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SECURITY THROUGH SPACE

Specialised bands and the increasing use of COTP and COTM are securing war zones more efficiently

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SatEditorial

On your Marks

Welcome to the February edition of *SatellitePro ME*. We're one month away from CABSAT, the only exhibition in the Middle East that brings broadcasters, satellite operators, equipment manufacturers, content creators, production crew and filmmakers under one roof.

You can be sure our team will be there in full force, to cover the exhibition and learn about new technology and projects, as well as just plain interact with all our friends in the industry. If you haven't got in touch to book a suitable time for a short catch-up, please do so soon.

This year's show promises to be bigger and better, with more than 30 brands within the Content Marketplace that will be offering TV, serial dramas, documentaries and other content for buyers from across the region.

The GVF Satellite Hub Summit will also draw a crowd from players in the satellite marketplace. It will focus on satellite and satellite communications, the challenges and solutions, and will deliver more specific content to support the region's satellite providers as well as attract regional telcos to participate.

According to the organisers, there are quite a few new exhibitors too this year, like China Satcom and ST Electronics. It should be interesting to see how they plan to expand their presence in the MENA. Read more about what some exhibitors will be showcasing at the show in our CABSAT Preview.

I wish you a wonderful February. As always, I'd love to hear your feedback and comments on this issue of the magazine. Please send me an email or call the number in the panel on the left.

Clayton Vallabhan
Editor

In this edition:

SkyStream

ADVANCING CONNECTIVITY

Today Sky Stream has established itself as a leading provider of managed and turnkey VSAT solutions across the Middle East, North Africa and South-West Asia for customers engaged in the Marine, Military and Oil and Gas sectors. Sky Stream provides flexible solutions to meet the ever changing demands of its customers, including the design, build and operation of networks. Its state-of-the-art control centre and hubs are complemented by a highly qualified and experienced team of engineers, project managers and customer service personnel.

Extreme conditions call for exceptional connections

10

16

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CABSAT
8 - 10 March 2016
Dubai World Trade Centre

MBRSC completes KhalifaSat's Engineering Model

>> MBRSC has announced the final design completion of the KhalifaSat Engineering Model, in addition to the software and systems within the satellite (the Critical Design Review). The significance of this achievement is that it is the penultimate step prior to the manufacturing of the Flight Model of KhalifaSat, scheduled for launch in 2018 on MHI's H-IIA launch vehicle, owned by Mitsubishi Heavy Industries. In addition to the Flight Model, Emirati engineers will commence the development of the ground station programmes that will manage all post-launch communication with the satellite.

The team presented all the designs to MBRSC's Internal Review Board, composed of systems engineers, managers and consultants, who discussed all the aspects and details related to the final design of the engineering model of KhalifaSat and its systems.

Amer Al Sayegh, Director of the Space Systems Development Department at

KhalifaSat being built in a cleanroom at the MBRSC facility.

MBRSC and KhalifaSat Project Manager of the KhalifaSat team, said: "We arrived at this advanced stage of development after over a year of collective efforts in designing the satellite's different modules and sub-systems, as well as the prototype mechanical unit and completion of various system and design tests."

+ www.mbrsc.ae

UAE SPACE AGENCY PARTICIPATES IN JAPAN SPACE WEEK

The UAE Space Agency participated in Japan Space Week, an event organised by the Japanese Embassy in the United Arab Emirates to celebrate Japanese achievements in space. Japan Space Week ran from 17-20 January and focused on strengthening mutual relations and sharing expertise in space sciences and applications between the two countries.

It involved several meetings and panel discussions on space policies in Japan and the UAE, with participation from the Mohammed Bin Rashid Space Centre and the Japan Aerospace Exploration Agency.

The panel sessions included discussions on means to support start-up companies in the space sector through developing the necessary infrastructure and environment, as well as allowing private sector companies to effectively develop the capabilities and expertise needed for a fully integrated space sector.

+ www.space.gov.ae

KYMETA CORPORATION'S ANTENNA TECHNOLOGY AND INTELSAT BRING CONNECTIVITY TO CARS

Kymeta Corporation and Intelsat are making the next evolution of connected car a reality. The companies will combine Intelsat's space-based communication with Kymeta's antenna technology to bring high-speed connectivity to cars on a global basis. This will enable the creation of new services on every continent, support software over-the-air applications, advance the potential for autonomous driving and pave the way for the future of the connected car.

"The automotive sector is a global business, where scalability and quality are essential to success," said Intelsat CEO Stephen Spengler. "We are enhancing the world's largest satellite broadband infrastructure with our next generation fleet, Intelsat EpicNG, allowing us to deliver highly efficient broadband services in the air, sea and with Kymeta, to the automotive sector. With our global connectivity, automotive manufacturers and car owners alike will benefit from consistent, highly reliable and secure connectivity, literally anywhere in the world. Intelsat is confident that the future of connected car means satellite-enabled."

Kymeta's satellite antennas remove the need for mechanical components by using software to electronically track and steer towards satellites.

Stephen Spengler, CEO, Intelsat.

+ www.intelsat.com

Etisalat and Thuraya launch new package

Etisalat has announced its new AnA Emarati mobile proposition, the first of its kind globally, offering Etisalat's mobile post-paid customers a unique bundle of Thuraya Telecommunications satellite-enabled calling minutes and SMS from anywhere in the world.

The new mobile bundle is designed to meet the demands of adventure-loving customers who spend their time outdoors in the desert or at sea. It provides a highly affordable alternate connectivity solution in remote locations, offering them the peace of mind of staying in touch with their family and friends.

Etisalat has partnered with Thuraya Telecommunications, allowing existing post-paid mobile customers to benefit from the satellite communication privilege.

Customers opting for the Ana Emarati mobile post-paid satellite bundles can continue placing both GSM and satellite calls using their existing mobile number and phone. They benefit from an additional free SIM card with the same number, to be
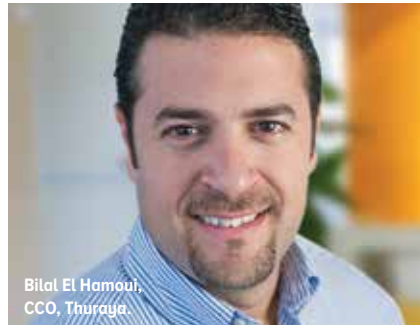
Bilal El Hamoui, CCO, Thuraya.

inserted in the satellite Hotspot device.

Bilal El Hamoui, CCO at Thuraya Telecommunications Company, said, "This is a really creative and original approach, and we are pleased to work with Etisalat on the launch of the Thuraya SatSleeve Hotspot. The SatSleeve Hotspot is a creative and important new device for the consumer market that offers fast, simple connectivity on-the-move."

+ www.thuraya.com

MDA PROVIDES COMMUNICATION SUBSYSTEMS FOR O3B

MDA has announced that it has signed a contract with Thales Alenia Space in excess of $14 million. Thales Alenia Space is the prime contractor for the O3b constellation and MDA will provide 96 communication antenna subsystems.

The subsystems will be used for medium Earth orbit satellites designed and built for O3b Networks. MDA has provided previous subsystems to Thales Alenia Space, as announced in December 2011.

O3b Networks Limited is a global satellite services provider operating a next-generation satellite network for telecommunications operators, internet service providers and enterprise and government customers in emerging markets.

MDA's business is focused on markets and customers with strong repeat business potential, primarily in the communications, surveillance and intelligence sectors.

+ www.o3bnetworks.com

UAE BECOMES MEMBER OF GROUP ON EARTH OBSERVATIONS

The UAE has become the latest member of the Group on Earth Observations (GEO), a voluntary partnership of governments and organisations established in 2005 to promote open access to Earth observation (EO) data for the benefit of all humankind. GEO member governments include over 100 nations.

The GEO community is creating a Global EO System of Systems (GEOSS) that will link EO resources worldwide across multiple societal benefit areas.

Director General of the UAE SA Dr Mohammed Al Ahbabi commented: "The GEO recognises that full and open access to Earth observation data, information and knowledge is critical for humanity as it tackles social, economic and environmental challenges at global, regional, national and local levels. We are thrilled to become members of the GEO and work with international organisations to help develop the concept of open access to EO data."

+ www.space.gov.ae

Dr. Mohammed Al Ahbabi, DG, UAE Space Agency.

Anaren wins contract for assembly on Eutelsat Quantum

Anaren has announced that it has received a $7 million contract award from Airbus Defence and Space for an advanced beamforming assembly to be deployed on the Eutelsat Quantum Satellite programme, which Airbus Defence and Space is developing for Eutelsat.

