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Industry Trends, News Analysis, Market Intelligence and Opportunities

The Evolving Satellite Ecosystem

by Omkar Nikam

The satcom industry landscape is changing dramatically. An industry that used to be dominated by satellite operators is now having to deal with a very complex ecosystem.

This was made evident in the recent CABSAT 2019 show, held in Dubai in March. The exhibition and conference, brought together a wide variety of players from the satellite communications industry, namely satellite operators, service providers, broadcasters, and others. As one of the world's premier satellite broadcast conferences, CABSAT has historically been just that—a predominantly satellite broadcast conference. However, in a sign of the times, recent years—and this year most notably—have seen a transition at CABSAT, from a primarily satellite broadcast conference to a satellite conference that has much emphasis on broadcast, but also perhaps equal emphasis on a surprisingly wide variety of other verticals. This tangential focus on broadcast was most apparently during the Global VSAT Forum (GVF) Satellite Hub Summit, which touched on a number of important satellite topics indirectly related to video. Likewise, this perpetually broadening of CABSAT's scope is an indication of the broadening potential of satcom, but also the slow but steady erosion of the video golden goose.

One significant takeaway from the whole of CABSAT, and more specifically the GVF Summit, was that the satcom industry landscape continues to change significantly. An industry that used to be dominated by satellite operators selling megahertz for video broadcast is becoming one that is beholden to our world where everything—our food, TV

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EDITORIAL

The Changing Industry Ecosystem

Our cover story this month tackles the changing industry ecosystem in which the satellite communication industry is facing. Much of the information from the story is from the proceedings of the Satellite Industry Hub Summit at CABSAT in Dubai last March, but a lot of the same themes have been re-echoed in last month's NAB. You can see the change dramatically as you enter the South Hall Upper, which used to be dominated by satellite companies--you'll find Facebook, Google and Amazon with large booths at the prime spots. In my interviews with satellite executives, however, it's clear that the major satellite companies are adjusting quite well to the new environment. Instead of competing with IP and OTT, which was previously seen as a threat, satellite companies are themselves providing these new services. It's not an "either/or" proposition any more, but how can we provide the best solution. Thus, making satellite an integral part of the new ecosystem.

View video interviews with key executives from the NAB 2019 at:

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Virgil Labrador

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Editor-in-Chief

Satellite Executive BRIEFING
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The Evolving Satellite Ecosystem from page 1

content, love lives, etc.—can be accessed via the universal language of zeroes and ones, via megabytes. In our increasingly-connected world, things like linear video broadcast will cease to be competitive in most instances, meaning that satellite operators must find a way to sell more megabits—a lot more megabits—to spearhead growth.

One such way that many analysts propose is through increasing satellite penetration for cellular backhaul networks. During the event, Andrew Faiola,Head of Mobility, Newtec, gave a glance at the 5G technology and its potential to reduce OPEX along with a data transfer of 88.39 Gbps in less than ten years as compared to 7.89 Gbps in 2016. This transition of the satcom industry into 5G technology will be a solid move to offer reliable connectivity solutions, but the ground segment capabilities are something that will watch the back of satcom industry in the coming years. With an increasing emphasis on Mbps, the satellite value chain will need to continuously develop more spectrally efficient equipment, allowing end users to get more Mbps, more cheaply, and more conveniently.

"...the satcom industry landscape continues to change significantly. An industry that used to be dominated by satellite operators selling megahertz for video broadcast is becoming one that is beholden to our world where everything—our food, TV content, love lives, etc.—can be accessed via the universal language of zeroes and ones, via megabytes...."

The innovation in the ground segment with low-cost investment will be one of the essential and decisive factors for the satcom industry, one which will enable the growth of satcom ser-

"...Ultimately, As connectivity everywhere becomes an expectation, and as the minimum viable bandwidth continues to increase, satellite will find a plethora of opportunities in filling in the bandwidth cracks of an ever more universally connected world..."

vices in aviation, maritime, etc. Isotropic Systems, a startup developing high-throughput terminals, is bringing new hope for the satcom industry. The company has already signed contracts with SES, OneWeb and Inmarsat to offer ground terminal capabilities with a minimum cost between US$300-400. Isotropic notes that its ground terminals will be released at the latest by 2022, with this and other advancements expected to open many new markets for satcom. With that being said, while new ground equipment will be a major enabler of market expansion, another omnipresent theme—that of lower capacity prices—was also present at CABSAT, and also presents interesting questions for the industry's future.

Declining Satellite Capacity Prices: Challenge or Opportunity?

The transformation in the satellite industry is being driven above all by declining prices, and significant increases in total amounts of capacity. This continued to be a topic throughout the week of CABSAT, and indeed, was highlighted by an industry report released the week of the conference outlining double-digit price declines. For satellite operators, major questions include how to move much more capacity without incurring significant cost, and how to maintain margin and value-add when selling wholesale. Ultimately, As connectivity everywhere becomes an expectation, and as the minimum viable bandwidth continues to increase, satellite will find a plethora of opportunities in filling in the bandwidth cracks of an ever more universally connected world. This will require new technologies such as steerable flat-panel antennas, satellite-friendly backhaul towers, and more efficient modems and other ground equipment. Importantly, all of these are being developed now. At lower price points, these applications will see huge opportunities for demand increases.

Traditional linear video broadcast offers relatively limited apparent demand elasticity for satellite operators—video broadcast companies like Sky UK or MultiChoice are unlikely to decide to broadcast many, many more channels if the price of satellite capacity comes down significantly. But, satellite vide in the form of OTT or related applications can present far greater opportunities for demand elasticity. During CABSAT week, Eutelsat launched Cirrus, a hybrid platform providing satellite and Over-The-Top (OTT) content distribution, with the company having secured its first customer, Mondo Globo, a Canadian video distributor to offer services via Eutelsat Cirrus. Through lower capacity pricing (brought on by Eutelsat's significant investment into HTS in EMEA to launch in the coming years), Eutelsat hopes to drive elastic demand growth, and subsequently grow the market.

The declining satellite capacity prices in-general can be viewed as a challenge for the operators but an opportunity for the service providers, and likewise an opportunity to generally expand the market for satellite services. Simultaneously, a close eye on the technology transformation and a hunt for integrating satellite capabilities in different verticals will surely create ample opportunities for the satellite operators.

Aligning Policy and Technology

A major issue that remains not sufficiently discussed is the issue of spectrum allocation, coordination, and more generally, regulatory alignment. During her speech at CABSAT, Ms. Xiuqi "Ellie" Wang from the International Telecommunications Union (ITU), discussed the legal aspects of the satellite spectrum and the need for utilizing spectrum effectively. With the oncoming NGSO constellations expected to utilize unprecedented amount of spectrum, there will be a hugely increased need for coordination of spectrum, not to mention the physical satellites themselves.

As clear as any of an indicator of the value of spectrum, the in-

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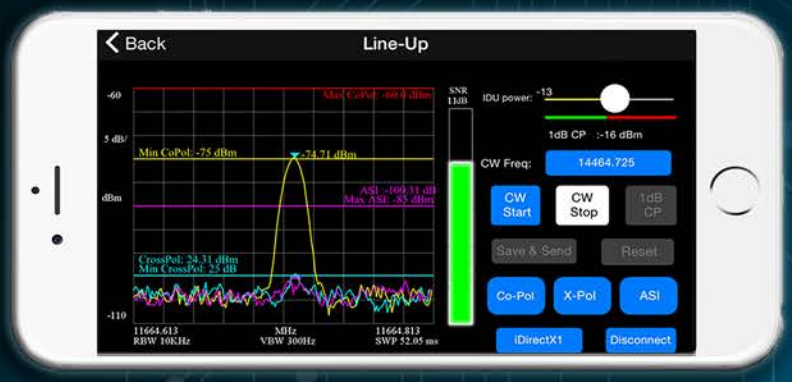

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dustry has recently observed the tug of war situation for C-band, although Ku- and Ka-bands have been recently more popular among the satcom players targeting LEO and MEO satellite business. Moving forward, it is clear that more exotic frequency bands such as Q-band will likely need to be utilized in order to accommodate even a fraction of the proposed constellations.

The utilization of the spectrum depends partly on supply (i.e. how many constellations are fighting over finite spectrum) and also demand (i.e. on the customer demand for a specific sets of applications). The World Radiocommunication Conference (WRC) in October 2019, in Egypt, will provide a broader picture on the radio spectrum usage for satellite services, with this being a hot topic to follow over the coming 6-12 months and beyond.

Key Takeaways from the GVF Satellite Hub Summit

The key takeaway from CABSAT, and from the GVF Satellite Summit 2019, is that the satellite operator value chain is evolving more quickly than ever, and that verticals such as linear video broadcast, while still relevant today, are not going to be the key to future growth. A changing value chain and changing consumer preferences, lower pricing, and policy issues will combine to redefine the satcom industry moving forward. This will require a lot more downstream activity, more resources devoted to helping satellite bridge the gaps in the global communications network, and more enabling non-industry professionals to help spread the benefit of satellite.

The Satellite Hub Summit at CABSAT featured a panel on "Big Ticket Issues on the Industry Forward Agenda" co-moderated by Virgil Labrador, Editor-in-Chief of Satellite Markets and Research and Riaz Lamak of the GVF. Panelists include (seated from left): Jack Buechler, Vice President, Business & Product Development, Talia; Nick Roullier, Vice President, Customer Enablement, SES Networks; Alexander Mueller-Gastell, CEO-ND SATCOM; Yasir Hassan, Director, Transmission Operations, ArabSat; Martin Coleman, Executive Director, Satcoms Innovation Group and Torsten Kriening, Chief **Commercial Officer, PTScientists GmbH.**

During the concluding part of the GVF Satellite Hub Summit, Riaz Lamak from the GVF announced Indo-Pacific Endeavour 2019 program, where GVF will be offering satcom training to 20+ military units from around the world. The Indo-Pacific Endeavour program is proof of international cooperation in defense satcom. It is also a valuable program to educate and exchange defense satcom capabilities among different nations, and is one such initiative.

Moving forward, satellite operators should should explore, create and implement their satcom capabilities in this multi-disciplinary ecosystem. While the attitude of adapting to customer needs will help satcom industry progress in the coming years and the change in policy implications with the evolving technology will pave the more flexible path for the satellite businesses.

Omkar Nikam is a correspondent of the Satellite Executive Briefing magazine based in Strasbourg, France. He also works as a Market Analyst with Orbital Gateway Consulting (OGC) Before joining OGC, he completed his Master in Space Studies from the International Space University and had over three years of experience in the Indian media and marketing industry. Apart from the academic and professional engagement in space activities, Omkar actively volunteers for the Space Generation Advisory Council (SGAC). He can be reached at: omkar.nikam@community.isunet.edu

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FEATURE

A Beautiful Setting for a State of the Art Teleport

by Virgil Labrador

Having worked at a teleport at the beginning of my career, I never miss an opportunity to visit one. Teleports remind me of the very exciting times I spent working in one. There is something about the mix of high technology and innovative, geeky engineers that never cease to amaze me, so when I was invited to visit a teleport in England I didn't hesitate to accept. But nothing prepared me for what I was about to see...

The drive from the train station of Rugby in the Midlands region of England, near the historic town of Coventry and Shakespeare's birthplace of Stratford-upon-Avon, took me through narrow rural roads with pastoral scenes of the beautiful English countryside. One would never think that a teleport would be in the vicinity but, just as we pass a quaint bed and breakfast, we enter the gates of what seems to be a beautifully landscaped garden with ponds where ducks and other wildlife roam freely. "Have we arrived in the teleport?" I asked my host. "Yes," he replied. But on the outset this looks more like an aristocratic manor than a teleport. But a teleport it was. And a very sophisticated one at that!

I arrived in Satellite Mediaport Services's (SMS) Lawford Heath Teleport-the brainchild of successful satellite entrepreneur Zvi Golod. A University of California Berkeley-trained engineer, Golod has over 35 years' experience in the satellite industry where he founded such pioneering companies as Satlink and Skyvision, among others. Satlink was a provider of content distribution, management and playout services based in Israel. The company got its big break during the Iraq war in 1991, when Satlink was one of the few companies able to distribute signals from Iraq to various international news agencies. It then expanded into various content distribution services and operated a teleport. Skyvision was one of the first providers of internet via satellite services. Both companies were doing very brisk business in the 90s and 2000s, when an unfortunate hiking accident in 2007 rendered Golod out of commission for nearly a year. He then decided to sell his stake in the two companies, one to his partners and the other to an investment group. Golod could have retired then or moved on to other business areas but the satellite business has been his lifelong interest and he sought out his next venture.

