

Satellite Executive BRIEFING

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Industry Trends, News Analysis, Market Intelligence and Opportunities

Opportunities in the Satellite Ground Segment Market

by Dan Freyer

Satellite Executive Briefing spoke with executives from large and emerging ground equipment suppliers about challenges and opportunities they are seeing in global and regional markets.

Not surprisingly, mobility continues to be a growth engine across the board, with in-flight (IFC) a sought-after, if challenging opportunity. Export opportunities into and from Europe remain strong for suppliers in terrestrial wireless backhaul. HTS architectures and new constellations have suppliers' attention as Ka-Band systems continue to deploy for broadband consumer, enterprise, and even interactive IP DTH systems in emerging markets.

Mobility Is King

In its June 2018 State of the Satellite Industry report, the Satellite Industry Association, a U.S.

trade group, reported a 5.6% year-on-year increase for industry ground equipment revenues including GPS equipment to \$119.8 Billion in 2017.

According to another market research report conducted by global broadband VSAT supplier, Gilat Satellite Networks, Ltd, satellite bandwidth capacity is expected to expand from 439 Gbps to 4.8 TBps between 2016 to 2023. "The highest growth segments moving forward are the IFC (Aero) and backhaul segments, while the Enterprise and Maritime segments are expected to remain flat. Consumer broadband will continue to be the larg-

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New Space



The new year is off to a running start with two shows right at the gate with the Consumer Electronics show (CES) in Las Vegas taking off on January 7 and the Pacific Telecommunications Council (PTC) in Hawaii on January 19. While the CES is not traditionally a show that satellite people normally go to, it is becoming more relevant as the satellite industry is looking for opportunities in Over the Top (OTT) and Internet of Things (IoT). The PTC, on the other hand, has always had a good satellite component and this year the World Teleport Association (WTA) and the Asia-Pacific Satellite Communications Council (APSCC) are featuring panel discussions at the conference.

In this issue we have a report from the DC5G conference in Washington, D.C. by our Associate Editor, Elisabeth Tweedie. 5G is becoming a hot issue for the satellite industry. Here at Satellite Markets we will cover not just the major satellite shows but other conferences and exhibitions such as this month's PTC and CES. Watch out for our coverage on these events at our website www.satellitemarkets.com and in the next issue of the Satellite Executive Briefing, 

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Opportunities in the...

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est segment, although its share is expected to drop substantially over the period” says Doreet Oren, Director Product Marketing & Corporate Communications for Gilat Satellite Networks. The company’s portfolio includes cloud based VSAT network platform, high-speed modems, on-the-move antennas and high efficiency, high power Solid State Amplifiers (SSPA) and Block Upconverters (BUC).

The company is focused on three segments: In-flight Connectivity (IFC), cellular backhaul and consumer broadband access for its Gilat’s SkyEdge II-c multi-service ground segment platform with X-Architecture.

Aeronautical (Aero) IFC Segment

Other providers agree that IFC is hot. With potential demand for thousands of aircraft systems yet to be purchased and deployed, the opportunity is enormous, and competition is fierce, vendors say.

“The fastest growing market globally is for in-flight connectivity as part of the mobility market,” says Heidi Thelander, Sr. Director of Business Development, Comtech Xicom Technology. The company, a unit of Comtech, is a leading supplier of tube-based and Solid State Power Amplifiers (SSPAs), and Block Upconverters (BUCs) for commercial and military satcoms, with power levels from 8 W to 3 kW, and frequency coverage within the 2 GHz to 52 GHz spectrum.

“The in-flight connecti-

ty satcom market was almost nothing just a few years ago,” says Thelander. “A wide range of companies, business models, and solutions have been created to address the market. Airlines and end users are having to sort through all the options available to them to find what works best. This market is expected to continue expanding, adapting, and eventually focusing on the most promising business models and



There is an explosion in demand for in-flight connectivity satcom market and a wide range of companies, business models, and solutions have been created to cater to the market. (Euroconsult photo)

solutions.”

Delivery of uninterrupted Internet connectivity for hundreds of passengers over the course of a ten-hour transcontinental flight is a complex undertaking. “Ensuring uninterrupted connectivity during a long transcontinental flight requires the onboard antenna to be able to “talk” to multiple satellites along the way, in Ka and/or Ku band. Particularly when working with narrow-beam HTS satellites, IFC providers need to seamlessly switch between beams and satellites as the plane travels,” explains Gilat’s Oren.

Gogo, which operates one of the world’s largest global satel-

lite networks for IFC, began upgrading the majority of its fleet to using Gilat’s modem during the past year for use with GoGo’s 2Ku service. Gogo has deployed Gilat’s hub platform at 15 locations worldwide and uses capacity from over 25 satellites. Gogo announced that Gilat’s modem can deliver more than 16x the throughput of GoGo’s previous modem. Gilat’s end-to-end broadband solution for In-Flight

Connectivity includes both airborne components and a complete ground segment infrastructure. The airborne components include Ku/Ka antennas, Wavestream transceivers and the Taurus MODMAN (modem manager), which have been installed in hundreds of Boeing, Airbus and other types of commercial aircraft.

LTE Backhaul

“In general, the worldwide mobility segment is the fastest growing segment for our business,” according to Doreet Oren. “It has expanded from US\$ 63million in 2016 to US\$ 80 million in 2017. We forecast continued revenue growth in this segment expect-

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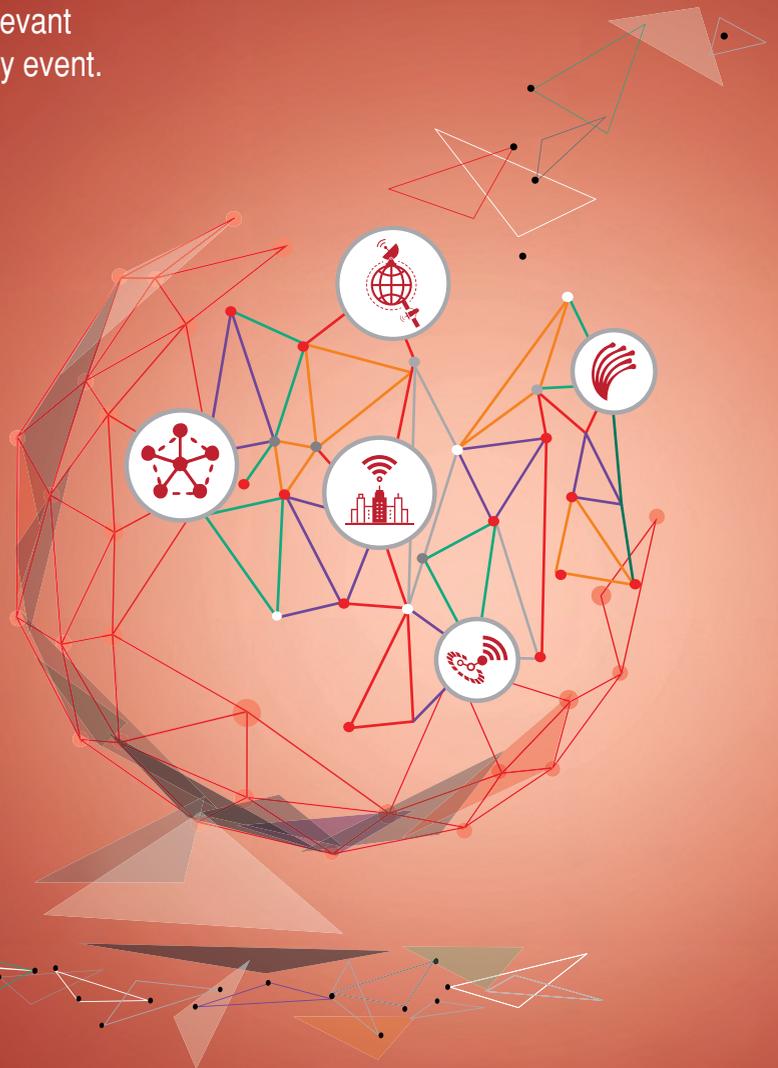
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ing around US\$ 100 million in 2018 from the worldwide mobility segment,” says Oren. In May 2018, Gilat reported first quarter 2018 revenues totaled US\$ 67.4 million, up 5.4% on the prior year, with around 40% revenue growth in its Fixed Networks and Mobility segments.

“The European market represents a substantial share of Gilat’s total revenues and we expect this market to continue to expand. Most of our revenues in Europe come from consumer broadband and cellular backhaul applications. In Europe, as well as globally, we focus on cellular backhaul solutions for mobile network operators (MNOs), as well as consumer broadband access solutions.”

According to the Oren, among VSAT players, Gilat leads the global cellular backhaul LTE market, having projects with Tier-1 MNOs worldwide such as Optus in Australia, SoftBank and KDDI in Japan, Globe in the Philippines, Sprint and T-Mobile in the United States, and others under its belt.

In Europe, Everything Everywhere (EE), part of the BT Group, is using Gilat’s satellite backhaul solution over high throughput satellites with a goal of extending its LTE network coverage to over 95% of the UK landmass by 2020, while enhancing network resilience and backup. Another European backhaul customer deal noted recently by CEO Yona Ovadia to share-

holders, is a backhauling deal for critical communications with Altice in Portugal.

Another player perceiving continued demand from backhaul applications is Quintech Electronics & Communications, Inc., a leading supplier of RF signal management equipment including L-Band RF matrix switches used in teleports, NOCs, cable head ends and broadcast facilities around the world. According to David Chan, Vice President of Sales & Marketing for Quintech, “We see the bandwidth for cellular backhaul and IPTV continuing to increase, while the bandwidth for broadcast and CATV programming remaining flat.”

Room for Innovation

Although the VSAT market is dominated by long-established large supplier like Hughes, Gilat, and iDirect, which collectively shipped about 87% of terminals in 2016 according to Comsys, the growing pie, along with new

architectures in has left room for new players to gain and sustain traction in different segments.

