

Satellite Services Market Update

by Elisabeth Tweedie, Associate Editor

The satellite industry has been in a state of flux for the last few years. Historically strong markets are facing increasing competition from various sources; and at the same time, advances in satellite technology both on the ground and in the air, have resulted in increased capabilities and falling bandwidth costs. To further complicate matters for the geostationary (GEO) operators, numerous low earth orbit (LEO) constellations are promising to join O3b (the Medium Earth Orbit (MEO) constellation) and enter the market.

Operators, Industry analysts and observers are reacting to these changes in different ways and there has certainly been no shortage of depressing headlines and commentary in the last few months. "Capacity prices have fallen between 35 and 60% in the last two years:" from Northern Sky Research. "Admit you have a problem:" from Deutsche Bank. "Wheels falling off satellite TV:" from Moffett Nathanson. Is the future really that bleak?

Now, more than ever, the market for satellite services is sharply divided between the developed and developing world.

In the developed world, both the terrestrial in-

frastructure and Over-the-top (OTT) offerings provide ferocious competition. At one time, satellite was the only way to deliver content to cable operators, and, to transmit content from sporting and other live events. Fiber has made inroads into the content delivery market, and bonded cellular, has made inroads into local newsgathering. OTT is now starting to have a dramatic effect on all linear programming including the Direct to Home (DTH) market. But the industry is not standing idly by, and watching its markets disappear.



Most of the major operators and service providers, now have fiber as well as satellite networks, and will offer and use the best available to meet the customers' requirements. Satellite, teleport operators and service providers, are now packaging delivering content to the OTT

providers as well as their traditional markets of cable, telcos and DTH operators. However, different approaches have been taken. SES, for example, has moved down the value chain, in the creation of MX1 and now offers a fully managed service to content providers.

Eutelsat Americas, is taking the opposite approach, and has recently partnered with Globecast,

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The Changing Satellite Market



I started in the satellite industry right after my graduation from the University of Southern California in 1992. To say that the industry has changed since is an understatement. Over the years, I have seen major changes unfold in our dynamic industry. But none have been more dramatic as far as the changes in just the last few years with the entry of many new players from diverse industries notable from the IT sector.

Collectively, these new companies introducing new ways of doing business and innovations are called the "New Space." Specifically, the term is used to refer to a global sector of relatively new, distinctly commercially minded aerospace companies and ventures working independently (of governments and their prime or major contractors, i.e., Old Space) to develop faster, better, and cheaper access to space, space and spaceflight technologies, and overall space missions—all largely driven by commercial, as distinct from political or other, motivations.

Our cover story this month surveys the changes underway in our industry. This month will also see the NAB in Las Vegas shedding more light in to New Space and other unfolding developments in our industry. We will keep you posted of all these developments.

See you all in Las Vegas!

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Satellite Services Market ..From page 1

to launch a new video platform for the Americas (Alaska to Argentina). This platform will use Globecast's advanced media management solution for linear and OTT. This includes: streaming, local ad insertion, Internet-of-things (IoT) services, High Efficiency Video Coding (HEVC) and regionalization services. Mike Antonovich, CEO Eutelsat Americas, stated: "Our position is to be partner friendly and work with all independent and channel partners."

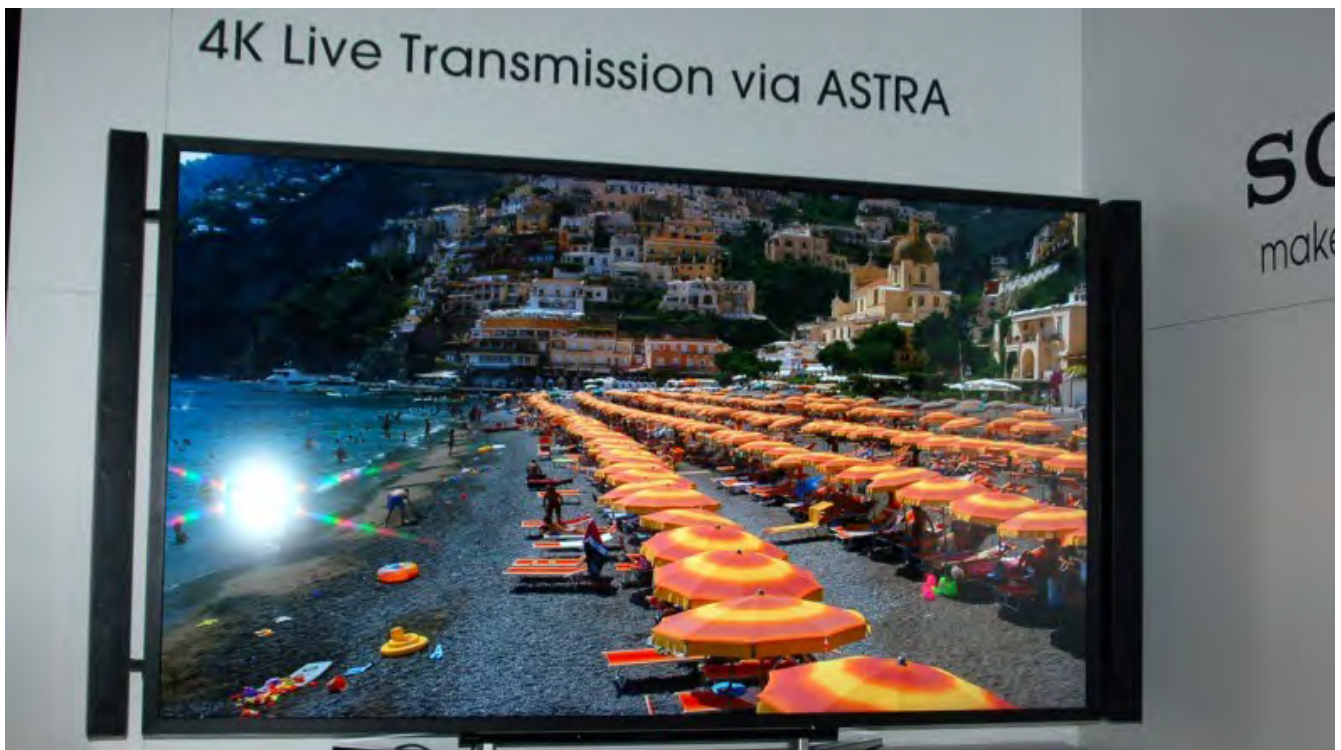
"...Now, more than ever, the market for satellite services is sharply divided between the developed and developing world..."

the same antenna, so switching from one to the other, really is a simple matter of flipping a switch. A huge improvement over other backup solutions that require re-positioning an antenna.

As discussed last month, Dejero,

events take place in other locations. For distribution, nothing is as efficient as satellite for delivering high quality content to large numbers of simultaneous viewers. Granted, there is latency, but this is consistent, and well under one second. There is no buffering.

During this year's Super Bowl, some



All the major satellite operators are now delivering 4K channels, something that OTT services are not technically able to in all but a small minority of households.

A unique feature of this service is what Mike refers to as the "No moving parts backup." A second satellite (Eutelsat 113W A) is located just four degrees away from the primary (Eutelsat 117W A) to provide fleet protection and redundancy in the event of any type of event, be it catastrophic or minor, impacting the primary satellite. The satellites use the same frequency and polarization, and can be seen by

has developed a service for local news-gathering that seamlessly combines bonded cellular with satellite.

Major sporting and other live events, have always been the purview of satellite. Bonded cellular is totally inadequate for uplinking for the number of cameras involved and bandwidth required, and whilst some stadiums and venues are now fibered, many

OTT viewers were subject to a transmission delay of two minutes, behind DTH and broadcast transmissions. On another occasion, this time in Europe, Yahoo delivered a live American Football game OTT. It was expected that that problems would arise if the number of viewers reached 50 million. As it was, the transmission crashed with 11 million viewers.