He found in 2005 a small teleport formerly operated by MCI in Rugby. Golod saw huge potential in the beautifully landscaped facility built on top of a former Royal Air Force nuclear bunker. Only about an hour's train ride from London, the teleport is strategically located where they can serve over 100 satellites from 60 degrees west to 60 degrees east. With exclusive, fully redundant network connectivity to multiple Points of Presence (PoP) in London and across the globe, the teleport can provide a variety of services all over Europe, the Middle East, Africa and even South America.

After selling his companies in 2008, Golod focused on developing the small teleport he just bought and rebranded it as Sat-

ellite Mediaport Services (SMS). Over the next few years SMS invested over 10 million dollars in upgrading the facility and installing state of the art equipment so that the teleport could support the new IP and other services required by their growing clientele.

Teleport Infrastructure

SMS has over forty antennas of various sizes including a 13-meter Ka-Band antenna being used as a Gateway for Arabsat's Ka-Band broadband services. There is room for expansion for additional antennas as SMS has purchased additional land adjacent to the teleport.

The teleport has fully redundant RF infrastructure for each antenna, backup uninterrupted power supply (UPS) and diesel generators, hot-swap-able components and automatic fail-over and load-balancing. Like most teleports, it is staffed 24/7, 365 days a year, working with the latest RF and monitoring equipment.

"What's unique about our teleport is the business model that we have adopted. We do not cater to end-users, we do not compete with our clients. We serve satellite operators and service providers who know their business well. We support them and help them grow and take away all the headaches that comes with infrastructure from them. That way they can focus on selling their services while we take responsibility for all technical operations," said Golod. "We operate very efficiently and provide a cost-effective service that no one in the industry can compete with us and we pass on these savings to our clients," he added.

The brainchild of satellite entrepreneur Zvi Golod, SMS teleport's state of the art equipment is interspersed with classical works of art and some whimsical touches such as an English phone booth with a Superman costume in it.

Services

As a teleport, SMS provides traditional services that include:

- Transmission and reception;
- RF uplink and downlink;
- IP connectivity and backhaul;
- Conception, installation and operation of VSAT networks
- One-way or two-way Internet backbone connectivity via satellite;
- Network / Hub Hosting;
- Hosting / Maintenance of Customer Furnished Equipment (CFE)
- Satellite capacity;
- Worldwide lease line connections;
- DVBS2 + SCPC services;
- Data Storage and backup;

and

- Collocation.

Among the services that the teleport is providing its clients include the collocation of a VSAT hub serving 150 bank branches throughout Africa. It is also providing maritime communication services that serve more than 700 ships at sea.

SMS is also providing SCPC and VSAT network management for large Internet Service Providers (ISPs)s in African countries such as Angola, Namibia and Nigeria.

An inveterate engineer who spends most of his time trying to solve problems and coming up with innovative solutions for his clients, Golod is always thinking ahead in terms of new services that his teleport can provide. He's



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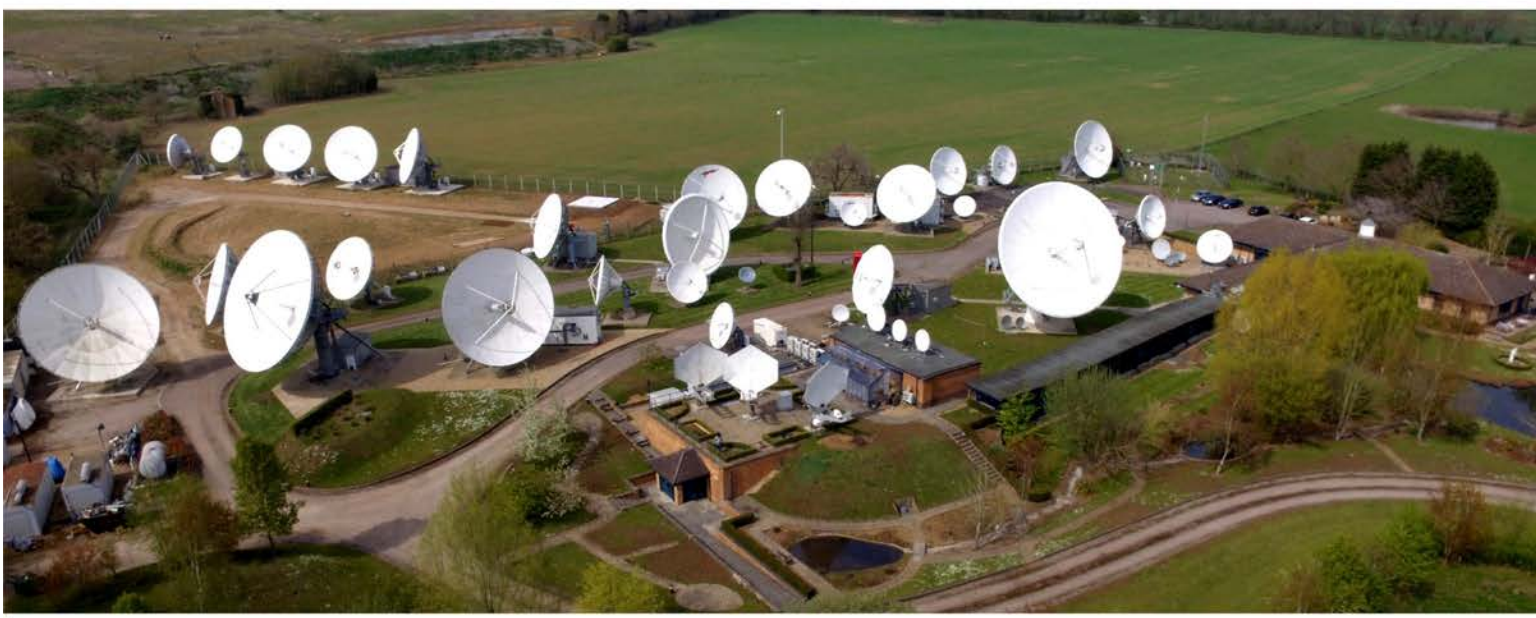

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Only about an hour's train ride from London, the teleport is strategically located where they can serve over 100 satellites from 60 degrees west to 60 degrees East. With exclusive, fully redundant network connectivity to multiple Points of Presence in London and across the globe, the teleport can provide a variety of services all over Europe, the Middle East, Africa and even South America.

very bullish about the new MEO and LEO constellations and says their teleport is ready for the new services that they will require. "The future is here, and we are ready to face the challenges required by these new services," said Golod.

According to Golod:"having state of the art infrastructure is important in the teleport business but it's the people that make the difference. We have been fortunate to have excellent engineering and support staff who are among the best in their field." SMS also takes care of its employees with weekly social activities at the teleport. With a park-like setting, the teleport is ideal for many outdoor social activities. The company also provides a profit sharing plan where each employee has shares in the company.

Ready for the Future

Golod and his team has managed to build yet another successful teleport that he bought 12 years ago. He has considerably expanded the capabilities of the teleport by investing in new equipment and facilities and buying up additional land. He's turned SMS into a successful enterprise and made it beautiful, too. When I asked him what's his secret in starting and developing successful businesses, he said that he always tries to be one step ahead and see what lies beyond. While many teleports are struggling and some even not surviving the challenging market environment, it's heartening to know that that there are still teleports that continue thrive in these changing times. The key to success seems to be to stay on top of technology, take care of your employees listen to your customers, provide a cost-effective and competitive product and it does not hurt to make it beautiful and aesthetically appealing as well.

View a video tour of SMS's teleport at:

www.satellitemarkets.com/sms-teleport

Virgil Labrador is the Editor-in-Chief of Los Angeles, California-based Satellite Markets and Research which publishes a web portal on the satellite industry www.satellitemarkets.com, the monthly Satellite Executive Briefing magazine and occasional industry reports called MarketBriefs. Virgil is one of the few trade journalists who has a proven track record working in the commercial satellite industry. He worked as a senior executive for a teleport in Singapore, the Asia Broadcast Center, then-owned by the US broadcasting company CBS. He has co-authored two books on the history of satellite communications and satellite technology. He holds a Master's in Communications Management from the University of Southern California (USC). He can be reached at virgil@satellitemarkets.com

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How Satellite Operators Close the Gap

The world is full of sharp disparities between the privileged and those struggling for access: access to good work, to knowledge, to the means to pursue their calling and preserve their communities. Around the world, dedicated people are using technology to close that gap. Technology that is literally out of this world.

Building a Better Future in Africa

In the United Kingdom, they are building a better future for students in Africa. The University of Leeds and Goonhilly Earth Station in Cornwall are working with the South African Radio Astronomy Observatory to teach high-tech skills to African youth. The project, called Development in Africa with Radio Astronomy, is also supported by the UK Space Agency, Oxford and other British universities. It began as a research project – rebuilding an old satellite antenna as a radio telescope. Today, it is an award-winning international collaboration between science and industry.

DARA, a Newton Fund project led by Professor Melvin Hoare of the University of Leeds with Goonhilly as an industry partner, uses radio astronomy to develop high-tech and business skills in eight sub-Saharan African countries.

Since its founding, the DARA project has trained 140 students in the technologies of radio astronomy and has another 120 in the queue. The goal is to give students skills, confidence and a passion they can bring home – to finish their own astronomy projects, to get good jobs, to launch businesses and inspire their communities to reach for the stars.

Digital Connectivity in the Developing World

In the developed world, we take digital connectivity for granted. For more than four billion people around the world, online access remains a luxury far beyond reach. That causes people to leave places like East Timor and the Solomon Islands in search of a better future, while the place they call home slips further and further behind.

But across Asia, things are looking up. Way up. For the first time, affordable broadband is coming to the Pacific and the rural stretches of Asia, thanks

to satellite. A company called Kacific is providing high-speed internet and easy-to-use ground equipment to local service providers across the region. These small businesses become stakeholders in their islands' future and help stop brain drain. Kacific began service using existing satellite capacity in the region. When it launches its new satellite next year, the digital gap will begin to close in earnest.

Disaster Relief via Satellite

And when natural disaster strikes, satellites get people out of harm's way. When a volcano erupted in the Pacific nation of Vanatau, it was coordination over satellite that made it possible to evacuate 10,000 people from the disaster zone.

That kind of coordination does not happen by accident. In 2018, two industry associations and the world's top satellite operators reached agreement with the United Nations World Food Programme to help the world respond faster to disaster. The Crisis Connectivity Charter commits the partners to pre-position satellite equipment in countries at high risk for disaster, train users and give priority for satellite access to humanitarian agencies. It is an agreement to share the burden of disaster – and the savings in suffering, in human life, in economic loss will be almost too great to count.

These are companies and organizations dedicated to close the gap running down the center of the world. They are winners of the 2018 Better Satellite World Awards from Space & Satellite Professionals International, and because of them, things are looking up. Way up.

This article is produced for the Satellite Executive Briefing by the Space & Satellite Professionals International (SSPI).

See more stories and videos of satellite making a better world at:

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OPINION

How Teleport Operators Grow the Satellite Pie

by Robert Bell

The teleport industry got its start in the days when monopoly telephone companies ruled and, in the US, COMSAT was the sole gatekeeper for access to domestic and international satellites. Then the Reagan Administration's Open Skies policy ended COMSAT's lock on satellite access, and entrepreneurs jumped on the new opportunity.

In the 19 years since then, the industry has changed in remarkable ways. The industries where early entrepreneurs pioneered are still important to the teleport industry, but its current generation of leaders is preparing for a much broader range of opportunities. Teleports originate and distribute online video and connect with ships, oil rigs, trucks, trains and aircraft. They help deliver consumer broadband and push the Internet of Things beyond the edges of the terrestrial network. They are integrating cloud services into their solutions and providing gateway services for the growing number of high-throughput GEO, MEO and LEO satellite networks.

Pulse of an Industry

The World Teleport Association recently published a market-sizing study of the global teleport industry. It updated research published last year provide estimates of the number of commercial teleports in operation, their revenues, satellite capacity usage, capital expenditures and headcount. Using this data, decision-makers can estimate the global and regional market share for a teleport operating company, conduct due diligence for mergers and acquisitions, and identify potentially underserved regions for investment and market development.