Smaller players have focused on specialized applications, such as defense networks. An example is Canadian supplier Spacebridge, headquartered in Dorval Quebec. The new company was spun out of Advantech Wireless, which sold its microwave and other business earlier in 2018 and according to Comsys VSAT Reports had a 2.5% global market share in 2016 shipments. Advantech Satellite Network’s ASAT II™ WaveSwitch™ technology allows-on-the-fly waveform switching between low-footprint MF-TDMA connectivity and high-throughput dedicated SCPC links that can be required for applications such as C4 video streaming from field-deployed troops, UAVs and land-mobile vehicles to command centers. “ASAT™ dynamically allocates bandwidth from a single shared bandwidth pool for highest efficiency,” ex-



Reports say Gilat’s satellite solutions are enabling cost effective and rapid deployment in rural areas, allowing the company to lead the cellular backhaul LTE market. (Gilat photo)

COVER STORY

plains Managing Director, Assaf Cohen. Platforms that partition waveforms to separate pools suffer from reduced efficiency and require additional management, according to Cohen. "In contrast, Advantech Satellite Network's™3D BoD™ and WaveSwitch™ provide multi-dimensional on-demand capacity assignment (SLA, demand and seamless waveform optimization), which delivers optimum efficiency. For mobility, we can save up to 30-50% of bandwidth as the dimensions can be modified on the fly via a single algorithm in our technology," he says.

A relatively newer player in the VSAT marketplace, UHP Networks manufactures VSAT equipment with a unique software-defined architecture, and a

stated ambition to disruptively innovate in the VSAT industry.

The company offers complete network solutions based on its product line of UHP (Universal Hardware Platform) satellite routers and NMS (Network Management System). UHP Networks has been growing at an annual average rate of 40% over the last 4 years. It has installed more than 300 networks in 45 countries. The company shipped 10,000 remote terminals and 31 Hubs in 2017 alone. Around 30% of its business comes from Europe today.

"Our solutions have superior scalability and unparalleled price/performance characteristics," says Dr. Vagan Shakhgildian, CEO/President of UHP Networks. "The UHP design has up to 10 times higher pack-

ets-per-second processing (PPS) capability and up to 20% greater TDMA bandwidth efficiency than the nearest competitor. Each system module can be dynamically configured to operate as Star or Mesh terminal, High-speed SCPC modem or a node of a Hubless TDMA network or an element of TDM/TDMA VSAT Hub," Shakhgildian says.

At IBC 2018 in Amsterdam, UHP networks demonstrated its latest, a very-high speed 430 Msps DVB-S2X forward link that will work with existing UHP-100 and UHP-200 satellite routers and the company's new multi-service Hub.

Smaller, Lighter, Rounder and Flatter

Industry opportunities have also attracted new players in



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The New Shape of Solid State

the RF and power amplifier market despite a strong base of well-established suppliers such as Communications and Power Industries (CPI SMP), Wavestream (Gilat), Comtech Xicom, Paradise Datacom, Advantech Wireless and others.

An example is Mission Microwave Technologies, LLC headquartered in Santa Fe Springs, CA. Founded in 2014 by industry executives, the company has developed X, Ku, Ka-Band BUCs and SSPAs from 12 to 400 Watts, and is focusing on what it calls the industry's most efficient, lightweight, and compact power SSPAs for commercial, military and space customers. According to Steve Richeson, VP Sales & Marketing for Mission Microwave, "An example is our 200 Watt Ka Band unit that weighs only 10 kg. An operator can literally carry one to install it on an uplink. Competitive BUCs in this range would require a mechanical lifting device."

Mobility requirements for light, power efficient RF packages continue to push technology suppliers towards innovation and improvements in performance.

Over the past year, Mission Microwave introduced its one-inch thick GaN BUCs, called Flatpacks, for portable terminals, as well as SSPA products with integrated BUCs in a unique cylindrical form factor. According to Richeson, requirements that make Mission Microwave products attractive for mobile and portable applications are the same globally – design, weight / size, and efficiency.

"On the mobile and porta-



Tremendous growth seen in the fly-away and transportable business. Customers are finding fly-away terminals to be easier to manage and deploy than truck-based systems. (Sematron photo)

ble side, we see a growth in the fly-away and transportable business. End users of these terminals now regularly ask integrators to use our products, knowing that any other choice leads to a larger and heavier system design," says Richeson. "Customers are finding these fly-away terminals to be easier to manage and deploy than truck-based systems." Richeson is bullish on the start-up company's growth potential in Europe. "We see tremendous innovation in payload designs from European Satellite operators that can take advantage of very sophisticated ground terminals."

Software Defined Networks (SDR) and Software Defined Networking (SDN)

To integrate with terrestrial solutions, satellite network equipment providers have added Virtual Networking, Software Defined Networking (SDN), Software Defined Radio (SDR) and Cloud capabilities to their product lines.

Employed in terrestrial as well as space communications, Software Defined Radio (SDR) technology uses software to replace hardware components in order to offer increased flexibility and re-

duce costs in radio systems. SDR technology lets operators more flexibly digitize their RF signals so equipment can adapt to communications across various modulation schemes such as satellite air interfaces, wireless protocols like LTE and other radio protocols by software instead of replacing radio hardware.

SDR requirements have spurred demand, for example, for Quintech Electronics & Communication, Inc. RF and Wireless Test Lab systems that help terminal and network designers more efficiently test and validate different device and performance features. According to David Chan, VP Sales & Marketing for Quintech, "We are seeing greater usage of software defined radios (SDR) and networks (SDN). Deployment of these technologies requires significant certification testing that involves costly field trials." The company's Laboratory Automation and Management Platform, Q-LAAMP®, is a software package used with Quintech's NEXUS RF Matrices that significantly increases lab efficiency and reduces test time, enabling cost savings and faster time-to-market. "We have seen

an increase in requests for lab mesh matrix switches that can emulate free space over coaxial cable to prove out the SDR and SDN prior to the field trials,” says Quintech’s Chan.

Software Defined Networks (SDNs) enable cost-savings, flexibility, and operational benefits by replacing hardware functions with software features in telecoms networks. Satellite communications networks are keeping pace. An example is Gilat’s X-Architecture, an SDN-based distributed network architecture. It provides operators with a single platform for multiple applications including fixed (e.g., cellular backhaul) and mobility (e.g., IFC) satcoms use cases. X-Architecture includes a global central management system, supporting any number of teleports and utilizing any number of satellites and satellite beams while ensuring resiliency and redundancy. Transparent switchover between beams, satellites and gateways, while maintaining user application sessions, to ensure end-user service quality.

Also using SDN, UHP Networks recently introduced its Smart Redundancy system design for Hub redundancy to leverage the Software-Defined Architecture of its products. According to the company this dramatically reduces implementation costs for a distributed network of redundant Hubs or master controllers.

Cloud Compatible
10 **Satellite Executive BRIEFING**

As enterprises migrate functions to private, public, and hybrid cloud-based terrestrial networks, in order to stay competitive, satellite data network architectures are incorporating cloud-capabilities that have gained ground in terrestrial environments.

For example, to lower the

ture also allows centralized data processing sites with a scalable, cloud-based design and Network Functions Virtualization (NFV). Global bandwidth management is supported by Gilat’s Cloud Quality of Service (QoS), enabling service providers to provision and manage bandwidth across multi-



As the number and size of MEO and LEO constellations increase, we are seeing the number of earth terminal gateways increasing. (ISS photo)

cost of ownership, UHP Networks uses its own cloud-based network management system for VSAT networks. Network management is carried out through the cloud-NMS which provides the necessary Functionality as a Service (FaaS) and also allows customer to manage the network with online support from UHP Networks’ NOC, according to the company.

UHP is not along in the trend to integrating cloud networking technology. Gilat’s X-Architec-

ple teleports, satellites and user beams from a central NMS.

HTS Architectures: More Beams, Q/V-Band

Executives say the industry is on the verge of a transformation with the expected abundance of GEO, VHSTs (Very High Throughput Satellites) and Non-GEO constellations. Low and medium earth orbit (LEO/MEO) systems consisting of hundreds or thousands of satellites offer big potential sources of new business

for ground technology suppliers, from terminals to RF subsystems to many other network elements and solutions.

“As the number and size of MEO and LEO constellations increase, we are seeing the number of earth terminal gateways increasing,” says Quintech’s David Chan. “This is driving the teleport markets toward a greater number of beams resulting in the need for larger configuration matrix switches. Our patented technology allows Quintech to offer COTS matrix switches with any number of input and output ports (in groups of 8) for a total of 256 per chassis. This lets customers fit all their ports into a single chassis more flexibly, while saving costs and minimizing the amount of required rack space,” according to Chan.

Another big HTS trend that is accelerating is the move to add more and more capacity at higher millimeter wave frequency bands. Constellations are adding Q/V-band payloads to upcoming satellites, in addition to the general expansion into Ka-Band in recent years. To meet potential demand for frequencies once reserved for military, experimental satellite, or terrestrial applications, RF suppliers are tooling up for these new requirements.

For example, Comtech Xicom is moving quickly to offer products at the newer Q/V-band frequencies, building on its Ka-band and Q-band HPA production experience. “Continued proliferation of the HTS systems and new architectures means that the market for high power gateway amplifiers in Ku and Ka-band, as well as new V-band amplifi-

ers, will show further growth,” says Comtech Xicom’s Thelander. To enable gateways at higher frequencies, the company is developing amplifier and converter solutions, including a new 250W V-band TWTA (47.2-51.2 GHz ITU band for satcom) and new multi-band switchable converters.

Looking Ahead: Staying Competitive with Terrestrial Technology

Industry participants also see next generation electronically-steered array/phased-array antenna (ESA/PAA) technology becoming more valuable as Non-GEO satellite networks expand. On-the-move applications, and IFC in particular, benefit from aerodynamic, flat antennas that can be electronically-steered with no moving parts.

According to Gilat’s Doreet Oren, “Electronically steerable beam capabilities of ESA/PAA (electronically-steered array/phased-array antenna) antennas better accommodate the need for intensive and robust multi-beams and satellite tracking that are required in the lower and medium orbit constellations.”

As the demand for broad-

band continues to grow across markets and applications, she believes that VHTS satellites will play a large role in delivering superior quality, high throughput services. “Looking ahead, we expect to see more and more hybrid GEO-NGSO networks leveraging the advantages of multi-orbit constellations, as well as integrated satellite-terrestrial networks. Leveraging the low latency of NGSO, we believe that satellite will play a major role in 5G deployments as well as IoT/M2M applications. All these will serve to meet the challenging requirements of growing broadband usage, users and markets, which are characterized by high data rate, high spectral efficiency, high mobility and high cost-efficiency.”

