P.I.Works.

It's claimed the project is the first of its kind to implement closed-loop SON optimisation functions for a complete LTE network.

BOLT! is using the *P.I.SON* optimisation platform to enhance its LTE-A network. As well as featuring closed-loop mobility robustness, it offers root sequence index, PCI conflict detection and resolution, and complementary automatic neighbour relations optimisation functions. As a result, it is claimed the operator has seen improvements in call handover success rates, reduced dropped call rates, and better radio access channel success rates compared to traditional and "labour-intensive" RAN optimisation processes.

According to Turkey-based P.I.Works, BOLT!'s network is a "highly dynamic" environment where 7,500 new LTE sites were added since the beginning of the project. It says its centralised SON solution has enabled more accurate network settings, making 200,000 parameter changes to impact network performance.

The vendor adds that BOLT!'s average throughput rates have increased by over 20 per cent, despite the fact that it signed up more than a million subscribers after just one year of service.

# DMR comes to the rescue for Disaster Tech Labs

Disaster Tech Labs is using Hytera's DMR radios to support its aid workers in the Philippines.

The Ireland-based non-profit organisation uses Wi-Fi and other technologies to re-connect communities in disaster zones. It has had a team in the Philippines since *Typhoon Haiyan* struck South East Asia last November.

Disaster Tech found there were no communication channels available for the remote areas in which its team was operating in, as any pre-existing services had been disrupted. It therefore needed a solution that would enable its volunteers to communicate over short to medium distances.

Hytera equipped the team with five of its *X1p* radios, an *RD965* and an *MCA10* multi-charger. The vendor says its *X1p* handsets provided "clear and interference-free" communication over various distances despite being used on top of hills and with vegetation in the way. It adds that there were no reports of signal degradation due to high humidity levels.

The *RD965*, Hytera's first digital/analogue portable repeater built to DMR standards, features IP67 protection which made it reliable in the hostile environment Disaster Tech Lab was working in.

The *MCA10* was installed in a vehicle and powered using a Goal Zero battery and two solar panels. Hytera says this combination proved to be more than effective at keeping the handsets powered up.

# Zong on the road to success in Pakistan's 3G market

Zong has been aggressively marketing its 3G services, and recently signed an agreement with the Daewoo Express Pakistan Bus Service to provide free 3G on all motorway routes. The cellco says it is the only operator to provide blanket coverage along the country's motorways.

Zong now has 2.92m subscribers on its 3G network since launching services in Pakistan less than a year ago. That makes it the country's second largest 3G operator in terms of customers.

According to figures for March 2015 from the Pakistan Telecommunication Authority (PTA), Telenor currently leads the 3G market with 3.53m subscribers, followed by Mobilink with 2.86m, and Ufone with 2.66m.

Zong is owned by China Mobile, the world's largest telco. As well as winning 3G spectrum in Pakistan's long awaited auction last year *(see News, Q2 2014)*, it was also the only operator to gain a license to offer LTE services using 1800MHz frequencies. The PTA said Zong added 24,000 new 4G users in March to take its total LTE customer base to 31,582.

Zong CEO Liu Dianfeng has reportedly said his company now has 500 4G cell sites in Pakistan and plans to have over 3,000 more by the end of the year. He added that although the use of LTE compatible devices was currently low in the country, it was growing at pace that justified Zong's investment of more than USD300m in newer technologies, particularly 4G.

In the meantime, Warid Telecom now has 66,140 subscribers on its LTE network that was launched in December 2014. It currently covers Karachi, Lahore, Islamabad, Rawalpindi, Gujranwala, Faisalabad and Sialkot.

Although Warid did not participate in last year's auction, it previously owned spectrum to enable a 4G rollout in Pakistan, and the license it acquired in 2004 is technology-neutral.

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# Dtac expands 4G in Thailand with big promises of more to come

Dtac has officially launched 4G in Bangkok and 40 cities in Thailand. The operator said it had completed the installation of more than 6,700 3G and 4G base stations by the end of March 2015, and plans to continue its network expansion with an ambitious target to have the most 4G subscribers in the country.

Dtac said it has gradually rolled out LTE to each city since the beginning of 2015, and claims it now has more than 970,000 subscribers since the initial commercial launch of 4G services in May 2014.

Dtac CEO Lars-Åke Norling (centre) gets hands-on, and says his "strong passion and commitment" will ensure the delivery of Thailand's "most powerful" 4G service.

The operator said its customers' overall average data usage is currently 4.2GB per person per month, and 1.75 million out of its 28.4 million subscribers (as at 1Q15) already have 4G capable smartphones. Dtac CEO Lars-Åke Norling is aiming to sign-up 2.5 million 4G users by the end of 2015.

He claimed his "strong passion and commitment" will drive the company to achieve a number of targets over the year. They include: delivering the "fastest and most powerful" 4G service with the largest bandwidth using 15MHz spectrum; expanding 3G to reach 95 per cent population coverage; and having the largest 4G subscriber base with 60 per cent of customers using the internet.

After AIS, Dtac (or Total Access Communication) is Thailand's second largest mobile operator. It is part of Norway's Telenor which owns a 42.6 per cent non-controlling interest.

## M1 to offer LTE voice calls

M1's mobile network in Singapore now supports 4G VoLTE calls. Customers on the operator's 4G plans will be able to take advantage of the new service at no additional charge.

M1 says that through the higher bandwidth available on its unique LTE-A network – which is capable of download speeds of up to 300Mbps nationwide – VoLTE technology will allow calls to be connected faster and offers higher quality communications compared to standard voice calls. The operator says the feature is designed to work "seamlessly" between its 3G and 4G networks to deliver uninterrupted conversation to customers.

M1 adds that 4G customers may need to update their phones' software to enable VoLTE, and that it is working with handset vendors to ensure upcoming devices come with the feature enabled.

Established in 1997, M1 provides mobile and fixed services to almost two million customers in Singapore The firm claims it was the country's first to launch nationwide 4G. It says it was also the first to offer ultra high-speed fixed broadband, fixed voice and other services on Singapore's Next Generation Nationwide Broadband Network.

## Dynamic capacity allocation trial complete

Dali Wireless says it has successfully completed the world's first ever dynamic capacity allocation field trial in Singapore.

US-based Dali specialises in digital-over-fibre wireless distribution systems that are claimed to provide significant advantages over traditional passive and active distributed antenna systems (DAS).

It has developed a patented wireless *RF Router* that enables capacity to be pooled at a central location and dynamically routed to where and when it is needed. As a result, Dali says resources are only consumed when needed and with elasticity.

Since the network can be dynamically configured with software, the company says entire base station sectors can be dedicated to specific high demand areas on-demand or per schedule using its wireless *Network Management System*.

Dali says its *RF Router* platform comprises the *tHost* headend (above), radio remotes, and a network management system.

To demonstrate its system's capabilities in Singapore, Dali worked with ICT engineering solutions specialist and Singtel subsidiary, NCS.

Radio capacity was pooled at a central location through the router, and a mix of live 2G, 3G and LTE-MIMO signals from the centralised base stations were dynamically allocated to where there was a high demand within the trial venue.

Dali says all KPIs were met, and in particular the high throughput performance KPI confirmed its claims of an almost lossless router-based RF distribution network.

The firm points out its *RF Router* is different from both conventional analogue and hybrid-digital systems. It says with traditional DAS, operators need to support the wireless peak load for each individual service area where mobile usage and density are high.

"This makes it difficult for operators to realise opex and capex savings," states Dali. "With *RF Router*, systematic capacity over-provisioning is no longer an issue. [Its] patented dynamic capacity allocation capability allows all mobile users to stay connected at anytime, anywhere without interruption to services."

## Free Wi-Fi promise for Sri Lankan towns

Sri Lanka's Government has launched a programme to offer free Wi-Fi in regional towns.

The programme was unveiled in April by the country's new president, Maithripala Sirisena, who came to office at the start of the year. The promise of free internet access was one of the pledges Sirisena made in his presidential election manifesto.

The Telecommunication Regulatory Commission of Sri Lanka (TRCSL) is spearheading the programme which will initially cover 100 towns.

Sri Lanka's new president Maithripala Sirisena promised free Wi-Fi as part of his election campaign.

Following this first phase, the commission says nearly all towns in the country are expected to be brought under the programme, making free internet readily available nationwide particularly to the rural youth.

Under the initiative, each citizen will be able to take advantage of free internet access of up to 100MB per month. Extra usage charges will apply to those who exceed this limit. The service is only available to Sri Lankan citizens and they will therefore need to register before using it.

In early April, the TRCSL held meetings with ISPs who said they would fully cooperate to fulfil the president's pledge and that they will bear the cost of the rollouts.

# Express-AM7 goes live

Express-AM7 was launched on 18 March. It is now offering what's claimed to be "state-of-the-art" communications and broadcasting services to users across a footprint that includes South Asia.

PHOTO © ROSCOSMOS

The Russian Satellite Communications Company (RSCC) has started communications and broadcasting services using its new *Express-AM7* satellite located at 40°E.

*Express-AM7* was launched from the Baikonur Cosmodrome in Kazakhstan on 18 March and successfully completed in-orbit testing during the following month.

It is now offering what's claimed to be "state-of-the-art" communications and broadcasting services to users to South Asia, sub-Saharan Africa, the Middle East, Europe and Russia.

Described as "a heavy-class telecommunications satellite", *Express-AM7* cost EUR152.8m (USD170m) to build and features 80 powerful transponders and nine antennas in C-, Ku- and L-bands.

RSCC says it gives both Russian and international users fresh opportunities to set up broadband internet access, build corporate networks including those based on VSAT, and provide broadcast and multimedia services.

The company adds: "The *Express-AM7* satellite will make it possible for mobile operators to build networks to bind remote cellular base stations in order to expand penetration and communications product line in hard-to-reach and remote areas."

# Afghan Wireless aims for growth with new charging and policy system

Afghan Wireless Communication Company (AWCC) is aiming to differentiate its services and provide an advanced customer experience for its subscribers by using Redknee's *Unified* charging and policy solution.

Having recently launched 3G services, AWCC is leveraging convergent services to monetise its next-generation data strategy and support future growth. It is delivering targeted incentives and rewards to subscribers to increase ARPU and customer loyalty.

According to Canada-based Redknee, *Unified* provides a single solution for operators to manage multiple platforms and end-to-end visibility of services and products to "enhance" the customer experience.

By using its real-time solution, the vendor claims AWCC is able to provide a greater range of value-add and personalised services faster to the market. Redknee adds its integrated charging and policy solution has allowed the operator to optimise its network investments, reduce network load, and set differentiated quality of service for individual subscribers.

The solution also means AWCC can generate revenue through new business models and partnerships with OTT providers.

# Mobile services will help reunite refugees

Refugees United (REFUNITE) has partnered with the Etisalat Group and Ericsson to help thousands of refugees and internally displaced people reconnect through mobile services.

Earlier this year in Dubai, the three organisations pledged to reconnect families uprooted and torn apart as they marked the official launch of The Family Reconnection Project in South and Central Asia.

Several new services started in April in Afghanistan and Pakistan, where separated families can now reconnect with missing loved ones via a free mobile application and helpline.

According to the UN Refugee Agency, Pakistan alone hosts the largest protracted refugee population globally, with more than 1.6 million refugees. Conflict and fighting has resulted in an additional 1.2 million people becoming internally displaced. Meanwhile, Afghanistan is home to more than 143,000 refugees, while some 683,000 are living as internally displaced people inside the country.

Ericsson CEO Hans Vestberg says Afghanistan and Pakistan are countries with real needs for the service.

REFUNITE says lack of access to the internet, coupled with a breakdown of traditional media channels, makes it nearly impossible for families to find each other and reconnect. It claims nearly 400,000 refugees and internally displaced people have registered at its website, www.refunite.org, since it was launched in 2008.

As the lead technology partner, Ericsson is helping to develop the platform. The company's president Hans Vestberg says: "Over time we have seen as we get scale and as more people register on the platform, the more actual reconnections are made.

"Afghanistan and Pakistan are countries with real needs for this service, and we are grateful that Etisalat will join us on our 2015 journey to get one million onto the platform."

Etisalat will create free access to the service in Pakistan and Afghanistan. During this year, it will also launch a free hotline for the illiterate, where separated families can ask questions and register via phones. In addition, the telco will launch large-scale awareness campaigns in conflict zones, refugee camps, tent cities and areas with internally displaced people.

Etisalat will be joining a coalition of mobile companies who are working to make the REFUNITE family reconnection services available in Africa and the Middle East.

# Vietnam 4G in 2016

Vietnam's government will reportedly begin to issue commercial 4G licenses next year. MobiFone, Viettel and Vinaphone are said to be ready to launch services following successful trials. They are among several operators in the country who were awarded licenses to test LTE services in 2011. Local reports say the government will begin issuing licenses in 2016 starting with the major cities. It estimates national 4G rollouts will start in 2017-18 as this is when the 3G subscriber base is expected to be around 55 per cent of the total market.