The teleport sector has seen consolidation as companies build scale to gain cost efficiencies and improve their competitive position. This has produced an industry that is smaller in the number of facilities it operates but larger in total revenues. The number of commercial teleports worldwide has decreased by 3% from 2016 to 2018, for an annual average of 1%. In 2010, WTA reported a worldwide commercial total of 996, representing an average 4% annual decline in facilities from 2010 to 2016. In that context, the 2016-2018 period saw a slower pace of consolidation in physical facilities

Over the same period, however, estimated total revenues of the teleport sector grew 5% from US$10.2 billion in 2016 to $10.7 billion in 2018. On that basis, average revenue per teleport rose 8% from $14.4 million in 2016 to $15.7 million in 2018. For the sector as a whole, consolidation did its job of creating fewer, more productive assets.

Consolidation has not been the whole story. In a mature technology market, midsize companies become larger and the largest seek further increases in scale. At the same time, however, new players enter the market to exploit new demand created by technology and market change. The teleport itself undergoes radical change: packing far more services into fewer antennas, virtualizing operations into software that once required massive hardware investments, and substituting terrestrial networks for satellite distribution where they can.

Regional Overview

Europe and North America are home to the largest number of commercial teleports, with the geographically larger Asia-Pacific region coming in third. The number of teleports in the top three regional markets declined from 2016 to 2018, howev-

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er, while Latin America and the Middle East/Africa logged corresponding increases.

Changes in regional revenues were also in single digits. North American teleport revenues grew 6.6% over the period, while Asia-Pacific revenues grew 4.5% and European revenues grew 3.9%. Latin America grew 3.0% while Middle East/Africa achieved a nominal 0.8% growth even as the number of facilities increased.

CAPEX and Capacity Spending

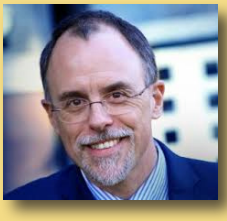
Capital expenditures varied among the regions in proportion to the number of facilities. Europe and North America are the two biggest markets for capital equipment purchases, with Asia-Pacific a distant third.

On a global basis in 2017, the teleport industry purchased 222,400 MHz of satellite capacity, with the spending in proportion to teleport counts in the regions. Capacity usage rose an average of 7% from 2016 to 2018, as detailed below.

The global teleport industry spent $4.9 billion on capacity in 2016, rising to an estimate $5.3bn in 2018. Spending on capacity increased during the period across all regions as teleport operators continued to make satellite a vital part of their network operations. Average spending on capacity grew 6.90% from 2016 to 2018.

Download the Report

For the complete report including global and regional breakdowns of teleports, revenues, capex, headcounts and antenna counts, go to https://www.worldteleport.org/store/ViewProduct.aspx?id=13793334.



Robert Bell is Executive Director of the World Teleport Association, which represents the world's most innovative teleport operators, carriers and technology providers in 46 nations. He can be reached at rbell@worldteleport.org.

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- Perfect for Uplink & Downlink Operations
- Customizable up to 4 Optical Links
- Variable Gain Control & RF Power Monitoring
- Extended L-Band & 10MHz Reference
- Switchable LNB-Supply
- Local and Remote Configuration & Monitoring

NEW

„HQ series“ Line Amplifiers

- Single, Quad and 1:1 Redundant Amplifiers
- Units with Internal Splitters (1:8, 1:16 to 1:32)
- Variable gain Control to max. 40dB
- Slope Equalization
- RF Power Monitoring & Threshold Alarming
- Front-Panel Monitoring Ports
- Switchable LNB-Supply
- Local and Remote Configuration & Monitoring

- **Unique - Innovative - Clever Switch Matrix systems**
- **RF-over-Fiber Solutions for Indoor & Outdoor Applications**
- **RF Line-Amplifiers (Single, Dual, Quad, 1:1 Redundant)**
- **RF Switches & Redundancy Switches**
- **Standard and Professional Splitters & Combiners**
- **Stand-Alone & Modular LNB-Supply/Control systems**
- **Custom-Made Products and Solutions**
- **Perfectly Suited for Applications in Teleports, Satellite Earth Stations, Broadcast- and Broadband Facilities...**

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Oilfield Connectivity and Cellular Backhaul

by Martin Jarrold

The satellite industry calendar for May and June 2019 will see two key events from the GVF-EMP Conference Partnership portfolio taken firstly to Aberdeen in Scotland and then to London.

Aberdeen, the principal hub of Europe's offshore oil industry, will host Oilfield Connectivity 2019: The Next Generation Digital Oilfield on 15th May; and, London's Docklands area ExCeL Center will host Cellular Backhaul 2019: Satellite and the 5G Journey as a feature of the KNect365 5G World exhibition (in association with Internet of Things World Europe/Tech XLR8 and Smart Transportation & Mobility) on 13th June 2019.

The Partnership has just recently announced the final line-up of speakers for the first of these programs which will examine latest developments in the communications technologies, services and applications that are mission critical for the upstream exploration and production connectivity ecosystem.

Oilfield Connectivity 2019 – which is supported by Comtech EF Data, Hughes, Newtec, iDirect, C-COM Satellite Systems, Integrasys, and Marlink – will comprise a series of presentation and panel discussion sessions featuring speakers from oil companies and academia, together with satellite technology solutions operators and vendors, and service providers. As at 1st May the program for Oilfield Connectivity 2019 is as follows:

0900-0915 Opening Remarks: Martin Jarrold, Vice President, International Program Development, GVF

0915-0945 End User Perspective: Video Streaming and Increasing Needs to Have Connectivity for Various Devices in Explosion Rated Areas: Nick Dawson, Drilling IT Program Manager, British Petroleum

0945-1115 Panel Session 1 Communications Technology Solutions & Building the Digital Oilfield

- Remote Oilfield Deployment of Robust Auto-Deploy Antenna Technology: Drew Klein, Vice President Sales and Marketing, C-COM Satellite Systems
- Maximizing Growth Opportunities via HTS Satellites – GEO and MEO: Simon Gatty Saunt, Vice President Sales EMEA Fixed-Data, SES Networks
- The M2M to IoT Journey... Closing the Loop: Robert Irvine, Global Account Manager Energy, SpeedCast
- Bandwidth Optimization… Beyond SCPC: Jean-Michel Rouylou, Head of Enterprise Market, Newtec

1145-1315 Panel Session 2

SKYWAN TECHNOLOGY

The One Mastermind of Satcom Networks

SKYWAN Technology is highly sought after for its live communication applications and real-time enhancements, where vehicles "on the move" provide transmissions for wide-ranging sectors from broadcast media to defence.

- Unique hybrid modem allowing for real-time transmission with high throughput
- Quick deployable hubless infrastructure and network architecture
- Known for its high level of security, **SKYWAN Technology** provides reliable communication with dynamic and efficient use of satellite capacity

SKYWAN Technology also serves a role in disaster relief – where every second counts – with voice and data transmission in tactical LTE-to-LTE cell communication.

ND SatCom's SKYWAN modem has been selected as one of the final nominees for the ViaSatellite Technology of the Year award, which will be announced live during the SATELLITE 2019 show.

Come and experience SKYWAN at the ND SatCom Booth # 118 at SATELLITE 2019.

For detailed information use the QR code or visit our website:

www.ndsatcom.com

ND SATCOM

Communications Service Solutions & Building the Digital Oilfield

- Unmanned Deployment Solution Innovations: Sebastien Couvet, EMEA Sales Manager, Integrasys
- Hybrid Satellite Network Solutions Taking Cloud Services and Applications Performance to the Next Level: Mark Bennett, Sales Director, Marlink
- HTS and the Digital Oilfield:- Mike Manson, Sales Manager Oil and Gas, Telenor Satellite AS
- Oilfields: Different Communications Service Solutions for Different Needs: Alessandro Caranci, Senior Vice President Satellite Communications, Telespazio

1315-1415 Lunch

1415-1545 Panel Session 3 Digital Oilfield Applications: Development & Roll-Out

- Big Data Goes Satellite, Principle Attributes Required for Success: Andy Lucas, Senior Vice President Operator Vertical, Comtech EF Data
- ViaSat New Maritime Terminals Provide High Throughput to Oilfield Industries: Christian Rigal, Principal System Engineer, ViaSat
- Subsea IoT and the Digital Oilfield: Theo Priestley, Chief Marketing Officer, WFS Technologies
- Applying Digital Gateways to the Digital Oilfield: Mark Lambert, Vice President Business Development, Kratos
- FPAs… The Route to Maturity:Callum Norrie, Royal Society Entrepreneur in Residence, Heriot Watt University

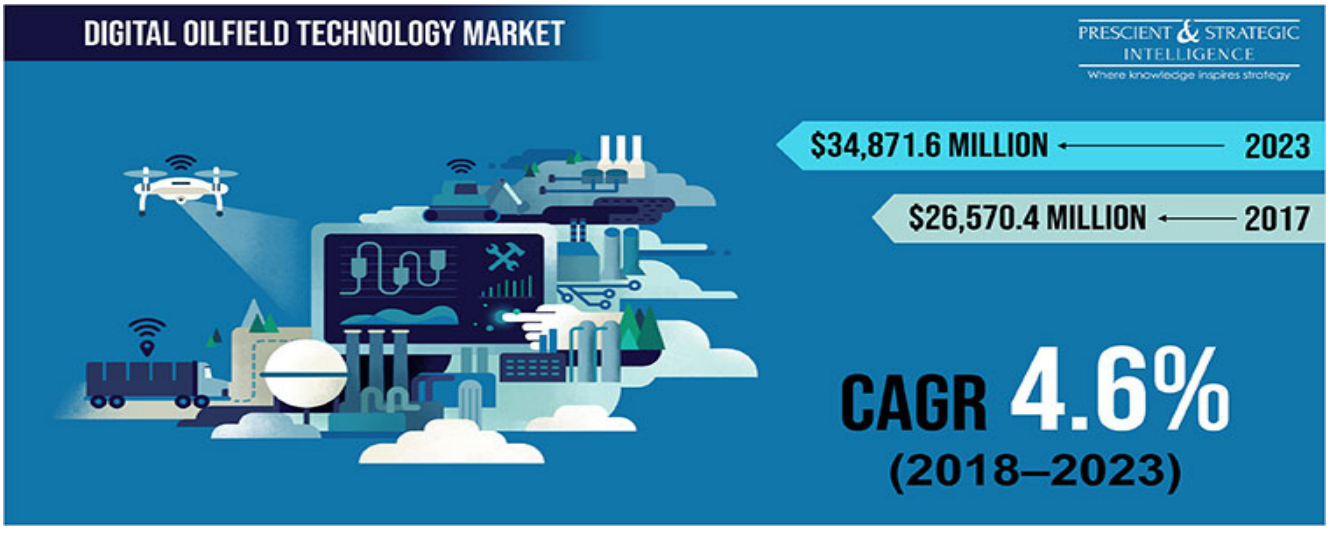
1545-1615 Networking Break

1615-1730 Panel Session 4 The Strategic Connectivity Ecosystem: The Compliance Environment

- The NIS Directive – Detecting Attacks on UK Critical Infrastructure: Martyn Curwen-Bryant, Sales Director, RazorSecure
- Compliance with International Data Transfer Requirements for IoT Services: Vadim Doronin, Senior Consultant, Access Partnership
- Compliance with Lawful Interception Requirements for IoT Services: Maria Zervaki, Policy Analyst, Access Partnership

1730 Closing Remarks

Martin Jarrold, Vice President, International Program Development, GVF



The Aberdeen digital oilfield program will be the GVF-EMP Partnership's 13th annual event dedicated to communications in the upstream oil ecosystem. Whilst this particular user vertical has its own unique demands on the ICT solutions ecosystem, for example, related to big data and connectivity robustness, it is also engaged with broader satellite communications themes such as growth in high throughput satellite capacity, the emergence of low earth orbit constellations, and cyber security, to note only

a few.

Embedded within the biggest 5G dedicated event in the world, the Cellular Backhaul 2019 program in London will be dedicated to exploring the current interaction between the satellite and wireless industries, the current and future growth of data traffic from mobile devices and how that will impact both cellular and satellite networks as they increasingly converge and integrate.

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.

With a roundtable-style format, Cellular Backhaul 2019 – which is supported by Comtech EF Data, Hughes, Newtec, iDirect, SES Networks and Gilat Satellite Networks – provides 5G World attendees a series of panels exploring the problems, risks and opportunities that exponential data traffic growth offers to both satellite and wireless industries and to the businesses that will rely on future integrated communications networks.

For further information and details regarding registration for these conferences, please visit www.uk-emp.co.uk/current-events-zone/oilfield-connectivity-2019/ and www.uk-emp.co.uk/current-events-zone/cellular-backhaul-2019/. Alternatively, please contact Paul Stahl at EMP (Century 21 Communications) – paul.stahl@uk-emp.co.uk – or Martin Jarrold at GVF – martin.jarrold@gvf.org

Martin Jarrold is Vice-President of International Program Development of GVF. He can be reached at:martin.jarrold@gvf.org.