The exponentially increased the supply of satellite capacity worldwide has made satellite an economically viable alternative for broadband connectivity, industry players say. But to keep pace with the new technical and market challenges in this dynamic environment, ground technology suppliers will need to continue driving down costs and increasing performance and utility. 



Dan Freyer is the Principal of **AdWavez Marketing LLC**, (<http://www.AdWavez.com>), a Los-Angeles-based boutique PR and marketing agency uniquely focused on helping space and related technology organizations expand their customers and markets. He brings over 20 years of experience helping leading satellite manufacturers, operators, and service providers grow their businesses. He can be reached at dan@adwavez.com.

Developments in the 5G Ecosystem

by Elisabeth Tweedie

The second DC5G held in Washington DC last November 2018, was not specifically targeted at the satellite industry, and representatives were in the minority, at the conference. It is however a subject that we cannot afford to ignore. Plenty has been written and said about the spectrum requirements, which seem destined to have a major impact on C-Band customers in the US and probably around the world. And Ka-Band customers may well see a similar impact.

However, whilst spectrum is a huge issue, and one that deserves all the attention that it is getting; 5G could also be a significant business opportunity and one the industry should be paying more attention to. 5G is the cellular network on steroids. It is expected to deliver speeds of

up to 10Gbps, 100 times faster than today's 4G LTE networks. Latency is to be reduced to one to four milliseconds from a theoretical 20 milliseconds today, and capacity is to be increased to one million devices per square kilometer.

Several of the speakers were tasked with defining the "killer app" for 5G. There was no consensus on that, but there was con-

sensus over the fact that that 5G has the potential to be transformational, enabling many new applications that could significantly change our lives. John Godfrey, SVP Public Policy, Samsung, in the opening keynote, pointed out that as technology advances, new applications emerge. The enhanced bandwidth provided by 4G-LTE (Long term evolution), enabled the sharing economy: Uber and Lyft for example. So,



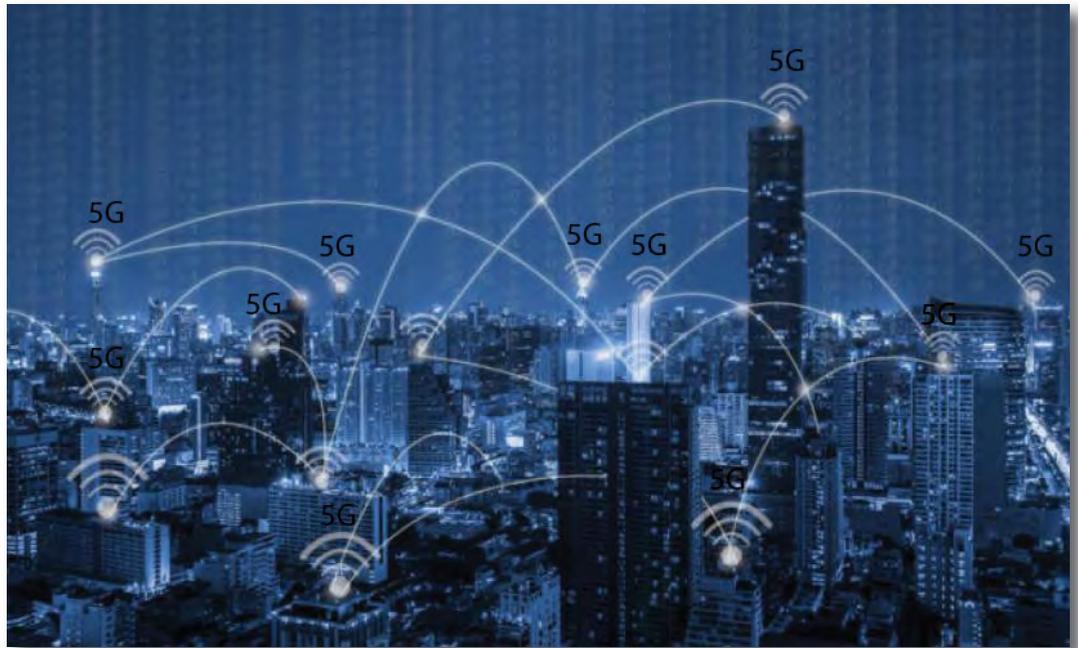
expect new and innovative applications to emerge.

Already there are experimental applications of augmented reality, that go way beyond Pokemon. An example that was mentioned, was the use of Google glass headsets to guide someone using a defibrillator. Godfrey, talked about using Virtual Reality in pain management.

Showing a person, a calming, soothing environment has been demonstrated to reduce pain levels, not only whilst emerged in the experience, but also afterwards.

Another example of augmented reality was given by Adam Zuckerman, Director of Ventures and Innovation, Discovery Inc. He envisaged a heads-up display in a car, that would mimic passing scenery, providing information; names and heights of mountains for example. There was considerable discussion over lunch, as to whether this would count as driver distraction or not!

The Internet of Things, is already happening, but many of the applications will be enabled by the enhanced capacity of a 5G network. Eugene Grant, the mayor of Seat Pleasant, MD, recognized as one of the world's smart cities, spoke about having sensors in homes, that would alert the emergency services when someone hadn't moved for a specified amount of time. This was cited as a way to avoid the tragedy of an elderly resident lying dead for



Connected cities: The Internet of Things, is already happening, but many of the applications will be enabled by the enhanced capacity of a 5G network.

days before anyone noticed.

Unsurprisingly, all this additional and linked information, that may be gathered, raised concerns about privacy and security.

“...there are four ‘sweet spots’ for satellite in 5G. These are: trunking and headend feed, backhauling and tower feeds, comms-on-the-move and hybrid multiplex (delivering content to complement terrestrial broadband)...”

One of the sessions was devoted to this topic. The Honorable Jill Kelley, President Military Diplomacy Strategies LLC, insisting that protecting personal information was the job of the government. Drew Martin, Director Federal Cyber Security Technology and Engineering Programs, T-Mobile, vehemently disagreed, stating that it is the carriers' job to protect data.

Whilst delivering millisecond latency effectively rules satellite out of the equation, it is not a prerequisite for many applications. Morten Hagland Hansen, VP Segment Market Management — Energy, SES Networks, pointed out that there are four “sweet spots” for satellite in 5G. These are: trunking and headend feed, backhauling and tower feeds, comms-on-the-move and hybrid multiplex (delivering content to complement terrestrial broadband). These areas take advantage of satellite strengths of high

bandwidth and ubiquitous coverage, enabling and extending 5G networks.

Network densification is needed for 5G, by 2025 a 50% increase in the number of base stations is forecast, and Chris Pearson, President 5G Americas stated that this process needed to start now, the industry couldn't afford to wait for 5G, before installing the additional base stations. Couple this with the tremendous growth in video; Cisco are forecasting that between 2016 and 2021, video will increase 8.7-fold to account for 78% of mobile traffic, and it is obvious that the demands for backhaul will increase correspondingly. Clearly, most of this will be in metro areas, where there is no or very limited place for satellite, but some will not be, meaning increased demand for satellite backhaul. Even with the increased capacity of 5G, delivery

of vast quantities of Over-the-top (OTT) video, much of which will be the same, to individual devices, has the potential to strain the network, potentially opening the door for satellite delivery to the edge.

There are a multiplicity of organizations and committees working on standards for 5G, many of them, based in Europe. Some of them have satellite as their main focus. This marks the

first time, that satellite has been considered as the standards are being developed, nevertheless, as Hansen stated: "We need to be the ones that fit in, and make it easy for cellular operators to incorporate satellite." SES is very actively involved in many of the committees, other satellite companies represented include: Avanti, Echostar, Eutelsat, Gilat, Hispasat, Intelsat, LeoSat, Newtec, Telesat and Viasat. 



Elisabeth Tweedie has over 20 years experience at the cutting edge of new communications entertainment technologies. She is the founder and President of Definitive Direction (www.definitivedirection.com), a consultancy that focuses on researching and evaluating the long-term potential for new ventures, initiating their development, and identifying and developing appropriate alliances. During her 10 years at Hughes Electronics, she worked on every acquisition and

new business that the company considered during her time there. She can be reached at etweedie@definitivedirection.com.

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Mitja Lovsin, General Manager, STN Networks



Can you give us a brief overview of the status of your business at this point? How do you see your position the markets that you serve?

STN (Satellite Telecommunications Network) is a recognised leading global teleport, with its head quarters based in Slovenia, in the heart of Europe.

STN operates on a global scale with extensive knowledge regarding individual regions around the world, giving the company an insightful advantage which allows it to quickly adapt to the market requirements and develop further with emerging trends.

The extent of STN's service portfolio is vast which includes single channel start-ups, multi-top tier DTH platforms, equipment co-hosting, telemetry tracking & control, IP backhauling and much more.

Our industry has experienced many changes throughout the last decade with the pace increasing exponentially over the later years, but so too has STN advanced and today its service capabilities go far beyond satellite and fibre.

What market segments has your company been involved in where you see the best potential growth for your company?

STN's past growth has been predominately based on the traditional broadcasting over satellite and all its related services. This market segment is still a major focus and steady growth is still being achieved even in this changing environment. However, it is evident that more and more clients want to have a hybrid distribution solution in place allowing them to easily extend their services from satellite to full OTT solutions.

At STN this evolving demand was already taken into account in previous facility technical upgrades and the company currently provides worldwide satellite distribution which incorporates a full OTT solution if so required. These combinations of available services makes

STN an all-inclusive solution centre for broadcasters.

On the teleport business in general, what changes do you see affecting it and how are you coping or taking advantage of the opportunities as a company?

Apart from the technical advances and other previously mentioned changes within our industry it is very clear that for many the current focus is on the LEO (Low Earth Orbit) satellite constellations and the need to accommodate the infrastructure for higher volumes and faster transfer of data.

A premium teleport ground station such as STN could be foreseen as the perfect location to host or sub-contract sections of this business market.

With its terrestrial fibre infrastructure that is second to none, virtually unlimited internet bandwidth, fully redundant connections to all major PoPs around the world and the fast easy process to obtain frequency licenses makes STN a very advantageous partner.