# Dragonwave 3G/4G deal

DragonWave has signed a supply agreement for its *Harmony Enhanced* long-reach microwave radio system and related services with an unnamed Indian mobile operator. The initial purchase order is for more than 3,000 turnkey links to support the cellco's upgrade and expansion of its nationwide 3G and 4G wireless services. DragonWave says *Harmony Enhanced* delivers capacity and spectral efficiency using its unique *Bandwidth Accelerator* bulk compression system. It says the platform will enable the operator to deliver a "comprehensive" suite of services.

# Indonesia and US link

Construction has begun on the first subsea cable system directly linking Indonesia with the USA. The USD250m Southeast Asia-United States (SEA-US) system is being built by NEC and a consortium that includes Telin, Globe Telecom, GTI Corporation, RAM Telecom International, Hawaiian Telecom and Telkom USA. When completed late next year, the 100Gbps 15,000km cable will connect to Manado in Indonesia, Davao in Southern Philippines, Piti in Guam, Honolulu in Hawaii and Los Angeles, USA.

# Airtel sets up 4G trials in Chennai

Bharti Airtel's subscribers in Chennai are being offered a free upgrade to 4G at 3G prices as part of an exclusive LTE trial that was launched in mid-May.

The operator says it will use the opportunity to gather valuable customer feedback around the quality of its 4G services and assimilate the findings into its wider agenda of building LTE network infrastructure for the city.

Airtel has also announced a partnership with Samsung to push 4G and expand the use of compatible devices. The two companies will promote each others' 4G products at their respective outlets. Samsung will offer bundled Airtel 4G SIMs along with its handsets, and will also be looking at launching its all new *Core Prime* smartphone in Airtel's 4G markets.

In addition, Airtel says it offers an "affordable" Wi-Fi hotspot device that allows compatible mobiles to connect to its 4G network.

Airtel is India's market-leading mobile operator and launched the country's first 4G service in Kolkata in April 2012. Its 4G services are now available across India which, as well as Chennai, also include Bengaluru, Pune, Chandigarh and Amritsar.

# Telkomsel expanding LTE network coverage area

Telkomsel is expanding the reach of its LTE network in Indonesia. The operator says it is able to cover more than 80 per cent of Jakarta, Bali, Bandung, Surabaya and Medan as 4G is currently supported by more than 1,000 of its eNode base stations.

Telkomsel says its LTE services can be accessed in the majority of central city locations, both outdoor and indoor, including strategic areas where high data usage has been recorded such as malls, offices, government buildings, tourist attractions, airports, etc.

In Jakarta, the network has been expanded to Tangerang and Bekasi. It is also serving the University of Indonesia in Depok where students and academics can now use mobile broadband to support their activities.

Telkomsel claims it now has around 240,000 LTE subscribers, and is seeing a 25 per cent increase in data usage from customers who switch from 3G to 4G.

"We will continue to add to the network's range so that more places are served," said Hendri Mulya Sjam, SVP of the Telkomsel's LTE project. He claimed Telkomsel had gained 240,000 LTE subscribers by April 2015, and that it is seeing a 25 per cent increase in data usage from customers who switch from 3G to 4G.

The operator plans to spend almost USD1bn on rolling out new base stations, and has set a target of securing a 50 per cent share of the local LTE market.

Of the new base stations, 75 per cent will support 3G and the remaining 25 per cent will be for 2G and 4G networks. In an effort to maintain a high network quality, Telkomsel plans dense deployments of its 4G base stations.

But the company has a long way to go in converting subscribers to 3G/4G – it is said to have around 80 million customers still on 2G.

# Interoute opens new Singapore POP to meet growing customer demand

Interoute has extended the global reach of its network with a new point of presence in Singapore. The new POP will support the operator's enterprise customers with an extra location in the Asia-Pacific region.

Interoute's network encompasses more than 67,000km of fibre, 12 data centres, 13 'Virtual Data Centres', and 31 colocation centres. It connects Europe, USA, the Middle East and Africa, extending to Hong Kong and now Singapore in the East.

Building on the firm's two existing POPs in Hong Kong, the new site in Singapore gives businesses expanding in Asia a connectivity, communications and computing hub in one of the world's most important financial cities. Interoute adds that customers in the country can now connect directly to its "assured performance" network, and access its portfolio of enterprise cloud computing, voice, video and data services.

Mark Lewis, Interoute's VP for communications and connectivity, said: "With the new POP in Singapore we are providing the network capacity, scale and additional services that enterprises need to realise the business growth opportunities in the area."

# Operators give their networks the SkyEdge

Gilat Satellite Networks has been supporting operators in the region with its innovative *SkyEdge* systems.

Earlier this year it said SMART – a wholly-owned mobile operator and internet service subsidiary of the Philippine Long Distance Telephone company – will use a *SkyEdge II* network for its backhaul.

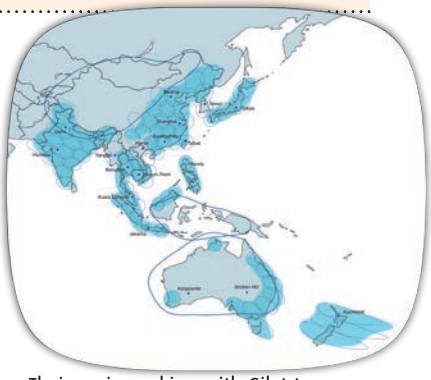
Gilat's Ku-band network will support both 2G and 3G BTS/Node B sites as part of a migration by SMART from older and less efficient VSAT solutions, such as older SCPC modems. The company has supplied a *SkyEdge II* network segment, *SkyEdge II Accent* VSATs, as well as other related services.

According to Gilat, its *SkyEdge II* backhaul solution enables operators to "significantly" save on satellite capacity through the use of Dynamic Allocation Multiple Access capabilities. The firm says DAMA allocates capacity to the site as required, and therefore results in opex savings.

It adds the solution also includes support of automatic uplink power control that compensates for rain attenuation without additional consumption of space segment, as well as strong QoS and policing, ensuring high quality even during periods of congestion due to excessive data traffic.

In a separate announcement, Thailand-based satellite operator Thaicom has teamed up with Gilat to launch the *IPSTAR* service to enhance broadband connectivity across Asia-Pacific. The service is part of a cooperation agreement the two companies signed several months ago to provide customers across the region with an integrated solution comprising Gilat's *SkyEdge II-c* VSAT satellite ground equipment and the *IPSTAR (THAICOM 4)* high throughput satellite (HTS).

*IPSTAR* was launched to 119.5°E in August 2005, and Thaicom claims it was the world's first HTS. The satellite uses multiple, narrowly focused spot beams and frequency re-use, and is capable of maximising the available frequency for transmissions. Thaicom says this improves efficiencies and increases bandwidth by a factor of 20 compared to traditional Ku-band satellites.



Thaicom is working with Gilat to provide broadband connectivity across *IPSTAR*'s APAC footprint.

# Managing the bias in spectrum valuations

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

Over the next few years, regulators across the region will continue to award new spectrum to mobile operators, particularly for 4G spectrum. The process by which this will be awarded will vary from market to market, but irrespective of the process, regulators will almost certainly be seeking to raise significant revenues from the sales.

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

Groups with a strong presence in Asia, such as Airtel, Axiata, Telenor, amongst others, will often delegate this task to the local business unit. This makes perfect sense as the local management team have a better understanding of the value of the spectrum compared to the head office.

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

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

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

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

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

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

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

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

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

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

*Graham Friend is managing director of Coleago Consulting.*

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# Nokia and Alcatel-Lucent to merge

Nokia plans to take over Alcatel-Lucent in all-share transaction that values the French company at EUR15.6bn (around USD16.6bn).

In mid-April, the two firms announced an MoU under which Nokia will make an offer for all of the equity securities issued by Alcatel-Lucent. Directors from both companies have approved the terms of the proposed deal which is expected to close in the first half of 2016, subject to customary conditions.

The combined company will be called Nokia Corporation. It will include more than 40,000 R&D employees from Alcatel-Lucent's Bell Labs and Nokia's FutureWorks divisions. Their aim would be to accelerate development of future technologies including 5G, IP, SDN, cloud, the Internet of Things, analytics, sensors and imaging.

Nokia Technologies will remain a separate entity with a focus on licensing and the incubation of new technologies. But Nokia has begun a strategic review of its HERE business, which specialises in mapping and location technologies, and is considering its sell-off.

Nokia Corporation will be headquartered in Finland with Risto Siilasmaa as chairman and Rajeev Suri as CEO. Alcatel-Lucent shareholders will own 33.5 per cent of the fully diluted share capital of the combined company, and Nokia shareholders will own 66.5 per cent, assuming full acceptance of the public exchange offer.

On the basis of the transaction closing in 1H16, the corporation will target around EUR900m (USD986.7m) of "operating cost synergies" to be achieved on a full-year basis in 2019. These will include organisational streamlining, and the rationalisation of regional and sales organisations, overlapping products and services, central functions, etc.

Job losses have not as yet been announced. Nokia says it intends to maintain employment in France that is "consistent" with Alcatel-Lucent's 2015 Shift Plan commitments. In addition, the company expects to expand R&D employment with the addition of several hundred new positions targeting recent graduates with skills in future-oriented technologies, including 5G. To ensure ongoing support for customers, activities for care services and pre- and post-sales are expected to continue as well.

Nokia Corporation is expected to have a strong balance sheet, with combined net cash at 31 December 2014 of EUR7.4bn (USD8.1bn), assuming conversion of all Nokia and Alcatel-Lucent convertible bonds.

### Indian spectrum sale brings in more than a trillion rupees

The Indian Government raised a record INR1.1 trillion (around USD17.6bn) from its recent sale of 800MHz, 900MHz, 1800MHz and 2100MHz frequencies. Telecom minister Ravi Shankar Prasad reportedly said the auction brought in 33 per cent more than the government expected, and exceeded the INR1.06 trillion earned from the 2010 auctions. The GSMA had previously criticised the country's authorities for setting high reserve prices *(see Wireless Business, Q1 2015)*.

Of the eight operators who took part in the auction that closed in late March, six secured new spectrum: Bharti Airtel; Idea Cellular; Reliance Jio; Reliance Communications; Uninor; and Vodafone. Aircel and Tata Teleservices were disqualified from bidding for new bands because they did not meet the financial requirements set by the Department of Telecom.

Bharti Airtel acquired 111.6MHz across the 900, 1800 and 2100 megahertz bands for a total of INR29,130cr. Of this, INR17,618cr was spent on the renewal of existing spectrum.

After its successful bid, Idea Cellular immediately announced the launch of 3G services on 900MHz spectrum in the Delhi circle. The operator said its 3G network had now expanded to 12 major markets in the country in addition to 3G services through intra circle roaming arrangements with other operators in nine circles, enabling its subscribers to experience "seamless" nationwide connectivity (except Orissa).

Reliance Jio gained new spectrum for use in 13 circles. The company plans to provide 4G services using LTE in 800MHz, 1800MHz and 2300MHz bands through what it says is "an integrated ecosystem". Reliance Jio, which is run by Mukesh Ambani, now has licenses for either 800MHz, 1800MHz or both in 20 out of total 22 India's telecom circles.

It will go head-to-head with Reliance Communications (RCom), which is run by Mukesh's brother Anil. It acquired new and top-up frequencies in 11 circles, and said it had become India's first and only operator with a nationwide footprint of contiguous 800/850MHz spectrum.

Uninor won fresh spectrum in the 1800MHz band in four of its six existing circles, and added the new circle of Assam.

Vodafone India paid INR258.1bn for 900MHz in all six of its circles due for extension in December 2015. The cellco said it is "significantly expanding" its 3G capabilities with the acquisition of 5MHz of 900MHz in Orissa and added a further 30MHz in the 2100MHz band in six new circles. It also bought an additional 5.6MHz of 1800MHz in three circles to complement the 49MHz of 1800MHz acquired last year.

### Critical communications market to deliver sustained growth in Asia

Asia's TETRA market is predicted to enjoy double digit growth over the next three years, according to global research organisation IHS.

IHS analyst Elizabeth Mead said the TETRA market continues to develop despite the rise of other digital technologies.

Speaking at the Critical Communications Asia event held in Kuala Lumpur during late March, Elizabeth Mead, IHS' senior analyst for critical communications, said: "The TETRA terminals installed base in Asia is set to grow by 11 per cent by 2018, mostly driven by significant uptake in Oceania, China, Hong Kong, Singapore, South Korea and Taiwan. TETRA terminals shipments are expected to reach almost 200,000 in 2018."

IHS said TETRA technology now represents 24 per cent of the digital technology market for LMR worldwide, and has achieved record shipment growth of 17 per cent in 2014 in the EMEA region.

"TETRA remains a favourite for many nationwide rollouts, given the exceptional functionality available," said Mead. "Even with an increase of digital technologies like DMR or dPMR, the TETRA market continues to develop."

The analyst further estimates that there still remains a significant LMR analogue installed base (more than 70 per cent) of existing mobile radio users that are yet to convert to digital, indicating that the potential for growth of TETRA technology across all major regions remains strong.

IHS is projecting increased success for TETRA in regions traditionally not necessarily considered strongholds of the technology. It believes the success TETRA has had in Europe is now being emulated in other markets, where new devices that offer enhanced capabilities including ATEX and covert capabilities are gaining traction in the public safety and security arenas.

