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SATELLITE Markets & Research

Industry Trends, News Analysis, Market Intelligence and Opportunities

Satellites and the Internet of Things

by Bernardo Schneiderman
Contributing Editor

The Internet of Things (IoT) is a growing market with the advance of the wireless internet and the smart appliances and industrial and logistic applications which used in the past Machine to Machine (M2M) communications terminology for the same application. In the context of satellite communication technology choices, the global satellite M2M and IoT market will reach 5.8 million in-service satellite M2M/IoT terminals by 2023 according to market research and consulting firm NSR.

NSR predicts satellite's share of the IoT market and the related machine-to-machine (M2M) sector will exceed US$ 2.4 billion in 2024, up from US$ 1.4 billion in 2014. IoT and M2M via satellite have "significant room for growth," NSR says, particularly in sectors such as shipping, agriculture, land transportation and government.

The basic requirements of the IoT are that all devices need to be connected wherever they happen to be. While Wi-Fi deployments, Bluetooth and terrestrial GSM networks are able to support many IoT applications, these network services cannot provide the ubiquitous and seamless coverage of satellites. The ultimate success of global IoT coverage will depend on the active support of satellite networks, such as the L-band (antenna) services. Satellite technology serves as a key enabler to transform IoT connectivity across industries and geographical borders.

To get an overview of the current status of the IoT market for satellites, we invited several companies to share their views on this important subject. Those that responded include major satellite companies like Globalstar, Inmarsat, Iridium, Orbcomm and a new player, Astrocast, that is planning to launch a constellation of miniaturized satellites focus in IoT. These companies participated in a virtual round table discussion with Satellite Markets and Research. The roundtable discussion features **Bryan Eagle**, VP-Business Development, **Astrocast**; Chris Gray, VP-Emerging Technologies, **Globalstar**;

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The African Satellite Market

Africa is one of the world's fastest growing market for satellite services. Opportunities abound in this market, with over 300 million of the continent's 1.1 billion residents do not have access to cellular phones and the Internet. The rapid expansion of the mobile market is changing how television and other media companies deliver content to consumers.

Despite the fierce competition among the satellite operators and terrestrial provider, there is still enough room for growth for everyone in the African market. Over one-third of the population still live in hard to reach rural areas where satellite may be the only viable option. There is a huge digital divide in Africa between those with and without access to broadband. The new High Throughput Satellite (HTS) will be playing an important role in bridging this gap.

View a video of an interview with Jacob Keret, Senior VP-Amos Spacecom on their plans for the African region and others. Click here to view the video:https://www.youtube.com/watch?v=2yT-MaGxfGU

One company that will be launching a HTS satellite over Africa is Amos Spacecom. Spacecom has been in the African market a long time and is very bullish about the African market. If you are attending East Africa Com in Kenya this month, do visit them at their booth.

Virgil Labrador
Editor-in-Chief

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Satellites and IoT ..From page 1

Geoff Bruce-Payne, Director-IoT Business Development & Strategy, **Inmarsat Enterprise**; **Tom MacLeod**, Director -IoT, **Iridium Communications**; and **Sue Rutherford** VP-Marketing, **Orbcomm**.

"...IoT is prevalent across a variety of vertical markets including heavy equipment, transportation, logistics, oil and gas, mining, maritime, aviation and consumer safety...."

Excerpts of the roundtable discussion follows:

Satellite Markets (SM): ***What kind of products or solutions are you offering for the IoT/ M2M markets?***

Astrocast: Astrocast, in partnership with the **European Space Agency, Airbus, and Thuraya**, is developing an advanced Nanosatellite network for the Internet of things. Our network will consist of 64 CubeSat satellites in Low Earth Orbit (LEO) enabling global coverage. We are focused on delivering similar network services to LoRa and Sigfox, but globally. Our price points will be similar to these existing terrestrial networks and vastly lower than existing satellite services.

Inmarsat: In the Enterprise (land-based) business unit which I work for, we work through distributors and solution partners who use our connectivity products, which consist of a broadband IP very similar to 3G, and a narrowband messaging service similar in many ways to LPWA networks like NB-IoT or LoRa. These serve the widest range of satellite-enabled IoT markets in the industry and allow for tailoring of solutions based on specific application requirements. We also partner with innovative solution providers to help bring their solutions to market globally for virtually any industry with remote operations or workers.

Iridium®: IoT powers new innovations and opportunities through a unique combination of global network connectivity, industry-leading core technology and an ecosystem of partners with expertise in virtually every market. The Iridium network is ideally suited to provide reliable connectivity for mobile tracking and asset management applications due to its low latency, reliability and robustness. Our low earth orbit (LEO) satellite constellation architecture enables the creation of small form factor, cost-effective antennas that are ideal for IoT applications. The Iridium 9602® and Iridium 9603® time-proven transceiver modules, can be seen in use cases across multiple industries, and are integrated into numerous partner solutions worldwide. Our latest IoT product, Iridium Edge™, is a cost-effective, modem that enables companies of all sizes to rapidly deploy and extend their IoT application coverage as a complement to cellular. The hardware-ready communications device helps our partners bring new satellite-enabled solutions to market quicker than their normal product development cycles.