Recently acquired building permission on purchased adjoining land to the current facility will now provide extensive ground space for antennas making future development possibilities in this area of the business almost limitless.

Where do you see your business in the next few years? What can we expect from STN in the coming year and beyond?

STN has grown to be a key player in the teleport industry and we are very positive that we will see continued expansion and business development in current and future business markets.

Anything else you would like to add?

It is always a pleasure to speak to Satellite Market and Research magazine and we look forward to adding to our story. We wish all your readers a very successful 2019. 

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Guess Who is “MINDING THE GAP?”

by Lou Zacharilla

I cannot say truthfully that the taste of kava will rival Veuve Clicquot, a smooth Italian Amarone or a glass of New York City tap water for that matter. But kava does give you a sedating buzz that is a combination of no-vocaine on top of an hour of Zen meditation.

I know because I had my first taste of it in 2018 during this year’s annual Better Satellite World awards in London thanks to the nation of Vanuatu. It was a heady night, as always.

The Nobel Laureate and environmental activist Al Gore said that the “only true, inexhaustible natural resource is human intelligence.”

If Al is right (and some very intelligent people, including members of the 2018 UN Broadband Commission’s report at the Mobile World Congress event in Spain, have in more bureaucratic jargon echoed his theory) you only need to look at the state of the much-discussed “digital divide” to see that we are still leaving a hell of a lot of “oil” in the ground and bushels of “peaches”

to rot.

Over 50% of the people on this planet, all of whom presumably are children of god, entitled to human rights and economic contributors still do not have affordable, adequate or ANY access to broadband. We know the familiar mantra. We hear it often from our own lips and increasingly those of the political class and media pundits.

But when we started to hear it from the “smart money” the ground shifted. People who put their money and their mouths where their minds are seemed to shake loose a paradigm that seemed glued. You know the litany of names who have barged into the space and satellite industry: Gates, Bezos, Musk and Wylter. You may not know others

who are among the intellectual architects of this initiative, such as Madame Suvi Linden, former Commissioner of Communications of Finland (an Intelligent Community Visionary of the Year for legislate the effort to declare Broadband a human right) and Philipp Metzger, Director General of the Federal Office of Communications (OFCOM) of Switzerland who earlier in the year helped orchestrate and present an important report for policy makers and regulators on ways to close the digital divide.

Combined, the momentum for “minding the gap” that separates billions of us from our potential has been accelerated by the satellite industry. Since connectivity is the first step to building the refinery of the mind that Mr. Gore spoke of, it is not a surprise that satellites are involved. While connectivity is not the final step to the successful development of regions and communities toward sustainable economic and social goals, none of it will happen without satellite playing a major role.





The Kacific team at the Better Satellite Awards held in London last December.

In London, at the SSPI's Better Satellite World awards, hosted by Milbank Law and the SSPI UK Chapter, there was an informal theme in 2018, "How Satellite is Minding the Gap." Everywhere satellite is helping people and places take an important first step.

This was the reason I had my first encounter with kava, a drink used to celebrate important events on the Pacific Island of Vanuatu.

Along with the initiators and satellite operator signatories of the Crisis Connectivity Charter, a major game-changing capacity agreement that will improve response times after disasters; Goonhilly Earth Station and Leeds University, which teamed to run a program that systematically trains young Africans to become entrepreneurial change agents back home; and Greg Wyler, named the UK's Personality of the Year by SSPI's UK Chapter - and who will only need an introduction if OneWeb fails (LOL) - Kacific Broadband Satellite also

"...An increasingly complex 'knowledge economy' has reached the shores of islands where kava is served..."

received the award.

With the founding investors of the venture on hand, including Candace Johnson, a co-initiator for the founding of SES Global and Christian Patroux, Kacific's CEO, Vanuatu's Ambassador to the European Union, the Honorable John Licht, whipped up a batch of something brown and liquid at a private ceremony prior to the Reception and Awards Dinner. Yeah, kava.

The best poetry is often uttered under the influence. And so it was that 30 minutes later I was relaxed enough to tell a sold-out room that in four short years that Kacific, with the help of Boeing and SpaceX, has begun to drive the spikes for the "new railroad" of the Pacific Islands. Kacific-1

will bring more payload and faster service at lower cost. It must. The stakes are high. And Kacific understands this, as did the others who received the Better Satellite World awards before them.

Perhaps Kacific's model will infiltrate more of our industry which sells broadband capacity through partners. Patroux and his partners were very clear that to be successful providers of telecom and broadband services are expected to evolve into "stakeholders" in the future of the places they serve. This is not only about selling satellite capacity this time. It is about tapping the endless resource. 🌐

Lou Zacharilla is the Director of Innovation and Development of the Space and Satellite Professionals International (SSPI). He can be reached at: LZacharilla@sspi.org



The Satellite Value-Add in Geneva & Dubai

Symposium Precursor to World Radiocommunication

Summit and Satellite Hub Summit at CABSAT

by Martin Jarrold

A brief retrospective of the GVF's calendar for the closing weeks of 2018 together with a summary of a major regional event taking place towards the close of the first quarter of 2019 together provide ample illustration of GVF's creative innovation in evolving and promoting mission-critical partnerships which facilitate debate on development and growth of the global satellite industry.

Following initial discussions in January 2018 between the ITU Radiocommunication Bureau Space Services Department and GVF, and further planning and preparation between the GVF Secretariat, GVF member Mahdi Bagh Computers Private Limited (MBC), and Geneva, GVF partnered with the ITU in delivering a November 2018 symposium focused on capacity building for national regulators.

The Satellite Symposium delivered at ITU's headquarters was supported by Hughes, SES,

Eutelsat and QuadSAT – with content development and extensive training support resources delivery provided by MBC staff – and took place just before the ITU World Radiocommunication Seminar 2018 (WRS2018).

The objective of the Satellite Symposium program was to build capacities with WRS2018 delegates, informing national regulatory authorities about the latest technology innovations in satellite communications, creating a greater level of understanding of the nature of the rapid mobilization of satellite based communication links, and providing an understanding of methodologies and approaches to reducing and mitigating the causes of satellite interference. The symposium was well attended by large numbers in-person and was simultaneously web-cast.

Following opening remarks made by Alexandre Vallet, Chief, Space Services Department, Radiocommunication Bureau, and



Jorge Ciccorossi, Senior Engineer, Space Services Department, Radiocommunication Bureau, GVF chaired the Symposium for the sessions of the first two-and-a-half-days.

During the Symposium, WRS2018 delegates from all continents had the opportunity to advance their understanding of the latest satellite communications systems and service trends, as well as of regulatory, policy and spectrum coordination issues. The addition of the Symposium to the continuation of the WRS series – previously held in the Americas, European and Asian regions – facilitated the inclusion of a hands-on outdoor workshop where participants had the opportunity to gain experience in the installation and use of satellite terminal equipment and to perform anten-

na pointing accuracy measurements. Simon Gray of Eutelsat, supported by Riaz & Fehmida Lamak and Shafeeq Hamza, also of MBC, demonstrated the use of an installation application for the Eutelsat Tooway system, and delegates practiced the use of the correct cable-stripping and crimping tools to correctly prepare terminal connections, also accessing the Internet over the established satellite link.

The final sessions of day three addressed the coexistence of small satellite constellations with other systems, related regulatory

itarian Affairs, Eutelsat; member of the GVF Board of Directors): “United Nations Crisis Connectivity Charter”

- Brennan Price (Senior Principal Engineer, Regulatory Affairs, Hughes/EchoStar): “Evolution & Future of Broadband Satellite Services”
- Joakim Espeland (CEO, QuadSAT): Drone technology in satellite terminal testing & installations
- Riaz Lamak (GVF Liaison on International Training, Benchmarking, Validation &

the event, and photographs of the proceedings may be accessed as follows:

YouTube video: <https://www.youtube.com/watch?v=FI-9AX0-nAYQ>

Photographs: www.flickr.com/photos/itupictures/albums/72157704046110604

The ITU Satellite Symposium 2018 has been lauded a significant innovation and a great first-time success, thanks to the invaluable material and personnel resources contributed by the members of GVF – Mahdi Bagh Computers



From left to right: Jorge Ciccorossi, ITU; Alexandre Vallet, ITU; Martin Jarrold, GVF; and Fehmida Lamak, MBC. Photo Credit: GVF

issues and new solutions on space monitoring.

The presenters/panelists and themes included (* Presentation slides available at www.itu.int/en/ITU-R/space/workshops/2018-SmallSat/Pages/Presentations.aspx):

- Christine Leurquin (VP, Institutional Relations & Communications, EMEA, SES) “Emerging Technologies & Innovations”
- Simon Gray (SVP, Human-

Product Quality): GVF-MBC classroom-based training

- Dr. E.P. Balasubramanian (Former Deputy Director Indian Space Research Organization): “Introduction to Satellite Communications”; “New Systems Technologies”; “Launch Vehicle Technology”; “Satellite Interference Reduction”

As well as the link to access speaker/panelists’ presentations (as above), a video summarizing

Private Limited, Hughes, SES, Eutelsat and QuadSAT – and the collaborative facilitation and leadership of the ITU’s Space Services Department.

In 2019, CABSAT returns to its traditional March calendar slot, and once again the Dubai exhibition will be complemented with an important GVF program of key satellite industry themes which will afford a high-profile to participating speakers and supporting sponsor organizations.



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*Source: Saudi General Entertainment Authority (GEA) Announcement - Feb 2018

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MARKET INTELLIGENCE

The GVF Satellite Hub Summit @ CABSAT 2019 – the 5th event in the successful series and one of the most important regional platforms delivered by GVF for MENA & South Asia – takes place over 12th to 14th March at Dubai International Convention & Exhibition Centre/Dubai

the Satellite Hub Summit include Euroconsult, Northern Sky Research (NSR), and SpaceWatch Global. Stéphane Chenard of Euroconsult, Chris Baugh of NSR, Torsten Kriening of SpaceWatch Global, Riaz Lamak, GVF South Asia Liaison for Training, Benchmarking, Validation & Product

applications, and markets.