### HTS to propel satellite backhaul

Current and next-generation solutions for wireless backhaul via satellite are forecast to generate healthy revenue streams from USD1.7bn in 2014 to USD5.3bn by 2024, according to Northern Sky Research (NSR).

In its *Wireless Backhaul via Satellite* report published in mid-April, NSR said a "robust market" is increasingly impacted by non-GEO high throughput satellite (HTS) programmes, specifically with LEO HTS presenting both challenges and opportunities for the industry.

According to the report, various service offerings will continue to target all market segments, posing risks as well as rewards.

NSR said traditional FSS capacity in C- and Ku-bands has so far been the most prevalent solution used for backhaul and trunking in land areas and has begun to address the need for 3G services. The analyst believes this capacity has also made a "compelling business case" for mobility platforms in the maritime and aeronautical sectors, serving the needs of high-paying passengers for the provision of Wi-Fi services.

But it added that less expensive and higher throughput capacity is challenging the economics of traditional FSS where erosion of the revenue base is leading to an 'HTS play' by operators that own traditional FSS transponders. "GEO HTS capacity is making a big push on land, air and sea where a clear migration in the fixed land towers backhaul and trunking markets is under way," said the report.

While non-GEO HTS is still in its infancy, NSR said it promises better latency with the likes of O3b making inroads in backhaul, trunking and mobility platforms. It added that although few details on LEO HTS programmes have been released, if one or two of these are launched, total capacity will increase manifold leading to price pressure for all offerings.

With so many LEO satellites and so much capacity proposed, NSR said many questions have arisen on programme viability in terms of both launching the systems and gaining positive returns if they do launch.

"Non-GEO HTS equipment pricing, specifically antenna systems, will have to come down dramatically compared to current O3b pricing in order to address capex considerations," said report author Jose Del Rosario.

"More importantly, although backhaul is a large and growing market, other applications will have to be targeted by LEO HTS systems as the market opportunity is relatively limited given that all systems will target this market space. Incumbents will surely respond to the LEO HTS threat in terms of lowering their own pricing such that the LEO HTS impact until 2024 is likely to be limited."

### Speedcast aims to power ahead in energy comms sector

SpeedCast claims it is now "well positioned" to become a top-three player in providing satcoms to the energy services markets with a number of recent deals, including the acquisition of Hermes Datacomms. In mid-March, the firm announced it had signed a definitive agreement to buy Hermes for an undisclosed sum. The UK-based company offers communications services using satellite, fibre and radio to the oil and gas industry in more than 50 countries around the world.

According to SpeedCast, the acquisition will "create a new global force providing communications and IT services to the energy sector". It says the deal will significantly strengthen its capabilities to serve and support energy customers worldwide and enhance its portfolio of managed solutions.

SpeedCast also expects to bolster its global network with new POPs in key energy markets around the globe including Central and South East Asia, Africa, the Middle East and Russia.

In February, SpeedCast also announced the acquisition of Geolink Satellite Services. It said the buyout, which is subject to regulatory approval, will boost its services for the energy and maritime sectors, and enhance its MSS portfolio in Africa. Details of the transaction were not disclosed. France-based Geolink is part of the CETel Group and specialises in both MSS and fixed VSAT services. SpeedCast says the deal will support a growing number of its Asia-Pacific customers who are asking for services into Africa.

## IN BRIEF...

Viettel plans to buy Beeline Cambodia which runs mobile networks in 24 provinces as Sotelco. Under the proposed deal, state-owned Viettel will purchase Beeline's assets and its 2G, 3G and 4G licenses for an undisclosed sum. The acquisition will reportedly give Metfone, Viettel's local subsidiary, more than 50 per cent of Cambodia's mobile market, along with over 96 per cent of mobile internet coverage nationwide.

Bharti Airtel has secured long-term funding from the China Development Bank (CDB)

## LATEST COMPANY RESULTS

| Date | Company | Country | Period | Currency | Sales (m) | EBITDA (m) | EPS (units) | Notes |
|---|---|---|---|---|---|---|---|---|
| 23/4/15 | ZTE | China | 1Q15 | RMB | 883 | NA | NA | YoY revenue from carrier networks increased 8.9%, driven by sales growth in products such as wireless communication systems, wireline switch & access systems, routers & router switches. |
| 23/4/15 | Ericsson | Sweden | 1Q15 | SEK | 53.5 (bn) | 19.0 (bn) | 0.40 | Sales in the quarter increased 13% YoY. Growth in India, North East Asia, South East Asia, Oceania & Middle East partly offset by anticipated lower broadband business activity in North America. |
| 28/4/15 | Bharti Airtel | India | FY14 | INR | 920,395 | 314,517 | NA | YoY revenues down 6% in India, & 9% in Bangladesh & Sri Lanka. Africa is also down 1%. |
| 24/4/15 | Dtac | Thailand | 1Q15 | THB | 22.88 | 3,241 | 0.97 | Total revenue for quarter showed increase of 1.9% YoY, driven by strong handset sales & data, offset by voice drop. However QoQ, total revenue decreased 9.5%, mainly because of strong *iPhone 6* sales in 4Q14. |
| 30/4/15 | SES | Luxembourg | 1Q15 | EUR | 477.8 | 356.1 | NA | YoY revenue is up 2.6%. Expects growth in group revenue & EBITDA of up to 1% (at constant forex) for the year ending 31 December 2015. |
| 30/4/13 | Intelsat | US | 1Q15 | USD | 602.3 | 470.5 | 0.69 | Business performing to 2015 expectations, according to CEO Spengler. $9.7bn contracted backlog provides visibility for future revenue & cash flow. |
| 5/5/15 | Telenor | Norway | 1Q15 | NOK | 30.3 (bn) | 10.6 (bn) | 2.70 | Reports all-time high revenues & "strong" organic sales growth of 8%. Turnaround plan in Thailand continues with some early signs of improvement with Dtac. |
| 5/5/15 | PLDT | Philippines | 1Q15 | PHP | 42.6 (bn) | 19.3 (bn) | 42.88 | YoY earnings down PHP0.5bn for Philippine Long Distance Telephone Company. Capex expected to remain high for 2015 due to anticipated exponential growth in data traffic. |
| 11/5/15 | VimpelCom | Netherlands | FY14 | USD | 19.6 (bn) | 8.0 (bn) | 0.53 | Africa & Asia performance impacted by weaker results in Algeria & Pakistan, offsetting strong performance in Bangladesh. |
| 12/5/15 | Eutelsat | France | 3Q14 | EUR | 368 | NA | NA | Revenues in line with objectives, with like-for-like growth of 4.5%. Quarter was marked by successful launch of EUTELSAT 115 West B, one of the first commercial all-electric satellites. |
| 14/15/15 | Sri Lanka Telecom | Sri Lanka | 1Q15 | LKR | 16.7 (bn) | 5.6 (bn) | NA | YoY group revenues grew 9% to LKT16.7bn, while earnings for mobile arm, Mobitel, increased 12% to LKR8.1bn. |
| 14/5/15 | Singtel | Singapore | 4Q14 | SGD | 4.34 (bn) | 5,155 | 10.7 | Net profit up 5% to S$939m. As at 31 March 2015, group's combined mobile customer base was up 8% YoY to 555m. |
| 18/5/15 | Arianespace | France | FY14 | EUR | 1.399 (bn) | NA | NA | 41% increase over 2013 revenue of €989m; described 2014 as a "record year" with 11 launches. |

and the Commercial Bank of China. CDB's credit deal is worth USD2bn in what Airtel says is the single largest bilateral commitment by the bank to an Indian company. USD500m will come from the Commercial Bank. The funds will need final approval but reports say Airtel will be able to draw on them over a long period, with loan maturities extended up to nine years.

Dhiraagu has begun rolling out fibre broadband in the Maldives and claims it is offering the country's fastest speeds at 100Mbps. Services are available to residential customers in Hulhumalé and Malé. This latest news from Dhiraagu follows an earlier announcement that it will provide broadband coverage to all islands before the end of 2015, and that its 3G broadband service is now available in an additional 21 islands.

Kabul residents can now pay their electricity bills using *M-Paisa* following a partnership between mobile operator Roshan and Da Afghanistan Breshna Sherkat. DABS operates and manages electric power generation, transmission, and distribution in major cities throughout Afghanistan. The two companies have launched a pilot programme for around 320,000 customers in Kabul and plan to expand to other provinces including Herat and Kandahar. *M-Paisa* is currently used by more than 1.3 million people in the country.

Warid Telecom has renewed its managed services deal with Ericsson for a further three years. As a result, the operator says it will have access to a number of extra benefits in Pakistan, including enhanced network performance, an optimised seamless user experience, field service efficiency, as well as first-line and second-line support. Abu Dhabi-owned Warid successfully launched its LTE services commercially in Pakistan at the end of last year, and has Ericsson has been its managed services provider since 2005.

2015 marks the 150th anniversary of the ITU. The union was born on 17 May in 1865 after 20 European states signed a treaty in Paris to harmonise telegraph services. As part of this year's celebrations held in Geneva, Robert E. Kahn, the co-inventor of the TCP/IP protocols, radio spectrum innovator Martin Cooper, and Bill Gates were among those honoured with the ITU's 150th Anniversary Award.

## NEW APPOINTMENTS

| Date | Name | New employer | New position | Previous employer | Previous position |
|---|---|---|---|---|---|
| 24/2/15 | Morten Karlsen Sørby | VimpelCom | Director | Uninor | CEO |
| 27/2/15 | Mike Coffey | Wyless | President & CEO | Wyless | President & COO |
| 11/3/15 | Bob Driver | Cambridge Wireless | CEO | UKTI | Director for high technology sectors |
| 13/3/15 | Jo Lunder | – | – | VimpelCom | Group CEO – resigned |
| 13/13/15 | Jean-Yves Charlier | VimpelCom | Group CEO | SFR | Chairman & CEO |
| 16/3/15 | Kevin McCarthy | Newtec | VP of market development | MTN Satcoms | COO |
| 18/3/15 | Anne Bouverot | Morpho | Chair & CEO | GSM Association | Director general |
| 24/3/15 | Dov Baharav | Gilat Satellite Networks | Interim CEO | Gilat Satellite Networks | Chairman |
| 1/4/15 | Kurt Riegelman | Intelsat | SVP, sales & marketing | Intelsat | SVP, global sales |
| 1/4/15 | Michael J. DeMarco | Intelsat | SVP, operations | Intelsat | SVP, marketing & solutions development |
| 6/4/15 | Fernando Valdivielso | ECI Telecom | VP EMEA sales | SEACOM | COO |
| 4/5/15 | Chuck Robbins | Cisco | CEO (as from July 2015) | Cisco | SVP, worldwide operations |
| 5/5/15 | John Chambers | Cisco | Executive chairman (as from July 2015) | Cisco | CEO |
| 12/5/15 | Sigve Brekke | Telenor Group | President & CEO (as from Aug 2015) | Telenor Group | Head of Asia |
| 12/5/15 | Jon Fredrik Baksaas | – | Due to retire at the end of 2015 | Telenor Group | President & CEO. Will continue to serve as an advisor until 2016 as well as GSMA chairman |
| 14/5/15 | Stephen Cheang | Neural Technologies | General manager for Asia Pacific | Syniverse Technologies | Country manager, Malaysia |

## INVESTMENTS, MERGERS & ACQUISITIONS

| Date | Buyer | Seller | Item | Price | Notes |
|---|---|---|---|---|---|
| 4/2/14 | Emerging Markets Communications | General Industry Systems | General Industry Systems | NA | The acquisition of the Norwegian firm strengthens EMC's energy & maritime business segments. |
| 27/2/14 | NEC Corporation | NEC Toshiba Space Systems | All shares | NA | NTSpace will become a wholly owned subsidiary of NEC & changed its name to "NEC Space Technologies" on 1 April. |
| 17/3/15 | Fastback Networks | Sub10 Systems | Sub10 Systems | NA | The combined entity will address what's forecast to be a $1.6bn market for sub-6GHz and millimetre-wave solutions for the mobile backhaul market. |
| 7/4/15 | Singtel | Trustwave | 98 per cent stake | USD810m | South East Asia's biggest telco aims to expand in cyber security. |
| 9/4/15 | Infinera | Transmode | Transmode | USD350m | Infinera says acquisition will complement its "strength" in long-haul optical transport market & its "early lead" in metro cloud market. |
| 24/4/15 | Reliance Jio | Saft | Evolion battery systems | EUR7m | Reliance Jio will use Saft's Li-ion backup batteries to support the next phase of its LTE rollout programme. |
| 29/4/15 | Emerging Markets Communications | MTN Communications | MTN Communications | NA | MTN Communications uses a hybrid satellite-terrestrial broadband network to provide communications & content for remote locations around the world, especially for the maritime & energy sectors. |
| 29/4/15 | Amdocs | Comverse | BSS unit | USD272m | Strategic acquisition expands & diversifies Amdocs' BSS customer base, particularly in Europe, Latin America & Asia Pacific. |
| 1/5/15 | Sepura | Teltronic | Teltronic | EUR127.5m | Reports say Sepura will draw on its debt facility as well as the proceeds of a share issue to fund the purchase of the Spanish PMR specialist. |

# Chameleon offers big power for small cell deployments

Eltek has unveiled two power systems for small cell deployments. The *Chameleon 48/650 HE* is a standalone rectifier with 20ms or 200ms hold-up time which, according to the firm, is "just enough" to manage normal mains disruptions without dropping the output. It is said to be small, lightweight and quick to install either on poles or walls, and has a discreet IP-65 rated exterior that is designed to blend into most environments.