The Eutelsat Quantum programme will feature the world's first fully reconfigurable commercial satellite, allowing Eutelsat to adapt the satellite in response to new demands in coverage, bandwidth, power, frequency and even changes in orbital position.

"Anaren's experience and demonstrated ability to design and produce high-performance, functionally flexible phased array beamforming assemblies put us in a position to provide Airbus Defence and Space with one of the key technologies

An artist's rendering of Eutelsat's Quantum satellite.

they were looking for on the Eutelsat Quantum programme," said Mark Kosalek, Vice President of Business Development for Anaren's Space and Defence Group. "Given the stated goal of in-orbit adaptability, our solution fully integrates active RF beam-

shaping and control functionality into a package which will meet the demanding size, weight and power requirements needed for this new platform."

+ **www.eutelsat.com**

ARIANESPACE SETS RECORD FOR NUMBER OF LAUNCHES

Arianespace set a new record in 2015 for its family of launchers operating from the Guiana Space Centre (CSG) in French Guiana, with 12 successful launches in 12 months. There were six Ariane 5 launches, three by Soyuz and three by Vega – a three-fold increase for the latter over the previous year. Based on this operational track record, Arianespace should boost sales to more than

Ariane 5 launcher at the Guiana Space Centre.

$1.5 billion in 2015, the highest total in its history. Arianespace won contracts for 33 new launches in 2015:
• Eight Ariane 5 launches for 14 geostationary satellites (GEO), including two government satellites (Eumetsat), with more than half of these contracts open to competition, and one special contract for the launch of the James Webb Space Telescope (JWST) on behalf of ESA, within the scope of collaboration with NASA
• 21 Soyuz launches for the OneWeb constellation and another launch for four additional satellites in the O3b constellation
• Three Vega launches, including one shared launch carrying the PeruSat-1 satellite and Skysat satellites for Google/Skybox Imaging
Arianespace also booked orders in 2015 worth $2.7 billion, including 35% for geostationary satellites to be launched by Ariane 5 and 65% for non-geostationary satellites to be launched by the three launchers in the family. Arianespace is announcing two new launch service contracts to start the year: one with Thales Alenia Space and Airbus Defence & Space for two COMSAT NG satellites.

+ **www.arianespace.com**

SATELLITE INTERNET SUPPORTS ACCESS BROADBAND CYMRU

Satellite Internet has announced it is supporting the Access Broadband Cymru scheme as a registered supplier. The scheme provides grants to help significantly improve broadband speeds in Wales.

Continuing its policy to improve broadband connectivity for homes and businesses across the country, the Welsh Government has announced significant revisions to its Access Broadband Cymru (ABC) voucher scheme, meaning that all homes and businesses across Wales that are currently unable to receive a superfast connection are eligible to apply for support. Estimates suggest that more than 100,000 premises will now meet the new qualification criteria.

The scheme is open to individuals, businesses, third-sector organisations and communities suffering from slow broadband connections.

Satellite Internet Managing Director Mike Locke said: "Even in today's access-dependent age, numerous properties across Wales and the rest of the UK still don't have reliable, high-speed internet."

+ **www.satelliteinternet.co.uk**
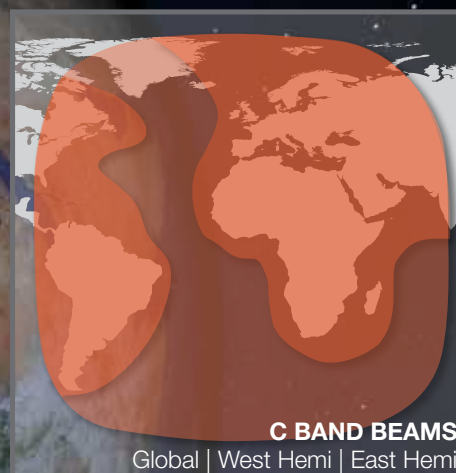
Paradigm to provide VSAT in Africa
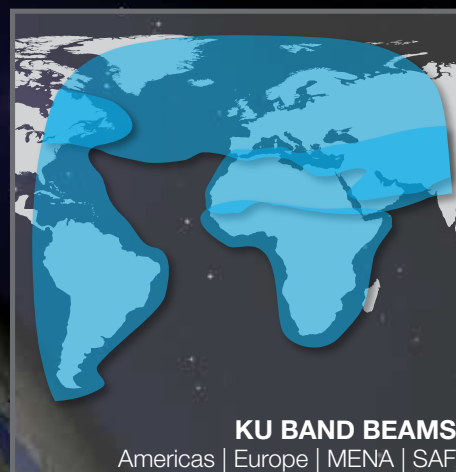
Paradigm is in the process of shipping multiple VSAT systems out for an EU-funded project which will serve over 50 countries in the developing African market. The African programme has been set up to enable improved management of the environment at continental, regional and national levels throughout the region.

Paradigm has ensured a reliable response to this requirement. Equipment for the first shipment was consolidated, individually crated, shipped and ready within a few weeks. The remaining order will be despatched over the next few months.

Multiple complete terminals (2.4m and 3.7m antennas) are included in the requirement along with spare components and specialised RF components to enhance signal reception.

"We are pleased to have been selected for this key overseas programme. It highlights some of the value we provide to our customers – utilising our in-house engineering design and expertise to provide complete VSAT systems, organising project delivery to tight timescales and providing logistic services," said Laura Holloway, Head of Sales at Paradigm.

+ paracomm.co.uk

SSL TO PROVIDE COMMUNICATION SATELLITE TO PT TELKOM

Space Systems Loral (SSL) announced that it has been selected to provide a communications satellite to PT Telkom Indonesia (Persero) Tbk, the largest telecommunication and network provider in Indonesia. SSL was informed last week that it is the winner of the procurement of the TELKOM-4 satellite, which will be used for fixed satellite services.

"Satellite services are particularly important in regions such as Indonesia where the population is spread over thousands of islands," said John Celli, President of SSL. "For SSL, this is the third satellite for Indonesia that we will add to our backlog, and we are honoured to play such an important role in expanding the telecommunications infrastructure for the nation and the region."

"Because our country consists of thousands of islands, Indonesia needs satellite technology," said Alex J Sinaga, President, Director and Chief Operating Officer of Telkom. "Satellite complements our other technologies, such as submarine cable, as the backbone that connects the islands of Indonesia."

+ www.sslmda.com

LEOSAT APPOINTS NEW CHIEF COMMERCIAL OFFICER

Ronald van der Breggen, CCO, Leosat.

LeoSat Enterprises, an emerging company with plans to launch a constellation of up to 108 low Earth orbit communications satellites, has announced the appointment of Ronald van der Breggen as Chief Commercial Officer.

Van der Breggen has more than 20 years of experience in the telecom and satellite industries. Prior to serving at SES, where as Vice President he was globally responsible for back-office sales and customer contract and service implementations, he worked for Dutch telecom incumbent KPN and later KPNQwest, where he oversaw the design, roll-out, marketing and sales of all IP services on EuroRings, a newly-built pan-European fibre network.

Mark Rigolle, CEO of LeoSat, said: "Ronald brings a myriad of skills to our organisation, and most importantly the experience of successfully running a sales organisation of a global satellite operator. He will be crucial in LeoSat's continued progress toward achieving our goal of delivering the only viable satellite solution for enterprise data, responding to specific customer needs which are not being met by today's technology."

Van der Breggen commented: "Having worked in both the fibre and satellite industries, I know first-hand the limitation for data on satellites as compared to fibre. With LeoSat, this will now change forever; it brings opportunities for customers they never had before and I'm really excited to help shape that future."