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Although total numbers of OTT viewers, still remain well below linear TV viewers, their growth is accelerating at the expense of satellite and cable TV operators. However, like the network operators, the satellite operators were quick to respond, with services of their own. In the last quarter of 2017, Directv lost 147,000 subscribers, but this was more than offset by the 368,000 subscribers that Directv Now, the operator's OTT service, gained in the same time period. Directv Now, is just over a year old and has a total of 1.2 million subscribers. Sling TV from Echostar, was launched at the beginning of 2015 and now has 2.2 million subscribers.

Netflix and Amazon Prime, have taken the lead in producing 4K content, but as mentioned in last month's article, the bandwidth requirements to deliver 4K content OTT to the home, make receiving it impossible in all but a minority of households around the

world. Satellite, on the other hand, can transmit 4K content, to millions of users with no degradation in quality. All the major satellite operators are now delivering 4K channels, including SES, who have 40% of 4K channels worldwide.

In the developing world, the situation is very different. Terrestrial connectivity is more limited, and where available, connection speeds tend to be much lower. Many channels are still delivered in Standard Definition (SD), so there remains plenty of opportunity to upgrade to HD. At Satellite 2018, Ignacio Sanchís, Chief Commercial Officer, Hispasat, pointed out, that of the 800 channels that it delivers in Latin America, only one third were currently delivered in HD, so there remains a healthy business opportunity to increase the number of HD channels in the region. Historically, the conversion to an HD channel as often been achieved by ini-

tially offering the channel in both SD and HD versions, so increasing the bandwidth demand for the satellite operator even more.

SES has introduced a novel solution to deliver a pseudo OTT service to viewers living outside the reach of higher bandwidth terrestrial connectivity. Video-on-Demand Everywhere, pushes a tailored selection of movies and TV shows to a set top box. A high content refresh rate, ensures the user always has something up-to-date to watch and where there is a home network, content can be viewed on multiple devices including smart phones and tablets. The service also integrates linear TV channels and one-off live events. Since the content is delivered by satellite and resides in the viewers' home, there is no buffering or delay.

Of course, there are also two niche markets, that are likely to remain pri-

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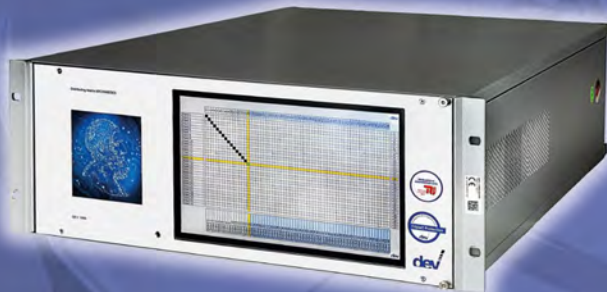


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THE ART OF ENGINEERING



marily satellite for the foreseeable future: namely the offshore maritime market and the aeronautical market. Both of these have been growing significantly in the last few years, and are predicted to continue to do so for many years. Maritime is embracing much greater bandwidth at the high-end of the market, and as the price of bandwidth continues to fall, the market is expanding to include smaller vessels. NSR is forecasting 48,000 maritime terminals in use by 2026, over double the number in service today. The aeronautical market continues to grow, but is still trying to find the ideal business model. Free or pay, own device or seat-back screen, app or no app required? Regardless, satellite offers a superior service to that offered by land-based systems. Euroconsult is predicting that the market will grow to US\$6.5 billion in 2026, from just under one billion in 2016.

So, what does the future hold for the satellite industry? It is changing at an unprecedented rate, as technology improvements continue to mold the

future. Terabit satellites, flat panel antennas, LEO constellations, channel bonding to name but a few. There will undoubtedly be casualties, company names that will disappear. But will the industry itself, be confined to the developing world and a few key niches, or will it adapt and thrive? In looking for an answer to that question, the industry could perhaps take note of what happened to the passenger railways in the US. Had they considered themselves in the transportation business, those rail companies, may have been operating airlines today. Customers want video and connectivity. As long as the service is reliable and good value, they are technology indifferent. As already mentioned, many of the operators and service providers are already em-

bracing change and offering fiber and OTT.

As long as the industry continues to be flexible and work together and with appropriate partners, it will survive and prosper, albeit with a few bumps along the way. But, maybe its time to start thinking of ourselves as the “Bandwidth Industry.”



Elisabeth Tweedie has over 20 years experience at the cutting edge of new communication and entertainment technologies. She is the founder and President of Definitive Direction a consultancy that focuses on researching and evaluating the long term potential for new ventures, initiating their development and identifying and developing appropriate alliances. During her 10 years at Hughes Electronics she worked on every acquisition and new business that the company considered during her time there. www.definitivedirection.com She can be reached at: etweedie@definitivedirection.com

The Switch is on!

by Lou Zacharilla

Rich Wolf needs no introduction to anyone in the satellite & media broadcast industries or to members of SSPI. As Vice President for Telecommunications & Affiliate Support at the ABC Television Network for over three decades, Rich's belief in enabling the satellite industry to better understand the importance of its broadcast clients' changing needs led him to two terms as the chairman of SSPI. His insistent support for nurturing new talent in the industries he was engaged with led him to be named by his peers as the satellite industry's Mentor of the Year in 2012.

After leaving ABC, Rich went to The Switch at the start of 2014, where he serves as Executive Vice President, Marketing and Corporate Communications under Keith Buckley. Buckley was brought on as The Switch's president and COO in 2017 and named CEO in February. With Buckley at the helm, the team is building a product and services portfolio that leverages the company's transport network for high-quality content and switching platform and is positioning it to be leveraged in ways that expand the market share and put new services into the market.

The Switch is a full-service media solutions provider, which provides advanced video switching and local fiber circuit services, scalable Ethernet and "at-home" remote production, studio and OTT services. Among its high-profile acquisitions was its 2013 purchase of HTN Communications, with its access to sports venues. (Wolf worked for HTN in the late 1970's.) The Switch is today found in every major professional sports venue, including a league-leading 30 Major League Baseball stadiums. The company has network operations centers (NOCs) in New York, Los Angeles and London.

As the nature of sports and broadcasting changes dramatically, so does the impact on services, costs and innovative product development for content delivery.

The implications for the satellite industry are obvious. Television was once satellite's dominant business. But content is finding multiple paths from camera to broadcast center to viewer. The paths include optical fiber, satellite, the public internet – a true hybrid environment - over every device imaginable.

I thought that these changes, in a business he has been central to, would be a good topic for a pre-NAB "back and forth." Follows are excerpts of our conversation:

Lou Zacharilla (LZ:) You have been involved in nearly every major development in the transmission of sophisticated video content since the satellite business got serious about it. You said to me recently that there have been three "waves" that got us to where we are today. Let's start there. What are they and how far into the third wave have we gone?

Rich Wolf: That's a polite way of saying I'm an old guy! Experience does give you an historical perspective through. Experience in the broadcast TV network distribution business is helpful when you are tasked with bringing new innovations and cost models to an industry that is changing by the week.

The story of the first 30 years of this industry, until about 1980, was mainly a story of AT&T's terrestrial net-



Rich Wolf

work, which was the distribution model that took content out to "affiliate" partners. As a regulated provider, pricing was governed by a guaranteed rate of return model. Pricing for distribution of broadcast TV network programming to affiliate partners could increase based only on regulation, not by market forces. Of course, a key date was 1984, when AT&T was deregulated.

The broadcast networks next started to follow cable programmers, who had already developed distribution satellite networks in the USA. Controlling distribution expenses was the primary driver for the conversion to satellite. Negotiations produced something most had never seen: fixed-rate, multi-year deals with satellite providers. Our incredible satellite backbone was built during this wave to reach our affiliate partners. This wave has lasted over four decades (with technology changes coming from the shift

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LZ: *Satellite also ushered in a wave of improved quality, expanded reach and offered a company like ABC the ability to manage their affiliate distribution systems in-house. A satellite contribution system came out of this too, along with Satellite Newsgathering (SNG).*

Wolf: Right. This was as powerful a technology and business shift as there had ever been and it is the basis for our current “wave.” Because we were now dealing with market and technology forces, the emergence of creativity and innovation is seen as central to it all. It has to be because we are in a time when there seem to be few restraints on content creation and distribution.