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NEW 2.2M ULTRALIGHT ANTENNA

- The most compact 2m class antenna on the market
- Comparable performance to competing 2.4m antennas with small pack-up
- High-stiffness ultra-lightweight carbon fiber reflector and positioner base
- Quad-band: Ku, Ka, X and C
- Intuitive coarse/fine Az/El positioning
- Simple feed polarization positioning
- Can be assembled and on-network in less than 25 minutes
- Packs into two checkable transit cases with each weighing less than 100 lbs.

AvL TECHNOLOGIES

avltech.com

Visit AvL at SATELLITE Booth #919

FEATURED PRODUCT

An Industry Icon: ATCi's Simulsat

With over 30 years experience in the satellite communications industry, ATCi's mission is to enhance the customer''s opportunity for profit by providing quality, reliable and cost effective satellite and fiber linked communications components and systems to commercial entities in the US and abroad.

ATCi introduced the pioneering Simulsat multibeam, parabolic antennas. Simulsat is the world's only true multibeam antenna that receives up to 35 satellite signals simultaneously, without adjustment or degradation in performance from one satellite to the next. Taking the space of about 3 parking spaces, Simulsat pays for itself in space, savings and insurance for future channels and programming changes.

Available in 3 size and performance variations: Simulsat 5B, Simulsat C/Ku and Simulsat 7, Simulsat is the only antenna you will need.

Simulsat is 2° compliant with the ability to capture signals from all C & Ku Band satellites within a 70° view arc. Simulsat has provided programming to more than 30 million cable subscribers in the U.S. and abroad.

Because satellite programming is constantly changing, satellite broadcast users need to constantly adapt to new and different channels and satellites.

Simulsat antennas have long provided the ultimate multibeam antenna solution to these needs. Simulsat improves users' ability to take advantage of immediate and future revenue opportunities without the need for an antenna farm and without the trouble of additional permits or foundations that multiple antennas require.

The Simulsat &A is the most technologically advance multi-beam antennathat can perfrom like 37 prime focus antennas.

Many systems have retrofitted parabolic dishes with dual or triple feeds in order to view more than one satellite. Multi-feed parabolics can view satellites across a 10° arc. However, since parabolics have but one true focal point, the adjacent satellites are offset, resulting in a degradation in reception quality on the fringe satellites. Simulsat receives all satellites across a 70° arc with uniform performance.

Simulsat curbs real estate costs because it is the size of about 3 parabolic dishes of equivalent performance. For those who are faced by high land costs and limited space, Simulsat is the solution.

Available in 2 different size and performance variations, the Simulsat is the ultimate solution for Broadcasters, Cable Television, Universities/ Distance Learning, Television and Radio, Military/Government and Business corporations with multiple satellite reception requirements worldwide.

Anthony Graves, Sales Director of ATCi said "Our customers love the ability to see up to 75° of satellite arc with one antenna plus the cost savings and coverage for future growth. There isn't another multibeam antenna in the marketplace that can compete with the new Simulsat 7A price and performance."

ATCi will be exhibiting at Satellite 2019 in Washington, D.C. from May 6-8. Visit ATCi at booth # 1118.

INTRODUCING the NEWEST

MOST TECHNOLOGICALLY ADVANCED

MULTIBEAM ANTENNA

SIMULSAT 7A

- **One Simulsat Performs Like 37 Prime Focus Antennas**
- **Saves Space:**
  Is the Size of About 3 Parabolic Antennas of Equivalent Performance
- **Fixed Antenna With No Moving Parts to Service**
- **Lower Overall Cost of Equivalent Antenna Farm**
- **Programming Movement:**
  Due to Constant Satellite Programming Changes, Simulsat Users Can Add Another Feed Without Having to Purchase Another Antenna
- **Receives, With Uniform Performance, Signals From All C and KU Band Satellites Within a 70° – 75° View Arc at 2 Degree Spacing**

Contact ATCi today for more information on the SIMULSAT 7A

Tel: 480.844.8501 | www.atci.com

ATCi

PRODUCTS & SERVICES MARKETPLACE

A guide to key products and services to be showcased at Satellite 2019, May 6-8, Washington, D.C.

Advantech Wireless Technologies
Booth # 700
www.advantechwireless.com

At **Advantech Wireless Technologies**, we design, manufacture and deploy networking for broadband connectivity, broadcast solutions, video contribution and distribution and mobile backhaul, using satellite and terrestrial wireless technologies. Our clients rely on Advantech Wireless to provide smart solutions that deliver fast, reliable and secure communications anywhere in the world. Our revolutionary technologies include world-leading GaN technology based high power amplifiers, SSPAs, block-up converters (SSPBs), frequency converters, fixed and deployable antennas, antenna controllers and terrestrial microwave radios.

ACORDE
booth # 2019
www.acorde.com

ACORDE manufactures reliable and field proven solutions such as compact and lightweight BUCs (X/Ka) and LNBs/LNAs, introducing new and efficient technologies such as GaN, and versatile approaches such as dual and quad sub-bands integrations. ACORDE offers built-to-spec up to Q/V-band under MIL-STD-810G/461E for ground, naval and airborne platforms.

Alga Microwave
booth # 700
www.alga.ca

Alga Microwave is a leading supplier of Radio Frequency (RF) and Microwave Solid State Power Amplifier, Pulsed Amplifier for Radar Applications, Transmitter and Transceiver products as well as RF Passive Components and systems.

The current product offering covers all major frequency standards, specifically: for Active Components L, S, C, X, Ku and Ka with frequencies that range from 2.0 to 31.0 GHz and within power spectrum of 5 to 16000 watts and for Passive Components - 500 MHz to 110 GHz. Alga is one of the few companies in the world offering products across this radio frequency and power spectrum. We specialize in products that are designed for each customer individually.

Amphinicy Technologies
booth # 2154
www.amphinicy.com

Amphinicy Technologies is a provider of complex software solutions and all-round software support for the satellite and space industry. After 20 years in the business Amphinicy has delivered over 100 projects to international space and humanitarian agencies, leading satellite operators and global satellite service providers, teleports and space mission operation centres, and satellite equipment manufacturers.

Our solutions are usually based around our products:

- BLINK – a fully software-based, ultra-fast satellite telemetry acquisition system for Earth observation. It is modular, flexible and scalable, and can support missions from AIV to operations, with post-processing and reporting capabilities
- Monica – a state-of-the-art ground segment monitor and control solution, built primarily for the satellite industry. It is robust, secure and reliable, demonstrates high performances and can scale from a single ground station to a network of hundreds of thousands VSATs
- SatScout – a powerful mobile application framework for commissioning and certification of VSAT terminals and antennas

Amphinicy operates from offices in Zagreb, Croatia and Luxembourg.

ATCi
Booth # 1118
www.atci.com

With over 30 years experience in the satellite communications industry, ATCi's mission is to enhance the customer''s opportunity for profit by providing quality, reliable and cost effective satellite and fiber linked communications components and systems to commercial entities in the US and abroad.

AVCOM of Virginia
booth # 324
www.avocmofva.com

AVCOM of Virginia is a vertically integrated technology

company with 30 years of experience in the design and manufacture of commercial high quality, spectrum analyzers and signal monitoring products, in the USA. At Satellite come see live demonstrations of our products featuring the EVO Series 6-GHz spectrum analyzer.

EVO-RSA-6070A RF Spectrum Analyzer

The New EVO Series is built on Avcom's completely new technology platform designed for higher performance, agility and growth in a world of ever-changing requirements.

Avcom has designed an SDR-style technology analyzer with a wide bandwidth receiver, employing FPGA, DSP, and high performance processors. The analyzer is based on a hybrid swept-FFT technology which provides extended frequency range and higher resolution.

"Following the Signal", and listening to our customers, this series is perfectly suited to provide functionality in earth stations, teleports, and RF signal monitoring environments. The EVO Series of analyzers is an excellent addition to the Avcom family of products for demanding applications which require the extended performance characteristics, while still providing Low cost-of-ownership and a highly cost-effective and reliable professional product.

AvL Technologies
Booth # 919
www.avltech.com

2019 is a very special year for **AvL Technologies** as we celebrate 25 years in the satellite communications industry. AvL's first antenna – serial number 001 – is a 1.8m SNG antenna still in operation today, and it operates from its third uplink truck at PacSat.

Avl will be higlighting at Satellite the following:

- The newest tripod configuration - 2.4m 2020T motorized transportable flyaway, a nine piece segmented reflector packs into five two-man-lift cases (single band) and can be assembled by two persons in 15 minutes. This easy-to-assemble tripod base with enhanced wind stability is easy to level and operates in C-Band, X-Band, Ku_Band or Ka-Band. With high elevation and wide azimuth ranges, the antenna interfaces with all types of RF electronics and services.

Model 2020T 2.4m MIL Quad-Band Motorized Flyaway

- The 1.35m rugged fully integrated motorized auto-acquisition platform is designed to accommodate current and future modem, RF and satellite frequency options. This line of user-configurable and IATA checkable carry-on terminal is ultra-compact, ultra-lightweight and ultra-high in performance.

C-COM Satellite Systems Inc.
Booth # 1609
www.c-comsat.com

Visit **C-COM's** Booth 1609 at Satellite for a live demo of the iNetVu® Ka-98H/JUP. This New Generation .98m auto-deploy, vehicle-mounted Driveaway antenna has been "approved for operation on Hughes JUPITER System" and is convertible from Ka to Ku band.

Also on display, the iNetVu® MP-100-MOT, a fully motorized, auto-acquire, 100cm carbon fiber manpack antenna which is a robust and lightweight (~20kg) system that will point to any programmed satellite with just the push of a button on the NEW iNetVu® 8020 Controller. This highly portable, multi-segment unit can be hand-carried by one person and assembled in less than 10 minutes with no tools required.

MP-100-MOT
Manpack Antenna

Comtech EF Data Corp.
Booth # 1401
www.comtechefdata.com

For 20+ years, **Comtech EF Data** continues to be the premier supplier of bandwidth-efficient satellite modems, VSAT networking solutions and RF products to MNOs globally in diverse and challenging environments. With infrastructure equipment supporting >60 Gbps of mobile backhaul over GEO, HTS and MEO, we have the experience and product diversity to facilitate value-added and efficient deployments. We closely monitor market trends and have designed our solutions to deliver true benefits to MNOs – the performance needed to reduce required satellite bandwidth, drive down the total cost of ownership, improve quality of experience and deliver the industry's highest KPIs.

COMTECH Xicom Technologies
Booth # 1401
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 has led in the design and production of millimeter wave TWTAs. Xicom has been shipping high power Ka-band amplifiers since 1997. We have shipped more than 2000 Ka-band amplifiers to military and commercial customers around the globe. We can offer CW amplifiers for TT&C as well as peak amplifiers for multi-channel communications. We offer both outdoor mounted and indoor products to meet our customers' needs.

Comtech Xicom is the world leader in Q-band HPAs. We have 50, 120, 140 and 200W products. As well as a dual-band Ka/Q band amplifier. We have full mil qualification. V-Band is an emerging frequency of interest due to the vast available bandwidth and the availability of V-band hardware. Comtech Xicom offers a 250W V-Band amplifier for gateway service.

Hispasat/Hispamar
Booth # 1325
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.

Integrasys S.A.
Booth # 101
www.integrasys-space.com

Integrasys is a privately owned company specialized on engineering and manufacturing Satellite Spectrum Monitoring systems and VSAT tools in the telecommunication and broadcasting markets. Integrasys was founded in 1990 by a group of Hewlett-Packard engineers experts on Automated RF & Microwaves Test Systems and Software. Since then Integrasys has evolved towards today's company, offering a wide range of signal monitoring products for different telecom services.

At Integrasys our mission is to provide the industry the best quality and fastest technology available in carrier mon-itoring systems, with the customer service and care that our customer's deserve. We want to add value to our customers in quality of service, technology, speed and cost efficiency, by innovating; therefore satellite industry recogniz-es Integrasys as the leader for innovation in satellite signal carrier monitoring systems and VSAT tools.

LP Technologies
Booth # 1742
www.lptechnologies.net

LP Technologies is a leader for spectrum analyzers, monitoring and interference detection solutions. LPT offers powerful systems that include hardware software solutions. Combining customer recommendations, constant innovation and 20 years of experience help to create powerful solutions while keeping the cost down. LPT is redefining spectrum monitoring and interference detection.