+ www.leosat.com

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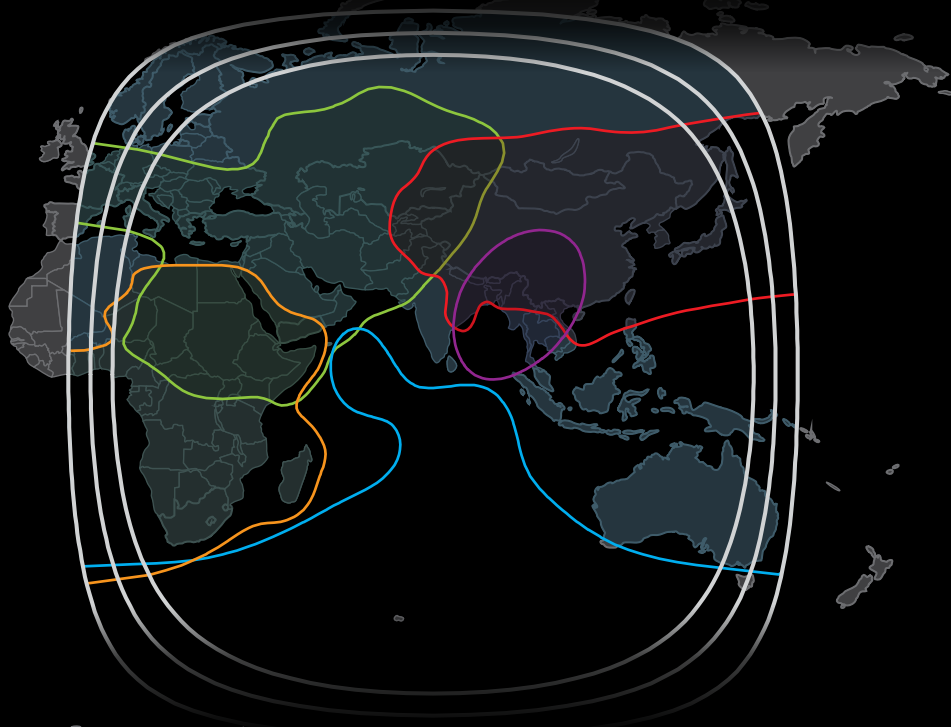
APSTAR-5@138°E

C-Band

Ku-Beams

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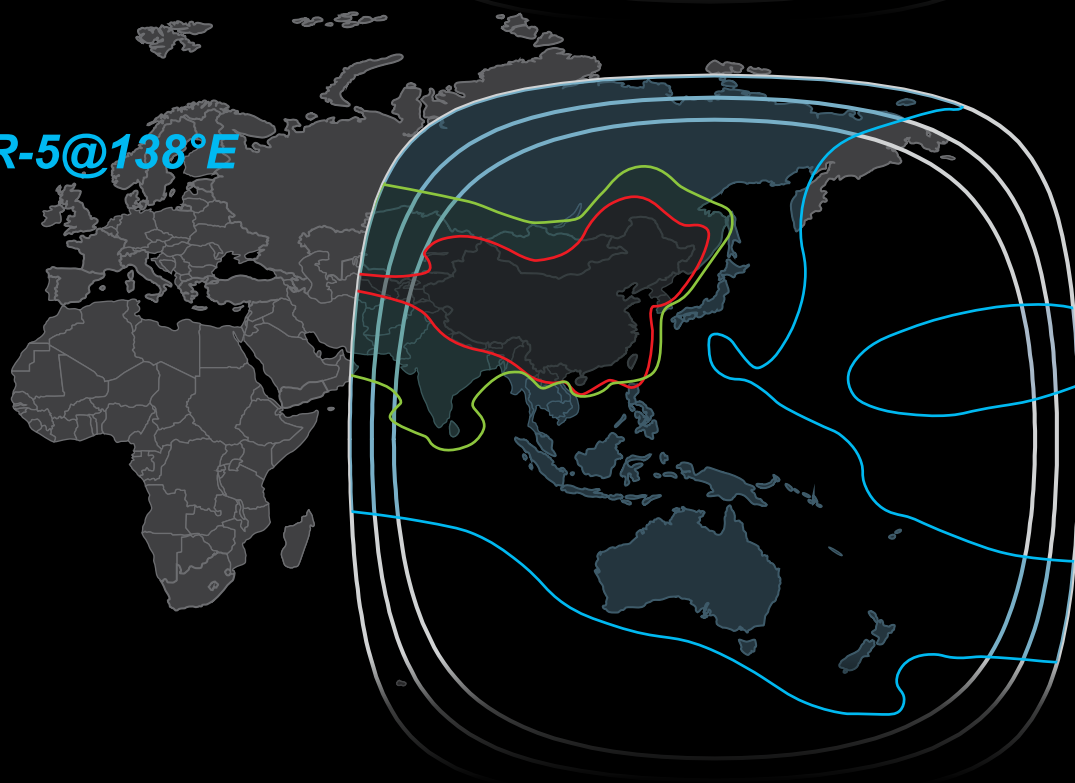
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SECURITY THROUGH SPACE

With the growing risk of terrorism and increasingly hostile environments, military satellites need to be durable and resistant in all stages of conflict. Specialised bands and the increasing use of COTP and COTM, are securing war zones more efficiently

Satellite requirements in the security industry differ depending on the market conditions and applications that are supposed to be used. There is still a tendency for Departments of Defence (DoDs) around the world to buy both military as well as commercial capacity.

Koen Willems, Market Director of Government and Defence, Satcom, Newtec, says that within the government and defence market there are different levels of security depending on operations, the sensitivity of the information and the application.

"Some strategic assets will receive higher security considerations than, for example, welfare applications. Putting all capacity on military satellites is not affordable for most DoDs, neither is it efficient enough. Moreover, not all satellites have enough coverage to reach all four corners of the world."

According to Matt Child, VP Global Government at Eutelsat, there are five different pillars that fixed satellite service (FSS) satellites need in order to serve the requirements of militaries. He identifies these as availability, assuredness, agility, authority and affordability.

"With availability, it is important to have the right capacity with the right performance in the right frequency bands, available when and where needed, mostly at short notice. Assuredness means that the communications link must be robust and secure and employ anti-jamming technology. Agility allows for increasingly fragmented communications requirements which are dispersed and on the move; the satellite must be able to adapt at short notice. Lastly, with authority and affordability, the fact that governments like to be in control of their assets and services and budgets under pressure means that the aforementioned pillars need to come in on budget," says Child.

Typically, military satellites use specific frequencies such as EHF and AEHF, and other technologies like frequency hopping and protected waveforms, to increase resilience and survivability. Willems says extra hardening and features are implemented on the satellite itself against external threats, to make them

> ## "With availability, it is important to have the right capacity with the right performance in the right frequency bands, available when and where needed, mostly at short notice"
>
> MATT CHILD, VP Global Government at Eutelsat

resistant throughout all stages of conflict. New satellites need to be adapted to the new threats in order to combat intentional and accidental damage.

Child says that in many ways military satellites are no different in terms of operation and performance, except that the often critical nature of requirements, where life may be at risk, demands a higher degree of availability, assuredness and agility.

"Governmental satellites operate in dedicated bands such as UHF, S- and X-bands, depending upon the requirement for ground, airborne, maritime and sub-maritime operations. In extreme cases, governmental satellites may be

protected from in-space nuclear explosions. They are controlled with encrypted telecommand and telemetry links."

The bandwidths and frequencies are again chosen as a function of operation and application. Tactical assets typically turn to protected payloads such as EHF, AEHF and X-band, whereas less critical applications turn to more commercial payloads. Selection of frequency is always a trade-off between considerations such as cost, service availability, throughput requirements, efficiency, coverage and need for security.

Many applications are used strictly for military and security purposes. Child explains that satellites are used for a range of applications and are an integral part of a nation's communications network. On the ground, there are fixed networks for inner city policing and national border control. Communications on the Pause (COTP) are used for overseas deployments of troops for general communications, welfare services and entertainment. Communications on the Move (COTM) are used for operations in the field, for air-to-ground communications and for UAV control and intelligence, surveillance and reconnaissance. Even at sea, they can be used for ship-to-shore communications, crew welfare services and submarine communications.

Willems adds that satellites in the security sector are also used for Earth observation, communications and global positioning.

"As for military communications, the choice for satellite is, in a lot of cases, the only means to exchange information from theatre towards the outside world. During conflicts, the first infrastructure to be damaged will be the terrestrial networks. Moreover, operations bring military personnel to the most remote places on Earth, where no communication infrastructure is available at all.

"As such, satellite is used for both fixed links and on-the-pause applications. For mobile satcom or on-the-move applications, the choice for satellite is even more evident; however, there might be some constraints due to the antenna size, which might impact the manoeuvrability and aerodynamics of land and airborne military assets," says Willems.

FSS satellites are protected against jamming, interference and signal interception. A number of techniques are employed, such as geolocation of the interfering source from a single satellite beam shaping to carve out the interferer, as well as channel hopping to avoid the interferer. Other technologies, such as spread spectrum and encryption, already

During conflicts, the first infrastructure to be damaged will be terrestrial networks, hence satcom is crucial to military personnel.

Eutelsat's Quantum satellite.

reduce these threats to a large extent. The use of proprietary satcom technology adds an extra layer of protection.

Furthermore, according to Child, ground equipment is more robust and has encryption capabilities as well, although operation is essentially the same as for other commercial equipment.