LZ: *How would you describe the “third wave?”*

Wolf: Without giving a long, boring speech, it is a fully-integrated satellite/terrestrial model. It is clear to us that it is an evolving cloud-based ecosystem. It is almost a cliché to say we are in a multi-channel world, but that is what is pulling this model along, as is the acceleration of software and the coupling of the IP protocol to incredibly deep data analytics. As I was saying earlier, the need to be continuously creative with product, service developments and customer value is key.

LZ: *It is also a time when many content providers and content distributors have stepped down in quality but still have QOS demands, right?*

Wolf: Yes it is. We need to give them more opportunities to access our network and our complete portfolio of products and services with various levels of QOS, at price-points to fit their demands. You give the customer the quality they want for their applications, right? Our goal is to avoid a commoditization trap by being able to deliver great quality (like the Olympics), but also a level of quality that supports start-up events and college sports like St. John’s lacrosse. These niche offerings are being broadcast and accessed on TVs and devices more and more. Our Network serves as a gateway to a stack of products across the entire content ecosystem that we believe can serve all platforms and is an important differentiator in the market.

LZ: *What has The Switch been doing to be creative with its assets and recent acquisitions?*

Wolf: There are two things that we have just finished working on. The first is an effort to put on the market a service which allows access to our fully-managed video services from anywhere on earth; one that also gives a customer control of their content via The Switch and with a flexible pricing regime. “Control” is the important benefit here.


Our new access service is something that Keith is laser-focused on and rightly so.

We are also finding, Lou, that “control” also plays into a subtle, almost unnoticed shift in the industry. That is, the need for workers in the production and programming space to work in ways that accommodates their lifestyle. Unlike, say, 20 years ago, people are seeking a work/life balance. The days of missing every family event are behind us.

Our “Switch At-Home” product is having an unintended consequence: happier, more productive workers at client companies. If you multiply that by the 800 video content producers and distributors we serve, that’s a lot of happy campers! Of course, you can never compromise the quality of the television production experience and we are proud to say that we have had great success in proving that The Switch At-Home production model meets the high-bar of quality that is expected.

LZ: *That is interesting. Access, creating value to the customer and the lifestyle benefit seem to complement each other. The access product seems to leverage your infrastructure to give a big strategic advantage to a broadcast customer. I would think that direct access to your community, including those many sports venues, broadcasters, studios and production houses, is something they cannot get in too many places.*

Wolf: That’s the idea. At NAB people will be hearing about “The Switch Access.” We just made the announcement. It gives customers easy access to our network from anywhere in the world. And yes, once they are connected, a customer has the same access to every other customer who is connected. They also have access to those 150-plus venues that are “Switch-connected.”

We are known for our ability to give our customers the control they crave. So “The Switch Access” also gives them access to our SwitchIT customer control scheduling platform. We won an award for this so they can be sure they are getting a service that their peers use too. 

For more information about The Switch go to:
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'Connectivity 2018' to the '5G World'

by Martin Jarrold



Connectivity 2018: Evolving the "New" New Verticals – Air – Sea – Surface – Rail was held in London's Canary Wharf district on 21st March 2018. This latest GVF program to address the growth of satellite communications verticals encompassing the aeronautical, maritime, land, and rail mobility environments featured four panel-based discussion themes focusing on:

- [1] Space & Ground Segment,
- [2] The Varied Connectivity Ecosystem,
- [3] Mobile Connectivity, the Cloud & IoT, and
- [4] Building User-Vertical Applications – Development & Deployment Environments.

The program opened with **Connectivity: The Market Opportunity**. Presented by Innovate UK, and the product of coordinated research across a range of markets contexts – including Future Cities, 5G Backhaul, Secure

Communications, Polar Communications, and Constellations – by the UK's Satellite Applications Catapult, the examination of the results of the research included forecasts of market yearly revenues by year 2030. The program continued with perspectives presented and then discussed covering a range of themes including:

- How Technology Disruptions are Changing Connectivity Business & Presenting New Market Opportunities
- Merging Satellite & Mobile into Seamless Ecosystems & Unified Value Chains
- Mobile Connectivity & 5G - The Unified Access Platform
- Optimizing a Unified Space & Ground Segment 5G and a Unified Satellite RAN
- Maintaining Backhaul
- The Power of Partnerships in the IoT Ecosystem
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- Bridging the Digital Divide in Latin America
- Bridging the Digital Health Divide

The presentations covering these themes may be viewed and downloaded as PDF files at: www.uk-emp.co.uk/current-events/connectivity-2018/programme/.

Aberdeen in May will be host location for GVF **Oilfield Connectivity 2018: The Next Generation Digital Oilfield** which will feature: Communications

Technology Solutions & Building the Digital Oilfield; Communications Service Solutions & Building the Digital Oilfield; Digital Oilfield Applications: Development & Roll-Out; and, The Greater Connectivity Ecosystem in the Oil & Gas Environment, and readers can track the development of the program and its population at www.uk-emp.co.uk/current-events/oilfield-connectivity-2018/.

After Aberdeen, major innovation comes to the next following program in the GVF's events calendar. **Cellular Backhaul: Smartphones & Tablets - To the Satellite Network & the World**, a regular feature of the GVF-EMP Conference Partnership calendar for the last three years, changes venue, context, and format in 2018. To be held on 14th June and embedded with **KNect365's 5G World | IoT World Europe | Digital CX World | Smart Transportation & Mobility**, this program is the first of the GVF-EMP portfolio to be embedded within another event, to be held at the ExCeL Centre on Royal Victoria Dock, again in London's Dockland district.

My previous column proved much more additional detail of the KNect365 event and GVF-EMP program, but now the Partnership has additionally confirmed the event's change of title to **The (Cellular Backhaul) World is Not Enough: Enabling a Smarter, Brave New Digital World of 5G, IoT & the Satellite Network**. The mission of the program and rests on the following backdrop.

Journey & Destination: 5G is in process of transition

Whilst the 5G standardization process is still ongoing and there are continuing uncertainties, the technology is progressing from having been an unclearly characterized and poorly focused vision of the future of wireless communications towards the delivery

of a plan for actual infrastructure – premised on the current emergence of an active ecosystem with various 5G capabilities being established with a range of roadmaps for trials, testbeds and deployments – that is sufficiently progressed to facilitate first commercial deployments by 2020, and to support (according to the Ericsson Mobility Report) an estimated half a billion 5G subscriptions by the end of 2022.

The future development of the global digital economy is underpinned by the success of 5G connectivity infrastructure, infrastructure within which – as clearly pointed to by the 3GPP, and 5GPPP, and other stakeholder actors – satellite will feature not merely as an “interfacing” technology and service, with a secondary role in the “network”, but an “integrated” technology and service, fully part of an evolving and complex “network of networks”.

It has been recognized by the **Net-World 2020** European Technology Platform that, “Thanks to their inherent characteristics, the satellite component will contribute to augment the 5G service capability and address some of the major challenges in relation to the support of multimedia traffic growth, ubiquitous coverage, machine-to-machine (M2M) communications and critical telecom missions whilst optimizing the value for money to the end-users.” And that, “Satellites can proficiently be part of a hybrid network configuration, consisting in a mix of broadcast infrastructures and broadband infrastructures managed in such a way that it brings, seamlessly and immediately, converged services to all end-users...”.