Globalstar: Globalstar has a long history of IoT products. Our SmartOne product line allows tracking, 3rd party inputs such a door sensors, water and oil level sensors and alerts for movement. SmartOne Solar is our latest product giving an unprecedented battery life of 8 years and is fully ATEX certified expanding the markets to all areas of oil and gas monitoring. Strong relationships with our VAR community is important to Globalstar as they build specialized products for many verticals based on our core chip technology of STX3 and STINGRs. The SPOT line of products for the consumer is another strong area with the SPOT Trace unit available for tracking and movement alerts and our SPOT Gen 3 used in nearly 6,000 rescues worldwide, with average of more than 2 rescues a day.

Orbcomm: is focused on providing solutions that connect businesses to their assets to deliver increased visibility and operational efficiency. We have a diverse customer base, including premier OEMs, solutions customers and channel partners, which spans the transportation, supply chain, warehousing and inventory, heavy equipment, maritime, natural resources and government markets. We provide individual application components, such as modems and chip sets, as well as full end-to-end solutions, such as freight transportation monitoring, cold chain compliance, refrigerated asset monitoring, fleet management, heavy equipment monitoring, driver safety, and cargo security systems. Our combination of global network services along with our state-of-the-art devices, device management and robust web-based Software-as-a-Service applications provides the global industrial IoT market's most comprehensive service offering and positions us as a leader and innovator in this space. In addition, our world-class solution delivery team provides end-to-end customer service – from installation to deployment to ongoing operations.

SM: ***Please provide some examples of key applications in some of the vertical markets that you have a good penetration using the satellite solution?***

Astrocast: Our global network can reach 90% of the world's geography that is not covered by terrestrial systems. The applications in these areas are dominated by a variety of maritime applications (boat tracking, emergency beacons, buoys), but we also see a

Astrocast, in partnership with the European Space Agency, Airbus, and Thuraya, is developing an advanced nanosatellite network for the Internet of things. The network will consist of 64 CubeSat satellites in Low Earth Orbit (LEO) enabling global coverage.
(image courtesy of Astrocast)

wide variety of applications to monitor remote assets. The list of these applications is quite extensive.

Inmarsat: There are many. We have a lot of historical business in Oil & Gas, ranging from well-head monitoring to pipeline monitoring, as well as tracking and alert solutions for remote workers. In utilities we have applications in smart grid ranging from advanced metering infrastructure to distribution automation. We also play a significant role as a redundant, highly reliable backup network to ground-based cellular networks for fleet management, security and driver safety. Maritime is another key area for us with satellite IoT solutions used for fisheries management and ship security.

Iridium: IoT is prevalent across a variety of vertical markets including heavy equipment, transportation, logistics, oil and gas, mining, maritime, aviation, and consumer safety. Iridium serves many of the world's largest heavy equipment Original Equipment Manufacturers (OEMs) providing reliable connectivity in support of their global telematics programs. Across the oil and gas industry, Iridium is routinely implemented at the well site to monitoring flow rate, fluid/chemical usage during drilling operations, storage tanks and peripheral equipment, such as generators. Along pipelines, Iridium is used extensively for cathodic protection monitoring, helping utility companies effectively measure usage and manage pipeline capacity. Iridium is also integrated into some of the largest transportation service provider solutions for fleet management, Department of Transportation (DOT) compliance, freight logistics and asset utilization. Lastly, Iridium is partnered with one of the world's leading, most recognizable, GPS navigation and wearable products companies. By leveraging the Iridium network, this company's products provide customers with global and reliable communications for outdoor enthusiasts, enabling always-available text messaging, emergency alerting and location tracking.

Globalstar: Oil and Gas is a large user of our SmartOne products from monitoring pipelines to tracking equipment in remote locations making it an integral part of their business. Another example is the tracking of engines on boats for insurance purposes against theft, an area that continues to grow as insurance companies need to track these high cost items where cellular is not available. Of course, tracking vehicles and other assets is another key vertical for Globalstar and we will continue to build solutions dedicated to serving that need.

Orbcomm: Our company offers a unique range of IoT network connectivity solutions, provided through both cellular network connectivity and global, two-way satellite data communication connectivity. Through our own network of LEO satellites and accompanying ground infrastructure, we provide worldwide coverage, including in the open ocean, allowing end-users to access our communications system in

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areas outside the coverage of terrestrial networks. Our unique, proven technology offers full two-way data communication with minimal line-of-sight limitations and reliable performance. Examples of key applications that utilize ORBCOMM's satellite network services are listed below.