"The security for ground equipment can be considered on different levels. On the physical level, the ground equipment needs to be rugged against the different environmental conditions and arenas where they are used. This includes dust and moisture intrusion, drop tests and vibration.

"On a security level, the requirements can range from features to avoid tampering and unauthorised physical access to features that take into account encryption standards. Moreover, the ground equipment needs to embed the different technologies, such as frequency hopping and spread spectrum, in order to guarantee the protection of the payload. Basically, the soldier needs the equipment to be survivable and needs to be able to send his information in a secure way and not give away his position in theatre."

The future of military satellites and satcom for personnel certainly looks bright. The security sector is increasingly looking to the commercial sector to meet its growing

> ## "Putting all capacity on military satellites is not affordable for most DoDs, neither is it efficient enough. Moreover, not all satellites have enough coverage to reach all four corners of the world"

KOEN WILLEMS, Market Director of Government and Defence, Satcom, Newtec

demands, and government spend to ensure national security is constantly on the rise, with worldwide conflicts and terrorism.

Eutelsat Quantum has been designed in particular to serve government markets that require high flexibility. The first satellite was ordered last year and will be launched in early 2019.

"The Quantum class of satellites has addressed each of the five pillars. With constant availability, Eutelsat Quantum is the first ever software-defined satellite which allows complete in-orbit configuration dynamically and in real time. It can provide performance, coverage and choice of frequency whenever and wherever required, in an instance.

"For agility, Quantum offers independent uplink and downlink beam shaping and positioning, fully flexible power distribution and independent frequency and channel allocation, as well as dynamic beam tracking and hopping. It has in-built geolocation and anti-jamming capabilities, as well as encryption on the satellite telecommand and telemetry links. Quantum also uniquely offers customers the ability to manage and control their own beam assets on the satellite in a secure and private way, and is available at commercial rates with a range of lease options," concludes Child. PRO

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Locking Horns
with Jammers

Jamming and interference have plagued satellite operators for years, and the arrival of LEO satellites is only going to compound the situation. We look at how satellite groups are arresting the slide into unregulated services in deregulated markets

Jamming can be broken down into two categories: intentional and unintentional. In radio, it is seen as a deliberate action, although the interfering signal causing the jamming may be the result of an intermodulation product unwittingly caused by two other signals incorrectly set up.

Roger Boddy, CEO, Global Teleports, has been working in the industry for a while, and has seen unintentional jamming first-hand. He says privatisation of the market in the mid-1980s took the not-for-profit satellite companies into a commercial world.

"This led to the trimming of overheads to show best return to investors, and deregulation away from the monopolistic national telcos into the hands of the privateers. The combination of reduced supervision and the quest to maintain double-digit earnings has been instrumental in an unregulated quality of service.

"Deregulated should never have led to unregulated, but it has become so. The Satellite Interference Reduction Group (IRG) has brought the industry to a point of recognising what has happened and starting to address course correction," says Boddy.

Boddy further explains that unintentional jamming will continue unabated until the causing signals are switched off or their set-up is corrected. Accordingly, the phenomenon may continue repetitively, with the causing carrier operators oblivious to the situation.

Intentional jamming is often politically or socially motivated. Politically motivated jamming is used to block or mask propaganda in times of conflict. Socially, it translates to blocking cell phones in an arena or auditorium where an intentional incoming cell phone signal would cause a nuisance.

Mark Rawlins, Chairman of the Space Data Association and Director of Communication System Operations at Eutelsat, has been studying the phenomenon for over two decades, and agrees with Boddy. He sees most of the jamming in the Middle East as politically motivated. Sometimes,
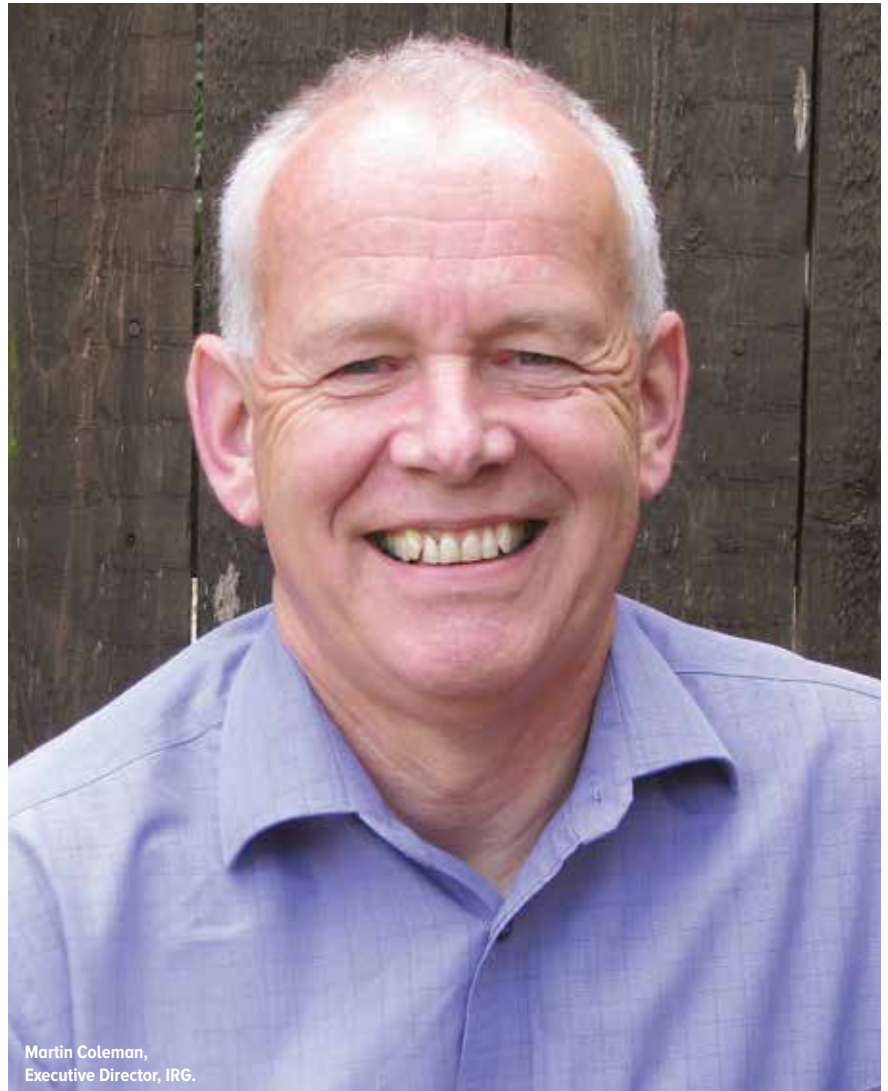
Martin Coleman,
Executive Director, IRG.

however, commercial jamming has been known to affect the region.

"Commercially motivated jamming has been observed occasionally, but is generally very rare. An incident occurred that has been identified to being linked to commercial objectives rather than political ones during the football World Cup in South Africa. Often, it is about blocking unwanted or unregulated content from a country or region. Considering the many thousands of satellite channels broadcasting around the world, jamming really only affects a minor number of services. However, when it does happen, it can have high visibility,"

explains Rawlins.

Furthermore, he explains, deliberate interference has been observed by most commercial satellite operators participating in IRG, mainly affecting DTH TV services or contribution links only.

Martin Coleman, Executive Director, IRG, says that jammers originally transmitted different types of carries to interfere with authorised transmissions. In most cases, however, they use a clean carrier (a carrier without modulation) to try and complicate the geolocation analysis and endeavour to prevent satellite operators from identifying the location of the jamming signal. The problem is huge for

Mark Rawlins, Chairman, SDA.

the services affected, as the time-to-resolve is always protracted and involves complex negotiation between international parties.

Boddy thinks that with privatisation came the abolition of type approvals, which made it comparatively easy for an untrained operator to gain access to satellites. "This in turn led to an increase in interference and a slow realisation that standards must be improved. Hence work by the IRG, GVF and a small kernel of concerned companies and individuals to lobby for changes, such as Carrier Identification [CID]."

Jamming and interference is not confined to one marketplace but is endemic

> **"Considering the many thousands of satellite channels broadcasting around the world, jamming really only affects a minor number of services. However, when it does happen, it can have high visibility"**
>
> MARK RAWLINS, Chairman, SDA

across all sectors where capacity is at a premium, oversold and poorly managed. The most affected are DTH services, with more than 80% of all intentional jamming incidents occurring in that vertical. The intent is always to block certain types of content from reaching viewers.