Additionally, the **3GPP** has specified a series of *Use Cases* where satellite will be essential and integral to 5G networks service offerings, namely:

●**Multimedia Delivery:** Mobile Broadcast; Content Caching; Broadcast

to Home

●**Broadband:** Mobile Broadband to Users & Vehicles; Fixed Broadband to Homes & Enterprises; Ubiquitous Coverage – Remote Area Services; Backhaul Connectivity; Broadband to Moving Platforms – Drones, Aircraft, Ships

●**Machine Type Communication:** Fleet Tracking; Asset Management; Wide Area Sensor Management

●**Critical Communication:** Disaster Management; Air Traffic Management; Reliable Communications

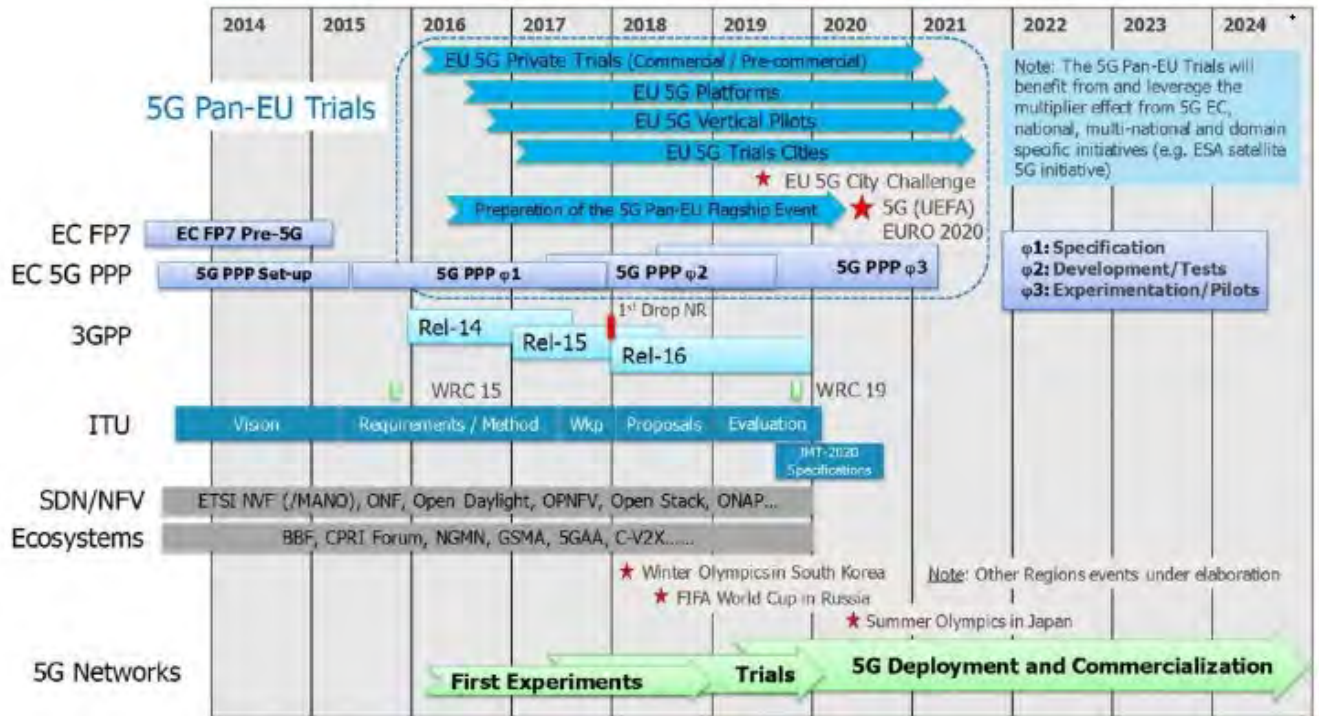
●**Vehicular Communication:** Traffic Updates & Software Upgrades; eCalls & Emergency Notifications

And, the 5GPPP has stated in its *Vision* documentation that, “5G wireless will support a heterogeneous set of integrated air interfaces: from evolutions of current access schemes to brand new technologies. 5G networks will encompass cellular and satellite solutions. Seamless handover between heterogeneous wireless access technologies will be a native feature of 5G, as well as use of simultaneous radio access technologies to increase reliability and availability.”

At no earlier point in the history of mobile communications is the success of the next generation of networking technologies so dependent upon the take-up of network services by industry vertical markets. This is clearly reflected in the qualitative nature of 5G, a quantum leap beyond the person-to-person communications focus of earlier generations of mobile and towards a device-to-device ecosphere characterized as – according to the International Telecommunication Union (ITU) – *Enhanced Mobile Broadband; Ultra-reliable and Low-latency Communications*; and, *Massive Machine Type Communications*.

●**Enhanced Mobile Broadband – eMBB** is aimed at meeting demand for

European Space Agency's (ESA) Satellite 5G Pan-EU Trials Roadmap



increasingly digital lifestyles, focusing on services with high bandwidth requirements, e.g., high definition (HD) videos, virtual reality (VR), augmented reality (AR);

•**Ultra-reliable and Low-latency Communications – (uRLLC)** is aimed at meeting expectations from digital industry, focusing on latency-sensitive services, e.g., assisted and automated driving, remote management; and,

Massive Machine Type Communications – (mMTC) is aimed at meeting demand for a further developed digital society, focusing on services that include high requirements for connection density, e.g., smart cities, smart agriculture.

The nature of 5G is, therefore, about a world of devices, that is, with the **Internet of Things (IoT)**, or rather – in time and with growth and evolution in the market – an Internet of Everything Everywhere (IoEE). Also a quantum leap – a leap, that is, beyond the realms of the maturing, and still expanding, M2M connectivity environment which has an already long-standing dependency on, and synergy

with, satellite communications links – the world of IoT will be built on a connectivity foundation which will comprise a highly integrated functionality of, and between, terrestrial wireless platforms and satellite platforms.

Satellite connectivity has provided the communications foundation for the requirements of several verticals for some several decades, but now it is trending to center stage for applications and users across the economic and social spectrum. It is no longer regarded by the wider sphere of communications solution provisioning as being *stage left*, no longer regarded as a *niche market-only* technology, no longer a solution of last or *remote* resort.

The 5G networked world of IoT, and related applications, will require that every device is connected wherever it happens to be and whilst Wi-Fi, Bluetooth and today's terrestrial wireless network connections are able to support many IoT applications, these technologies are

not, and will never be, ubiquitous and seamless. Thus they are not readily able to service the many areas of low population density within which economic activities – such as in the agriculture, civil engineering, mining, oil & gas and utilities sectors as well as in transport (human and logistical) between urban hubs – and the provision of social programs – such as education and health services – will benefit from IoT. IoT coverage, to be truly global in scope, will require wholesale integration of the terrestrial with the ubiquity and seamlessness that only satellite networks can provide.

For further information on all GVF-EMP programs please regularly visit www.uk-emp.co.uk/current-events, or alternatively contact me at GVF (martin.jarrold@gvf.org).



Martin Jarrold is Director of International Programs of the GVF. He can be reached at martin.jarrold@gvf.org

Baylin Acquires Advantech Wireless Inc.'s Radio Frequency and Microwave Divisions

Baylin Technologies Inc. announced that newly incorporated, wholly-owned subsidiaries of Baylin have acquired the radio frequency, terrestrial microwave and antenna equipment divisions of Advantech Wireless Inc. and certain of its affiliates.

"The addition of Advantech's RF and Microwave divisions is a transformational acquisition for Baylin that will enable us to accelerate growth in our wireless infrastructure segment by broadening our product offering and providing us access to new verticals and geographies" said Randy Dewey, Baylin's President and CEO.

"We are very excited to be joining forces with an industry leader that shares the same commitment toward innovation. Wireless carriers have substantial demand for RF and microwave products and as an approved supplier to key carriers, Baylin will be able to more fully take advantage of Advantech's diverse suite of products" said David Gelerman, Advantech's CEO.

The purchase price for the Acquisition is CDN \$ 49 million (subject to customary adjustments), comprised of the following: CDN \$48 million in cash; and CDN \$1 million in Baylin common shares at a price per share of CDN\$ 3.24, being the volume weighted average price of the Baylin Shares on the Toronto Stock Exchange for the five (5) trading day period immediately preceding the announcement of the sale.