At Satellite, LP Technologies will be showcasing its LPT-LEO solution, the first automatic monitoring and interference detection software dedicated to monitor Low Earth Orbit satellites. LEO gives customers the ability to connect all their spectrum analyzers around the world to monitor LEO satellites without interruption.

Mission Microwave Technologies
Booth #809
www.missionmicrowave.com

Mission Microwave Technologies is developing revolutionary Solid State Power Amplifier BUCs to support ground-based, airborne, and space-based applications. Utilizing the latest in semiconductor technology, we have optimized the size, weight, and power (SWaP) for these critical applications while delivering the best possible reliability. Mission Microwave currently offers advanced GaN BUC products at X-Band, Ku-Band, and Ka-Band from 12W to 400W, and sets the "new standard" for performance and reliability.

ND SatCom
Booth # 118
www.ndsatcom.com

At Satellite 2019, **ND SatCom** will be highlighting its SKYWAN **5G product which features:**

- One compact device for all applications and network roles
- Smallest hub on the market
- Supports all kinds of topologies

The SKYWAN **5G** satellite router is a reliable, flexible and versatile satellite communication platform for customer centric networks. It is a bi-directional MF-TDMA plus DVB-S2X system that supports voice, video and data applications in the most bandwidth efficient manner combined with unrivalled real-time performance.

SKYWAN 5G unlocks new business opportunities for service providers e.g.in enterprise networks. Total cost of ownership is significantly reduced thanks to the fact that only one type of device is needed for all roles in the network. Each SKYWAN **5G** has the full functionality on board and specific features are unlocked by a license key. One small hardware for all network roles simplifies logistics and unprecedented scalability enables the growth of your network in a very cost efficient manner. This saves costs in terms of logistics, certifications, network configuration and maintenance. Measuring in at only 1 RU the SKYWAN **5G** is the smallest hub device on the market.

SKYWAN **5G** enables star, mesh, multi-star and hybrid topologies. Each unit can act either as a hub or master station, therefore adding agility in terms of its network role. Geographical redundancy of the master station is already built-in and a DVB-S2X outbound can be added easily at every station. Network virtualization allows seamless integration into all IT infrastructures.

The device is so flexible: the customer can change the topology anytime, or cascade units to increase traffic volume per site according to business growth.

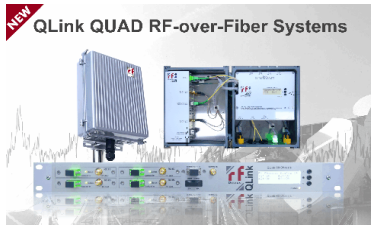
Newtec
Booth # 1701
www.newtec.eu

Newtec is specialized in designing, developing and manufacturing satcom equipment and technologies that can be applied in a wide range of single and multiservice applications from broadcast (all-IP networks), consumer and enterprise VSAT, government and defense, cellular backhaul and trunking and mobility, offshore and maritime markets.

Discover Newtec's latest industry-leading broadcast equipment, including the M6100 and the MCX7000; Find out more about the benefits of All-IP broadcasting and how it can transform your business; Experience a demonstration of DVB-S2X Channel Bonding UHD Contribution: 4K sports/events coverage made possible over fragmented space segment.

RF Design
Booth # 2411
www.rf-design-online.de

RF-Design specializes in developing, manufacturing, and marketing high-quality RF equipment, RF distribution and RF-over-Fiber solutions for the international Satellite-, Broadcating- and Broadband communications market. Our product portfolio includes a wide-range of Switch Matrix systems, RF-over-Fiber solutions, Splitters/Combiners, Switches/Redundancy Switches, Line Amplifiers, RF/DVB Signal Quality Analyzers and LNB-supply/conrol systems... perfectly suited for applications in Teleports, Satellite Earth Stations as well as for Broadcast- and Broadband RF distribution infrastructures. We also have strong capabilities to design and to manufacture custom-made products and 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.



At Satellite, we will be demonstrating our new RF Quad over Fiber system ***"QLink"*** with our new single, quad or 1:1 redundant ***"HQSeries"*** amplifier units and our *"FlexLInk"* Switch Matrix Solutions.

Spacebridge
Booth # 709
www.spacebridge.com

SpaceBridge Inc. is an established supplier and global market leader in broadband satellite communications technology. The company develops and provides satellite network equipment and

services, VSAT HUBs, Terminals for Point-to-Point, Point-to-Multi-Point, and Mesh typologies, as well as SCPC broadcast modems for GEO & NGSO satellite constellations and Cloud-Based managed services.

Terrasat Communications
Booth # 1135
www.terrasatinc.com

Terrasat Communications presents the latest state-of-the-art IBUC for Fly-Aways & COTMs; the IBUC3. The latest in Terrasat tech is now ultra-lightweight, super compact, available up to 40W & comes with a 3-year warranty. All IBUCs allow the operator to customize configurations & manage alarms & sensors for real-time network management and control. IBUC reliability is baked into the IBUC3 design and verified through intensive individual unit testing. Terrasat Communications designs and manufactures innovative RF solutions for Satellite Communications systems. Our ground-breaking IBUC – the Intelligent Block Upconverter – brings advanced features and performance to C-band, X-band, Ku-band, & Ka-band satellite earth terminals and VSAT's. Our products offer exceptional value at a reasonable cost, thereby allowing our customers to stay ahead of their competitors. Through conservative engineering, Terrasat products have gained a reputation for enduring over the long term in extreme operating conditions.

IBUC3 for Fly-Aways and COTMs

UHP Enterprises
Booth # 800
www.uhp.net

UHP Networks is a leading global manufacturer of advanced VSAT networks and systems. Headquartered in Montreal, Canada, the company has over 370 networks and over 40,000 remote terminals installed in 50 countries. Among its customers are Fortune 500 corporations, major broadcast networks, top-tier US Mobile Network Operators and government agencies. UHP has the industry's first software-defined VSAT router, offering unparalleled processing capability (packets per second, Mbps, TCP sessions) per W of consumed power and superior bandwidth efficiency owing to the industry's most sophisticated TDMA protocol and DVB-S2X signalling. The company won the 2018 VSAT Stellar Award for Best Ground Segment Technology.

Walton Enterprises
Booth # 1619
www.de-ice.com

Walton De-Ice, the world's leading designer and manufacturer of satellite earth station antenna (ESA) weather protection solutions, will showcase its all-new Walton ADC-4000 Antenna De-Icing Control System at Satellite. 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 satellite 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.

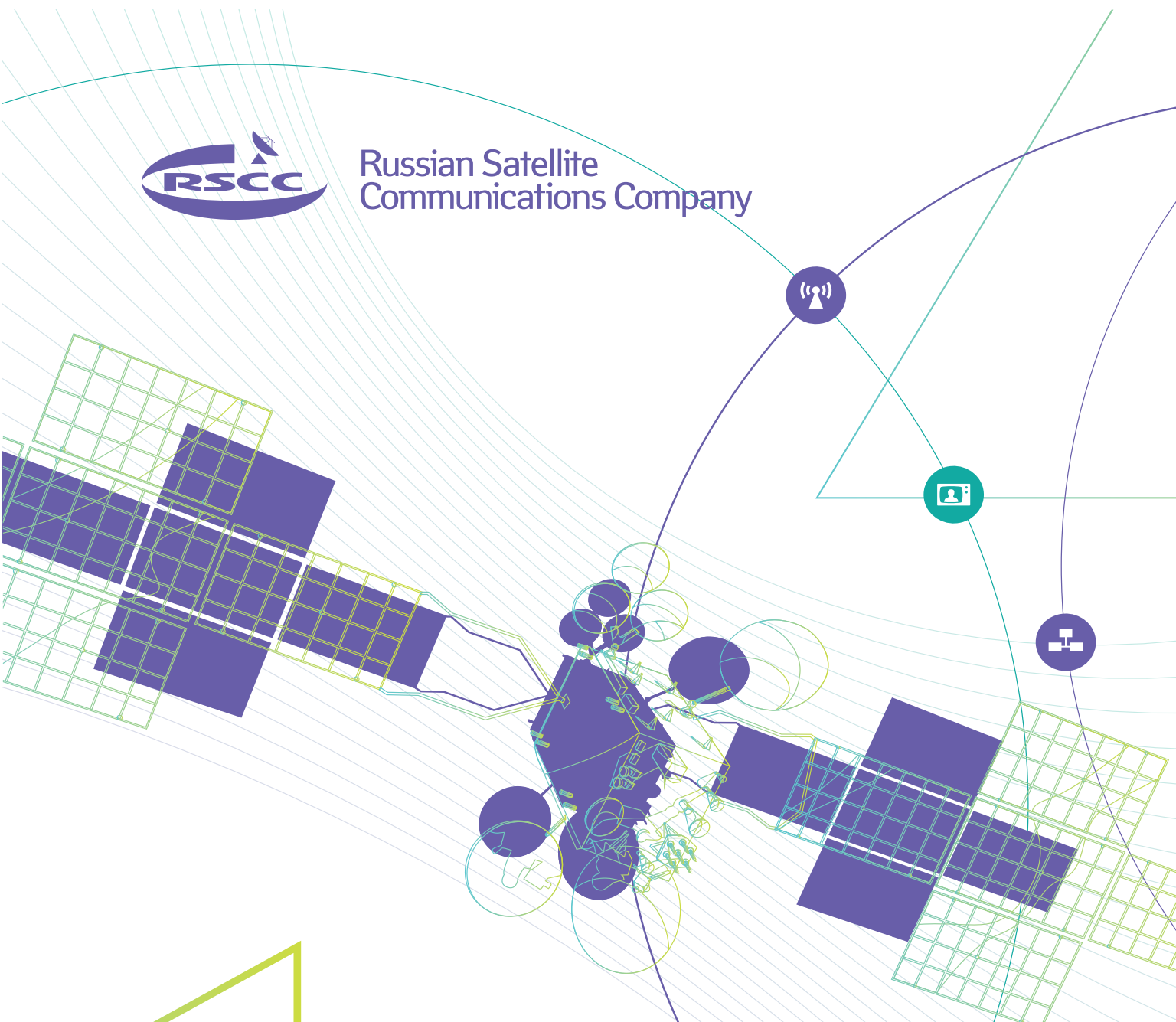
Work Microwave
Booth # 2113
www.work-microwave.com

At Satellite 2019, **WORK Microwave** will be showcasing the industry's first V-Band frequency converters as a qualified product. The converters are available in various dimensions of outdoor housings and cover the full ITU uplink bandwidth range from 47.20 to 51.40 GHz, providing full 4 GHz of bandwidth. As global consumption of bandwidth-intensive data and broadcast services increases, higher throughput satellites will be a requirement in the future. By offering V-Band-ready equipment WORK Microwave is helping the satellite industry tackle this important challenge.

Xiplink
Booth # 1619
www.xiplink.com

XipLink is the technology leader in wireless link optimization (WLO) using industry standard SCPS TCP acceleration, UDP enhancements, data/header compression, link bonding and Internet optimizations to deliver a better wireless experience over stressed communication links. Our award-winning XipOS software dramatically improves web experience and optimizes other Internet traffic in markets such as maritime, cellular backhaul, ISP backhaul, military and aviation broadband. The XipLink solution is packaged into appliances or virtual images and sold through OEM, Integration and Service Provider partners around the world. XipLink is a private, employee owned company with headquarters in Montreal, Quebec Canada and field personnel worldwide.

Russian Satellite
Communications Company



FUTURE SATELLITES FOR DIGITAL FUTURE

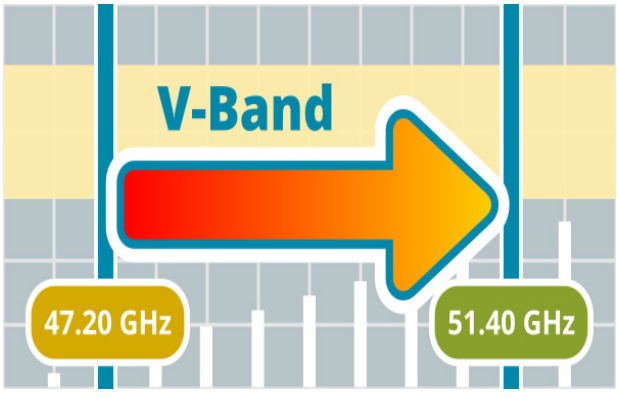
www.rscc.ru

FEATURED COMPANY

Work Microwave

WORK Microwave's satellite communication products have been deployed by operators worldwide to support a range of applications within the satellite broadcast and satellite communications markets, including SNG/contribution, direct-to-home, IP networking, teleport management, governmental and more.