The *48/650 HE* also features surge protection on input and output, a heat sink for optimal passive cooling, and high-efficiency technology based on the firm's *Flatpack S* rectifier module. Eltek says this has a compact design to ensure maximum power density.

The *Chameleon 48V (pictured)* is aimed at deployments where monitoring and battery backup is needed.

It consists of two rectifier units, a box that includes an advanced monitoring unit for system control and easy connection, plus a battery, all contained in one small compartment.

In addition to more power, the *48V* offers all of the features of the *48/650 HE* plus a complete ~30 minutes backup system at 600W load using 7Ah batteries (not included). It features temperature compensated charging, low voltage battery disconnect, and a free vented battery compartment. Energy logs with advanced monitoring of battery, performance and temperature are also supported.

**MANUFACTURER:** Eltek

**PRODUCT:** Chameleon power solutions

**MORE INFORMATION:** www.eltek.com

# Intelligent site management gets even smarter

Flexenclosure has added several new features to its *eManager* tool which provides remote management and energy optimisation of its *eSite* power systems.

Amongst the enhanced features, it now offers safe storage and time stamping of all site data to ensure information is never lost. In the event of a communications breakdown between the NOC and the site, all site data is stored in the *eSite* and uploaded to *eManager* once links have been restored.

The tool can now also be used to fully configure *eSite*. All settings can be controlled and adjusted remotely from the NOC, eliminating the need to send specialist personnel to the site.

In addition, users can now securely log in to *eManager* from any connected web browser. Network managers can remotely monitor fuel consumption, schedule refuelling when necessary, manage theft alarms, etc, while maps show eSite locations and their operating status.

Working in conjunction with *Diriflex*, eSite's intelligent control system, *eManager* can collect and analyse all relevant site data, storing it in a detailed energy data warehouse for benchmarking, trend and historical analysis, as well as real-time monitoring.

**MANUFACTURER:** Flexenclosure

**PRODUCT:** eManager

**MORE INFORMATION:** www.flexenclosure.com

# Cummins releases its most powerful workhorse

The *QSK95* series generator sets are Cummins Power Generation's most powerful diesel generator sets to date, offering up to 3.5MW 60Hz and 3.75MVA 50Hz. The vendor claims they are engineered with the highest kilowatt per square foot ratio in their class, resulting in a smaller footprint that achieves a 20 per cent improvement in power density.

As well as offering more power, Cummins claims that the new generators also offer "best-in-class" fuel economy thanks to an innovative fuel injection system. It says that over the course of 8,000 hours of operation, the *QSK95* can achieve fuel savings of more than USD400,000.

The company adds that fewer maintenance requirements, longer service intervals (such as three-year or 1,000-hour oil and filter change intervals), and 25,000 hours to major overhaul, makes the generators "ideal" for prime power applications.

**MANUFACTURER:** Cummins Power Generation

**PRODUCT:** QSK95 Series

**MORE INFORMATION:** www.cumminspowerofmore.com

# Remote solar power for edge communications kit

ComNet's solar powered systems are designed for applications where a remote camera or wireless repeater is needed but power is either not available or too expensive.

Its *NetWave Solar* range of kits aim to offer a complete system for providing remote power to edge communications equipment. They include: a solar panel; valve-regulated lead-acid battery; solar charge controller; PoE mid-span injector; and an outdoor steel enclosure. The latter has a gasket hinged lid with two tamper proof locks operated by a special key for security.

The 30A solar charge controller features an LCD for local diagnostics and system health monitoring, intelligent PWM charging mode, and battery protection from overcharge/over discharge. ComNet adds that the battery provides "outstanding" deep cycle and cold weather performance.

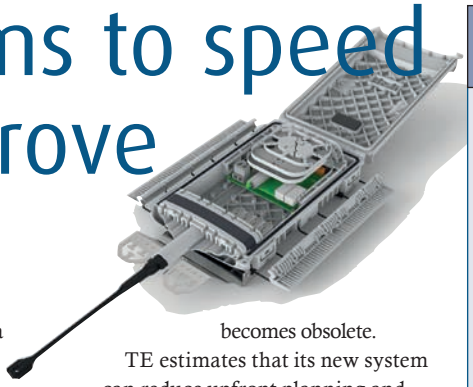
Four pre-configured kits are available: the *NWKSP1* and *NWKSP2* each offer a 15W continuous power system with six and three hours of peak sunlight respectively; while the *NWKSP3* and *NWKSP4* each have a 30W continuous power system with six and three hours of peak sunlight respectively. Customised options are also available upon request.

**MANUFACTURER:** ComNet

**PRODUCT:** NWKSPx off-grid power systems

**MORE INFORMATION:** www.comnet.net

# Cable system aims to speed hetnets and improve 4G coverage



TE Connectivity has combined power and optical communications into one system. It says the resulting powered fibre cable system eliminates the complexity of small cell installations and allows devices to be placed exactly where they are needed for maximum 4G wireless coverage.

The system is said to incorporate everything needed to power and communicate with a small cell – including the power supply, a hybrid cable, and a remote powering unit that corrects for DC line loss to eliminate the need for electrical design calculations.

TE claims its cable has a reach that is greater than 10 times the distance of standard PoE+ cables. It says the ability to transport power further makes it possible to place small cells exactly where they are needed to focus wireless capacity.

By combining power and fibre communications, the company says local powering is no longer needed. It adds that determining how to obtain power from building owners, utility companies or municipalities is therefore eliminated, and negotiations of who pays for powering the small cell and how consumption is monitored becomes obsolete.

TE estimates that its new system can reduce upfront planning and engineering time for many small cell deployments by 50 per cent or more. The system is designed for low power DC transmission (NEC Class II), negating the need for highly-skilled electricians, and is also said to simplify installation. Up to 32 devices can be connected simultaneously from one power supply.

Remote powering units can be factory terminated onto the hybrid cable with exactly the correct connectors for a given small cell. To place a small cell exactly where it is needed, the customer simply plugs in the connector, mounts the remote powering unit, and installs the cable back to the power supply located up to 1km away.

**MANUFACTURER:**
TE Connectivity

**PRODUCT:** Powered fibre cable system

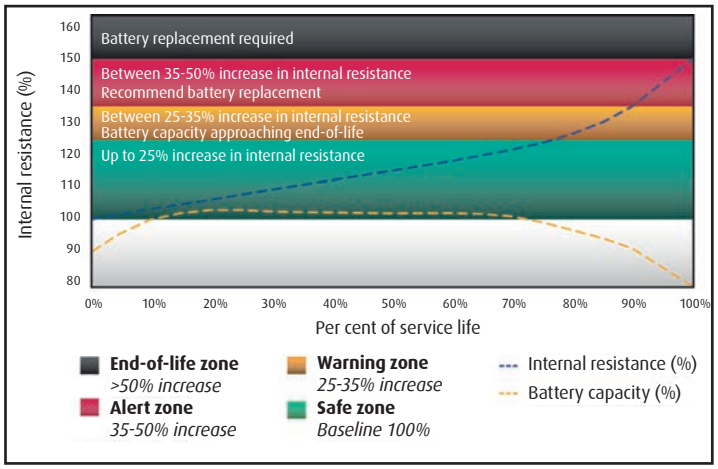
**MORE INFORMATION:**
www.te.com/poweredfibe

# Life cycle approach will cut battery costs

Emerson Network Power (ENP) claims its *Battery Optimisation Program* (*BOP*) will help telecom providers optimise the performance and lifespan of DC power system batteries in critical infrastructure environments.

The program uses a tailored combination of traditional discharge testing and what ENP says is state-of-the-art internal resistance tests. It assesses battery health and the impact of various parameters such as battery type, age, discharge cycling and ambient temperature.

Four standard battery management solutions are offered, ranging from a low-cost offering with limited testing, to one that provides a value suitable for the most critical sites (comparable with the IEEE benchmark). Each one targets different type of site demands and can be further customised to meet specific requirements.




ENP says the program is "dynamic and widely flexible", with different test techniques and frequencies applied to meet various demands in site criticality and budgets.

The *BOP* is based on highly-trained field engineers using standardised data collection templates to safely and accurately collect and report test results and observations. ENP's battery experts analyse that information, recommend necessary remedial actions, and develop future testing procedures to ensure high reliability of the batteries and network, and to optimise the cost of the battery life-cycle maintenance.

In one recent deployment, the company says it used the programme to design a battery maintenance strategy which not only improved reliability but also reduced the customer's battery maintenance expenses by 25 per cent.

**MANUFACTURER:**
Emerson Network Power

**PRODUCT:** Battery Optimisation Program

**MORE INFORMATION:** www.EmersonNetworkPower.eu/EnergySystems

## ALSO LOOK OUT FOR

## RAN energy efficiency standard agreed

The ITU and European Telecommunications Standards Institute (ETSI) have agreed a new standard to measure the energy efficiency of mobile radio access networks.

*Energy efficiency measurement and metrics for telecommunication network* (*ITU-T L.1330* and the technically equivalent *ETSI ES 203 228*) is said to be the first standard to define energy efficiency metrics and measurement methods for live RANs. It provides a common benchmark to evaluate performance, and its application will build uniformity in the methodologies employed by such evaluations, in parallel with establishing a common basis for the interpretation of the results.

The ITU says the standard accounts for the fact that optimising the energy efficiency of equipment within a network does not guarantee the optimisation of its overall energy efficiency. It has been developed to take a more comprehensive view of a RAN, incorporating impacts on energy efficiency caused by the interactions of interconnected equipment within complex networks.

*ITU-T L.1330*'s scope extends to radio base stations, backhauling systems, radio controllers and other radio site infrastructure equipment. The technologies covered include GSM, UMTS and LTE (including LTE-A).

According to the union, the standard offers a pragmatic measurement approach focusing on the performance of 'partial' networks to extrapolate estimates of the energy efficiency of 'total' networks. It provides for a total network to be defined by topologic, geographic or demographic boundaries, enabling estimations of the energy efficiency of an operator's, country's or continent's networks, or networks distinguished by their coverage of urban or rural areas.

The result of these estimations is captured by an assessment report, the form of which is also detailed by the new standard.

# Using towers to reach new heights

Estimates based on a number of different sources indicate that there around 950,000 towers in South Asia, and almost half of them are in India.

While mobile operators regard towers as a costly burden, South Asia's tower companies are growing fast and showing no signs of slowing down, as ABDUL MONTAQIM discovers.

There are currently around a million telecoms towers in the countries covered by *South Asian Wireless Communications*: Afghanistan, Bangladesh, Bhutan, Cambodia, India, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Vietnam. Of these, India is by far the biggest telecoms market. It has a population of 1.3 billion people and 941 million mobile connections, according to the GSMA Association (GSMA).

But the region's exact tower count remains uncertain. Organisations that conduct research into the sector tend to jealously guard their information and only sell it for a high price (and none of it is for publication). Our estimates, based on a number of different sources, suggest that there about 950,000 towers in South Asia and almost half of them are in India.

## India – the big fish

In its *Telecommunications Infrastructure Policy* report published in 2011, the Telecom Regulatory Authority of India (TRAI) estimated there to be 400,000 towers in India. More recently, the *Economic Times of India* said there were 440,000 in the country, while another source, the India Energy Storage Alliance (IESA), puts the figure at 650,000. There is obviously some disparity between these figures, but most sources agree that India will reach about one million towers well before the end of the decade, and by 2017 if you believe the IESA.

It would probably make more sense to go with the latter's estimate of 650,000, partly because the *Economic Times*' figure of 440,000 would mean that not much has changed in the past four years – and that is clearly not the case when you consider how fast Indian tower companies have grown. Towercos currently comprise about 60 per cent of India's total market, and of these firms Indus Towers claims to be the world's biggest with 115,942 towers in 15 circles across the country.

Indus Towers was formed by merging the passive infrastructure assets of three MNOs: Bharti Airtel subsidiary Infratel owns 42 per cent; Vodafone India has 42 per cent; and Idea Cellular 16 per cent. These three are believed to be India's largest telcos. In a statement at the time of Indus Towers' launch in 2007, they said they would provide passive infrastructure sharing services across the country.

Some industry experts believe the creation of Indus Towers and the infrastructure sharing concept was critical in the formation of the tower industry in India. A widely circulated table shows a list of the top towercos in India *(see right)*. The source of this data is not generally given, but it's

likely to have came from a report by TRAI dating back several years.