The cash portion of the purchase price for the Acquisition was funded through new indebtedness and Baylin's existing cash resources. Advantech may be entitled to additional compensation of between CDN \$0.75 million and \$3 million in each of 2018 and 2019 conditional on the Business meeting certain EBITDA targets in those years.

Headquartered in Montréal, Québec, Advantech is a leading designer and manufacturer of customizable radio frequency, terrestrial microwave and antenna products for several wireless communications markets. Advantech has

developed significant innovations for over 25 years, including pioneering the use of Gallium Nitride technology to create smaller, lighter, and more powerful products. Advantech has over 160 clients in over 150 countries and offices across the globe.

Baylin would acquire title to the "Advantech" business name, intellectual property, customer contracts and other licenses, rights and contracts.

The principals of Advantech have entered into a consulting agreement with Baylin, pursuant to which they will provide their services to Baylin for a period of two years.

In connection with the acquisition, Baylin has entered into a credit agreement with Crown Capital Partners Inc., pursuant to which Crown will provide a CDN\$ 33 million term loan, with a rate of 9.0% per annum and maturing in 60 months. In addition, a total of 682,500 warrants of Baylin were issued to Crown.

Post the Acquisition, Baylin will have over \$10 million in cash and a net debt/pro-forma LTM EBITDA⁽¹⁾ ratio of

approximately 2.4x.

Raymond James acted as exclusive financial advisor and Aird & Berlis LLP acted as legal counsel to Baylin on the Acquisition. Raymond James also acted as exclusive advisor to Baylin on the debt capital raise.

Baylin is a leading global technology company with over 39 years of experience in designing, producing and supplying innovative antennas. We strive to meet our customers' needs by being their trusted partner from initial design to production with an extensive portfolio of custom engineered solutions and leading edge off-the-shelf antenna products.

The principal owners of Advantech Wireless retained ownership of the VSAT product lines and will be doing business as Advantech Satellite Networks.



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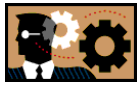


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Products and Services MarketPlace

A guide to key products and services to be showcased at NAB 2018 in Las Vegas, Nevada, USA from April 9-12, 2018.

Advantech Wireless

booth: South Hall Upper # SU 8510

www.advantechwireless.com



Advantech Wireless supports the critical need for High Throughput Satellite communications in a rapidly expanding digital environment. Our proven low-cost and highly reliable system solutions are meeting the ever-increasing need for high-bandwidth communications essential to broadcasters. We integrate award-winning research and development engineering into our designs. The result: custom solutions with lowest overall capital and operating costs, together with an unparalleled commitment to lead the industry in materials, design and reliability. Learn more about our World Leading SATCOM GaN based SSPAs/BUCs, pulse amplifiers for radar systems, frequency converters, Broadcasting Datalink Solution, Fixed & Mobile Antennas and Microwave Radios.

AVL Technologies

Booth: Outdoor Exhibits # OE 115

www.avltech.com



This year at NAB, **AvL Technologies** will only be outdoors at booth #OE115. AvL's booth will feature the latest addition to its flyaway family – a 2.0m ultra-lightweight manually operated axi-symmetric antenna. The antenna features a 14-piece carbon fiber reflector that packs into two checkable transit cases each weighing <100 lbs. This 2.0m ultra lightweight flyaway antenna is the most compact 2.0m antenna on the market and offers performance specifications comparable to competing 2.4m lightweight antennas with small pack-up.

Additionally, on display will be a Family of Integrated Terminals (FIT) - aperture sizes 0.75m, 0.98m & 1.35m.



AvL 2.0m Ultra-Lightweight Flyaway Antenna

This line of user-configurable IATA checkable and carry-on satellite terminals are ultra-compact, ultra-lightweight, ultra-high performance fully integrated systems, can be upgraded from a baseline manual-point configuration to a motorized auto-acquisition platform.

We will also display our 85cm auto-deploy flyaway system. This highly-integrated satellite communication system features a mission-configurable weatherproof electronics enclosure and represents the latest power efficient technology in a lightweight, airline checkable, 2-case solution. The antenna operates with the AvL AAQ auto-acquisition antenna controller module.

C-COM Satellite Systems Inc.

booth: Outdoor Exhibits # OE 11050

www.c-comsat.com



Please visit **C-COM's** outdoor booth OE11050 at NAB 2018 to discuss the latest in COTP and COTM antenna innovation. On display will be the iNetVu[®] FLY-981, iNetVu[®] 980+ Driveaway, and MP-100

ManPack. C-COM offers the world's premier commercial grade Mobile VSAT solution for Oil & Gas Exploration, Disaster Recovery, Government/Military, SNG, Emergency Management, Cellular Backhaul, Mobile Banking, and many other vertical markets.



COMTECH EF Data

booth: South Hall Upper # SU 3308

www.comtechefdata.com



Comtech EF Data's Heights Networking Platform is engineered to elevate your services with unparalleled horsepower, efficiency and intelligence. The platform's features were designed with the service provider and its multiuser environments in mind. It combines efficient waveforms, Heights Dynamic Network Access (H-DNA), header and payload compression engines,

WAN & GTP optimization, multi-tier QoS, proven dynamic bandwidth and power management along with bi-directional ACM capability to provide the highest user throughput, highest availability, and most optimal resource utilization available in the industry.

COMTECH Xicom Technology
booth: South Hall Upper # SU 3308
www.xicomtech.com



Comtech Xicom Technology provides a broad product line of KPAs, TWTAs, SSPAs and BUCs for worldwide satellite uplink covering C-, X-, Ku-, DBS-, Ka-, Q

-band, Tri- and Multiband with power levels from 8 to 3,550 watts and available in rack-mount and antenna-mount ODU packages.

Comtech Xicom Technology offers state-of-the-art Gallium Nitride (GaN) solid-state amplifiers for the fast-growing In-Flight Connectivity market. We have DO-160 in-cabin certified and cabin exterior certified designs. The high



efficiency technology and advanced packaging techniques used enable industry-leading power density products that meet the tough environments of airborne applications.

Xicom SSPAs and Block Upconverters (BUCs) for in-cabin ARINC-type and out-of-skin hermetic configurations support DO-160 requirements from category A1 to F2. Xicom Gallium Nitride (GaN) SSPAs enable high-speed satellite connectivity for both airlines and travelers around the world. For more information go to: <http://www.xicomtech.com/applications-airborne>

Hispasat/Hispamar
booth: South Hall Upper # SU 7825
www.hispasat.com



The **HISPASAT Group** is composed of companies with a foothold in Spain as well as in Latin America, where its Brazilian affiliate **HISPAMAR**, sells its services.

The Group is a leading Spanish- and Portuguese-language content broadcaster and distributor, including over important direct-to-home television (DTH) and high-definition television (HDTV) digital platforms. HISPASAT is one of the

world's largest satellite companies in terms of revenue in its sector, and the main

Newtec
booth: South Hall Upper # SU 1516
www.newtec.eu



Newtec, a specialist in designing, developing and manufacturing equipment and technologies for satellite communications, will be showcasing at the NAB its most advanced VSAT modem to date – the first on the market to support wideband DVB-S2X, the Newtec MDM5000 Satellite Modem. The MDM5000 is capable of receiving forward carriers of up to 140 MHz, and processing over 200 Mbps of throughput. On the return channel, it supports SCPC, TDMA and Newtec's unique Mx-DMA™, up to 75 Mbps.

Norsat International
booth: South Hall Upper # SU 3114
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tional introduces the new **WAYFARER™** fly-away antenna to its offering of commercial products. Available in auto or manual acquire, the reliable **WAYFARER** fly-away antenna delivers strong performance and enables fast setup with tool-free installation. Equipped with a 1.2-meter reflector, the antenna is flexible in a wide range of applications and can be used by broadcasters, telecommunication service providers, news organizations, and in remote environments such as oil and gas, and mining. The **WAYFARER** fly-away antenna offers quality and durability in a lightweight and compact package.