Headquartered in Holzkirchen (near Munich), Germany, and comprised of four operating divisions — Satellite Communication, Navigation Simulators, Defence Electronics, and Sensors and Measurement — WORK Microwave leverages over 30 years of experience to anticipate market needs and apply an innovative and creative approach to the development of frequency converters, DVB-S2/S2X equipment, and other digital signal processing technologies while maintaining the highest standards for quality, reliability, and performance.



WORK Microwave's Satellite Communication division develops and manufactures high-performance, advanced satellite communications equipment for telecommunications companies, broadcasters, integrators, and government organizations that are operating satellite earth stations, satellite news gathering vehicles, fly-aways, and other mobile or portable satellite communication solutions.

At Satellite 2019 in Washington, D.C. from May 6-8, WORK Microwave will be showcasing at its booth # 2113, the industry's first V-Band frequency converters as a qualified product. The converters are available in various dimensions of outdoor housings and cover the full ITU uplink bandwidth range from 47.20 to 51.40 GHz, providing full 4 GHz of bandwidth. As global consumption of bandwidth-intensive data and broadcast services increases, higher throughput satellites will be a requirement in the future. By offering V-Band-ready equipment WORK Microwave is helping the satellite industry tackle this important challenge.

"Over the years, we have seen the industry move into new bands, from C- to Ku- and Ka-Band, in order to relieve pressure on available bandwidth. Now, it's time to make use of the tremendous potential of future-forward technology like the V-Band," said Matthias Stangl, Director of Analog Satcom Products at WORK Microwave. "Our V-Band converters set the benchmark for innovation thanks to a unique feature set and readiness to deploy in the real word. We are excited to lead this industry initiative and address the emerging commercial need for high-frequency Satcom equipment."

Offering the first commercial delivery of V-Band converters validates WORK Microwave's position as the industry's leading provider of Satcom equipment. WORK Microwave's converters offer unrivalled features and performance, including excellent phase noise, gain flatness, spurious response, group delay, and a multichannel architecture that allows wider coverage of each frequency band.

View a video tour of WORK Microwave's brand new headquarters and manufacturing facility at:
www.satellitemarkets.com/work-microwave-2019

WORK MICROWAVE

Over 30 Years Experience

Next Generation of Satellite Communications

Ultra High Frequencies

4 Channel V-Band Upconverter

Industry's first qualified V-Band Frequency Converters. Covering the full ITU uplink bandwidth range from 47.20 to 51.40 GHz.

End-to-End Wideband Modem

A-Series AX-80 Modem

All-IP Platform designed to support ultra-wideband transponders up to 500 Msps. Full throughput with 256 APSK up to 3 Gbps per direction.

WORK Microwave devices are deployed by operators worldwide to support a range of broadcast and data applications in satellite communications markets, including HTS/UHTS, SNG/contribution, direct-to-home, IP networking, government and defence, and more.

Learn more at **www.work-microwave.com**

DVB S2X

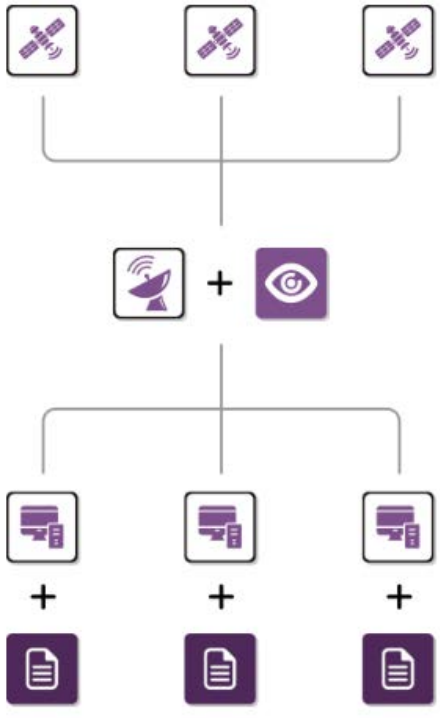
Visit us at Satellite 2019
Booth 2113

CASE STUDY

Satellite Data Acquisition in the Blink of an Eye

Humans are using space to improve life on earth. Climate change monitoring, natural crisis mitigation, food production and natural resource management, security and disaster management, transportation are just some of the examples where space data improves our everyday life. Reliable and timely space data is a priority. New sophisticated optical and radar payloads and new satellite constellation with frequent revisits are putting pressure on the satellite ground segment performance. More and more data are coming from the above from both traditional and NewSpace constellations. Therefore, there is a need reliable, powerful and scalable data acquisition solutions on the ground to make space applications efficient.

This case study will focus on the two major trends in the satellite ground segment industry: Ground station as a service powered by cloud computing technologies; and the advantages of the software-centric over hardware-centric solutions



Blink's position in the satellite data processing chain.

Ground station as a service powered by cloud computing technologies

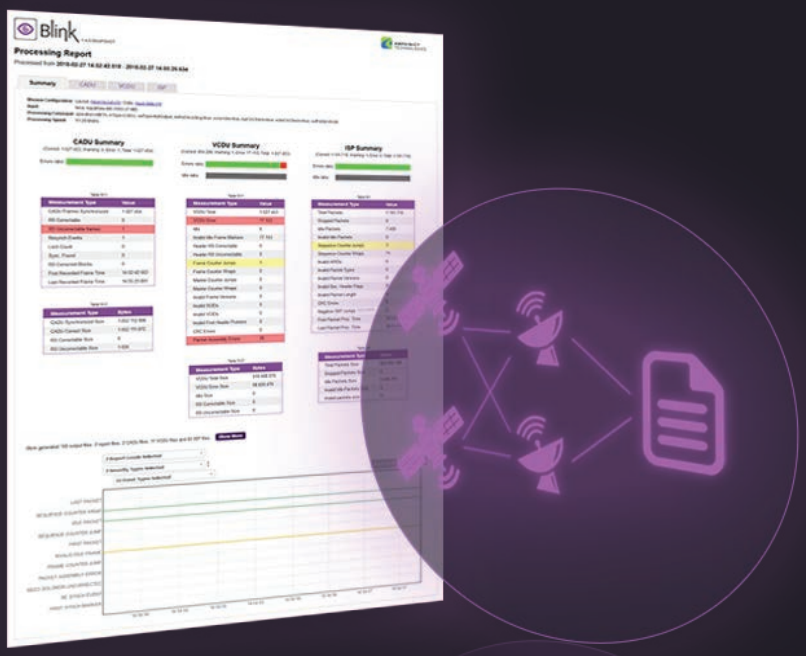
Key characteristics and advantages of the "ground station as a service" model:

- Satellite ground station on demand, fast and direct access to your data and a-la-carté options.
- Avoid building your own ground stations and antennas and scale your satellite operations quickly, easily and cost-effectively.
- Avoid obtaining costly hardware equipment for data processing, storage and networking and rely on cloud computing technologies.
- Often the global service is provided through the cloud and you are not tied to a specific geolocation. You can communicate with your satellites from distant locations all around the world – without needing to obtain a permission to install the GS in another country.
- No long-term commitments: Avoid obtaining long-term leases with ground station providers. Download the data when and where you need it and pay only for what you have used.

Being a 100% software solution, Blink is perfect for cloud computing: connect it to the signal from the antenna, and it will make digital signal processing (DSP) and frontend processing completely in the cloud, making your downstream processing, distribution and applications simple and straightforward. It is powerful (supported the most demanding missions with +1Gbps throughputs) scalable (from 1 to 100 satellite-constellations), Newspace-friendly solution and can provide flexible business models, aligned with service providers' models.

Blink

Satellite Data Acquisition in the Blink of an Eye



Blink is a CCSDS-compatible satellite data acquisition system built in software.

It utilizes the processing power of today's top-of-the-line commercial CPUs and GPUs and radically reduces costs, improves flexibility and speeds up the ground station evolution.

ULTRA - FAST

+1 Gbps processing speeds

SCALABLE

Different product packages based on link capacity requirements

RICH REPORTING

Rich, precise reports with detailed processing metadata and overall statistics

INTEGRATION

With any standard-compliant demodulator and monitor & control system

EASE OF USE

Easy to install and operate
Shorter outages: hours not weeks

LICENSING

Standard license
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Software that understands the satellite industry.

SATELLITE 2019
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blink.amphinicy.com

CASE STUDY

Advantages of the fully software-centric approach

Software-based solutions can provide advantages over hardware-based ones:

- Enables flexibility: multi-purpose, multi-mission and multi-protocol
- Leverages well tested COTS components and standardized IP technology
- Future proof: it is easier to develop, reconfigure, maintain, repair, deliver – can provide shorter lead times (weeks vs. months)
- It comes with affordable pricing (no more expensive hardware) and flexible licensing options, including Pay-as-you-grow model
- Enables developing disruptive products and services, opening new agile companies and make technology accessible to broader audience of entrepreneurs and users

Amphinicy Technologies, a company that provides software solutions for the satellite industry knows all about that. They provide complex software solutions and all-round software support for the satellite and space industry for more than 20 years. After 10 years in the Earth Observation satellite data acquisition domain they acquired in-depth knowledge and experience to develop the Blink solution, an ultra-fast 100% software-based satellite data acquisition solution.

Blink is an innovative and disruptive technology selected as one of the 5% most innovative European projects in the space sector by the European Commission. Its qualities are:

Scalability

Blink can support nanosatellite constellation operators growing their platform from a demo spacecraft to several hundred satellites in orbit, as well as traditional missions like Copernicus Sentinels with throughputs of over 1Gbps. Blink comes in different product packages based on the performance requirements and mission size.

Modular solution

Blink can be used in different scenarios:

- Assembly, integration and testing (AIT) phase to test satellite communication components before launching
- In operational phase for real-time data acquisition and processing with rich reporting capabilities.
- Post-processing and offline data analysis at any time.

Blink can support nanosatellite constellation operators growing their platform from a demo spacecraft to several hundred satellites in orbit...Blink comes in different product packages based on the performance requirements and mission size.

Flexibility

Blink supports multiple protocols (CCSDS, DVB-S2...) and modulation schemes and is easy to configure. One Blink device can be used to receive data from different missions, reception is scheduled in software.

Licensing

Blink comes with affordable prices and two business models: standard license and pay-per-use tailored for the NewSpace market. It comes in three options, tailored to your needs and requirements.

Blink Software

Full software library for ultra-fast CCSDS telemetry processing and analysis. Command line tool enables data reception troubleshooting during all phases of the mission life cycle, including ad hoc, extremely fast header analysis, data extraction, conversion and report generation.

Blink Device

Blink software integrated with a high data rate SDR (Software Defined Radio) demodulator provides a stand-alone EO telemetry processor and analyzer as a part of your ground data acquisition station.

Blink Station

Blink Device completely integrated with Monica or a third-party M&C solution to provide a full-fledged ground station data acquisition and control.

See a demo of Blink at the Amphinicy booth at Satellite from May 6-8, 2019 at booth # 2154.

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Mission Microwave Technologies

One of the fasterst growing companies in the satellite ground segment market is Mission Microwave Technologies, a manufacturer of highly efficient Solid State Power Amplifiers (SSPAs) and Block Upconverters (BUCs). The company started in 2014 and in that relative short time has increased in market share in the very competitive ground segment market by introducing a line of innovative products that are keeping up with changing customer requirements.

"We've grown considerably. We have more than doubled the size of the company since January this year and will more than triple the revenues from last year,"said Francis Auricchio, President and CEO of Mission Microwave.

"Mission Microwave's value proposition of smaller, lighter and more efficient high power amplifiers is enabling our customers to create highly portable, higher throughput terminals with lower power consumption than previous options. Our customers rigorously evaluated our products and chose Mission Microwave to support their customers' demanding requirements for reliability, performance and delivery," added Auricchio.

Mission Microwave's value proposition of smaller, lighter and more efficient high power amplifiers is enabling its customers to create highly portable, higher throughput terminals with lower power consumption than previous options.

"Mission Microwave Technologies brings revolutionary design for Radio Frequency (RF) and microwave electronics, supporting ground-based, airborne, and space-based applications. Using the latest in semiconductor technology, Mission Microwave's focus is to minimize the size, weight, and power (SWaP) for these critical applications, while providing its customers with the best possible reliability," said Steve Richeson, Vice-President of Sales and Marketing of Mission Microwave.

Mission's Stinger, Javelin and Titan products have been designed into families of terminals across X, Ku and Ka-band frequencies. The common form factor and interfaces of these products allow designers to create flexible platforms eliminating the need to reconfigure the implementation when missions change.