Also, during the CABSAT exhibition GVF's traditional evening reception will again be generously hosted by the GVF member organization MenaNets, and its CEO, Mazen Nassar, who is one of GVF's principal trainers in the MENA region. For more



ITU staff, GVF trainers & Symposium/Workshop delegates with Tooway satellite terminals.

Photo Credit: GVF

World Trade Centre.

The previous four years of the event have been widely recognized as an essential value-added feature of the exhibition. The 2019 program will comprise two full days (12th & 13th March) of free-to-attend, presentation-based, and panel discussion-focused content, presented within a physical "Hub", an open-access theatre-style structure situated within the satellite exhibition halls. In 2019, the format will be augmented with an additional half-day paid-for Workshop session on the final day of CABSAT, 14th March.

Key Knowledge Partners for

Quality, as well as Virgil Labrador, Editor-in-Chief of this publication, will comprise the moderating team. An important Media Partner will obviously be Satellite Markets & Research, and others will include Satellite Evolution EMEA, talk Satellite, and SatellitePro ME.

The GVF Satellite Hub Summit is an established major focus for the discussion of satellite communication industry themes applicable to the Middle East, North Africa and South Asia regions, and serves to create a prominent platform for addressing and analyzing evolutionary and revolutionary transitions in satellite technologies, services,

information about GVF's CABSAT high profile speaking and sponsorship opportunities, please contact me at martin.jarrold@gvf.org.



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

United Technologies to Separate into 3 Independent Companies; Completes Acquisition of Rockwell Collins

Farmington, Connecticut, Nov. 26, 2018— United Technologies has announced the completion of its acquisition of Rockwell Collins and the company's intention to separate its commercial businesses, Otis and Carrier (formerly CCS), into independent entities.

The separation will result in three global, industry-leading companies:

- United Technologies, comprised of Collins Aerospace Systems and Pratt & Whitney, will be the preeminent systems supplier to the aerospace and defense industry; Collins Aerospace was formed through the combination of UTC Aerospace Systems and Rockwell Collins;
- Otis, the world's leading manufacturer of elevators, escalators and moving walkways; and
- Carrier, a global provider of HVAC, refrigeration, building automation, fire safety and security products with leadership positions across its portfolio.

“Our decision to separate United Technologies is a pivotal moment in our history and will best position each independent company to drive sustained growth, lead its industry in innovation and customer focus, and maximize value creation,” said United Technologies Chairman and Chief Executive Officer Gregory Hayes.

United Technologies Corp., based in Farmington, Connecticut, provides high technology products and services to the building and aerospace industries. By combining a passion for science with precision engineering, the company is creating smart, sustainable solutions the world needs.

Rohde & Schwarz Acquires Pixel Power

Munich, Germany, November 27, 2018 — Rohde & Schwarz has acquired Pixel Power Limited, a Cambridge, UK- based company, which offers innovative graphics, master control and integrated playout systems for broadcasters and playout faci-

ties. These systems enable dynamic content to be delivered more efficiently for linear TV, mobile, online and OTT/VOD.

Pixel Power has consistently developed its portfolio of software-based IP solutions that are virtualizable for the private or public cloud, whilst offering new OPEX business models as part of the broadcast technology transformation. The company has been developing and deploying broadcast solutions for 31 years. With this acquisition Rohde & Schwarz further expands its portfolio to complement existing product lines.

Cornelius Heinemann, Head of Transmitter and Amplifier Systems, File Based Media Solutions, said the acquisition significantly expands Rohde & Schwarz's Broadcast & Media portfolio with new and exciting solutions. “Together we can combine the software defined technologies and virtualized environments to offer customers the very real benefits that they provide in broadcast playout and VOD markets,” he said.

James Gilbert, co-founder and CEO of Pixel Power, adds, “Our virtualizable integrated playout technology is making a major contribution to Rohde & Schwarz reaching its ambitious goals for cloud-based solutions. Our modern license and payment model also contributes to this. In return, the Rohde & Schwarz size, stability, structures and competencies offer optimal opportunities for the further development of our products and the expansion of our worldwide sales. We believe this combination will benefit our customers enormously.”

Advantech Satellite Networks is now Doing Business as Spacebridge

Cape Town, South Africa, November 13, 2018— Advantech Satellite Networks, an established vendor and global market leader of broadband satellite communications systems announced here at the Africom Conference and Exhibition that it will now be doing business as Spacebridge Inc.

The company provides satellite equipment and services for deploying satellite communication networks: VSAT HUBs, VSAT Terminals in Point-to-Point, Point-to-Multi-Point, mesh topologies as well as SCPC and broadcast modems.

Spacebridge Inc. also provides Cloud-Based au-

onomous managed services for its customers helping them to eliminate CapEx investments and save on network management OpEX.

It's diverse portfolio includes its ASAT™ product line supporting different verticals with various technologies and applications such as: Cellular backhaul, Industrial Internet of Things - IIoT, commercial and military Satcom-On-The-Move - STOM, high-speed broadband, multicast IPTV, voice over IP, videoconferencing, L2/L3 VPN, Virtual Network Operator and HD/UHD TV broadcasting

ASAT™ Wave Switch™ technology that SPACEBRIDGE INC. brought to the market in 2015, allowing return link dynamically selecting and switching to most-appropriate waveform - optimizing satellite resource usage for the network owner and operator.

As part of the significant revolution in the satellite market NGSO LEO/MEO satellite constellations takes off, SPACEBRIDGE INC. is working in close partnership with New-Space players, proactively participates in this change of the satellite communication landscape, developing VSAT systems which are capable of utilizing this capacity leap and deliver 4G, 5G backhauling, IIoT and many other applications to our customers.

Boeing, Safran Begin Joint Venture for Designing, Building and Servicing Auxiliary Power Units

Chicago, Ill., Nov. 9, 2018 — Boeing [NYSE: BA] and Safran [EPA: SAF] have received regulatory approvals for a joint venture so they can begin designing, building and servicing aircraft Auxiliary Power Units (APUs)—onboard engines that are primarily used to start the main engines and power aircraft systems while on the ground and, if necessary, in flight. The companies also named Etienne Boisseau as Chief Executive Officer of the joint venture.

The agreement establishes a partnership between two of the world's leading aerospace companies to work together on APU products and expanded service capabilities to benefit customers and industry. Both companies have a 50 percent stake in the joint venture. The initial team will perform design work in San Diego, Calif.

“Safran is proud to launch this joint venture with Boeing in order to offer state-of-the-art APUs and

enhance customer value. Together, we are committed to delivering innovative, highly technological and cost-competitive solutions to global customers. We are confident this joint team will provide first-class products and services within the best integrated industrial organization,” said Philippe Petitcolin, CEO of Safran.

The joint venture combines Boeing's customer and airplane knowledge and Safran's experience designing and producing complex propulsion systems.

“We are open for business and excited to offer even more value to our customers throughout the lifecycle of their investment. This joint venture strengthens Boeing's vertical capabilities as we continue to expand our services portfolio. By making strategic investments that accelerate our growth plans, we also are providing our customers with expanded, innovative services solutions,” said Stan Deal, President and CEO of Boeing Global Services.

The name of the joint venture as well as the location of the future headquarters and production and service facilities will be announced at a later date.

Verimatrix Acquires Akamai Identity Services

San Diego, Calif., Oct. 23, 2018— Verimatrix, a specialist in securing and enhancing revenue for network-connected devices and services, has announced the acquisition of the assets that comprise the Akamai Identity Services (AIS) product from Akamai (NASDAQ: AKAM), the intelligent edge platform for securing and delivering digital experiences. Adding TV Everywhere (TVE) type service capabilities to the Verimatrix portfolio underscores the importance of a common authentication system to reduce friction within the content distribution workflow and ultimately support new ways to increase the value of the content chain on a global level.

“This acquisition fits perfectly with our roadmap to streamline content workflows via cloud-based technologies to connect global consumers with great content,” said Mike Kleiman, COO, Verimatrix. “We are able to extend the value of these global identity services under our solution umbrella and provide a more flexible, yet standards-based alternative that will improve the experience for consumers and open new markets for content providers and

Benedikt Breuer Appointed New International Key Account Manager HFC Networks for AXING Group

Friedberg,
Germany, Dec.
19, 2018 – Benedikt
Breuer will
strengthen
the AXING



Group from February 1, 2019, by joining AXING AG and DEV Systemtechnik GmbH as “International Key Account Manager HFC Networks.” This was announced by the two companies who said Breuer’s activities will comprise technical sales with a focus on global support for cable operators, municipal utilities and system partners.

After earning engineering and master’s degrees in Electrical Engineering and Information Technology, Breuer’s career began as an electronics and software developer at measuring receivers manufacturer KWS Electronic GmbH. After a brief period managing European sales with a Chinese modem producer, he returned to KWS Electronic as Deputy Head of Development, later handling international sales in 2016. Breuer’s recent endeavors have featured highly insightful seminars and lectures in behalf of international network operators in the complex field of DOCSIS 3.1 implementations.

“We have in Mr. Breuer a technically skilled expert with vast industry and specialist knowledge.

Our goal is to continue to grow in the HFC area with DEV Systemtechnik and AXING AG, as well as to strengthen our position as a system supplier,” said Johannes Moser, member of the Management Board of AXING AG and DEV Systemtechnik GmbH.

SpacePath Communications Names John Mulroe as Business Development Manager for North America

Hampshire,
UK, Dec.
11, 2018 —
SpacePath
Communications, a dedicated,
European-based,
SATCOM

amplifier manufacturer and equipment supplier, has announced the appointment of John Mulroe as Business Development Manager, North America. Bringing a wealth of industry experience to SpacePath, John previously worked for Thales Electron Devices (TWT) as sales manager, and at satellite uplink equipment supplier, Tango Wave, prior to its acquisition by SpacePath in 2017 where he was responsible for sales and marketing. At SpacePath, John will focus on the company’s expanding footprint in commercial and defence markets across North America.

Colin Bolton, Director, SpacePath Communications, said: “John’s extensive experience of the North American market will help us to grow and scale our business across key markets in the region, and his wider knowl-



edge of the SATCOM industry will also ensure we continue to support all customers with market-leading products and services, globally.”