Boddy says there is always a monetary loss involved to clients faced with interference and jamming. "Experience has shown that poorly managed capacity can cause 50% loss of potential revenue. Currently, major satellite operators are writing down 10% of their operational costs to the resolution of interference issues. Where capacity has been grossly oversold, the end users are being charged huge service fees for mediocre service with little or no support."

Boddy says that of late, deliberate jamming has typically followed political unrest, where one party seeks to block the other's propaganda. Inadvertent jamming occurs wherever demand exceeds supply.

According to Coleman: "Intentional jamming of services affects the availability and significantly reduces the quality of service, the increased manpower to resolve – a mixture that always creates losses. Most of the intentional interference incidents are due to political situations, especially since the Arab Spring and the ongoing current political crisis in the Middle East region." With the current critical political situation and the crisis in the Middle East, he expects several jamming incidents to occur this year that will target DTH channels.

Speaking about the challenges in trying to mitigate interference, Boddy thinks that users have been sold services delivered through large portions of capacity, while seeking a low-cost solution. He says untrained resellers want to jump on the bandwagon of a satellite service without a proper understanding of best practice.

"We therefore undertake training to ensure best practice for the service we and our resellers deliver to end users, so that we might seek to satisfy the end users with a reasonable quart of service delivered from a cleaned pot. We also continue to lobby the UK regulator to take steps to support international initiatives such as Carrier ID.

"There is also a huge move to an increasing number of LEO satellite systems that by 2019 will double the density of satellites in the LEO band, and then further see a quadrupling of LEO satellites. For the GSO operators, this creates an increasingly dense barrier between Earth stations and their satellites in geostationary orbit, along with a whole new classification of interference to be considered in link budget calculations," says Boddy.

The only way to resolve the situation is to arrest the slide into unregulated services in the deregulated marketplace. The IRG initiative over the last five years has resulted in three major satellite operators and major equipment manufacturers adopting Carrier ID. The current proposal to the European Conference of Postal and Telecommunications Administrations (CEPT) to endorse CID will provide a regulatory gateway for users seeking resolution of interference through their satellite operator.

"NASA is already tracking 500,000 orbital items of between 1cm and 10cm, and a further 200,000 items of space junk of at least 10cm. We currently have 487 GEO, 41 Elliptal orbit, 87 MEO and 696 LEO satellites in operation.

"With the potential for at least eight times the number of operational LEO satellites by 2019, not to mention growth in the MEO and LEO constellations, there must be academic and engineering studies commissioned as a matter of urgency to examine the effect of such increased orbital density on the phenomenon of interference," explains Boddy.

"With the increasing risks and problems that have been faced over recent years, satellite operators are getting smarter. Better geolocation tools and predictive methods help us manage and hopefully outsmart the jammer. In addition, and behind the scenes, working groups like IRG, GVF and ESOA work collaboratively to continuously develop technologies and methodologies, and strengthen the ITU position in taking solid and strong actions against those countries involved in intentional interference. In addition, future satellites, including some recent launches, shall have the technology onboard to

"NASA is already tracking 500,000 orbital items of between 1cm and 10cm and a further 200,000 items of space junk of at least 10cm. We currently have 487 GEO, 41 Elliptal orbit, 87 MEO and 696 LEO satellites in operation"

ROGER BODDY, CEO, Global Teleports

mitigate this type of interference," says Coleman.

Rawlins thinks a two-tier approach is necessary to fight jamming. One involves using technology to locate the jammer when it occurs. The other should be driven by regulators such as the ITU and involves taking action

against countries and individuals involved in intentional interference.

"Improved satellite technology and collaboration will also help to mitigate the problem. At the SDA we have just launched a new geolocation service which, as well as helping in other cases of interference, will be an important tool for our members when facing jamming. The service offers those members without an existing geolocation capability a means of locating the source of interference. The member being subjected to interference across any of its satellites will be able to leverage support from other SDA members and request help in performing a geolocation.

"Monitoring system providers are working hard in coordination with satellite operators to enhance and develop tools and techniques to more rapidly and efficiently identify the sources of interference affecting satellite services. These tools will enhance success rates with geolocalisation, or can allow us to identify carriers, enhancing the work started with the Carrier ID initiative," concludes Rawlins. **PRO**

Roger Boddy, CEO, Global Teleports.

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Ready for **CABSAT**

This year's CABSAT will draw more than 950 exhibitors and close to 15,000 industry professionals. We take a look at what exhibitors will have on show

Newtec to introduce
HTS VSAT modem

As High Throughput Satellites (HTS) continue to open up new markets and push the limits of today's ground segment technology, CABSAT 2016 will see Newtec launch the industry's first high throughput VSAT modem supporting DVB-S2X.

With DVB-S2X on the forward link and Newtec's unique Mx-DMA return technology, the MDM5000 provides operators with an efficiency gain of up to 50%, thus reducing OPEX and CAPEX. This wideband modem is designed to get the most out of HTS transponders, while its two receive channels make it ideal for future mobility applications. Thanks to Newtec Dialog's Mobility Manager and the built-in Antenna Control Unit (ACU)

communication protocols, moving from one beam to another becomes very easy.

Other applications which will benefit from the MDM5000 include medium-size enterprise networks, government applications, oil & gas, maritime and cellular backhaul. As the most recent addition to Newtec Dialog's product line, the MDM5000 complements Newtec's full range of modems, ensuring the optimal solution for every application and price point.

Visitors to Newtec's CABSAT 2016 booth – ZK6-30 – will also be able to take a tour of the latest software release of the company's multiservice platform, Newtec Dialog 1.3. The scalable, flexible and efficient platform allows operators to build and adapt their business as the market changes, by enabling multiple services over a single, all IP-based VSAT platform. New features include DVB-S2X on the forward link, support for the MDM5000, Layer 2 bridging and mobility support. Newtec Dialog is also equipped with its unique Mx-DMA return technology, which combines the flexibility of TDMA with the efficiency of SCPC, without any compromises.

First time exhibitors at CABSAT 2016

Cable and Satellite Equipment
- Amitronica
- Doteck
- EMP Centauri
- Fracarro
- Jaggard - Radica
- Sumavision
- TeleDis

Satellite Companies
- Atron
- China Satcom
- DataPath
- IP Dish
- M-Three Satcom
- MediaCast Network
- SMS Media
- ST Electronics
- Telekou Technologies

SES to showcase mobility solutions

Next-generation data and mobility solutions, innovation and humanitarian solutions will be taking centre stage at SES's CABSAT 2016 booth.

With nine satellites currently covering the Middle East, delegates visiting SES's CABSAT 2016 booth – Stand ZE4-10, Zabeel Hall 4 – will learn more about SES's new projects across the Middle East and find out how its next-generation solutions can help them extend their reach and explore new opportunities across the region and beyond.

Representatives will be available to discuss new growth opportunities across the Middle East and what SES is doing to address the growing demand for comms-on-the-move, while its interactive

Google Earth tool will enable visitors at the booth to explore new connectivity solutions to serve next-generation networks.

From the latest developments in aeronautical and maritime solutions to service platforms such as emergency.lu and SATMED, which provide vital connectivity to aid humanitarian missions around the world, SES is continuously developing new solutions to serve the demands of a changing world.

Visitors will also get a chance to view Ultra HD at the SES stand and witness first-hand the cutting-edge technology that creates a more compelling viewing experience of premium movies, sports and documentaries.

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WORLD RADIO DAY 2016

ETL to showcase new **tech in RF**

ETL Systems will be showcasing its new technologies in RF distribution at Stand ZH4-42. This comes following major contract wins in the region.

ETL has designed new functionality and increased benefits into a series of advanced products, including StingRay RF over Fibre and Dextra splitters and combiners. New StingRay models on show will include redundancy systems for reliability and standalone component modules, while new Dextra models now include options with integrated DC and 10MHz pass.

Also on display will be ETL's compact 128x128 Vulcan L-band Switch Matrix/Router and Alto variable gain line amplifiers. The Vulcan offers excellent RF performance and benefits from reduced power consumption and hot in-service expansion, while the Alto series of amplifiers offset signal loss from long runs of cables and passive splitters and combiners by providing gain.

The company's presence at CABSAT follows major contract wins in the region, including QSAT Communications, which ordered eight of ETL's new 10MHz pass Dextra combiner units for a multinational UAE-based telecommunications service provider's mobile VSAT systems.

A 48x32 part populated Vortex L-band matrix was also ordered recently for a major television broadcaster in Dubai.