- Connecting Equipment: Remote work site monitoring, data analytics for operations and utilization of equipment as well as OEM service, parts and warranty compliance
- Connecting Transportation: Visibility of fleets and cargo on the road, rail and sea and asset utilization in distribution centers.
- Connecting Vessels: Automatic Identification System (AIS) services and monitoring of ships and buoys.
- Connecting Drivers: Communication in remote areas of concern, driver safety and situational awareness along route.
- Connecting Government: Monitoring of supply shipments and logistics, in-transit visibility and security detection and intrusion.
- Connecting Rail Cargo: Control and monitoring of refrigerated rail cars, FSMA compliance and loss mitigation of load liability.
- Connecting Oil and Gas: Visibility of smart grids, oil & gas operations and other fixed assets at remote work sites, Electronic Logging Device (ELD) Mandate compliance and worker safety.

SM: What are your plans for the next 2-5 years with regards to new IoT solutions via satellite?

Astrocast: We will be offering both a low-cost module and a very low-cost RF chip for our customers to integrate into their applications. The module will be available in the Spring of 2019. The chip will be available in 2020. Once the chip is out, we will be working with strategic partners to build very low cost global products that we can jointly develop and bring to market.

Inmarsat: Although we've been doing M2M for many years through various partners, the broad and accelerating market investments in IoT are driving a lot of new business growth for us as companies in all industries look to derive new efficiencies and insights from their operations through access to more and diverse data sources. In the Enterprise business unit we see new adoption coming from industries beyond our historical markets and have a particular focus on agriculture, mining, transportation and logistics. The key to growth in this market is intelligent partnerships required to build and operate an end-to-end service for customers that delivers tangible outcomes for their business. We've made various strategic partnership announcements over the past couple years and you can expect to see more in the coming years. We're also heading toward the launch of our next-generation constellation within a few years, which will extend our current services well into the future and offer some exciting new capabilities, with a focus on IoT particularly leveraging our highly reliable L-band services.

Iridium: Iridium is over half-way complete in launching its next-generation satellite constellation, called Iridium NEXT. Enabled by the new network, Iridium will introduce Iridium Certus℠, a global and reliable enterprise-grade broadband solution that will target many of Iridium's traditional markets served today. The new solution will also address the needs of mission-and business-critical applications, requiring much higher speeds, where Iridium does not currently compete. Across the spectrum of Iridium Certus capabilities, Iridium IoT will be able to address higher throughput applications more efficiently, such as Supervisory Control and Data Acquisition (SCADA), surveillance, and other data intensive Remote Telemetry and Control. Additionally, Iridium Certus for IoT positions Iridium to provide backhaul for campus-based emerging Lower Power Wide Area Networks (LPWAN) more effectively. As a normal course of business, Iridium considers potential strategic partnerships that may enhance or add long-term value to its IoT service portfolio. For instance, in 2017, Iridium signed a Memorandum of Understanding (MoU) with a company called Hiber® and is collaborating with them on potential ways to expand space-based IoT services

Globalstar: The Connected Car is a big focus at Globalstar and we recently announced a new division to focus on this growing and innovative market. The need for cars to have connectivity when cellular is not available is a major requirement and satellite is the only way to provide that coverage. Additionally, the agriculture sector is looking for more real time data and Globalstar is actively working with companies around the globe to increase the tracking of animals, not only their location but their health information transmitted at regular intervals. Globalstar's ability to provide global coverage eliminates the need for any on-site hardware is very appealing to that market which is generally outside cellular coverage. The SmartOne Solar with the ATEX certification will open new markets in oil and gas and we are already seeing a great success with this product.

Orbcomm: With one of the largest engineering teams in the industrial IoT, in-house innovation continues to be at the forefront of ORBCOMM's strategy. We are planning to release more than 20 new products and solutions that leverage our satellite and cellular networks, ranging from feature enhancements to sensors and peripherals to product configurations to user interface designs this year. These projects span every aspect of our business as well as several new product categories and vertical markets, and will offer our customers greatly improved price points, features and performance gains. For example,

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we are building a single hardware platform that offers the best satellite combination of geographic coverage, the most regulatory authorizations, the fastest service, and the largest message payloads. ORBCOMM's dual-mode Radio Frequency Integrated Circuit (RFIC) leverages both the Inmarsat L-Band and OG2 networks. The dual-mode satellite RFIC enables customers to take advantage of the Inmarsat L-band constellation's lowest latency in the industry, combined with ORBCOMM's VHF network, which is superior in supporting applications that do not have direct sight lines, to deliver the best, most reliable service in the industry and at the lowest price points. We'll also be enhancing our IoT solutions offering with a major initiative to expand our data analytics capabilities, which we use to identify patterns to predict valuable operational information from the data collected by our various SaaS platforms.