Ascend Telecom Infrastructure says the sharing model has prompted the emergence of independent towercos such as Viom (which has around 50,000 towers in India), GTL Infrastructure (which has 35,000) and American Tower Corporation (10,000). Rajat Chitravanshani, Ascend Telecom Infrastructure's chief supply chain and project officer, says: "These independent companies had no telecom component and restricted themselves to the building and leasing of towers for a fee of INR25,000-30,000 [about USD400] per company per month for typical contracts of 15-20 years. The model was so successful that today only state-run telcos Bharat Sanchar Nigam and Mahanagar Telephone Nigam, which together have some 70,000 towers, are yet to separate their tower businesses."

The sharing model was not primarily intended to create the tower industry. India's well populated mobile market features 12 operators, and all of them face mounting pressures to cut costs. One of the main ways in which they are doing so is by selling off their infrastructure, mainly towers, so that they can devote all their attention to developing services and building subscriber loyalty. Increasing regulation, especially environmental regulation, possibly leading to an increase in operating costs, is putting further pressure on the operators who are already facing declining ARPU.

## Tower power

Even though the actual number of towers is debatable, what is certain is that there is a growing concern about their environmental impact. In 2012, the Indian government introduced a green policy that requires 50 per cent of all telecom towers in rural areas and 20 per cent of those in urban areas to be run using cleaner power generation systems. The deadline for the switch is this year.

| INDIA'S TOP TOWERCOS | |
|---|---|
| Indus Towers | 115,942 |
| Reliance Infratel | 31,000 |
| Bharti Infratel | 20000 |
| Quippo Telecom Infrastructure (QTIL) | 23,000 |
| GTL | 9,000 |
| Essar Telecom | 6,000 |
| American Tower Corp. | 4,000 |
| Tower Vision | 3,000 |
| Aster Infrastructure | 1,000 |
| India Telecom Infra | 1,000 |
| KEC International | 400 |
| Independent Mobile Infrastructure | 400 |

Based in Yangon, Apollo Towers owns and operates telecom towers and power infrastructure in Myanmar. This includes construction, management and leasing of sites to all mobile operators in the country.

According to a GSMA study published in 2012, about 40 per cent of tower sites in India have unreliable access to the power grid, while 20 per cent are off the grid completely. As a result, around 60 per cent of the country's tower sites are currently powered by diesel generators. Diesel is generally believed to be one of the worst pollutants, and the government wants more towers to be powered by hybrid power systems using solar, wind, biomass or fuel cells. The green policy goes even further, saying that 75 per cent of rural towers and 33 per cent of urban towers will have to switch to hybrid by 2020.

India's Tower and Infrastructure Providers Association (TAIPA) says the country's tower networks are on course to consume 17kWH of energy by 2016. If the government's green policy is not followed, diesel usage will increase 50 per cent in that time. With the current CO2 emissions from tower sites running at 11 million tonnes annually, the country can ill afford to pay the costs of cleaning up the dirty air that will result from increased diesel use. Air pollution currently causes 116,000 deaths in India every year, according to the World Bank.

However, while the social arguments for going green may be irrefutable, the financial consequences could also be dire for some companies. Diesel might be dirty, but it is significantly cheaper than 'greener' alternatives such as solar and wind. The extra costs would be quite punitive – particularly on the operators that still own towers. While the independent towercos are on a growth curve, MNOs are fighting to retain the profits they have as the market becomes saturated and ARPU falls. The last thing they need is to see their costs go up.

## Up for grabs

All of this has resulted in the rise of the independent tower company, and there is no sign that the deal-making will end any time soon.

India's market leader Bharti Airtel has 325 million subscribers in its global operations which include Sri Lanka, Bangladesh and 17 countries in Africa. On that continent, it has already sold 12,000 of its 15,000 towers and plans to off-load the rest as soon as possible. In its home market, Bharti Infratel has transferred approximately 30,000 towers to Indus Towers which continues to expand. At the end of 2014, it signed a USD750m deal with Reliance Jio on infrastructure sharing. Under the agreement, Reliance Jio will utilise the infrastructure provided by Indus to launch services across the country. The cellco is preparing to launch 4G and says it is the only India-wide operator with a license that allows it to provide voice services using broadband wireless access spectrum.

"We are continuing our effort to create a new age network which will provide innovative and empowering digital solutions to every Indian through our high-speed 4G services," claimed Reliance Jio MD Sanjay Mashruwala. "We are building our network through a combination of infrastructure that we are creating on our own, and those that we are renting from quality partners. We already have such tower sharing agreements with all the major players in India, and this relationship with Indus Towers will further accelerate the rollout of our services."

Meanwhile, Reliance Communications (which is separate to Reliance Jio) is planning to sell at least a majority holding in its tower business, Reliance Infratel. It claims to have 45,000 towers, and the firm is looking for about USD3 billion for the assets.

In neighbouring Pakistan, Warid Telecom recently sold more than 4,500 of its towers nationwide to Dubai-based Towershare under a sale and leaseback arrangement. The Abu Dhabi Group owned operator said selling the towers will enable it to concentrate more on its customers, and accelerate its 2G and LTE rollouts. It is also expected to reduce capex and opex.

Further east in Bangladesh, Airtel is considering the sale of its 4,000 towers that are estimated to be worth around USD200m. The country has about 30,000 towers in total, the vast majority of which are still owned by operators. But the GSMA says this will change as "site sharing is an emerging trend" in Bangladesh.

Myanmar is a relative newcomer to the mobile telecoms market and is now seeing significant

activity in its tower sector. The country currently has around 7,000 towers and according to figures from the GSMA it is looking at building an estimated 17,000 to service the communications needs of about 70 per cent of its 52 million people. As a result, Myanmar's incumbent national operator, Myanmar Posts and Telecommunications (MPT) is being pressured into competing for what it had previously taken for granted.

Analysts at GPM estimated last year that MPT has about 1,800 tower sites, with another 1,000 planned for this year. MPT is believed to have about 8.4 million subscribers. Until now, the operator never had to consider accounting for much, but since the government awarded two mobile licenses in 2013 – one to Qatar-based Ooredoo and the other to Norway's Telenor *(see News, Q3 2013)* – MPT has been under so much scrutiny that it is currently considering a partnership with an outside company. Names such as Orange, Singtel and Vodafone have all come up here.

One of the main reasons for MPT's newly acquired outward-looking perspective is the threat from Telenor and Ooredoo. Since launching services in Myanmar last year, Telenor claims it now has 6.4m customers while Ooredoo says it has 3.3m. Between them, they are thought to have about a total of 4,700 towers coming online in the country this year. Telenor has ordered several thousand towers – 1,000 from Apollo Towers and 2,000 from Irrawaddy Green Technology. The telco says it wants a total of 10,000 towers in two years in Myanmar.

In May, Singapore Windsor (SW) won a build-and-lease contract of 500 towers for Ooredoo Myanmar. Ooredoo has already built more than 100 towers in the country, and plans thousands more. SW claims the deal underlines its "growing presence" in Myanmar as a telecoms service provider. The company started life in Hong Kong in 1986, and while its primary business is manufacturing printed circuit boards, it has diversified, targeting Myanmar's telecom sector.

Indonesia is the world's largest archipelago and the second-most populous nation in South Asia with 255 million people and 318 million mobile users. Despite its vast geographical spread and the size of its population, the country has a small number of towers. According to estimates from financial analysts at Moody's, there are about 72,000, and 45 per cent of these are owned by three companies: Profesional Telekomunikasi Indonesia (Protelindo); Solusi Tunas Pratam (STP); and Tower Bersama Infrastructure.

Moody's AVP and analyst Nidhi Dhruv believes these three towercos are now preparing to expand. "The Indonesian tower industry has developed rapidly amid a supportive regulatory and business environment, and we expect the largest independent tower operators to acquire additional assets from telecom operators."

One of the country's biggest operators, XL Axiata, plans to sell 3,500 of its towers to STP, which is linked to private equity company the Carlyle Group, for USD459m. STP already owns about 3,000 towers in Indonesia, which makes it the country's third-largest towerco. Dhruv says: "The organic growth of the tower companies should also remain robust as they continue to receive orders to build towers in response to the efforts of the leading Indonesian telecom companies to strengthen and expand their 3G/LTE networks." ■

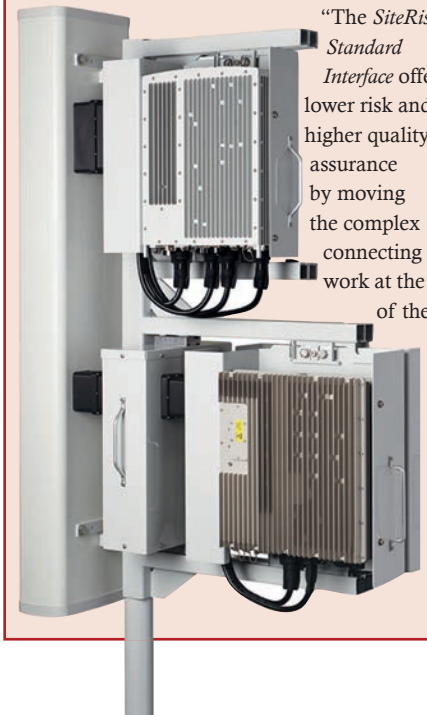
## TOWER SOLUTIONS GO OVER THE TOP

It has become increasingly complex, time-consuming and expensive for operators to maintain existing cellular sites, according to infrastructure specialist CommScope. It says infrastructure typically has to be assembled on-site at the top of the tower, and the lack of a single tower-top design standard has made each upgrade a challenging process.

That all changed in 2013 when CommScope and Ooredoo announced the development of the world's first factory-assembled tower tops for base station remote radios (*see News, Q2 2013*). These are pre-assembled according to a single global design standard, and the two companies said this new approach to building wireless networks results in significant benefits. It's claimed the pre-assembled tower tops provide greater network capacity, significantly reduce installation time by around 50 per cent, cut ongoing electricity consumption, and free up valuable space at the top of the tower.

Part of the aim of what CommScope now calls the *Andrew SiteRise* solution was to create and maintain a future-ready network that is radio vendor agnostic, and does not require significant on-site remote radio modifications for future upgrades.

Last year, the firm expanded the solution with the *Andrew SiteRise Standard Interface (pictured below).* It describes this as a new way of connecting an RRU to the base station antenna. The interface has been designed to give an operator the flexibility of using multiple RRU technologies and frequency bands in a simplified plug-and-play arrangement. Key to the solution is a patented connector technology that provides an essentially PIM-free, blind mate connection.



"The *SiteRise Standard Interface* offers lower risk and higher quality assurance by moving the complex connecting work at the top of the tower into a more controlled environment," says CommScope. "This innovation reduces the risk of craft related errors due to the harsher and more complex working conditions at the top of the tower."

Wireless infrastructure provider Radio Frequency Systems (RFS) has also developed a factory-assembled tower top component solution.

The company says its *SiteExpress* system (*shown above*) is tailored to meet specific customer needs, and supports multiple technologies including LTE. It has been designed to support simple or complex projects with multiple components from RFS, RAN vendors, or even third-party infrastructure providers. Units can be individually equipped with multiband antennas as well as all required cabling and site optimisation products as needed.

Similar to CommScope's solution, RFS says some of the typical benefits of using *SiteExpress* include reduced site installation time, improved performance due to reduced jumper losses, and easy planning for future upgrades.

The complete system is assembled by the firm's technicians in a controlled environment, tested to ensure it meets all operating requirements, and shipped to a site ready to be hoisted and installed at the top of a tower.

"Tower technicians face many challenges in the field with ever increasing complexity and crowding of the sites, which can lead to costly mistakes and delays," said RFS product line manager Teppo Lukkarila. "*SiteExpress* is engineered for fast and reliable deployments, allowing our customers to save time and money by moving installation steps away from the tower and into a controlled factory environment."

When the firm launched its system late last year, it said 700 *SiteExpress* units had already been delivered to customer sites globally. It added that a "leading" international communication company was successfully using the product in a nationwide 3G network in South East Asia.

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Satellite education enables coaching institutions to reach doctors with postgraduate medical aspirations no matter where they are located.

# Just what the doctor ordered

## Broadband satellite is helping India address a shortage of doctors, as SHILPA CHOUDHURY explains.

With 381 public and private institutions, India boasts the largest number of medical colleges in the world and produces thousands of medical school graduates per year. Even so, the vast and populous country faces a perennial shortage of doctors.

In response to the constant need for more doctors, in January 2014 the Indian cabinet approved a proposal to create 10,000 new seats in government medical colleges, substantially increasing the 50,000 currently available in the nation's public and private medical schools. The goal is to cut the country's doctor-patient ratio from 1:2000 to 1:1000, and reduce the distance that people living in remote areas must travel to reach medical care.

While increasing the number of medical college seats addresses the overall need for more doctors, it does not directly deal with the severe shortage of specialists for both rural and urban medical services.

Shilpa Choudhury, Marketing and product manager, Hughes India

In particular, there is a critical need for practitioners in rural areas where 70 per cent of the specialist posts at rural health centres, which provide basic medical services to villagers, are vacant.

With medical services in such high demand, every medical graduate is a valuable asset to the country. This is where the lack of uniformity and uneven quality of medical education across India starts to become a problem. Medical graduates who are interested in pursuing useful specialties, such as oncology, endocrinology, otolaryngology, etc, often have trouble getting onto postgraduate programmes because they haven't received the necessary training to pass the required entrance exams.