Among the key orders that Mission Microwave recently received are orders from multiple government contractors to provide X, Ku and Ka-Band Block Upconverters as components of complex SATCOM terminals in support of the Warfighter. The combined value of these orders was over US$ 12 million in the first quarter of 2019.

The products delivered by Mission Microwave for these programs include high performance Commercial off the Shelf (COTS) amplifiers for X, Ku and Ka band terminals. These products rely on Mission's patented GaN (Gallium Nitride) amplifier and BUC designs to support customers operating in harsh environments while reducing the Size, Weight, and Power (SWaP) burden on the remote users. Mis-

sion Microwave has moved to the forefront of the satellite terminal industry in shipping high power X, Ku and Ka Band amplifiers and BUCs for mobile applications in ground, maritime and other applications in both government and commercial industry sectors that require reliability, performance and efficiency.

"We have a variety of products that are filling the demand from customers to meet their requirements for smaller, lighter terminals. Having multiple bands with the same physical size amplifiers enables the integrators to increase their portfolio without making physical changes to their terminals. Their customers see the value of not having to re-engineer every time they have a new mission." said Auricchio.

"And our business has taken off because of this. We started out with Ku-Band and then we got into Ka- and X-Band and the largest portion of our business now is Ka- band," Auricchio added.

Auricchio said the company will continue to grow by "staying ahead of the solid state technology evolution rather than follow the competition and keep on top of changing customer requirments. We see growth in the maritime and aviation markets and we intend to be a major player in these markets, among others," said Auricchio.

Mission Microwave will be showcasing their products at the Satellite show in Washington, D.C. from May 6-8, 2019. Visit them at booth # 809.

View a video interview with

Steve Richeson, VP-Sales and Marketing of Mission Microwave at:

www.satellitemarkets.com/richeson-2019

EXEC MOVES

Van den Driessche Appointed SSPI President

Washington DC, April 29, 2019 — The Space & Satellite Professionals International (SSPI) announced the appointment of Thomas Van den Driessche, CEO of Newtec, as president of its board of directors through March 2020.

Van den Diessche

Van den Driessche has been active in the broadcast and satellite markets for the past 20 years. He has spent 12 of those with Newtec, where he started as director of sales and business development. At the end of 2016, he was made CEO.

Van den Driessche will work closely with board chairman David Myers, president of the Communications Sector for Peraton, to continue the growth of SSPI's membership beyond traditional GEO communications into LEO, MEO, earth observation, optical communications and into a new era of the space economy, with a more global footprint. Other current board members represent Blue Origin, Boeing, CBS, Ericsson, Eutelsat, Globalstar, Hughes Network Systems, Kymeta, OneWeb, Planet, SES, SpaceX, Speedcast, SSL, the Spaceconnection, Viacom and Viasat.

SSPI was founded in the USA in 1983, with Sir Arthur C. Clarke, creator of the satellite concept, as its honorary chairman. SSPI's founding purpose was to serve as a professional network in a young industry that was on the verge of substantial growth.

WTA Names Neumann Teleport Executive of the Year

New York, NY, April 29, 2019 — The World Teleport Association (WTA) named Guido Neumann, CEO, CETel as the 2019 Teleport Executive of the Year. Neumann will accept the award at the 2019 Teleport Awards Luncheon, on May 7th during the SATELLITE 2019 conference in Washington, DC.With enduring entrepreneurial spirit, Neumann has managed CETel since its incorporation in 2005. Even under harsh economic conditions that teleports have been faced with around 2012, he maneuvered CETel safely, successfully and profitably and created what CETel is today.

Neumann

Neumann proactively contributes to strengthening the relationship between service providers and satellite operators. His natural desire for business transactions has led him to engage in merger & acquisition projects and resulted in several profitable deals, such as the French Geolink Satellite Services, the Swiss Paradox Engineering VSAT Business and Onlime Managed Satellite Services from UK.

In 2018 CETel opened its doors to local schools in order to promote professions related to teleport operations such as RF engineering, IT administration, and NOC support. Besides managing, leading and further growing CETel and his passion about the global satellite industry, Neumann's focus lies on his charitable foundation, actively supporting humanitarian help and the protection of animals and nature.

SSPI Names Hall of Fame Inductees

Space & Satellite Professionals International (SSPI) announced that, on May 7, it will induct three new members into the prestigious Space & Satellite Hall of Fame. The 2019 honorees are Greg Wyler, Founder and Executive Chairman of OneWeb; Matt Desch, CEO of Iridium; and Henry Goldberg, Partner at Goldberg, Godles, Wiener & Wright.

"This year we add to the Hall of Fame a set of leaders who have created commercial space markets and made them work," said SSPI executive director Robert Bell. "We honor an executive who led a LEO company from the largest bankruptcy in US history back to the public markets and then to development of a new constellation of higher capacity L-band spacecraft. We celebrate an entrepreneur who has been the first mover in commercializing high-capacity services in MEO and LEO, blazing a trail that dozens of companies are following today. And we salute a legal innovator whose work made possible competitive satellite communications, video neighborhoods and the VSAT industry, and who is still driving progressive regulation of NGSO constellations."

The latest members of the Hall of Fame will be inducted during the 2019 Hall of Fame Celebration ceremony on May 7, the opening night of the SATELLITE 2019 convention and exhibition.

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Calian Group Acquires SatService

Steisslingen, Germany, April 2, 2019--Calian Group has acquired SatService, a solid player in the European satellite ground systems market, for euro 4.5 million or US$ 5.05 million.

Based in Steisslingen, Germany, SatService offersnnovative engineering solutions and products for the satellite communications market. Its business will support Calian SED's expansion in the European market with turnkey satellite solutions as well as products. SatService product offerings include the sat-nms line of first-class software and hardware solutions for antenna control and tracking, monitoring and control systems and L-band transmission.

"SatService has a very strong technical team and a reputation for excellent service and support," said Patrick Thera, president, Calian SED. "Our skill sets and product offerings are very complementary which includes our combined abilities to provide turnkey satellite radio-frequency (RF) ground systems. SatService offers innovative products that serve as key building blocks for communication network solutions including antenna control and L-band signal management. Our combined locations in Germany and Canada broaden our base of operations to support customers throughout Europe, North America and beyond."

Michael Ulbricht, former owner of SatService said, "We are pleased to become part of the Calian SED team and increase our coverage of the satellite ground station market. I am also very pleased to continue as managing director for the next few years to support and grow the business that I have dedicated more than 20 years to. As always, my team and I will support our customers with innovative engineering and rock-solid implementation."

Conviva's State of Streaming Industry Report: Overall Viewership Up 72%, Consumption Rising at 49%

Foster City, Calif., May 1, 2019 — Conviva, a research firm that specializes on the streaming entertainment industry, has concluded that while adoption of streaming is increasing, so is the complexity of achieving the goal of seamless video delivery at scale. In its "State of the Streaming TV Industry for First Quarter 2019," Conviva said that maintaining a high-quality viewer experience across content and advertising is critical as streaming TV providers look to increase viewer retention and monetization.

In addition, social media plays an increasingly important role for promotion and monetization, and as a distribution platform in its own right.

Some of the most revealing and surprising insights from Conviva's analysis are as follows:

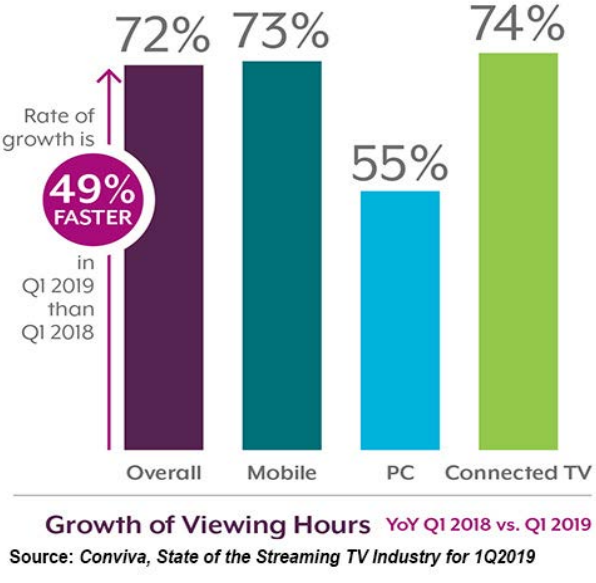
• Size and pace of growth are both increasing. Viewership overall is up 72% year-over-year, and the rate of consumption has increased, growing 49% faster in Q1 2019 than in Q1 2018.

• Content aggregators (virtual MVPDs) like DirecTV Now, Hulu, PlayStation Vue, and Sling saw viewership up 108% year-over-year as compared to 60% growth for other services in the United States.

• The battle for the TV screen is not over. Amazon Fire TV captured 18.6% share of viewership, up significantly from 11.4% share in Q1 2018 as it gains on Roku's long-standing lead at 42.4% share.

• Amidst impressive growth, minimizing quality issues remains top of mind for the industry with buffering (when the video pauses during playback so it can reload) seeing the largest improvement, down 34% year-over-year.

• Up to 47% of streaming ads are failing. As more ad dollars shift to streaming, the cost and viewer engagement risks are huge. As another form of streaming content, the quality of the entire ad experience is paramount to success.



Growth of Viewing Hours YoY Q1 2018 vs. Q1 2019

Source: *Conviva, State of the Streaming TV Industry for 1Q2019*

• Social media is a big opportunity for content distribution and monetization. Increasingly viewers are engaged

• in real-time for peak events like the Oscars, sports, and politics across multiple channels. Cross-channel visibility and promotion maximizes exposure and engagement for publishers.

• The highest peak concurrency in Q1 2019, the point at which the maximum number of viewers tune in all at once, came on January 8th UTC. This peak, which was 37.6% higher than the previous year's Q1 peak, came as #2 Clemson bested #1 Alabama in the College Football Playoff National Championship.

Conviva is the real-time decisioning platform for optimized streaming entertainment. More than 250 industry leaders across 5 continents – including CBS, DAZN, HBO, Hulu, PlayStation™Vue, Sky, Sling TV, Turner, and Univision – rely on Conviva to maximize their consumer engagement, deliver the quality experiences viewers expect, and drive revenue growth. With a global footprint of 100 billion streams per year across 3 billion applications streaming on devices in 180 countries, Conviva offers streaming providers unmatched scale for continuous video measurement, intelligence, and benchmarking across every second of every stream on every screen.

Conviva's data is collected using proprietary sensor technology, which is embedded directly within streaming video applications. Conviva analyzes a trillion

real-time transactions per day. In this report, the year-over-year data from Q1 2019 as compared to Q1 2018 was normalized based on Conviva's customer base.

For the first time, this report contains Conviva's streaming advertising and social media insights. Data highlights new potential failure points which are critically important as ad dollars move to streaming. Also included are insights into viewer behavior and social platform performance for peak events that drive high-performing campaigns, as streaming TV providers increasingly use social media to engage customers through both short-form and full-length content distribution. These new sources of data provide a more complete view across the streaming TV ecosystem.

According to Conviva, overall, streaming viewership was up 72.4% year-over-year in Q1 2019, consistent with past reports and trends we've been tracking for overall growth of the industry. Viewership is not only up year-over-year, but the rate of growth has increased, with viewing hours growing 49% faster in Q1 2019 than in Q1 2018. That doesn't change the fact that the internet wasn't built for video. As streaming TV viewership grows, and devices increase and fragment, the complexity of delivering this massive scale at linear TV quality has intensified.

Peak concurrency, the point at which the maximum number of viewers tune in all at once, also increased with the highest peak in Q1 2019 37.6% higher than the previous year's peak. Interestingly, despite major events including the Super Bowl and March Madness, this year's Q1 peak was reached on January 8th, during the College Football Playoff National Championship as Clemson took on Alabama.

Even more impressive than that single peak, the average daily peak was 76.1% higher than the same period last year, which illustrates that concurrent demand peaks are consistently higher. Notably, while this puts a significant strain on delivery services, quality metrics have continued to improve during this time period. This indicates that streaming TV providers and the industry ecosystem are keeping up with demand, even during the highest volume periods.

Growth among virtual multichannel video programming distributors (virtual MVPDs) like DirecTV Now, Hulu, PlayStation Vue, and Sling continues to outpace the field, said Conviva, with viewership up 107.7% as compared to 59.6% growth for other services in United States. Virtual MVPDs also continue to best other services in terms of quality, although the gap is closing slightly. Other services in the United States made significant improvements in video start time from 5.95 seconds in Q1 2018 to 4.28 seconds in Q1 2019 - in line with virtual MVPDs at 4.21 seconds. Nevertheless, virtual MVPDs continue to outperform other services when looking at other quality metrics including buffering at 0.26% as compared to 0.70%, picture quality 5.1 Mbps as compared to 4.5 Mbps, and video start failures at 0.68% as compared to 1.88%.