Exterity to showcase **IP video portfolio at CABSAT**

Exterity has announced that it will demonstrate its complete IP video product portfolio at CABSAT this year.

The Exterity enterprise IP video portfolio enables systems integrators and consultants to easily specify and install a full end-to-end IP video system to distribute content over the corporate LAN and beyond, via WAN, Wi-Fi, the internet or a content delivery network, extending media distribution to any device connected over any network.

Colin Farquhar, CEO at Exterity, commented: "The Middle East will be home to some of the world's largest events over the next few years, from Dubai 2020 to the FIFA World Cup in Qatar in 2022, transforming the region into one of the fastest-growing AV markets. Organisations in the Middle East want the highest quality audiovisual technology for their tech-savvy customers. At CABSAT, we will show how our flexible, robust and future-proofed enterprise IP video solutions can help them provide high-quality content to the right audience, on the right screen, regardless of the network."

The complete product range enables organisations in multiple sectors, including education, hospitality and oil & gas, to make high-quality video content consistently available across their premises and beyond, giving staff, visitors and guests flexibility.

Next & NextStar to showcase **DVB STBs at CABSAT**

Yuksel Elektroteknik San.ve Tic. is going to be at CABSAT this year, showing its range of Next & NextStar DVB STBs and multi-switches. It also designs security surveillance systems and LED lighting.

It has the latest technology in SMT production, investment and a 13,500sqm high-tech factory building which can churn out one million SMT components in an hour, corresponding to production of four million sets of STBs annually.

Yuksel Elektroteknik San.ve Tic. has recruited over 300 employees and supports customers with more than 400 concept shops and over 500 after-sale service points. The company also has export business in more than 20 countries.

Turksat, Digiturk and TTNET are important business partners. Yuksel Elektroteknik has been expanding its product line with LED TVs, tablet PCs and home appliances too.

PREVIEW

Es'hailSat to showcase Es'hail 1 and Es'hail 2 at CABSAT

Es'hailSat is exhibiting at the annual CABSAT exhibition in Dubai, showcasing Es'hail-1 – currently transmitting high quality premium DTH television content from the 25.5/26 degrees East neighbourhood for leading channels such as Al Jazeera and beIN Sports – and Es'hail-2, the company's second satellite, scheduled for launch in Q4 2016.

Es'hail-2, a new high-performance satellite with sophisticated anti-jamming capabilities, will be positioned at the 26 degrees East hotspot position for TV broadcasting, significantly adding to the company's ability to provide satellite capacity for high quality premium DTH television content across the Middle East and North Africa.

In addition to providing transmission for established news and sports channels, a growing number of new Arabic channels are choosing Es'hailSat to launch in the MENA region. Both Qatari cultural channel Al Bidda and Al Araby Television Network, a London-based channel, both recently launched HD channels exclusively on Es'hail-1.

Es'hailSat has commissioned a new teleport to provide broadcasters with secure and independent satellite transmission. A dedicated 50,000sqm site north of Doha has been chosen for the new facility, which will provide satellite TT&C and capacity management together with a wide range of teleport services such as uplink, downlink, contribution, multiplexing, encoding, playout and broadcasting. The high-tech teleport will also provide back-up studios for TV channels and serve as a disaster recovery facility for broadcasters. The site will be linked with key media broadcasters by a redundant dedicated fibre optic link.

CPI Satcom to tout amplifiers

CPI Satcom will be at CABSAT and will be showing off its range of high-power TWTAs, SSPAs and KPAs for satellite uplink applications. The company offers some of the most advanced and power-efficient amplifiers available in the market.

It specialises in a comprehensive product line of Ka-band amplifiers in the industry, with TWTAs up to 800W and SSPAs up to 160W. The TWTAs are offered with CPI's patented LifeExtender / LifePredictor technology, which promises to extend tube life by 30-50%.

The efficient SuperLinear TWTAs are available in DBS- and Ku-band up to 1,250W, C-band at 2.25kW, and X-band at 550W and 2,500W. The new 1,250W DBS-band outdoor SuperLinear TWTA provides up to 552W of linear power at the flange, with excellent NPR performance and power efficiency.

CPI also offers GaN SSPAs, with high-power BUCs ranging up to 200W in C-band, Ku-band and X-band, and up to 160W in Ka-band.

Norsat to demo ATOM series at CABSAT

At CABSAT 2016, Norsat will be showcasing its portable satellite terminals, including the Ranger high-performance ruggedised satellite terminal ideal for rapid deployment, as well as its ATOM series of block upconverters (BUC) and solid state power amplifiers, which are among the smallest, lightest and most powerful in the market.

It has an ability to be easily integrated into a variety of systems, making these products ideal for portable applications such as broadcast, airborne and comms on the move. The ATOM series is flexible and can be configured and customised to meet varying application requirements.

Norsat says the show provides the opportunity to meet customers and resellers and introduce new products into this market. It is looking to strengthen its network within this region and welcome discussions from interested partners.

Founded in 1977, Norsat International's products and services include customised product design and development; production, distribution and infield support and service of fly-away satellite terminals; microwave components; antennas; radio frequency (RF) conditioning products; maritime-based satellite terminals; and remote network connectivity solutions.

CONTENT MARKETPLACE

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APT to showcase **APSTAR-7**

APT Satellite Company Ltd will be showcasing different services to customers at CABSAT this year. These consist of a wide range of applications, including video distribution, direct-to-home TV, cellular backhaul, corporate network, maritime and aeronautical mobility services.

"This is our seventh time participating at CABSAT. We currently own and operate five in-orbit satellites – APSTAR-5, APSTAR-6, APSTAR-7, APSTAR-7B (partial), APSTAR-9 satellite (APSTAR Satellite Fleet) – covering regions in Asia, Europe, Africa, Australia and Pacific islands which contain approximately 75% of the world's population. We provide superior one-stop shop satellite transponder leasing, broadcast, teleport and data centre services to broadcasters and telecommunication customers," said Thomas Antony, Sales Director at APT Satellite.

The Apstar-7 satellite at 76.5 degrees offers superior coverage for a range of services. It offers global C-band, a platform which enables Arab broadcasters to reach Asia Pacific homes, the largest multichannel video market globally in terms of subscribers.

It also offers a Ku-band MENA beam with superior coverage ranging across the Middle East, Europe, North Africa and central Asia. It is widely used for network services, broadcasting-contribution and occasional use, as well as maritime and aeronautical applications.

"We also have the Sub-Saharan Africa beam, which can be cross-strapped to the MENA beam, which allows a service provider to uplink from Middle East or Europe and downlink in Africa and vice versa. This allows managed service providers to benefit from the wide reach and capitalise on the efficiencies of Ku-band," said Antony.

Gazprom Space Systems to promote **Yamal satellites**

Gazprom Space Systems will be participating at CABSAT for the 10th time at Booth ZH6-40, and will be speaking about capacity on Yamal satellites, which in total amounts to 248 equivalent transponders of 36MHz.

C-band payload of Yamal-202 at 49 degrees East has good coverage over the Middle East and North Africa, and with its semi-global coverage (Europe, Middle East, North Africa, South and Southeast Asia) it is possible to arrange channels between the informational and business markets of almost all the eastern hemisphere. This satellite is mainly used for organisation of both broadband trunk channels and small or medium-size networks for corporate and governmental customers. This satellite shall be replaced by Yamal-601.

The Yamal-402 at 55 degrees East provides Ku-band coverage over Russia, CIS countries, Europe, part of the Middle East and Sub-Saharan Africa. Satellite antennas form four fixed beams – Russian, Northern, European and Southern – and one steerable beam. The interbeam connectivity between European and Southern beams is in great demand among customers. It is used to provide communications services to operators of pay TV, the corporate sector, governmental structures and NGOs. Around half the VSAT networks of diverse technologies and scale operate via this satellite in the EMEA region. The steerable beam currently covers Sub-Saharan Africa, to strengthen the GSS position in the region.

Santander to tout its **facilities**

Santander Teleport will be at CABSAT and will be showcasing the facilities of its teleport in Spain.

The teleport operator offers satellite communication services in C-, X-, Ku- and Ka-bands for service providers, enterprises and government organisations in the maritime, enterprise and defence markets. It has access to a global terrestrial network, and works with partner teleports to provide global reach.

"We look forward to the annual CABSAT event to meet up with suppliers, partners and customers to find common ways to serve those companies in need of fast, efficient and reliable communications," said David Andres, BDM at Santander Teleport.

The teleport's services include uplink/downlink facilities, colocation of customer equipment, antenna hosting, connectivity to major PoPs and end customer sites, internet access, back-up / disaster recovery services, VSAT services, custom-designed solutions and specialised satellite operator services like IOT, TT&C and RCM.