As a result, many doctors turn to India's 'medical coaching' schools to receive the supplemental training they need to pass specialty entrance exams. These schools are in turn increasingly turning to distance learning systems built on satellite broadband technology to extend postgraduate exam training throughout the country.

## Coaching across the distance

Medical coaching schools are a USD22m industry in India. To extend their reach to a greater number of students nationwide, many coaching schools have created distance learning systems built around satellite broadband technology.

Satellite education enables coaching institutions to reach doctors with postgraduate medical aspirations – no matter where they are located – and train them with highly qualified faculty. This supplemental education offers them an equal opportunity to compete for admission into prestigious postgraduate programmes.

Broadband satellite network solutions provide a virtual face-to-face experience with high-quality, high-clarity media that enables direct eye contact, two-way voice interaction, and chat-based queries. With high definition and 3D-quality images, the educational experience simulates the in-person training available at labs and classrooms.

In the past, satellite connectivity was typically thought to be too expensive, too slow, and unreliable to support such a demanding application. With the advent of high-performance satellite broadband connectivity and advances in radio technology, the cost and reliability of satellite connectivity have made satellite systems a viable option for medical coaching companies trying to span India's long distances.

Among the advantages the current generation of satellite broadband technology offers are:

**Competitive cost:** high throughput satellite (HTS) systems reduce satellite bandwidth costs by an order of magnitude. This reduction is achieved primarily through the use of spot beams which allow frequency re-use and higher order modulations. Bandwidth in the megabits per second is possible at monthly costs comparable to any other connectivity option.

**Multicast capability:** inherent in the nature of satellite broadcast is the ability to send data once and have it received by many. This is a useful capability for medical coaching companies to provide students with content such as e-books, presentations, documents, etc. Multicasting also enables schools to broadcast live learning to several locations at once.

**Universal coverage:** as long as there is line-of-sight to the satellite, broadband access is available. This is especially relevant in a large country like India, enabling each regional coaching centres to service several remote locations.

**Low cost and simple installation:** a typical installation at a school would include the satellite dish, satellite modem, and one or more PCs. All of these can be acquired at relatively low cost and installed in less than a day. Specialised equipment such as digital whiteboards, video-conferencing and multimedia systems, and even 3D learning experiences may be connected to take advantage of the broadband connectivity.

## Satellite medical coaching at work

The Delhi Academy of Medical Sciences (DAMS) and the Dr. Bhatia Medical Institute (DBMI) are two of the coaching schools that have implemented satellite networks.

DAMS deployed a Hughes tele-education network in more than 50 coaching centres across 22 states, significantly extending its reach beyond the big cities. DBMI covers the sub-continent with more than 75 medical coaching centres equipped with a Hughes network. Between those two schools and others, the total number of satellite-equipped centres powered by Hughes alone is expected to grow to 200 in 2015. They will extend a better education and a broader range of opportunities to more and more medical students.

"The Hughes technology and learning software have helped us take the students to a new level," said Dr. Sumer Sethi, director, DAMS. "The beauty of it is that we can create mass delivery of this education, yet keep it individualistic. This will be the future of medical education in India."

The broadband medical training solution consists of a central studio where specialist doctors teach, and remote classrooms throughout the country that can receive and transmit data, voice and video with the central studio. Equipment includes a satellite antenna, modems, studio equipment, and medical training software. The main broadcasting studio is set up in a centrally-located city headquarters. Students attend classes at satellite-enabled local coaching centres or classrooms that are seamlessly connected to the main studio.

In addition to providing satellite connectivity, Hughes is working with partners to help coaching schools develop the special medical training software needed to deliver live and self-paced educational content. The company's IOL-3 software platform gives coaching schools a larger array of teaching tools and connectivity options for expanding medical coaching.

IOL-3 enables instructors to engage in multi-party video communication with an option for audio-only communication. Instruction options include chat and application sharing, video sharing with presenter voice overs, public and private chat,

## UN SAYS BROADBAND IS 'KEY TO EDUCATION FOR ALL'

The UN Broadband Commission for Digital Development says the availability of mobile phones, tablets and e-readers with broadband connectivity is the key to making education available to all.

According to a report published earlier this year by the commission's working group on education and led by UNESCO, a lack of resources remains critical. For instance, it said that if an average of eight children share each classroom computer in OECD nations, teachers in Africa can struggle to share each computer among 150 or more pupils. But with increasingly sophisticated mobile devices now packing more computing power, the commission believes broadband-connected personal wireless devices are the solution.

"Every day, everywhere, women and men are inventing new ways to use broadband, mobile telephones and computers to be empowered, more autonomous and free," said UNESCO director-general Irina Bokova. "We need to tap this inventiveness to improve education, especially for girls and women. But we have a long way to go. Two thirds of illiterate adults are women, and two thirds of the world's out-of-school primary-age children are girls. This is a huge injustice, and a gap that we must fill. The continued expansion of broadband combined with technology can help us make giant strides towards this."

ITU figures show that mobile broadband is the fastest-growing technology in human history, and active subscriptions now exceed 2.1 billion – three times higher than the 700m fixed broadband connections worldwide. The UN said most of this progress has taken place in the developing world which has accounted for 90 per cent of global net additions for mobile cellular and 82 per cent of global net additions of new internet users since early 2010.

ITU secretary-general Houlin Zhao said:


UNESCO director-general Irina Bokova said the continued expansion of broadband combined with technology can help improve education, especially for girls and women.

"Mobile broadband gives us the chance to truly bring education to all, regardless of a person's geographical location, linguistic and cultural frameworks, or ready access to infrastructure like schools and transport. Education will drive entrepreneurship, especially among the young – which is why we must strive harder to get affordable broadband networks in place which can deliver educational opportunities to children and adults."

Telecoms tycoon Carlos Slim co-chairs the UN commission. He said nations, governments and stakeholders need to ensure that the potential of broadband for education is fully leveraged so that successful initiatives, such as new online course platforms, and many valuable education and training contents, become quickly available to people worldwide. "Technology should be used for inclusion, and we should make vigorous efforts to ensure this."

and one-to-one private interaction. Tools such as hand raise, polls and quizzes enable instructors to take several different approaches to communicating content to students. Session recording and editing enables schools to archive content. With auto scanning of all remote classrooms, instructors can confirm that students are still engaged and gauge students' comprehension of material.

## Future forward

While the current emphasis is on live instruction, the latest generation of satellite networks support several other capabilities that will help India's coaching schools prepare doctors for specialist training. Among them are:

**Video content delivery:** pre-recorded content such as lectures, documentaries, and other video content may be delivered in a 'forward and store model' so that the material can be viewed when needed.

**Student-to-student interactions via video conferencing:** students may learn just as much from each other as they do from teachers. On-demand video-conferencing can connect students in different regions or even different parts of the world so that they can interact independent of their instructors. Video-conferencing is a more engaging way of communicating than audio conferencing or texting, and enables students to have more productive exchanges.

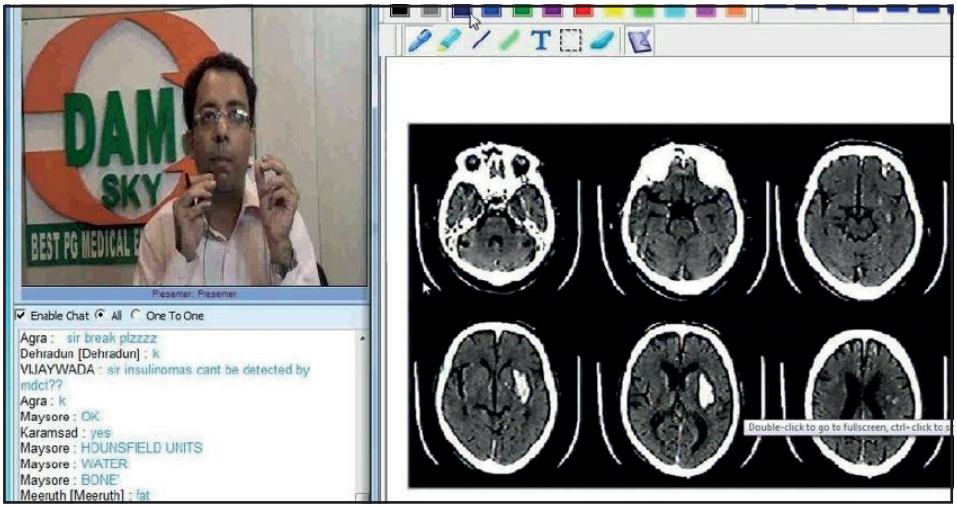
**Remote test administration:** in some countries, standardised tests are used to evaluate students on a level playing field. These tests must be delivered securely and on time to meet testing schedules. In Indonesia for example, this is a daunting task simply because of geography and population size. Digital delivery could be the solution.

**Up-to-date materials:** textbooks are very expensive to purchase, maintain and deliver. Digital delivery solves this issue when coupled with e-readers such as tablets.

**Self-paced learning:** computer-based training or self-paced learning is common in higher education and trade-oriented learning. Kiosks or terminals to support this may be located close to under-served areas where populations already work.

India's economy is expanding, growing more varied, and attracting talent from all over the world. To continue this economic growth and enjoy the societal benefits that accompany it, the country needs a medical education system that can meet its needs now and in the future.

India's size is an obvious challenge to effecting any broad changes. In spite of that, medical coaching schools have demonstrated the efficacy of using satellite technology to broaden the pool of qualified applicants for post-graduate education in vital specialties across the entire country. As satellite technology continues to advance, it will support more advanced medical education applications to help India meet its growing demand for healthcare. ■




Dr. Sumer Sethi teaching at the Delhi Academy of Medical Sciences studio powered by Hughes. He believes remote learning via satellite broadband represents the future of medical education in India.


The broadband medical training solution consists of a central studio where specialist doctors teach. Students attend remote classes at satellite-enabled local coaching centres or classrooms that are seamlessly connected to the studio.

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# Fibre: faster, greener and connecting more people

Many governments around the world have launched state-led strategies to expand their broadband access. To maintain advances in economic development, IAN DAVIS says South Asian countries such as India must invest similarly in their telecoms infrastructure.

Around the world, recognition of the part played by improved communications in delivering economic growth during a time of global recession has led to several governments taking action to increase the take-up of high-speed broadband services.

Amongst the industrialised nations, Connecting America sets the target of 100 million subscribers at 100Mbps by 2020 whilst in the European Union, the Digital Agenda proposes 100Mbps subscription for 50 per cent of the population and 30Mbps available throughout. Meanwhile, in the most rapidly developing economies, even faster penetration is demanded. In China, the twelfth Five-year Plan requires 100Mbps FTTH to 100 million subscribers this year.

To maintain advances in economic development, India must invest similarly in telecoms infrastructure, providing fast, accessible connections to subscribers in a large and geographically diverse country that contains both vast, populous cities and remote, inaccessible villages. As Prime Minister Modi tweeted in June 2014: "Infrastructure should not only be about highways but also about information highways. The way ahead lies in creating optical fibre networks." India's National Telecom Policy targets 500 million broadband subscribers by 2020.

The technology to achieve this will be a mixture of fixed-line connections to the building and mobile connections to the cellphone. At the heart of all these technologies will be optical fibre – the core infrastructure that makes all high-speed broadband possible. And to meet the particular challenges of the final connection to the customer, fibre design has evolved to increase capacity, accelerate installation, and diminish capital outlay.

## The Indian telecoms landscape

India's population of around 1.2 billion people is served by an already competitive telecoms market

Ian Davis, Regional marketing director EMEA, Corning

with numerous established operators challenging to provide a service for subscribers.

In the densely populated large cities, where average disposable incomes are higher, Indian operators can rapidly make inroads into government connectivity targets and quickly recoup investment in the process. But rolling out services to more remote, rural towns and villages presents a more challenging undertaking. The distances involved adversely impact the capital cost per subscriber and the time to recoup investment is extended.

A further consideration in providing more universal coverage is the need for energy efficient solutions. Installing networks to remote regions is not only capex intensive; the large-scale operation of active equipment (terminals, amplifiers and regenerators) requires electrical power and the cost of power goes directly to the opex of the provider. Due consideration must also be given to the environmental impact of the power provision.

Providers planning broadband deployments in India can draw on the experience of plenty of operators around the world. Network requirements differ widely and so there is no universal architecture of choice. However, all require optical fibre to be installed deep into the network; the deeper the fibre penetration, the higher the performance of service available.

Competing technologies have several trade-offs such as, for example, speed, reach, ease of installation and power usage. An advantage of wireless technology is its relative ease of installation. Although the wireless data rate is limited by distance and active user density (unlike fixed-line solutions that can offer a dedicated 100Mbps to 1Gbps per subscriber), in any large, sparsely populated country, customer convenience and the need to reach rural communities means wireless will always be a large part of any broadband strategy.