Norsat WAYFARER Flyaway Antenna

RF-Design
@Toner Cable booth, South Hall Upper # SU 9117
www.rf-design-online.de



RF-Design specializes in developing, manufacturing and marketing high quality RF distribution solutions for the international Satellite-, Broadcast- and Broadband communications market. Our product range includes a wide range of **Switch Matrix systems, RF-over**

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distribution infrastructures.

We also have strong capabilities to design and to manufacture custom-made RF distribution solutions for your individual needs. All our products are developed, manufactured, tested and approved in our own facilities in Lorsch, Germany and characterized by high quality, reliability and superior RF performance.

Mr. Oliver Vogel, Director Sales and Marketing will be available for you at the **Toner Cable Booth #SU9117** and would be pleased to meet you there during the show. Please send him an e-mail to o.vogel@rf-design-online.de or call him at **+49 (0) 6251 80 384-22** for arranging a meeting.

RSCC
booth: South Hall Upper # SU 12014
www.rsc.ru

The **Russian Satellite Communications Company (RSCC)** is Russia's satellite communications operator, whose spacecraft ensure global coverage. The RSCC satellites are positioned along the geostationary orbital arc from 14° W up to 145° E, covering the entire territory of Russia, CIS, Europe, Middle East, Africa, Asian-Pacific region, North and South America, and Australia.



Walton De-Ice
booth: Outdoor Exhibits # OE 12024
www.de-ice.com

Walton De-Ice the world's leading designer and manufacturer of satellite earth station antenna (ESA) weather protection solutions, will unveil its all-new Walton **ADC-4000**

Antenna De-icing Control System for the first time in Europe at the IBC. The **Walton ADC-4000** makes the operation of Walton hot-air de-icing systems more accurate and efficient than ever, offering potential savings in management and labor overhead for satel-



lite broadcast and head end facilities.

The **ADC-4000 Antenna De-icing Control System** adds a new method to actively control the heat within an antenna de-icing enclosure thus allowing for improved control of the antenna surface temperature. "Our new **ADC-4000** features now give users control of the actual temperature on their dish," adds Walton.

The system provides rain and snow detection, basic monitoring and control functions and control of heaters and blowers in order to maintain ice-free conditions on an antenna reflector, feed, and sub reflector without assistance from site personnel. The **ADC-4000** uses ambient tempera-



ture monitoring, and senses both within De-Ice enclosure (Plenum) and outside near the reflector's surface. Local units (**DS-18**) on or near the antenna and remote units (**DP-10 Remote Control/Status Unit**) work in unison with temperature probes and other components to provide the most up to date and cost effective Antenna De-ice Control System in the industry. Temperatures are displayed via the remote digital rack mounted monitor (**DP-10**), and the system can communicate with external earth station and broadcast M&C systems via RS-232, 4 wire RS-485, IP through Ethernet or Fiber Optics. The all-new **DS-18** and **DP-10** units are EMI/RFI rated for Defense applications. The **ADC-4000** provides four control functions: Snow Detection, Rain Detection, Heater Operating Point Control, and Main Reflector Temperature Balance Control. The Temperature Balance Control function reads and stores "temperature span" settings in order to ensure that the surface temperature of a main antenna reflector is uniformly distributed, thereby preventing or minimizing reflector distortion losses. Broadcasters can designate "Trigger Temperature" thresholds for auto activating/de-activating antenna heaters, with optional adjustable time delay settings. Existing installations of legacy **ADC-3000** or **ADC-2000** De-Icing Control systems can add Temperature Control features similar to the **ADC-4000's** built-in feature by ordering an easy-to-install **TCS-2** upgrade option.





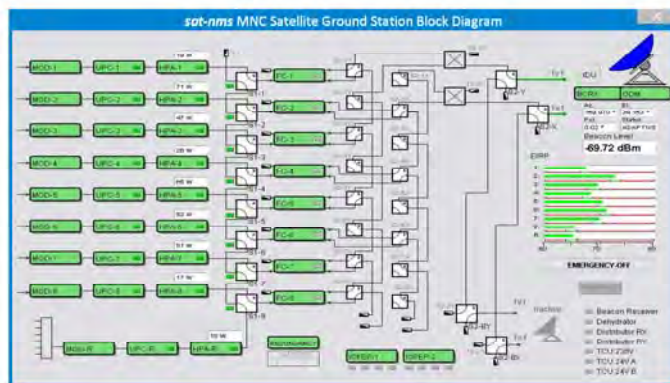
**OPERATORS DO NOT WANT TO SEE BLOCK DIAGRAMS...
... BUT ENGINEERS DO !**

sat-nms MNC Operator View

Antenna
 satellite: Eutelsat W1 10E orbit: -10.0 °W
 azimuth: 179.62 ° elevation: 35.11 ° pol: 4.56 ° H
 az dest: 179.62 ° el dest: 35.11 ° pol dest: 4.6 ° rx pol: H rx band: 11GHz
 SNR: 194

IRD-1
 frequency: 11120.0 MHz mode: QPSK lock video audio: [checked] [checked] [checked] eb/no: 3.00 dB
 rx pol: H rx band: 11GHz requested: 11GHz selected: 11GHz
 symbol rate: 4.340 Msps fec: 1/2 audio-1: STEREO prog: 1011 level: 17 dBm
 data rate: 3.995 Mbps prog: 1 audio-2: STEREO prog: 0 level: 17 dBm
 PRESET

TX-1
 frequency: 14176.830 MHz pol: V tx on: OFF eirp: 54 dBW measured: -99.90 dBW
 symbol rate: 6.11130 Msps fec: QPSK-3/4 standard: DVB-S pilot: OFF aspect: 16.9 modulation: ON
 PRESET RF Off ON AIR [checked] [checked]



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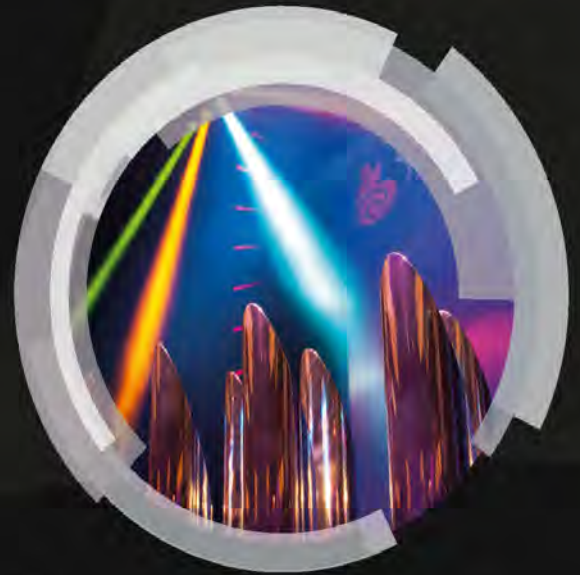
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Thaicom Names Kaewruamvongs CEO

Satellite operator **Thaicom Public Company Limited** announced that its board of directors has appointed **Anant Kaewruamvongs** as new Chief Executive Officer and Director of the Board, effective May 1. Mr. Anant takes over from Mr. Paiboon Panuwattanawong who resigns from his positions as Director, Member of the Executive Committee and Chief Executive Officer, effective from May 1st, 2018.



Kaewruamvongs

"The Thaicom board of directors and I welcome Anant Kaewruamvongs as new CEO. We believe his extensive experience makes him the ideal candidate to lead the company as we navigate through the next stage of growth and diversification of our business. We are highly confident that Mr. Anant is the right person to lead and move Thaicom forward," said Prasert Bunsumpun, Chairman of the Thaicom Board of Directors.

Kaewruamvongs, aged 57, has over 30 years of experience in the IT and telecommunications sectors in Asia, where he has held several executive positions. He was the CEO and managing director of CS Loxinfo, a leading Thai IT solutions provider, from 2013 to 2018. Mr. Anant obtained a Master of Management from SASIN Graduate Institute of Business Administration.