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Funding
and **pay**
television

The MENA market is remarkably healthy, with more than a thousand channels available across the region. Because of the prevalence of satellite delivery, most people can access all those channels, wherever they are, and because most are in English or Arabic, they have a wide appeal

The challenge lies in funding for those channels. The traditional business model – funding by advertising – has limited value. A recent analysis by Deloitte found that the advertising spend per capita in North America is a huge $195. In Western Europe it is $76. In the MENA region, it is just $12.

That number may even be an over-estimate. It is notoriously difficult to get precise advertising revenues in the Middle East, and there is growing pressure to establish a pan-regional board to create reliable and trusted audience ratings and advertising revenues.

Another issue affecting advertising revenues, according to Sami Raffoul of the Pan-Arab Research Centre, is the political situation. "The multiple crises suffered by the region over the last few years have not only adversely impacted the advertising business in the territories immediately subject to conflict, but has a knock-on effect across the entire region."

On the other hand, David Butorac, CEO of pay TV satellite operator OSN, told a conference recently that "the reality is that the Middle East is a fast-moving, affluent region with high disposable incomes and very modern infrastructures. Regional GDP is growing at 6%. Our market is very tech savvy, young and engaged."

OSN's solution to the funding issue is to deliver a pay TV service. According to Butorac, the usual business model for pay TV is volume, but in a region with 750 accessible free to air channels, that is not practical. Instead, its offer is based on quality content.

In particular, it offers the best of Western programming, without overt censorship. As Butorac told the conference, "When *The Wolf of Wall Street* was shown in MENA cinemas there was 40 minutes cut from it; when we showed it on OSN we cut 40 seconds." To be able to show uncensored programming, OSN and other satellite pay TV providers have had to work with regulators to demonstrate that its paywall and family ratings systems are sufficient protection.

OSN also offers very quick access to popular content. Last year, 77 of its US and UK series were aired within 24 hours of their first release, and the most recent series of *Game of Thrones* was shown at the same time as its premiere in America.

OSN serves 24 countries from Morocco to

David Butorac, CEO of pay TV satellite operator OSN says regional GDP is growing at 6%, and that the market is very tech savvy and young.

> "The multiple crises suffered by the region over the last few years have not only adversely impacted the advertising business in the territories immediately subject to conflict, but has a knock-on effect across the entire region"

SAMI RAFFOUL, Pan-Arab Research Centre

Iraq, although inevitably its focus is on the wealthier Gulf states. According to research body Ovum, 30% of homes in the UAE have pay satellite services, more than the 24% who have free-to-air digital satellite.

Saudi Arabia has lower pay TV penetration, but it still reaches a quarter of homes. Qatar has exceptionally high pay TV reach, at over 75%. Interestingly, Qatar has a ban on individual satellite dishes, imposed in the 1990s, although clearly this ban has never been enforced.

According to Dennis Lehtinen, head of pay TV operations at Abu Dhabi Media, pay TV is growing in the GCC countries. The main drivers, as elsewhere in the world, are exclusive sports, including the main

European football leagues, movies and TV series both from Western countries and from the Arabic world and Turkey.

The ADMC view is that premium sport remains a key driver for pay TV growth. However, the cost for sports rights compared to the customer affordability in the region makes it hard to find a business model.

The English Premier League is a case in point. BeIn Sport reportedly paid $500 million for the rights, which is widely felt to be far more than the market could justify: "about $400 million too much", according to OSN's Butorac.

To put that in context, research house HIS estimates total region-wide pay TV revenues at a fraction under a billion dollars in 2014. That, though, puts the MENA region as the fastest growing globally in terms of pay TV.

Echoing Butorac's optimism, HIS senior analyst Constantinos Papavassilopoulos said "the MENA region represents huge opportunities for investors. If we look at the demographics alone, over 60% of the population is under 35, they are media-literate and have developed international tastes in television content."

HIS forecasts that, between 2015 and 2019, the MENA pay TV market will grow five times faster than that in the US, UK, Germany, France or Italy. By 2019, according to Papavassilopoulos and his colleagues, there will be 6.6 million pay TV homes, and revenues will have surged to over $1.8 billion. PRO
Source: CABSAT

Protecting Vital
Radio Spectrum

Satellite operators provide crucial connectivity around the world using vital satellite frequency bands and therefore sharing arrangements with mobile operators should not target these bands

The space 36,000 kilometers above the Earth, as unlimited as it may seem, is quite a finite resource.

Irrespective of the number of spacecraft orbiting at that far a distance, the transmissions are confined, as per the law of physics, by the radio spectrum that can be operated at the geostationary ring around the Equator. The authorisation to use this spectrum is granted by the States which have applied for these rights through the International Telecommunication Union (ITU), a regulatory body of the United Nations.

THE ITU: ALLOCATING RADIO SPECTRUM AND ORBITAL POSITIONS

The electromagnetic spectrum used for all radio communication technologies and services is defined as the range from 1 hertz

> **"The electromagnetic spectrum used for all radio communication technologies and services is defined as the range from 1 hertz to 3000 gigahertz. This includes television broadcasting, telecommunications and mobile phone services"**

to 3000 gigahertz. This includes television broadcasting, telecommunications and mobile phone services, with a certain portion of the spectrum allocated for each group of services, including satellite services.

The use of this spectrum is coordinated by the ITU, a specialised UN agency for information and communication technologies.

The ITU is responsible for allocating transmission frequencies and satellite orbits, developing the technical standards that ensure networks and technologies interconnect seamlessly, and working to improve access to information and communication technologies in underserved communities worldwide.

Its activities affect broadband Internet, latest-generation wireless technologies, aeronautical and maritime navigation, radio astronomy, satellite-based meteorology,

SPECTRUM IS SPLIT INTO DIFFERENT PARTS THAT ARE THEN ALLOCATED TO ONE OR MORE SERVICES

Very Low Frequency (VLF)	Low Frequency (LF)	Medium Frequency (LF)	High Frequency (LF)	Very High Frequency (VHF)	Ultra High Frequency (UHF)	Super High Frequency (SHF)	Extremely High Frequency (EHF)
Maritime navigation signals	Navigational aids	AM radio, Maritime radio	Shortwave radio	FM/DAB radio	TV, Mobile	Mobile, Wi-Fi, satellite communications, Microwave systems	Mobile, Radio astronomy

30 kHz · 300 kHz · 3 MHz · 30 MHz · 300 MHz

Ku-band 10 - 17 GHz

Ka-band 17 - 31 GHz

C-band 3 - 8 GHz

3 GHz · 30 GHz

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convergence in fixed-mobile phone, data, voice telephony, TV broadcasting and next-generation networks.

Based in Geneva, Switzerland, the ITU is part of the United Nations Development Group. ITU members include 193 countries (Member States) and close to 800 academic institutions and private-sector companies (Academia, Sector Members and Associates), which conduct most of the work for each sector. Private organisations – such as carriers, equipment manufacturers, funding bodies, research and development organisations, and international and regional telecommunications organisations – may join the ITU as non-voting Sector Members. SES is a Sector Member of the ITU through various administrations and actively participates in the meetings.

The World Radiocommunications Conference (WRC) is the key ITU meeting, convening in Geneva for three to four weeks every three years.

Thousands of delegates from over 150 countries gather to discuss and revise the international Radio Regulations, which cover all telecommunications throughout the world. The conference WRC-15 ran from November 2-27, 2015.

KU-, KA- AND C-BAND
Commercial satellite operators like SES mainly use three spectrum bands: Ku-, Ka- and C-band.

Ku-band
The Ku-band represents the portion of the electromagnetic spectrum from 10 to 17 gigahertz. Ku-band is used primarily for satellite broadcast and for fixed data services (commercial and government customers), and increasingly for mobility services due to its small antennas and favourable propagation characteristics.

Ka-band
The Ka-band represents the portion of the electromagnetic spectrum from 17 to 31 gigahertz. Currently, Ka-band is used primarily to enable broadband type of applications for both commercial and government customers. Demand for this band is set to grow further as demand for broadband connectivity continues to rise.

C-band
The C-band covers the frequencies from 3 to 8 gigahertz in the microwave range. C-band satellite networks provide many critical services, including TV broadcasting,

mobile backhaul, satellite telemetry, public meteorological data distribution, corporate business networks, aviation security, aeronautical applications such as the International Civil Aviation Organisation (ICAO) network, and vital communications for public protection and disaster relief. C-band satellite networks are extremely reliable – even in rainy regions – and cannot be replaced by bands with different propagation characteristics and narrower beams, such as Ku- and Ka-bands. C-band satellites can cover very large areas from continents to the entire globe as seen from one satellite.