Moreover, there is an increasing acceptance by government that rural outposts tend to suffer disproportionately from economic under-performance, so policies are often enacted to promote the rural telecommunications infrastructure. An example is the National Broadband Network (NBN) in Australia, in which the final seven per cent of the population cannot be covered economically by an FTTP connection. Instead, wireless or satellite will be employed to enable universal population connectivity.[1]

As more operators become conscious of network energy costs, power reduction becomes a significant factor behind technology selection. PON (passive optical network) technologies in particular offer outstanding subscriber broadband speed at less than one Watt per subscriber.[2] In the United States, Verizon reports that power requirements for its FTTH GPON network are only 38 per cent of its copper DSL network.[3]

By installing fibre deep into the wireless network and using fibre to connect between antennas, much of the performance and energy efficiency advantages demonstrated by GPON can also be achieved by wireless.

## The key to delivering broadband to remote areas

Copper is not suited for 3G and 4G backhauling due to its limited bandwidth and reach, and is being rapidly replaced by other transmission media *(see figure 1 overleaf)*. Either the signals are hopped from

station-to-station using microwave (and the number of hops is likely to be large for long links with low-loss budget such as rainy areas, for example) or else the stations can be linked by optical fibre cable and splitters used to direct the traffic.

Whilst superficially attractive compared to installing cables in trenches, the microwave solution can be expensive. Commercially available Ethernet transceivers exist to allow un-amplified connectivity up to 80km at data rates of 10Gbps – whereas microwave hops tend to be limited to about 4km[4] (depending on carrier frequency, availability, etc.) resulting in the need for construction of many intermediate towers.

But of course remote towers require fuel to maintain operation and, for sites far away from the main power grid, diesel for generators represents an expensive commodity to both buy and transport. On the other hand, two Ethernet transceivers (required for bi-directional optical transmission) consume approximately 2W of power compared to a few tens of Watts for an equivalent outdoor microwave transmit-receive system.[5]

Across a large national network, fibre therefore provides the cheaper, greener backhaul alternative. For example, 92 per cent of Portugal Telecom's cell sites are now fibre-based[6] to take advantage of the improved performance and energy efficiency.

Consideration must also be given to future-proofing the network against the continued increase of data capacity (driven mainly by transport of video content) and higher subscription take-up. The upgrade path for fibre by faster channel wave division multiplexing (WDM) is well established (100G deployments are now common-place and 400G channel transmission is operational in some live networks[7]). Migration to higher data rates using microwave is likely to result in a large increase in antenna density because of the increased attenuation at the higher frequency transmission bands assigned by regulators to increase capacity. This leads to even greater power consumption penalties.

As discussed, the GPON network delivers excellent performance whilst maintaining relatively low energy expenditure. Wireless access can be converted into a GPON network *(see figure 2 bottom left)* to allow effective delivery of mobile services to a village. Antennas centred directly in the village provide connectivity to all, and businesses may also access the network from the local antenna or, for improved performance, be provided with an exclusive FTTP connection.

Using such an approach, the Indian National Optical Fibre Network (NOFN) initiative can allow thousands of 'panchayats' (village councils) to be provisioned with high-speed connections that are accessible to all.

Recent advances in optical fibre technology have led to improved products for access networks. Low-loss fibres featuring approximately 10 per cent lower loss at operational wavelengths around 1310nm and 1550nm allow longer reach and additional power budget margin for repair if the cable is dug-up (a recurrent hazard of installing cable in regions of rapid infrastructure development).

Other fibres have been developed that are more resistant to optical loss caused by bending, allowing their use in easily-installed, densely-packed micro cables. Combining the properties of low-loss and bend resistance, Corning has recently introduced *SMF-28* Ultra fibre that is ideally suited to the demands of the access network. This fibre is also well-suited to future upgrade using protocols that utilise a wider operational spectrum to deliver improved capacity.

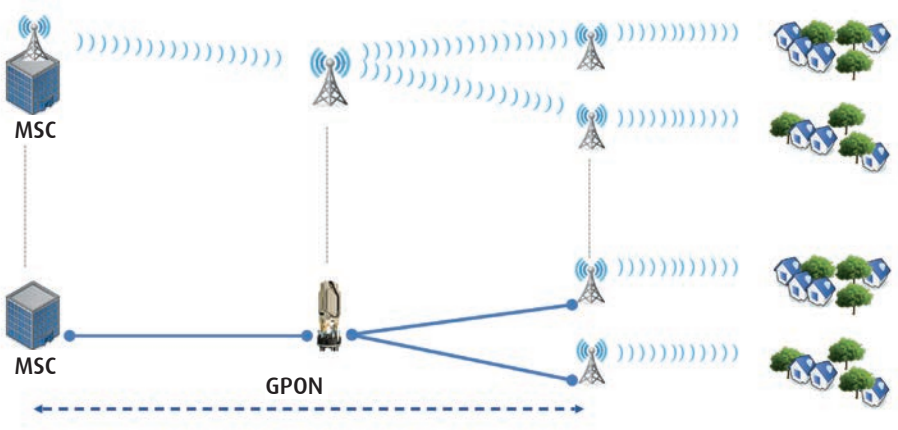


Figure 1 – alternatives for the mobile backhaul. Signals may be transmitted between towers through microwave or by optical fibre cable.

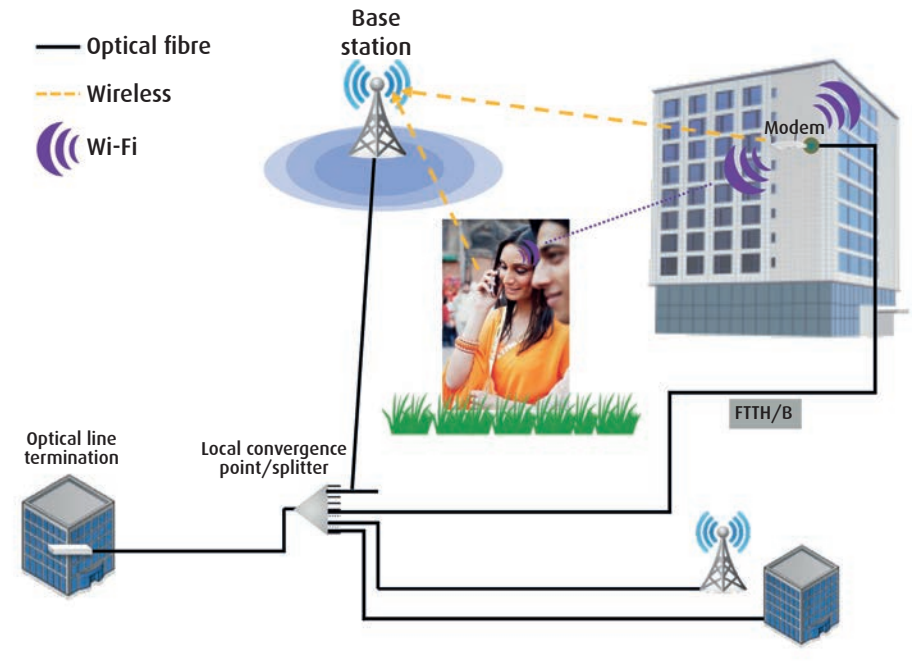


Figure 2 – a converged G-PON deployment. Mobile backhaul and FTTP fixed connections can be provided over the same network infrastructure.

## Conclusion

Increasing the penetration of high-speed connections is an enabler of economic growth in developing regions. To deliver these services to a dispersed population in a way that is both environmentally friendly and economical, optical fibre needs to penetrate as far into the network as possible. Converged solutions are possible that combine wireless and fixed-line connections. Furthermore, the recent development of low-loss, bend-resistant fibres in micro cables allows rapid installation, resilience to repair, and future upgrade to higher capacity protocols. ■

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[4] www.ericsson.com/res/docs/review/Microwave-Capacity-Evolution.pdf
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# Vodafone celebrates 30 years

The first call was made using Vodafone's *Transportable VT1* which weighed 5kg and had around 30 minutes of talk time.

This year marks the 30th anniversary of mobile telephony in the UK. The country's first mobile call was made on 1 January 1985 on the newly-launched Vodafone network. Michael Harrison, son of former Vodafone chairman Ernest Harrison, was the first to test the system. He called his father using a Vodafone *Transportable VT1* which weighed 5kg and had around 30 minutes of talk time.

The first generation of mobile phones became available for sale in the UK in 1984 even before a network was officially live. Vodafone says such was the demand for a fully portable, cellular phone that more than 2,000 orders had been taken by its sales team before Harrison made his historic call. By the end of 1985, over 12,000 devices, each costing around GBP2,000, had been sold.

In 1983, UK regulator Ofcom awarded two mobile licenses: one went to British Telecom which ran the Cellnet network (later to become O2 before being bought by Spanish telco Telefónica in 2005 for GBP18m); the other was won by Vodafone.

Vodafone was originally formed as a subsidiary of Racal Ltd, an electronics company established in the 1950s by Raymond Brown and George Calder Cunningham. At the time, it was 80 per cent owned by Racal, with Millicom owning 15 per cent, and the Hambros Technology Trust five per cent.

In 1991, Racal and Vodafone de-merged, and the Vodafone Group was publicly listed as an independent company on the London and New York stock exchanges.

# Saudi Arabia's telecoms market is largest in MEA

Saudi Arabia remains the largest telecoms and enterprise IT market in the Middle East and Africa despite a drop in revenues, according to Pyramid Research.

In a report published in mid-April, Pyramid said total mobile and fixed services revenues in the country's consumer and enterprise segment declined by one per cent to USD16.2 billion in 2014. It added that this was Saudi Arabia's first decline in overall service revenue in the last decade.

Pyramid said the drop was the result of "aggressive" promotional activity and the re-statement of results from Mobily, the country's second largest MNO. It saw revenue fall by 20 per cent in 2014.

Despite the declines, the Saudi Arabian telecoms market remained the largest in terms of total service revenue in the MEA region in 2014. It was followed by South Africa with USD13.4 billion and Turkey with USD13.0 billion.

Annual growth in Saudi Arabia over the next five years is forecast to average three per cent per year, reaching USD18.7 billion by 2019.

Hussein Ahmed, analyst at Pyramid Research, said: "Operators have invested in upgrading network infrastructure and systems to handle growing data traffic volumes. The need in the short-term is for swift deployment of fibre connectivity in high demand areas such as Riyadh, Jeddah, Mecca, Medina and Al-Ahsa. This will improve the competitive services segment, where historically the incumbent operator STC has led."

New operators, which not only target Saudi Arabia but the wider region, are also expected to enter the market. Pyramid said a number of venture capital funds have already launched in the country, including Alkhabeer Capital, Mobily Ventures, STC Ventures and the government's own tech start-up fund.

It added that the entrance of Virgin Mobile and Lebara will add a "fresh impetus" to the mobile market with new promotions for data and voice services.

# HKT converges networks simultaneously

Hong Kong Telecom (HKT) has converged its 4G mobile networks simultaneously using multi-operator core network (MOCN), carrier aggregation (CA) and VoLTE systems from ZTE.

After acquiring CSL in 2014, HKT operated two commercial networks in parallel. It therefore needed to integrate the two as quickly as possible to ensure high quality and seamless services for its subscribers.

As the supplier of one of its two mobile networks, ZTE optimised HKT's network performance through the use of large-capacity, high-performance hardware as well as the latest software.

In 2012, it provided CSL with a complete IMS-based VoLTE solution with voice call continuity support using eSRVCC (enhanced single radio voice call continuity) technology. The VoLTE network was launched for commercial use in 2014.

With the deployment of MOCN, CA and VoLTE technologies, ZTE says it has now further assisted HKT to bring its two networks together. It says the end-to-end network sharing solution has enabled HKT to achieve network interconnectivity, service convergence, and "set the standard" for global VoLTE interoperability.

"KPIs such as VoLTE connection time and voice quality will be near perfect, and users will be able to experience communication services of the same quality as before, and download files at a rate of up to 300 Mbps," claims the firm.

# Eutelsat HTS supports in-flight Wi-Fi

Vueling says it has become the first low-cost airline in Europe to offer high-speed Wi-Fi to its passengers. Last year, the Spanish company began working with Telefónica to install Wi-Fi on its aircraft using connectivity via high throughput satellites (HTS).

In March 2015, the partners announced that the first Airbus A320 with the new integrated service is the EC-LZN. The plane can carry up to 180 passengers who will be able to use their mobile devices during medium haul flights and benefit from download speeds of up to 20Mbps.

Specialist engineers and technicians took several days to install all the Wi-Fi equipment needed for Vueling's A320. They deployed three access points that are sited behind the aircraft's ceiling panels, as well as a wireless Ethernet bridge, wireless data unit, and an antenna power supply unit.

The heart of the system is located in the avionics bay under the cockpit. Here, a satellite modem is used to send and receive the signal to and from the antenna, and it is also the interface with the baseband signal processing equipment.

Connectivity is provided via Eutelsat's *Air Access* platform and *KA-SAT* satellite. A Ka-band antenna, installed on top of the fuselage, can track the satellite while the aircraft is in flight. A protective dome is installed over this external antenna, which is in turn covered by a fairing in order to preserve the Airbus' aerodynamics.

Specialist technicians installed three APs behind the aircraft's ceiling panels.