SpacePath Communications was established in 2014 following the acquisition of the amplifier business from e2v Technologies. Based in Hook, the company designs, manufactures and distributes an expanding range of innovative satellite uplink amplifiers and associated equipment, including RF high power amplifiers (HPA), solid-state amplifiers (SSPA), redundant system controllers and sub-systems.

Newly-Elected GVF Directors to Enhance Key Strategic Initiatives to Promote the Commercial, Economic, Political & Technological Advantages Enabled by Satellite Industry

London, UK, Dec. 10, 2018—The international satellite industry has confirmed executives to serve on the Global VSAT Forum (GVF) Board of Directors to lead the association as it continues to build greater awareness and use of the applications, services, and technological advantages provided by satellite-based solutions.

The election results come as GVF is already into its third decade of operation. In 1997, leading organizations in the satellite communications industry launched the GVF, a non-profit, international association to represent the interests of the satellite industry and aid in the promotion of satellite technology and

services. Since then, GVF has become the unified voice of the global satellite communications industry with member organizations from every major region of the world. The broad-based membership represents every sector of the satellite industry, including fixed and mobile satellite operators, satellite network operators, teleports, satellite earth station manufacturers, system integrators, value added and enhanced service providers, telecom carriers, and users, together with, more recently Earth observation companies.

Elected to the GVF Board for a two-year term of office are Yasir Hassan, Director of Transmission Operations, ARABSAT; Arunas Sleky, Vice President, Corporate Marketing, Hughes Network Systems; Paul Deedman, Director, Spectrum Regulation, Inmarsat; Nick Dowsett, Director, IntelsatOne Enterprise Solutions, Intelsat; and Keith Johnson, COO & EVP of Energy at SpeedCast.

“The satellite industry can be proud of its extraordinary achievements of the past two decades,” said David Meltzer, Secretary General of GVF. “Having only recently taken up the leadership of the GVF Secretariat, it gives me great pleasure to work with an excellent group of industry executives who possess a wealth of experience and knowledge from a diverse group of companies.”

Schermerhorn Joins Intelsat as RVP, North America

McLean, Va., December 6, 2018 — Satellite operator Intelsat S.A. (NYSE: I) announced that Timo-

thy Schermerhorn has joined the company as regional vice president, North America. Schermerhorn will be responsible for the development and implementation of Intelsat’s sales and go-to-market strategies for the company’s network, mobility and media customers operating in North America.



Schermerhorn will be based in Intelsat’s McLean office in Virginia and report directly to Kurt Riegelman, Intelsat’s senior vice president, sales, marketing and communications.

“Tim is a proven leader whose expertise will be critical in driving Intelsat’s strategy in North America,” said Kurt Riegelman. “As we work to support our customers’ digital transformation, Tim has a strong understanding of the complex communications challenges facing our broadband, mobility and media customers.”

Schermerhorn joins Intelsat from Synacor, where as senior vice president, sales and marketing, he led the global sales, marketing and channel distribution strategies for the company’s telecommunications service providers. Prior to joining Synacor, he served as vice president and general manager, broadband & media at Ericsson, Inc. In that role, he directed sales, business development and operations for Ericsson’s leading broadband and media accounts. Prior to that, he held senior sales and gen-

eral management roles at Intel Corporation, Advanced Digital Broadcast, Motorola and General Instrument.

Gary Drutin Appointed New CEO of NovelSat; Outgoing CEO Itzik Wulkan to retain position as President

Ra’anana, Israel, Dec. 5, 2018 — NovelSat, a world leader in satellite transmission technology, today announced that Gary Drutin has been appointed as Chief Executive Officer of NovelSat and as a member of the Board of Directors of the company. The Board has accepted the request by Itzik Wulkan to be released from his position as CEO, a role he has held since co-founding NovelSat 11 years ago. Wulkan will continue to serve the company as its President, focusing on strategic Business Development and as an observer of the Board of Directors.



Drutin joined NovelSat earlier this year as chief business officer. He has served as CEO of FST Biometrics, Chief Customer Officer for Allot, and Bizdev Director for Broadcom’s Microwave business following the acquisition of Provigent, where he was SVP Worldwide Sales. Drutin also held GM, VP and other positions for AudioCodes, Cisco and Digital. Drutin was appointed to the top management position by the NovelSat Board of Directors.

Drutin joined NovelSat earlier this year as chief business officer. He has served as CEO of FST Biometrics, Chief Customer Officer for Allot, and Bizdev Director for Broadcom’s Microwave business following the acquisition of Provigent, where he was SVP Worldwide Sales. Drutin also held GM, VP and other positions for AudioCodes, Cisco and Digital. Drutin was appointed to the top management position by the NovelSat Board of Directors.

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NATO Members Drive Fastest Increase in Global Defence Spending for a Decade

London, UK, Dec. 15, 2018 – Global defence expenditure grew by 4.9 percent in 2018, the fastest growth rate since 2008, according to the annual Jane’s Defence Budget report, released today by business information provider IHS Markit (Nasdaq: INFO). Global defence spending grew for the fifth consecutive year to reach a total of USD1.78 trillion in 2018, significantly exceeding the post-Cold War record of US\$ 1.69 trillion in 2010, according to the report.

Fueling this global growth was a 5.8 percent boost to NATO spending, which totaled US\$ 54 billion, largely due to higher defence spending in the U.S. Jane’s by IHS Markit forecasts that overall NATO defence expenditure will exceed USD1 trillion in 2019.

“Following a challenging period for NATO members in the wake of the global financial crisis, countries have begun to increase defence spending again, in response to emerging threats” said Fenella McGerty, principal analyst, Jane’s by IHS Markit. “This has slowed the rebalance in defence expenditure toward emerging markets.”

Jane’s by IHS Markit projects that global defence spending growth will moderate to a level of around 2 percent per year over the next five years as budget increases in Europe and North

Top 20 defence budgets - 2017 and 2018 (USD billion)

Position	Country	2017*	Position	Country	2018*
1	USA	656.7	1	USA	702.5
2	China	191.2	2	China	207.6
3	India	61.2	3	India	62.1
4	UK	57	4	UK	58.4
5	France	52.5	5	Saudi Arabia	56
6	Saudi Arabia	52.1	6	France	53.6
7	Russia	50.9	7	Russia	51.6
8	Japan	48.3	8	Japan	45.1
9	Germany	43.5	9	Germany	44.5
10	South Korea	38	10	South Korea	39.1
11	Australia	32.1	11	Australia	32
12	Brazil	28.9	12	Brazil	29.9
13	Italy	26.7	13	Italy	27.2
14	UAE	19.3	14	UAE	21.4
15	Canada	16.5	15	Iran	17.4
16	Israel	16.4	16	Canada	16.1
17	Iran	16.2	17	Israel	16
18	Taiwan	14.6	18	Spain	15.3
19	Spain	14.4	19	Taiwan	14.5
20	Pakistan	12	20	Turkey	13

*Figures in constant 2018 USD billions. The intelligence cutoff for this report is 13 December 2018.

America slow and emerging markets again become the key source of growth.

“In 2018, we’ve seen a reversal of recent trends with Western states driving growth”, said Craig Caffrey, principal analyst at Jane’s by IHS Markit. “Going forward we still see Asia and the Middle East as the key sources of sustainable increases in defence spending.”

NATO members increase spending

In 2010, NATO member spending accounted for two thirds of global defence expenditure. As emerging markets expanded and developed economies implemented cuts over the decade, the balance of glob-

al defence expenditure shifted dramatically. The NATO share of expenditure steadily declined to just 55 percent in 2017 with non-NATO spending on track to surpass NATO expenditure by the early-2020s.

“As 24 of the 29 NATO members increased their defence budget in 2018, the decline in the NATO share of global spending has stalled” McGerty said. “The recommitment to defence in Western states means the global balance of expenditure between NATO and non-NATO markets is now more likely to shift from the mid-2020s”.

Nine NATO members will reach the 2 percent of GDP benchmark for defence expenditure in 2019 – compared to just

four members in 2014. These countries are the US, Greece, Estonia, Lithuania, United Kingdom, Poland, France, Latvia and Romania.

US continues to invest in modernisation

US defence spending increased by USD46 billion in 2018 to reach USD702.5 billion as the Pentagon sought to improve military readiness and bolster missile defence capabilities. The 7 percent boost to the Pentagon's budget represents the largest increase in US defence spending since 2008.

“Modernisation accounts will reach USD244.1 billion in FY19 – the highest level of investment funding since the period FY07-10, which experienced the maximum Overseas Contingency Operations and maximum US Department of Defense (US DoD) spending levels.” said Guy Eastman, senior analyst at Jane's. “The funding levels for FY18 and FY19 have enabled the US DoD to start on the road to improved readiness and acquire improved warfighting capabilities.”

Eastern European budgets continue to expand, while Germany's 11 percent spending boost will bolster Western Europe's total

Six of the ten fastest growing defence budgets in the world in 2018 were situated in Eastern Europe. Defence spending in the region grew by almost 9 percent in 2018 with Poland, Romania and the Ukraine driving increases. Notably, spending on military equipment has more than doubled in the region since the annexation of Crimea in 2014.

Western European defence

spending increased for the third consecutive year in 2018 to reach USD248 billion – 2.4 percent higher than 2017. In 2019, regional spending should exceed pre-financial crisis levels as growth accelerates to 3.6 percent driven by a major 11 percent increase in the German defence budget.

“As fiscal balances have improved, countries are able to respond to a markedly poorer security environment and address the capability gaps that have emerged,” McGerty said. “European defence cooperation is also a driving factor as countries look to bolster domestic capabilities but also partner on new technologies, all of which requires greater investment.”

While the outlook for defence spending growth in Europe appears on an upward trend, this hinges on a stable UK defence budget and therefore upon the outcome of Brexit negotiations and the impact on the UK economy.

Strong economic conditions in Asia-Pacific drive accelerated growth

Growth in Asia-Pacific accelerated to 3.6 percent in 2018 but remains below the average 4.8 percent rate seen over the past decade. Total regional spending reached a record high of USD465 billion in 2018.

Despite security concerns, economic growth continues to be the primary driver of defence budget growth in Asia.

“Strategic drivers are undoubtedly becoming more important, but trends continue to be dictated by economic and fis-

cal conditions. Strong underlying economic fundamentals mean that Asia is where we expect the majority of the sustainable long-term growth will come from,” Caffrey said. “From a budgetary perspective, we're still seeing very few indicators that an arms race is underway in Asia”.