EBU Appoints O'Connor

Vanessa O'Connor has been appointed to the new role of Director of Member Relations and Communications of the **European Broadcasting**

Union (EBU).

She joins the EBU from Eutelsat where, as Corporate Commu-



Vanessa O'Connor

nications Director, she took part in key phases of its development, including restructuring from a European inter-governmental organisation into a private company and the expansion of Eutelsat's global activities across video, telecommunications and broadband markets.

Vanessa managed an international team operating out of Eutelsat's Head Office in Paris where she developed and implemented company-wide communications strategies targeting diverse stakeholders in both commercial and public sector environments.

In her new role, she will be responsible for strengthening the EBU's relations with Members and developing a long-term communications strategy for the EBU, and for public service media in general.

Prior to joining Eutelsat in 1988, Vanessa worked in London as Editor-in-Chief of Digital TV Europe, the first pan-European publication on new media. She graduated in Modern Languages from the University of Oxford and speaks English, French and German. She will take up her new role on June 1st.

D'Alessandro Appointed CEO of Windmill International

Windmill International, Inc. announced the appointment of **Carl D'Alessandro** as their new president and chief executive officer. He will succeed Richard Manganello, who is retiring from Windmill International, Inc. after 28 years of dedicated service as

the founder of the company.

As president and chief executive officer, D'Alessandro will oversee and direct all aspects of the company. He will provide industry-knowledgeable leadership and direction to achieve established business goals while working to strategically grow in new markets and sustain value creation for Windmill's customers and member owners.

MD'Alessandro comes to Windmill from Harris Corporation where he held

several senior leadership roles. During the past 12 months, as Vice President, Global Business Development, D'Alessandro drove sales and



Carl D'Alessandro

business development effectiveness of a >400-person team through enhanced talent management, tools, and processes.

Prior to its divestiture, D'Alessandro was President of Harris' Critical Networks segment where he built a unified leadership team, integrated legacy businesses and processes, and managed a 6,000 person global employee base. He drove excellent performance in a 500+ program portfolio through focused talent management, consistent process discipline, and recurring high-level stakeholder interactions. During his tenure, Critical Networks achieved record award fee performance and secured several contract re-competed and extensions worth US\$ 2 Billion. The segment developed systems and provided managed services supporting air traffic management, civil and national security spacecraft and satellite ground systems, critical IT infrastructure, among others.

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- Also available with optical inputs
- Switchable LNB supply
- Variable gain control, slope equalization...

RF Design Celebrates 20th Anniversary

On February 16, 2018, RF Design, an RF distribution solutions provider for the global satellite, broadcast and broadband communications industry based in Lorsch, Germany celebrated its 20th anniversary with a customer event at its facilities. The company has been growing exponentially over the years and is planning to expand even further due to increased customer demand. It is hiring new personnel and expanding its facilities to accommodate their new product lines.



Pictured here is RF Design co-Founder and current CEO Ralf Mayr demonstrating their latest products. *“Our customer oriented service and our high quality products have made us a reputable partner within this sophisticated industry. We are a team of highly qualified and motivated people so our equipment are at a very high quality standard,”* said Mayr.



Satellite Markets and Research Editor-in-Chief Virgil Labrador (third from right) with key RF Design staff. On his right is Oliver Vogel, Director of Sales and Marketing.



Satellite Backhaul Going Mainstream?

New NSR Report Finds Satellite Capacity Demand Positioned to Skyrocket by 2027 as LTE

Cambridge, MA – April 4, 2018 – NSR’s [Wireless Backhaul via Satellite, 12th Edition](#) report, released today, forecasts annual satellite capacity revenues reaching \$4 billion by 2027, serving over 3 Tbps of demand. Mobile Backhaul captures the greatest opportunities, as satellite usage increases among MNOs and becomes a widespread solution. Lower capacity prices are reviving Trunking, as new demand is emerging from previously un-addressable markets. IP Content Distribution also continued making solid progress with thousands of sites now active in this segment.

“Price degradation is making it

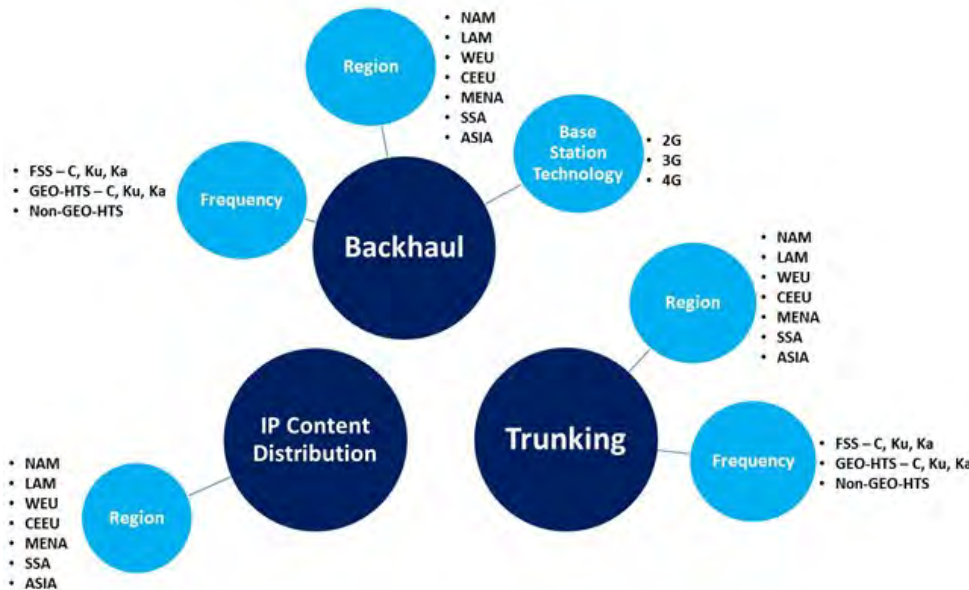
hard for satellite operators to grow revenues. However, we are approaching a trigger point at which price elasticity will help demand to take off. The topology of deployments is changing radically, from serving tens of USO-driven sites to being a mainstream solution with thousands of units per network,” states Lluç Palerm, NSR Senior Analyst and report author. “If MNOs take a pragmatic approach to network deployment, and do the math, they will realize the possibilities of Satellite Backhaul. However, awareness and perceptions are still holding growth back”.

Progress in Ground Segment is vital to departure from the old paradigm, with NSR forecasting cumulative equipment revenues from 2017-27 to surpass \$2.6 billion. Satcom must make the solution easy for MNOs to adopt, and consequently, end-to-end services will proliferate.

After years of hype generation, 5G implementations are

finally becoming real. Beyond extravagant network requirements, the true focus for Satcom must be in finding a way to fuse with ground networks via consolidating SDN/NFV technologies and integrating MNO operation platforms.

Video continues to be the “cash cow” for the satellite industry, but OTT is putting that to task. Satellite is reacting by offering VoD over satellite with some promising initial experiences. While penetrating those video ecosystems will be hard, transition to heavier formats, 5G or the ongoing Media-Telecom convergence open a window of opportunity for satcom.



[Wireless Backhaul via Satellite, 12th Edition](#) is an industry leading

analysis and forecast of 3 key market segments: Mobile Wireless Backhaul, Trunking and the newly added IP Content Distribution. The study assesses the installed base of sites in seven different regional markets, investigates trends impacting market growth, forecasts capacity and equipment revenues, and predicts satellite capacity requirements for provisioning each market vertical. Beyond classic C-, Ku- and Ka-band FSS capacity, NSR also leads the industry in forecasting use of High Throughput Satellites (HTS) segmented by band (C-, Ku- & Ka-bands) for GEO-HTS systems and assesses the impact of Non-GEO HTS constellations in the Backhaul markets.