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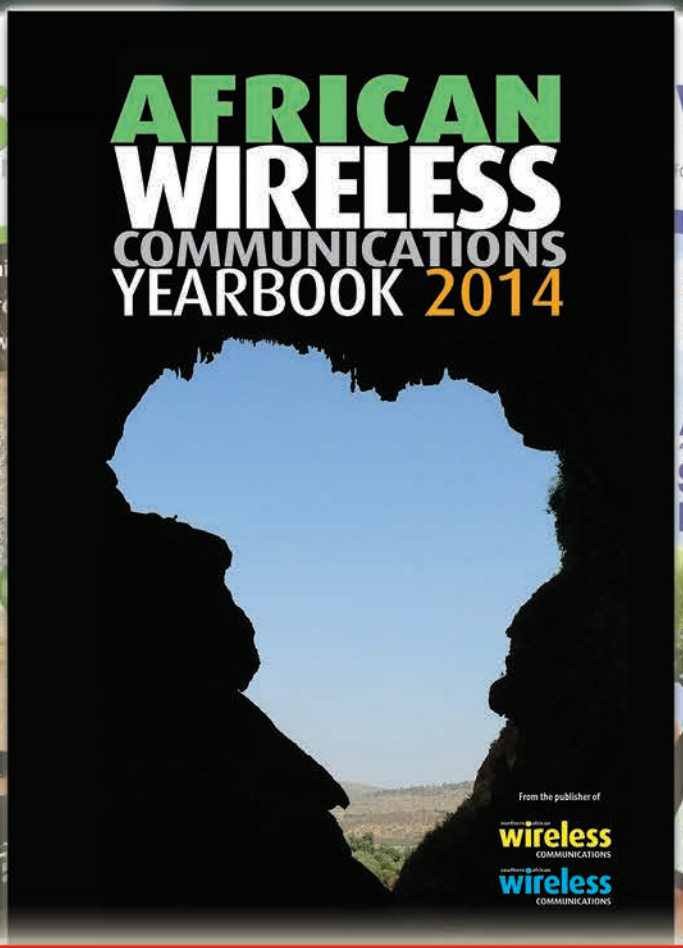



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# Xtera demonstrates 'ultra-long' distant transmission

Xtera says it can deliver unrepeatered transmissions beyond 600km at 100G.

Telecommunications infrastructure company Xtera Communications has demonstrated what it describes as "ultra-long" unrepeatered transmission over 607km at 100G and 632km at 10G.

Xtera says it was able to send signals such long distances by using its *Wise Raman* technology, which increases the optical span length by turning some parts of the line fibre into an amplification medium.

This is achieved via the Raman non-linear effect, where optical pump waves are launched into the fibre to create optical gain for the optical signal carriers, says Xtera. It also used its "enhanced" *Remote Optically Pumped Amplifier (ROPA)* configuration in the demonstrations.

Bertrand Clesca, head of global marketing for Xtera Communications, says: "These demonstrations represent the industry-leading results for ultra-long single-span transmission at 100G and 10G. After the 400G field trial over 1,500km of aged, lossy fibres in Verizon's network in summer 2013, and the demonstration of 150 x 100G transmission on a single 410km span in 2014, these new results illustrate the performance of Xtera's *Wise Raman* amplification solution for optical backbone networks over long distances."

The demonstrations were conducted with large effective area ultra-low loss fibre from Corning and the support of State Grid Information and Telecommunication Company.

Corning provided its *Vascade EX2000* optical fibre, which has an average attenuation of 0.160 dB/km, and an average effective area of 112μm$^2$. Xtera says this enables higher optical launch powers for Raman pumping, ROPA, and data transmission.

## Tait to deliver largest DMR Tier 3 system in US

Tait Communications, a provider of critical communications systems for utilities and public safety agencies, has been commissioned to create what is claimed to be the largest digital mobile radio (DMR) Tier 3 system in North America. The client is the Alliant Energy Corporation, which supplies Midwest US.

The new 122 site DMR trunked network will provide coverage for Alliant's territories in Iowa and Wisconsin, and will replace an assortment of legacy independent radio networks. The new system will supplant the old system in phases, with the first phase due to be finished before February 2017, with completion before the end of 2017.

The agreement includes the provision by Tait of the radio network system and approximately 1,650 subscriber units. It also contains a 12-year managed services contract, which comes into effect at the end of the first phase of the rollout.

Garry Diack, chief executive of Tait Communications, says: "This system upgrade will deliver better-than-before coverage and reliability to improve worker safety. Additionally, our managed services capability allows us to work in partnership with Alliant Energy to optimise their network over the life of the system."

Alliant Energy generates and distributes electricity and natural gas for more than one million electric customers and 420,000 natural gas customers. Its geographical territory spans about 70,000 square miles.

## Telstra makes SDN platform available worldwide

Telstra is making its software-defined networking (SDN) platform available globally. The company says the move is a result of its recent acquisition of Pacnet, a global telecommunications provider.

Telstra, the Australian Tier 1 telecommunications giant, will make the *Pacnet Enabled Network* – or *PEN* – available at 25 points of presence worldwide.

The network spans eight countries, including Australia, Hong Kong, Singapore, the US and UK. It also offers connectivity options into public cloud services to bridge hybrid cloud deployments.

Darrin Webb, chief operating officer, global enterprise and services, says the new, global *PEN* platform helps to combine Telstra's and Pacnet's infrastructure to provide "enhanced connectivity and services" across Asia and the rest of the world.

Pacnet's early adoption of SDN technology prompted Telstra to accelerate its plans. It decided to build on Pacnet's existing 16 *PEN* POPs across Asia by adding nine new Telstra *PEN* POPs.

Webb claims *PEN* has created the world's first globally connected on-demand networking platform.

"While software, servers and storage have all become virtualised over the past decade, networks have largely remained unchanged," he says. "The new *PEN* platform re-imagines the role of traditional telecommunications and enables organisations to complement traditional network approaches with SDN technology.

## Facebook chooses Infinera for global optical network

The world's largest social network, which boasts one billion users of its website every day, has chosen the Infinera global optical network for its data flow.

Facebook says the Infinera *Intelligent Transport Network* will light what it claims is the world's longest terrestrial optical network route, capable of delivering up to eight terabits per second of data transmission capacity.

The new route spans 3,998km and is deployed without any regeneration. Facebook's European terrestrial network stretches from its Lulea data centre in Sweden, across major hubs throughout Europe. Infinera will use its *DTN-X* platform to connect these hubs for Facebook, also using its *FlexCoherent* solution, which it says can deliver terabits of capacity on a single fibre across the continent.


Infinera's Tom Fallon says Facebook is a good example of how to build a global network.

Tom Fallon, Infinera CEO, says: "Facebook is a classic example of how leading internet content providers are building global networks that interconnect their data centres to accelerate the delivery of high bandwidth, feature rich services worldwide."

Currently, Facebook delivers 100 gigabit per second coherent transmission to its European network via 500Gbps super-channels, featuring a forward-scale design to support 1.2Tbps super-channels in the future. The high capacity super-channels are enabled by 500Gbps photonic integrated circuits (PICs) developed and fabricated by Infinera – the only supplier providing 500Gbps of transmission capacity from a single line card.

PICs enable the *DTN-X* platform to integrate wavelength division multiplexing super-channel transmission with up to 12Tbps of non-blocking optical transport network switching, providing seamless scaling as traffic requirements grow in the future.

# Siemens will monitor Arabsat's fleet traffic

Siemens Convergence Creators (SCC) will monitor all traffic within Arabsat's satellite fleet. It will install a new CSM (communications system monitoring) system at the company's Dirab Earth Station in Saudi Arabia to provide a round-the-clock monitoring service for the RF and quality-of-service measurements, the characterisation, decoding, and analysing of all carriers within the payload.

The CSM solution that SCC will provide is called *SIECAMS*. The company says it will enable Arabsat to enter "a new dimension" of satellite monitoring and interference detection and thus improve the quality of its satellite services. It's claimed *SIECAMS* has a flexible architecture that is designed to be ready for future requirements. SCC reckons it is one of the first satellite monitoring solutions available on the market to support Carrier ID detection, a new technology that enables the identification of the owner of a satellite signal.

Arabsat's Khalid Balkheyour says the company is taking a leading role in SIRG.

Both Arabsat and SCC are members of the Satellite Interference Reduction Group (SIRG), which they say will lead to cooperation in combating and mitigating satellite interference to improve the overall quality of satellite services.

Khalid Balkheyour, president and CEO of Arabsat, says: "Carrier ID is a global, industry-wide initiative aimed at speeding up the resolution of interference and improving the quality of service for all users of satellite communications.

"Arabsat is actively involved in the global interference mitigation initiatives through its leading role in SIRG and the [Global VSAT Forum], and always strives to use state-of-the-art technology to ensure the highest quality services to its customers with current and future satellites."

■ Meanwhile, Arabsat has awarded Arianespace a launch service contract for the *Hellasat-4/Saudi Geo Satellite-1*. Arabsat is teaming up with King Abdul-Aziz City for Science and Technology to develop the satellite, which will be built by Lockheed Martin.

## Polish police deploy TETRA

Three police forces in Poland have selected Sepura TETRA technology for their secure communications. Police in Lodz, Krakow and Szczecin will deploy the vendor's *FR400* base stations, *SICS NET* dispatch consoles, a fully redundant central switch, and hand-portable radios with encryption, SDS and packet data functionalities. Sepura's TETRA infrastructure will be shared by police with a variety of public sector organisations and emergency users such as the fire and ambulance services, as well as the regional crisis management centre.

## Intelsat gets ETL upgrade

Intelsat has chosen RF signal distribution equipment by ETL Systems to upgrade its teleport facilities. ETL's technology – specifically its *Enigma* range of equipment – will be used at each teleport to monitor the signal strength of each line of communication from the various satellites. *Enigma* routers provide operators with quick switching time that allows continuous cycling through the various channels to prevent any outage going unseen, says ETL.

## DAMM gains certification

DAMM has obtained EN 50121-4 standards certification for its *TetraFlex Outdoor System* which is designed for the rail and metro sectors. EN 50121-4 certification is issued for railway applications, including signalling and telecommunications apparatus, by European standards bodies. It specifies limits for emission and immunity and also provides criteria for performance. By gaining the certification, DAMM's mission critical TETRA radio platform can now be used in all rail systems where EN 50121-4 is required.

## Ooredoo in deal with Hong Kong telco

Qatari operator Ooredoo has signed an IPX/MPLS multi-service interconnection deal with PCCW Global, the international operating division of Hong Kong telco HKT.

PCCW Global says its customers all over the world can now benefit from multiple enhanced IPX and MPLS services when connecting with Qatar's "thriving commercial service community" on the north-eastern coast of the Arabian Peninsula.

The agreement also enables PCCW Global and Ooredoo to collaborate in the provisioning of services to carrier and multinational customers requiring services such as VoIPX, GRX, Diameter, HD calling, HD video conferencing, Ethernet, cloud and SDN.

"Our IPX network can be directly accessed in 140 countries around the world without having to make use of the public internet or long-distance connections," says Frederick Chui, PCCW Global's SVP of global data sales and pre-sales.

"Extensive coverage, coupled with the diversified design of PCCW Global's private MPLS/IP network, ensures direct connection to our IPX voice platform and the highest quality services."

Ooredoo and PCCW Global are already collaborating as founder members of the Asia-Africa-Europe-1 (AAE-1) subsea cable system which is scheduled for completion in 2016.

Supporting PCCW Global's plans to deliver services into Africa and the Middle East, AAE-1 is said to be one of the largest consortium cable projects under way in the world today, extending some 25,000km (*News, Dec 2013-Jan 2014*).

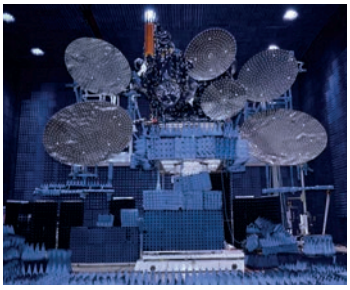
## Tuvalu selects ABS for high-speed internet

Tuvalu Telecommunications Corporation (TTC) and ABS have signed a five-year contract for the use of the *ABS-6* satellite, which is located at 159ºE and covers the Pacific Ocean and East Asia regions.

TTC provides mainly satellite-based services for communications and broadband connectivity between Tuvalu's islands and atolls, and the with the rest of the world. It will use C-band capacity on *ABS-6* to increase the volume of traffic to the six atolls and three reef islands that make up the tiny island state of Tuvalu, which has a population of about 11,000 people and is located in the Pacific Ocean roughly halfway between Hawaii and Australia.

*ABS-6* will enable state-owned TTC, the nation's only telecoms service provider, to offer high-speed internet to schools, banks, and hospitals, as well as for IP backhaul services for its mobile network.

ABS CEO Tom Choi says his firm is supplying Tuvalu with "reliable communications connectivity". He adds: "In March 2015, Tuvalu experienced the impact of Cyclone Pam when it passed through the region and disrupted communications for days. This service will offer critical communications to ensure the necessary infrastructure is readily available to support the needs of Tuvalu."



*ABS-6*, pictured in 2013 before its launch, will now service Tuvalu and its population of 11,000 people.

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