Saudi surpasses France as fifth largest defence spender

Higher oil prices over the course of 2018 contributed to an uptick in growth in the Middle East and North Africa with total spending in the region reaching USD180 billion. Saudi Arabia increased its defence outlay by 7 percent to hit USD56 billion, making the Kingdom the fifth largest spender on defence globally.

“The large increase in Saudi Arabia's defence budget drove trends in MENA,” Caffrey said. “With oil prices falling again in the latter part of the year, regional growth is likely to remain relatively conservative in the short term.”

Brazil dominates defence spending in Latin America

Latin America's defence spending grew by 10.4 percent in 2018, reaching a new high of almost USD62 billion. Brazil's allocation of USD29.9 billion accounted for 48.3 percent of this total.

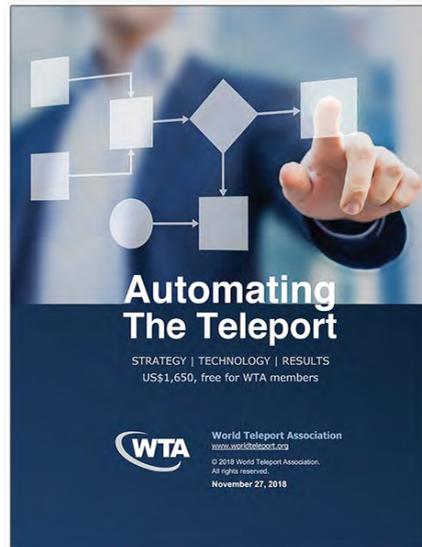
“The recovery in Latin American defence budgets continued this year, but aside from Venezuela, where hyperinflation necessitated massive spending supplements, growth was markedly slower than in 2017,” said Andrew MacDonald, senior analyst

at Jane's by IHS Markit.

New WTA Report, "Automating the Teleport," Explores the Critical Role of Automation in the Industry's Future

New York City, NY, December 14, 2018 — The World Teleport Association (WTA) today released Automating the Teleport a new research report that shares insights from thought leaders in the industry on how automation will play a critical role in transforming the teleport from traditional antenna farms to data centers with dishes that layer on value-added capabilities and services. Based on interviews with executives from teleport, satellite and technology firm, the report offers guidance on what to automate, how to analyze the cost and benefit, and how to avoid deployment nightmares. The report is sponsored by Kratos.

The explosion in satellite capacity is dramatically changing the dynamics in the space industry. The teleport which sits in between the terrestrial and space segment is being driven to become more innovative and operationally efficient to meet these new bandwidth demands. The current environment is changing quickly and moving from traditional teleports working with wideband FSS satellites to HTS gateways supporting a huge increase in bandwidth and an exponential growth in services. The critical question is: how will the teleport increase efficiencies to support more capacity, more customers, more services, more flexibility and more dynamic usage,



all at a lower cost per service?

"Automation improves the technical operation of ground segment businesses," said executive director and report editor Robert Bell. "But the real payoff is on the commercial side. Automation allows companies to shift from being reactive to proactive, enabling faster delivery of services at lower cost, and adding revenues without expanding headcount."

WTA members can access the report by signing in to their accounts on the WTA website. Non-members can purchase the report for US\$1650.

Land Mobile Satcom Market to Generate US\$ 18 Billion over 2 Million Sites by 2027

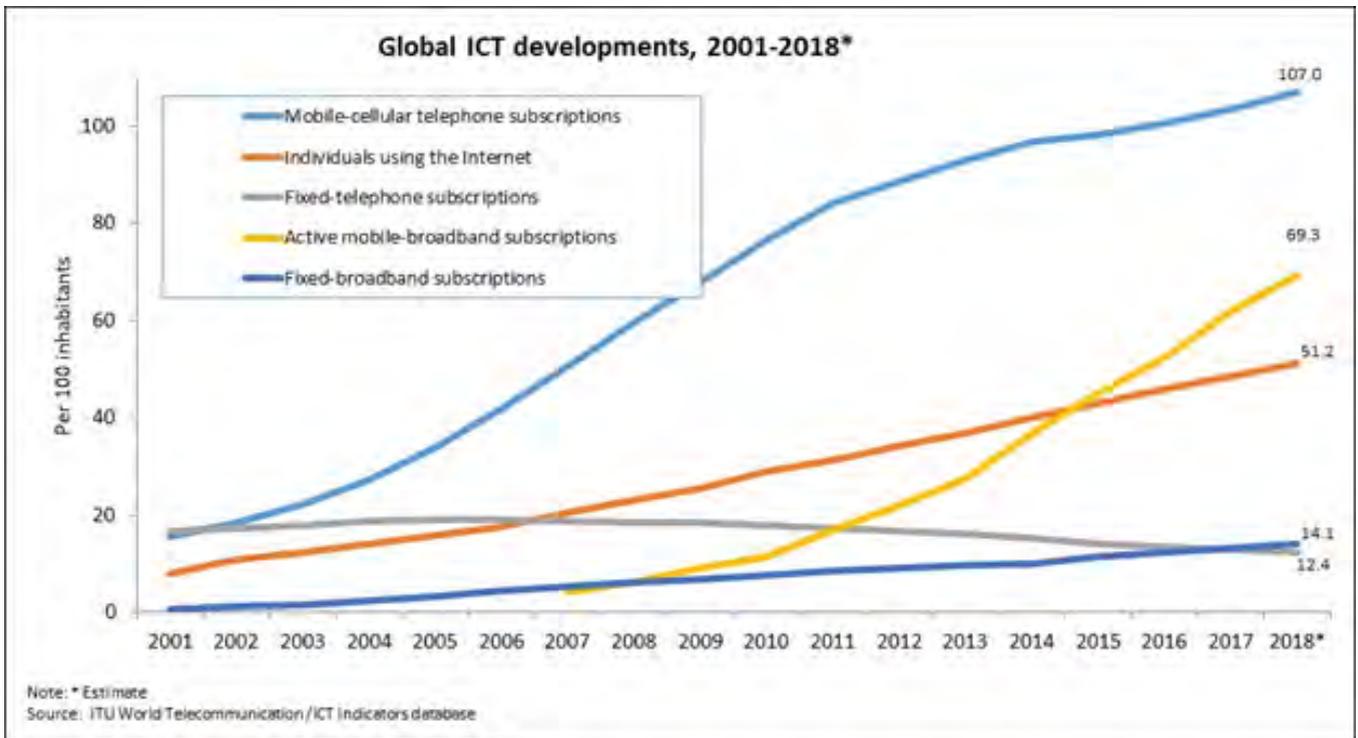
Cambridge, Mass., December 12, 2018 – NSR's Land Mobile via Satellite, 6th Edition released today, forecasts the markets to yield US\$ 18 billion in cumulative retail revenues from the satcom land mobile markets, and annual retail equipment revenues to quadruple from \$92 million in 2017 to US\$ 376 million in 2027.

Flat panel antennas driving vehicle connectivity contribute to this rapid growth of equipment revenues, and new form factors and products hitting the market, offering an increasingly diverse range of devices, will further contribute to such growth.

While the land mobile market has traditionally been dominated by voice-based handsets, NSR found that other form factors, push-talk-talk, hotspots devices, and consumer handheld form factors will exhibit relatively higher growth as customers migrate towards more data-centric environments. Consequently, the share of retail revenues attributed to traditional handhelds will decline from 33% to 15% over the coming decade.

"Growth will remain modest across the traditional land mobile market; however, there is significant upside potential to connect vehicles – most notably buses, trains and cars with high speed, always on connectivity combining IoT type applications with in-vehicle hotspot internet," states Alan Crisp, NSR Senior Analyst and report author. "While cars have the greatest addressable market, connected trains and buses are a much surer bet to implement satcom connectivity, with a captive end-user audience, a much clearer business case, and lower price sensitivity," notes Crisp.

However, NSR does not expect the connected vehicle segment to take off until at earliest 2021- 2022. Line of site issues with GEO-HTS remain, given buildings and trees typically seen along roads and highways. LEO-HTS solutions will need to be



fully developed before connected cars have a chance to enter mass market territory, and prices for installation for satcom connectivity into cars, trains and buses remains high, with lower prices for electronically steered flat panel antennas expected to unlock significantly greater demand.

NSR's Land-Mobile via Satellite, 6th Edition report builds upon NSR's extensive research and databases into the MSS and FSS markets and is the industry reference for examination into trends and insights into anything land mobile related. LMvS6 provides clear and concise answers as to the satcom opportunity across traditional and upcoming form factors. This report includes extensive analysis of addressable markets, operator market shares, vertical segment forecasts, pricing, in-service units and revenue across the entire range of land mobile applications. This coverage is framed within NSR's tra-

ditional depth of industry knowledge analysing all key segments with unmatched level of detail and provides unrivalled actionable insight to decision makers across the land mobile satellite value chain.

Access to and Use of ICTs Keep Growing but Stronger ICT Skills Needed to Connect People Everywhere

Geneva, Switzerland, December 11, 2018 — More and more people have access to and are using the Internet. However, stronger information and communication technology (ICT) skills are needed to connect people everywhere, highlights ITU's Measuring the Information Society Report 2018. At the same time, ICT prices have dropped globally in the last decade. Improved ICT regulation and policy-making have played a pivotal role in creating the condi-

tions for the reduction of prices, ensuring that part of the efficiency gains of higher ICT adoption are passed on to consumers.

“This year's report shows how increased investment in broadband technologies is driving the global digital transformation and enabling more people to access a myriad of services at the click of a button,” says ITU Secretary-General Houlin Zhao. “At the just concluded Plenipotentiary Conference (PP-18) held in Dubai, ITU Member States approved the four-year Strategic and Financial Plan, which includes a strong commitment to ITU's statistical work. We will work together to build the ICT infrastructure and develop ICT skills necessary to foster inclusive economic growth, drive innovation and bridge the digital divide.”

“Now in its tenth year, ITU's annual flagship report is widely recognized as a source of the world's most reliable and impar-

tial data and analysis on the state of global telecommunication/ICT sector,” says Brahim Sanou, Director of ITU’s Telecommunication Development Bureau. “Our analysis shows that digital technologies are fundamentally transforming the way we live and offering important opportunities for boosting economic growth, enhancing communications, improving energy efficiency, safeguarding the planet and improving people’s lives.”