For additional information on this report, including a full table of contents, list of exhibits and executive summary, please visit www.nsr.com or call NSR at +1-617-674-7743.

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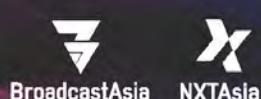
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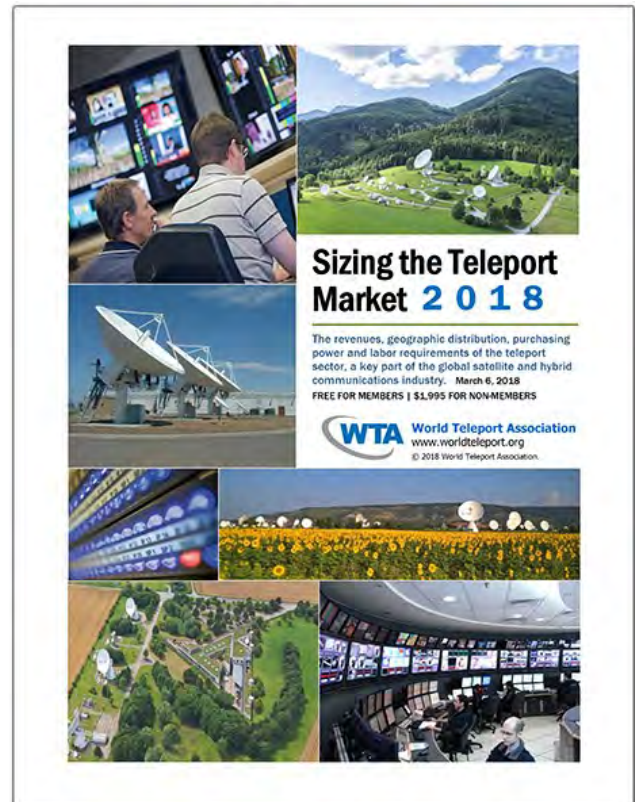
WTA Releases New Report: Sizing the Teleport Market 2018

New York, NY, March 27, 2018—The World Teleport Association (WTA) today released *Sizing the Teleport Market 2018*, a new research report that updates market sizing data last published in 2010. It enables readers to estimate the global and regional market share of a teleport operating company, identify potentially underserved regions for investment, and support due diligence for mergers and acquisitions.

The 2018 study finds that the number of commercial teleports worldwide has decreased 1 percent per year from 2016 to 2018 as the teleport sector consolidated and companies scaled up to gain cost-efficiencies and improve their competitive position. Over the same period, however, total estimated revenues of the sector grew 6% to US\$10.4 billion, as consolidation created fewer, more productive assets. In 2017, an estimated 13,700 people worked in the teleport industry, which operated more than 24,000 antennas.

“Consolidation has not been the whole story,” said WTA executive director and report author Robert Bell. “In a mature technology market, while midsize companies become larger and the largest seek further increases in scale, new players enter the market to exploit new demand created by technology and market change.”

Accessing satellites may be what distinguishes teleports from other communications service providers, but it is only part of their repertoire. Teleports are the channel by which satellite can be integrated into complex networks involving fiber, microwave, wireless and mobile technologies in order to expand their reach beyond the edge of the network, broadcast one-to-many, or feed bandwidth-hungry applications. Increasingly, they are “data centers with dishes,” which are expert at bridging apparently incompatible systems and solving challenging problems in content delivery or end-to-end networking. They know how to simplify the complexities of space-based networks in order to make satellite links just another port on the router. They are among the world's leading experts in adapting Internet Protocol technology for high-latency circuits, “push” applications and other uses never envisioned by the developers of IP. They are emerging as essential components of cloud-based appli-



cations and Internet of Things networks.

WTA members can access the report at no cost by signing in to their accounts on the [WTA Website](http://www.worldteleport.org). Non-members can purchase the report for US\$1,995.

Since 1985, the World Teleport Association (www.worldteleport.org) has focused on improving the business of satellite communications from the ground up. At the core of its membership are the world's most innovative operators of teleports, from independents to multinationals, niche service providers to global carriers. WTA is dedicated to advocating for the interests of teleport operators in the global telecommunications market and promoting excellence in teleport business practice, technology and operations.

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Key industry trends and opportunities

Satellite Transponders Global Market Outlook

Dublin, Ireland, March 22, 2018— According to a new research report from Research and Markets, the Global Satellite Transponder Market accounted for US\$ 15.35 billion in 2017 and is expected to reach US\$ 28.65 billion by 2026 growing at a CAGR of 7.1% during the forecast period.

Factors such as growth in KU-band & Ka-band services, technology upgrades in VSAT system and increasing demand for high throughput satellite (HTS) are propelling the market growth. However, factors such as growth of telecommunication network, requirement of huge capital investment and Satellite launch failures & operational anomalies are hampering the market.

A satellite transponder is a group of radio transmitter and radio receiver installed on a communications

(radio, TV, data) satellite. When a ground stations transmits a radio signal the satellite, the transponder receives that signal, amplifies it, changes the

frequency (usually to a lower frequency to avoid feedback with the receiving antenna) and transmits the signal (with its radio, TV or data content) as a satellite beam the ground, where it is received by different ground stations

antenna that send the content on the user.

C-Band is the unique frequency allocation for communications satellites. The lower frequencies used by C-Band perform better under adverse weather conditions than the Ku-band or Ka-band frequencies. The growth is attributed to increasing usage of transponders of working on these bandwidths in weather forecasting, broadcasting, mapping and many more applications. C-band satellite service is better suited for subscribers with large bandwidth requirements.

For more information please go to: www.researchandmarkets.com/publication/mwfu18z/4480590



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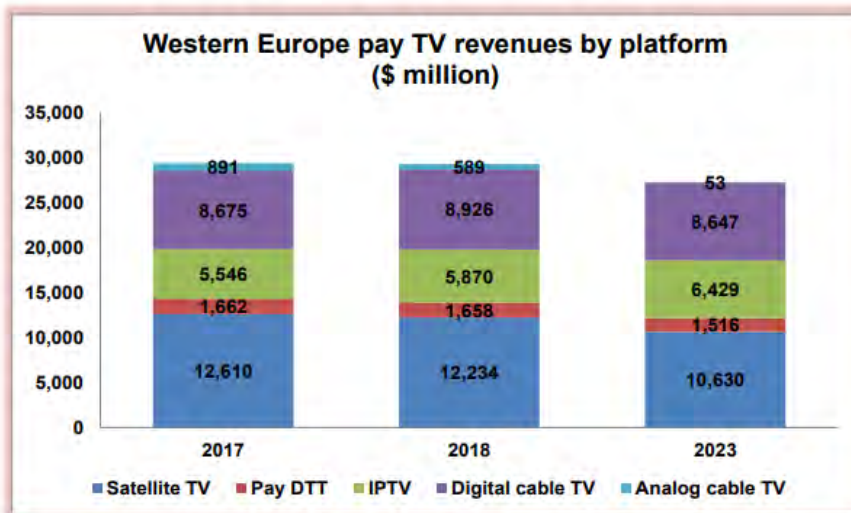
AC Powered Antenna-Mount SSPAs		
X-Band	Power Output (Watts)	Weight (Lbs)
XTSLIN-100X	100 Linear	32
XTSLIN-200X	200 Linear	49
Ku-Band		
XTSLIN-100K	100 Linear	32
XTSLIN-200K	200 Linear	49
DC Powered Antenna-Mount SSPAs with BUCs		
X-Band	Power Output (Watts)	Weight (Lbs)
XTSLIN-20X-B1	20 Linear	5.3
XTSLIN-50X-B1	50 Linear	10

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Vital Statistics



Source: Digital TV Research Ltd

Western European pay TV will gain subscribers between 2017 and 2023. Although this only represents a 2.6% increase, the Western Europe Pay TV Forecasts report estimates nearly 3 million more subs to take the total to 106 million. According to Digital TV Research.

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