Conviva noted that virtual MVPDs focus on distributing content via connected TV with many offering free or discounted connected TV devices as part of their promotional offers. As would be expected, consumption for virtual MVPDs over-indexes on connected TV devices at 73.0% of all viewership as compared to 43.1% for other services in Q1 2019. While connected TV generally outperforms mobile and PC in terms of quality delivered, virtual MVPDs still outperformed other services even accounting for the additional viewership via virtual MVPDs on connected TV.

However, encouraging viewership on connected TV devices through promotions or further investment in connected TV applications may be beneficial for other streaming services as they focus on improving the viewer's experience.

There are literally millions of potential issue combinations that can impact the quality of the viewer's experience and require continued industry-wide infrastructure improvements, the research firm said. However, amidst skyrocketing demand, streaming providers have consistently delivered increasingly strong overall quality.

Conviva has been measuring the quality trend for more than a decade, and it is clear consumers have become increasingly sophisticated and impatient. With billions of eyeballs up for grabs, improving viewer experience will continue to be critically important, Conviva concluded.

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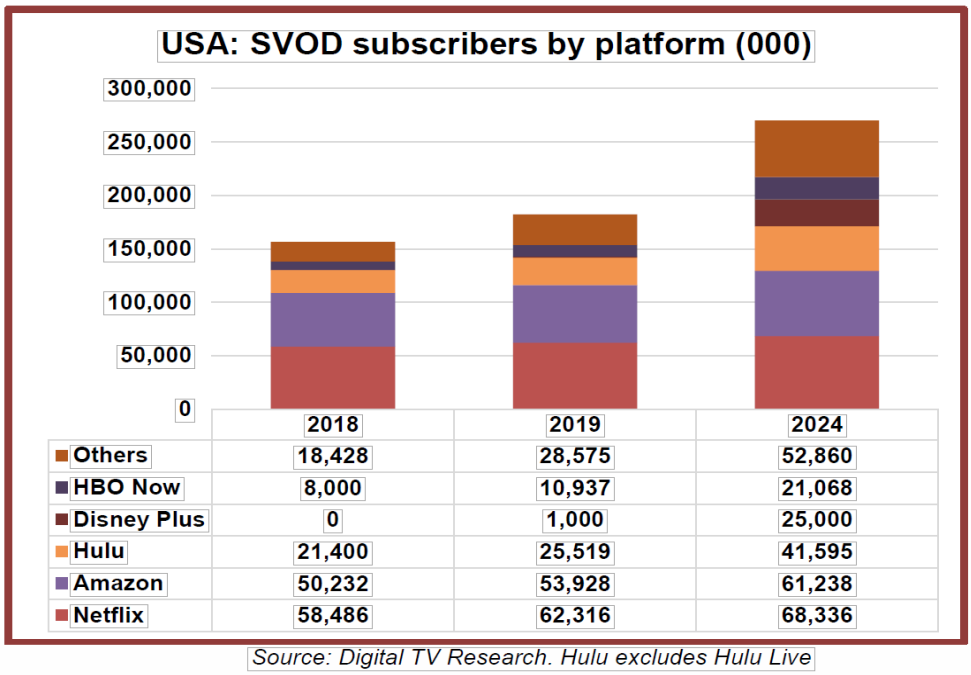
VITAL STATS

US SVOD Subscriptions to Reach 270 million



	2018	2019	2024
Others	18,428	28,575	52,860
HBO Now	8,000	10,937	21,068
Disney Plus	0	1,000	25,000
Hulu	21,400	25,519	41,595
Amazon	50,232	53,928	61,238
Netflix	58,486	62,316	68,336

Source: Digital TV Research. Hulu excludes Hulu Live

The number of SVOD subscriptions [for movies, linear channels and TV episodes - excluding other platforms such as sports services] in North America will climb by 110 million from 160 million in 2018 to 270 million in 2024. These figures are gross – many homes take more than one SVOD platform. Digital TV Research forecasts that 77.8% of TV households (94 million) will subscribe to at least one SVOD platform by 2024.

The average SVOD household will pay for 2.89 SVOD subscriptions. This compares to 70.0% of TV households (84 million) TV households subscribing to at least one SVOD platform by end-2018. The average SVOD subscriber paid for 1.91 SVOD platforms at end-2018.

Simon Murray, Principal Analyst at Digital TV Research, explained: "Several high profile SVOD launches are imminent. We expect that Disney+ will have 25 million US subscribers by 2024. Apple TV+'s growth will be more modest at 8 million by 2024. This means that Netflix's share of the total will fall from 37% in 2018 to 25% in 2024 - despite the company adding 10 million subscribers."

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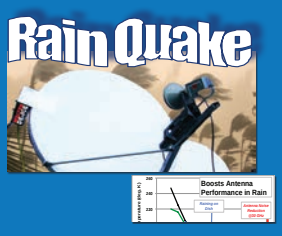
Rain Quake



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The Satellite Markets 20 Index™

Company Name	Symbol	Price May 1, 2019	52-wk Range	
Satellite Operators				
Asia Satellite Telecommunications Holdings Li	1135.HK	6.68	4.62	6.90
Eutelsat Communications S.A.	ETL.PA	16.09	14.80	23.11
APT Satellite Holdings Limited	1045.HK	3.52	2.47	3.80
Inmarsat Plc	ISAT.L	545.20	335.30	646.00
SES S.A.	SES.F	15.22	11.86	20.81
Satellite Manufacturers				
The Boeing Company	BA	377.69	292.47	446.01
Maxar Technologies	MAXR	4.93	3.83	55.28
Lockheed Martin Corporation	LMT	333.33	241.18	351.35
OHB SE	OHB.DE	35.7	27.55	38.25
Honeywell International Inc.	HON	173.63	123.48	174.01
Equipment Manufacturers				
C-Com Satellite Systems Inc.	CMI.V	1.67	0.98	1.90
Comtech Telecommunications Corp.	CMTL	23.53	20.95	36.94
Harris Corporation	HRS	168.50	123.24	175.50
ViaSat Inc.	VSAT	90.82	55.93	90.93
Gilat Satellite Networks Ltd.	GILT	8.83	7.54	10.74
Service Providers				
DISH Network Corporation	DISH	35.12	23.22	37.47
Globalstar Inc.	GSAT	0.53	0.29	0.73
Orbcomm Inc.	ORBC	7.24	6.19	11.25
Sirius XM Holdings Inc.	SIRI	5.81	5.48	7.70
Speedcast International	SDA.AX	3.88	2.73	6.83

The Satellite Markets 20 Index™ is a composite of 20 publicly-traded satellite companies worldwide with five companies representing each major market segment of the industry: satellite operators; satellite manufacturers; equipment manufacturers; and service providers. The base data for the Satellite Markets Index is January 2, 2008 - the first day of operation for Satellite Markets and Research. The Index equals 1,000. The Satellite Markets Index™ provides an investment benchmark to gauge the overall health of the satellite industry.

INDEX	Index Value May 1 2019
Satellite Markets 20 Index™	2,645.76
S & P 500	2,867.19

avia
ASIA VIDEO INDUSTRY ASSOCIATION

Satellite Industry Forum 2019

17 June 2019, Four Seasons Hotel Singapore
#aviasif

As 2019 progresses, it will be of interest for many to find out what trends the satellite industry will see play out this year, as well as what the key drivers of growth will be for operators and customers alike.

Gearing up with new discussion topics, AVIA Satellite Industry Forum 2019 is proud to announce the preliminary program and introduce an early lineup of distinguished speakers:

Keynote:
Steve Collar
President & CEO
SES

Huang Baozhong
EVP
APT Satellite

Roger Tong
CEO
AsiaSat

Jean-François Fenech
CEO
Eutelsat Asia, Chairman of AVIA Satellite Industry Committee

Mitsutoshi Akao
Executive Officer & Group President, Global Business Group Space & Satellite Business Unit
SKY Perfect JSAT

Barry Matsumori
CEO
BridgeSat

M.N. Vyas
Founder Member and Executive Director
Planetcast Media Services

Mark Dankberg
CEO
ViaSat

Suwit Pruckwattananon
Chief Business Development Officer
mu Space

Mark Rigolle
CEO
LeoSat Enterprises

Neville Meijers
CCO
Kymeta

John Finney
CEO
Isotropic

Gregg Daffner
CEO
GapSat

Stéphane Vesval
VP, Commercial & Export Space Business
Airbus

Amanda Chia
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For registration, contact Vanessa@asiavia.org

For sponsorship, contact Adela@asiavia.org

For speaking, contact Jaime@asiavia.org

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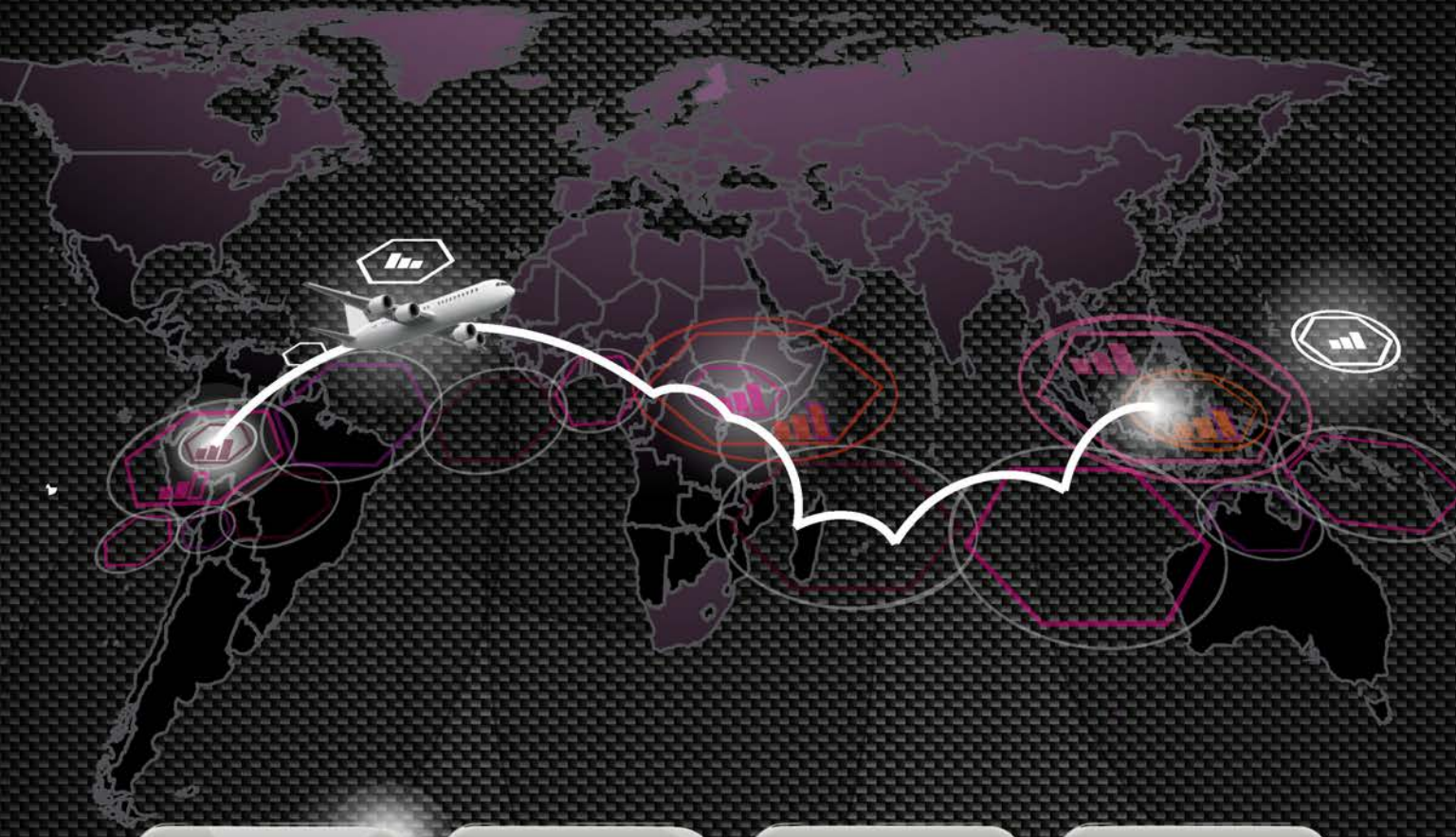

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