The Current State of ICT

The report finds that there continues to be a general upward trend in the access to and use of ICTs. Most importantly, the world has crossed the halfway line in terms of Internet use, with 51.2 per cent of the world population using the Internet by the end of 2018.

ICT Skills for the Future

Lack of or inadequate ICT skills are a major impediment for people to access the Internet. ITU data and other cross-nationally comparative data sources show that there are considerable gaps across the board in the skills needed. A third of individuals lack basic digital skills, such as copying files or folders or using copy and paste tools; a mere 41 per cent have standard skills, such as installing or configuring software or using basic formulas on spreadsheets; and only 4 per cent are using specialist language to write computer programmes.

Computer users in developed countries seem to possess more ICT skills than users in developing countries. Lack of or inadequate ICT skills can seriously constrain the socio-economic development

of developing countries and Least Developed Countries (LDCs).

The report suggests that inequalities in ICT use reflect other inequalities, such as those related to education, wealth and gender between the different regions of the world.

ICT Revenues and Investment Trends

The report shows global retail telecommunication revenues reaching USD 1.7 trillion in 2016, representing 2.3 per cent of global gross domestic product (GDP). At the regional level, the importance of the sector in driving economic growth is clearly noticeable, especially in the developing world. Telecommunication revenues in 2016 represented on average 3 per cent of GDP in Africa and the Arab States, compared to 2 per cent in Asia and the Pacific and the Americas (excluding the United States and Canada), and less than 2 per cent in the CIS and Europe.

Fixed-line revenue represented half of telecommunication revenues generated in 2016 worldwide. Globally, mobile revenues declined by 7 per cent between 2014 and 2016, from USD 924 billion in 2014 to USD 859 billion in 2016. The report finds that mobile revenue growth is impacted by the uptake in services that run “over-the-top” (OTTs) of existing telecommunications infrastructure and that the success of IP-messaging apps is often to the detriment of traditional text usage and the associated revenue. It also notes that the ICT sector is characterized by large infrastructure investments, with growth in telecommunication

capital expenditure driven largely by data demand and use in developing economies.

ICT Price Trends

The report highlights that ICT prices have dropped globally in the last decade in parallel with the increase in access and use of ICT services. Fixed-broadband services recorded the largest price drop of all ICT services. Mobile-cellular prices also maintained a steady downward trend in the period 2008–2017, in line with the continuous increase in mobile-cellular penetration. Improved ICT regulation and policy-making have played a pivotal role in creating the conditions for the reduction of prices seen in the period 2008–2017, ensuring that the efficiency gains of higher ICT adoption are partly passed on to customers.

Some of the most populous countries worldwide, such as Bangladesh, China and India, stand out for having achieved mobile-cellular price baskets under USD 3 per month and feature among the top 20 countries with the lowest prices. A number of LDCs, including Bhutan, Ethiopia, Myanmar, Nepal and South Sudan, also offer prices below USD 3 per month.

Almost all developed countries had computer-based mobile broadband prices corresponding to less than 2 per cent of gross national income (GNI) per capita. The price of an entry-level fixed-broadband plan significantly decreased worldwide in the last decade, from more than USD 40 per month on average in 2008 to

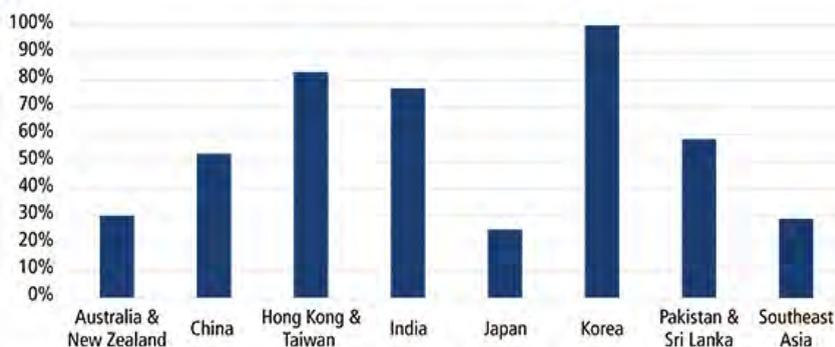
US\$ 25 per month in 2017.

MPA Report: Asia Pacific Pay-TV Industry To Grow 5% In 2018, Exceeding US\$56 Billion In Revenue

Singapore, Dec. 8, 2018 — Pay-TV revenue in Asia Pacific, comprised of subscription fees and local and regional advertising sales, will top US\$56 billion in 2018 after 5% annual growth, according to Asia Pacific Pay-TV Distribution, a new report published today by leading industry analysts Media Partners Asia (MPA). The Asia Pacific pay-TV industry will continue to expand at a 3% CAGR between 2018-23 to exceed US\$66 billion in revenue by 2023, according to MPA forecasts. MPA's Asia Pacific Pay-TV Distribution report covers 17 markets across the region.

Over the next five years, the biggest gains will come from the utility-oriented China market, where pay-TV revenues are projected to grow at a 3% CAGR to reach US\$25 billion by 2023, and the more accessible and commercial India market, where pay-TV revenues are set for an 8% CAGR to reach US\$16 billion by 2023. That makes India the highest growth and most scalable pay-TV market in Asia Pacific. At the same time, Korea, another regional pay-TV powerhouse, will grow at a 3% CAGR to reach US\$7.4 billion in revenue by 2023, according to MPA forecasts, while pay-TV revenues in Japan will climb at a 1% CAGR to touch US\$7.1 billion over the same time-frame.

PAY-TV PENETRATION ACROSS ASIA PACIFIC (2023)
TV homes with at least one pay-TV service (%)



Source: Media Partners Asia

Elsewhere, pay-TV momentum will moderate in Indonesia and the Philippines, two of Southeast Asia's biggest growth economies, according to MPA, while Australia, Hong Kong, New Zealand, Malaysia, Singapore and Thailand will register revenue declines ranging between a -1% to a -6% CAGR over 2018-23.

Commenting on the findings from the Asia Pacific Pay-TV Distribution report, MPA executive director Vivek Couto said:

"Pay-TV stakeholders are adjusting to new realities as the industry shifts to IP-based distribution. The growth of high-speed broadband and online video is driving fundamental changes in content consumption and investment across key markets. This, together with piracy, will continue to adversely impact pay-TV industry growth. There will be more fixed broadband subs than pay-TV subs across much of Asia Pacific by 2021, while the gap between the mobile broadband subs base and pay-TV & fixed broadband subs will further widen as mobile networks emerge as a major means for mass content distribution, accelerating the shift in content consumption from

households to individuals.

Couto added, "M&A activity for the Asia Pacific broadcasting and pay-TV sectors for 2017 and the first half of 2018 reached US\$10.5 billion in aggregate, with the biggest deals taking place in Australia, India and Korea. More M&A and consolidation is likely in these markets with Southeast Asia likely to join the action over 2019-20."

MPA analysis indicates that the pay-TV subscriber base in Asia Pacific will grow by 3% in 2018 to reach 645 million subs, representing 57% of TV homes with at least one pay-TV service. The Asia Pacific pay-TV subs base will grow at a 2% CAGR between 2018-23 to reach ~696 million by 2023, according to MPA projections. Pay-TV penetration by 2023 will fall to 55% of TV homes when adjusted for multiple subscriptions, largely due to an acceleration in cable cord cutting in China.

Ex-China, net customer additions across Asia Pacific will significantly slow from 10.4 million in 2017 to 6.5 million in 2018. India will account for 47% of the growth in 2018"

Following the Signal

AVCOM

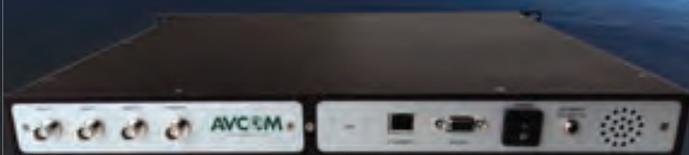
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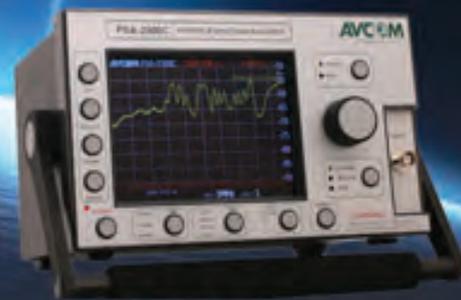
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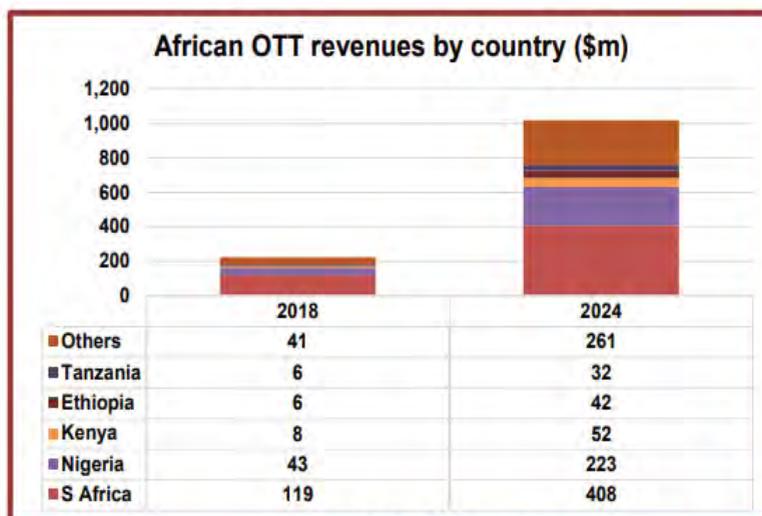
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VITAL STATS

African OTT TV Revenues to Reach US\$ 1 Billion



Source: Digital TV Research

Sub-Saharan African OTT movie and TV episode revenues will reach \$1,018 million by 2024 – up from \$223 million in 2018. Despite this quintupling of revenues, Africa still has a lot of potential growth in the long-term according to Digital TV Research.



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