C-BAND NETWORKS PROVIDE CRUCIAL CONNECTIVITY FOR EMERGENCY RESPONSE
C-band enables emergency support to the public when they need it most. When disaster strikes and terrestrial infrastructure is down, up-to-the-minute information can mean the difference between life and death. Satellite connectivity via C-band is the fastest way to get communications services up and running for those seeking rescue or coordinating relief efforts.

First deployed in South Sudan in January 2011, emergency.lu is such a platform designed to quickly re-establish communications in

remote areas isolated by natural disasters or other emergency situations. The platform was again deployed in November 2013, when Typhoon Haiyan devastated up to 80% of the built environment in the central Philippines, took thousands of lives, and displaced and cut off all means of communications for millions of people.

OTHER CRITICAL COMMUNICATION NETWORKS ENABLED BY C-BAND

C-band is the core communication infrastructure for most humanitarian organisations and NGOs for e-learning and e-health. Empowering remote communities by providing access to education and healthcare has proven itself one of the most valuable aspects of satellite connectivity.

The SATMED e-health platform from SES relies heavily on C-band to fulfill its ambition to improve public health in emerging and developing countries. This satellite-based communication solution connects health staff working in the world's most remote areas to the international health community for consultation and regular training.

The global VSAT industry on the other hand is also heavily dependent on C-band, as it provides vital communication links with the highest availability for the commercial maritime industry as well as the oil and gas sector, and enables land-based VSAT applications such as mobile backhaul services across challenging terrain and remote territories.

There are as many as 75,000 bank branches, ATM networks and trading platforms connected via C-band across Indonesia that allow as much as USD 400 million to be dispensed on a daily basis. In rural areas in Africa and Asia, this frequency band is also used for mobile backhaul, allowing 2.9 billion people to stay connected to their friends and family through mobile phones. Oil and gas platforms rely on C-band for exploration, extraction and monitoring. In the maritime sector, as many as 12,000 vessels and cargo ships are using C-band to maintain crew welfare and optimise operational efficiency.

WRC-15 PROPOSAL: MOBILE TELECOMMUNICATIONS SEEK MORE SPECTRUM

In the lead-up to WRC-15, the international
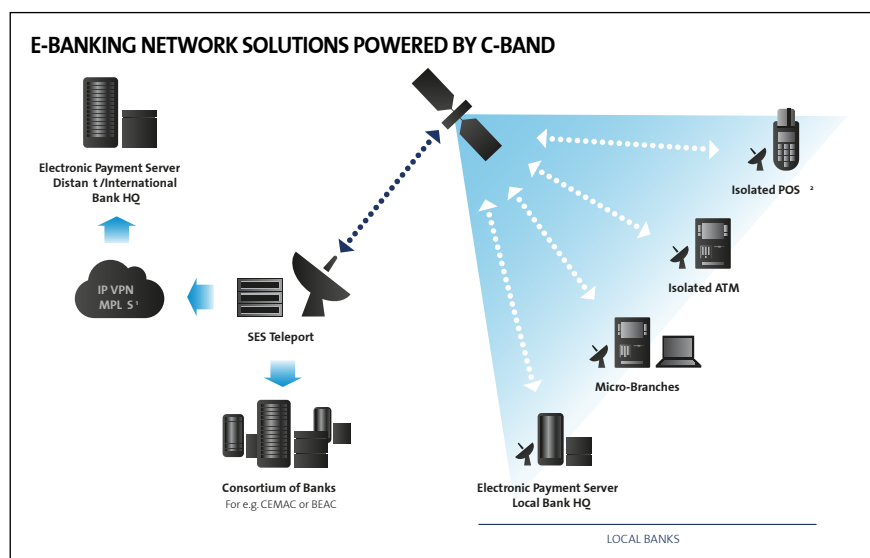
E-BANKING NETWORK SOLUTIONS POWERED BY C-BAND

> "This satellite-based communication solution connects health staff working in the world's most remote areas to the international health community for consultation and regular training"

community of terrestrial mobile service providers and equipment manufacturers requested more spectrum, with the aim to gain access to a portion of the C-band that is currently allocated to satellite operators.

Satellite operators oppose this proposal as it raises major concerns. A global designation of the C-band for terrestrial mobile communications would prompt countries to allow mobile wireless services into the spectrum, causing insurmountable interferences. Nearly a dozen technical studies which are summarized in ITU reports have clearly concluded that sharing C-band between mobile and satellite operators is not feasible in the same geographical area since a minimum separation distance between the operations cannot be guaranteed.

The practical result is that terrestrial mobile networks cannot operate in the C-band anywhere in the world without causing substantial harmful interference with the established satellite transmissions. The interferences would lead to the loss of vital communications during emergency response and disaster relief efforts around the globe. In addition, it would put at risk video distribution, satellite news gathering, programme distribution chains, international programming feeds, terrestrial transmission networks, and the provision of programming to cable head-ends.

C-band is the backbone of the broadcasting industry and to other users currently using this spectrum. Today about 170 commercial satellites are using C-band spectrum. Billions of euros and dollars are invested in C-band technology and ground infrastructure; hundreds of millions of households worldwide depend on C-band for their television programming. Only looking at the geostationary orbit, C-band satellites represent an in-orbit investment of as much as USD 50 billion. Substantial additional investment has been made on the ground to communicate with, and receive services from, satellites using C-band.

The risks and losses of sharing C-band to the global community far outweigh the gains to the mobile communications sector. Satellite operators therefore strongly oppose it. **PRO**
Source: SES

Geolocation: Crucial Support

Geolocation enables a satellite operator to locate the interfering carrier and leads to
a resolution of the interference incident Mark Rawlins, Chairman of the SDA explains

Interference continues to cause problems for satellite operators and can also be disruptive to customer services. As an industry, we are building a number of tools to combat it, such as Carrier ID (CID), which has been spearheaded by the Satellite Interference Reduction Group (IRG).

CID is in principle an extremely useful method of identifying the source of interference. However, until it reaches widespread implementation, there will remain a large proportion of unidentified carriers. Add to that those scenarios where CID will never be present, such as in the case of deliberate jamming, it is clear we need something when CID is not present.

Geolocation is one such tool, enabling an operator to locate the interfering carrier and leading to quick and efficient resolution of the interference incident. Monitoring system providers are working hard in coordination with satellite operators to enhance and develop tools and techniques to more rapidly and efficiently identify the sources of interference affecting satellite services. These tools will enhance our success rates with geolocation.

However, there are a couple of main challenges when it comes to performing a geolocation and definite scope to make it better and faster, so that we can drastically reduce the time to resolution.

The first challenge is that to be truly effective you need more than one satellite to conduct it and find the source. In most cases, an operator won't have two of its own satellites together, therefore we saw a need to share data that helps them identify another satellite they can use to perform the geolocation. However, the difficulty in selecting the best neighbouring satellite, reference emitters, and time for geolocation which meets all geolocation requirements can be daunting.

We have therefore been developing a

> ## "Monitoring System providers are working hard in coordination with satellite operators to enhance and develop tools"
>
> MARK RAWLINS, Chairman, Space Data Association

solution within the Space Data Center (SDC) that will help an operator identify another satellite they can use to perform the geolocation. The SDC tool will automatically analyse all geolocation solution set possibilities and rank-order them within the SDC. When the SDC is alerted to an interference event, it will be able to use data stored in its database to provide feasible and optimised solution sets consisting of secondary satellites, reference emitters and optimal times-of-day for geolocation measurements.

The other significant challenge when it comes to geolocation is that not every satellite operator has internal resources and systems to perform geolocation. Systems can be expensive, as well as needing trained staff able to operate them, so it is especially challenging for smaller satellite operators. Therefore, we have just announced a new service to offer a support matrix between satellite operators whereby they will share resources and expertise to locate sources of interference. Members who are subject to interference on any of their satellites can now count on a system and a process to engage support from other SDA members and request help in performing a geolocation.

With this service, the SDA is actively pursuing its policy of information exchange and cooperation in order to ensure quality of service for the satellite communications community.

We hope by offering this service, we will be ale to help our members resolve interference quickly and efficiently. We also expect it to have an impact for the entire industry, as of course interference is an industry issue and a problem affecting one of our members today may be affecting another tomorrow. As with any type of interference, the quicker it is resolved, the better for the entire space environment. PRO

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