SM: Considering the cellular operators are focusing on the IoT market, do you have any hybrid solution using cellular and satellite technology for customers that require this kind of solutions?

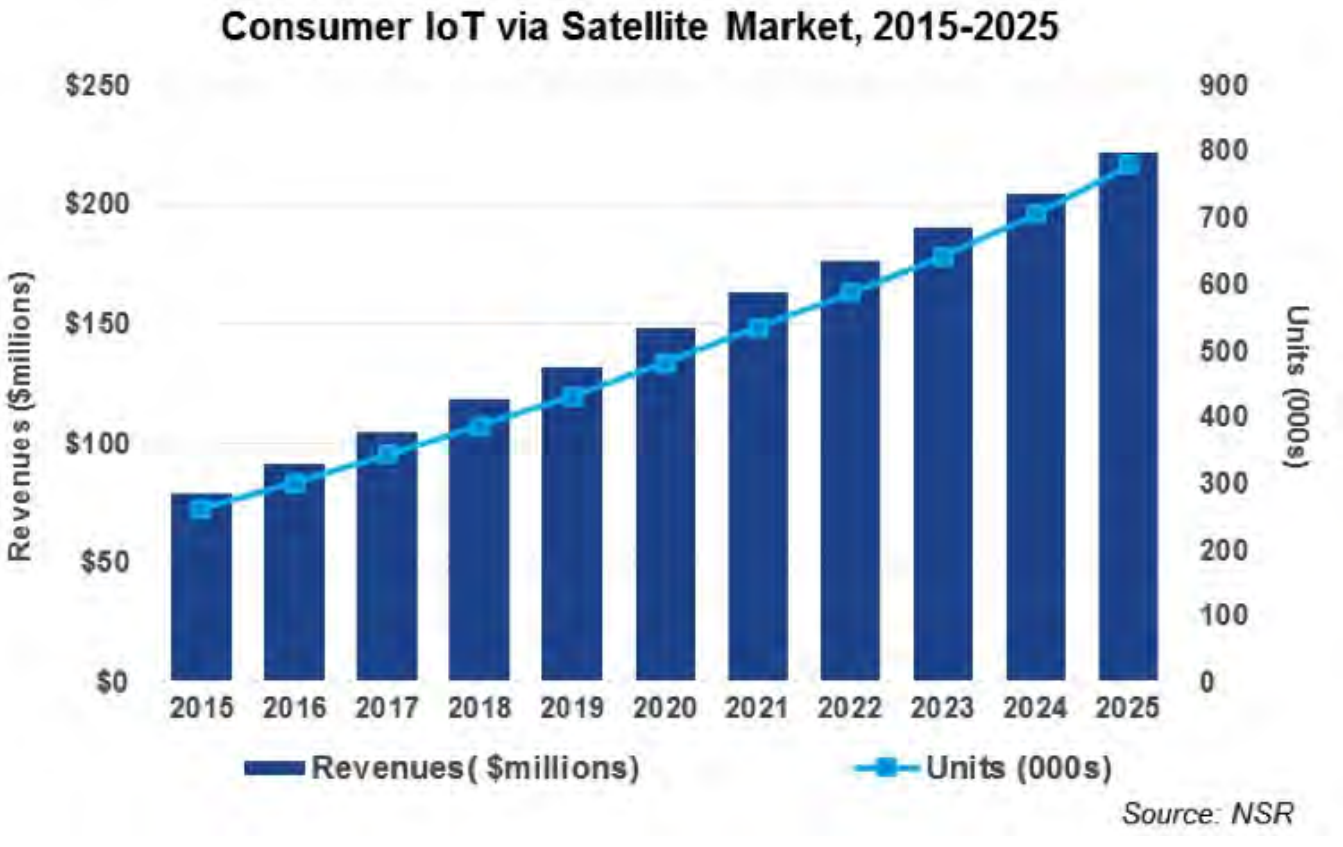
Astrocast: We have already seen example of terrestrial applications that are looking for low cost back-up communications services to ensure some minimal connectivity if the terrestrial networks were down because of natural disasters or weather.

Inmarsat: Absolutely yes. The range of IoT solutions is extremely diverse and there are no one-size fits all. Our primary markets are places that simply don't have cellular coverage or where it isn't reliable. But we complement cellular in both mobile and stationary applications with reliable hybrid solutions. We also have a capability to rapidly deploy industrial IoT networks using a combination of Low Power Wide Area aggregation (for example, LoRaWAN) on the ground with satellite connectivity to the cloud or direct to the enterprise. There is a lot of investment happening now in the LPWA market for IoT that is expanding the connectivity market beyond cellular carriers, and we'll play a part in that too.

Iridium: Since cellular connectivity is a prevalent communications solution within the IoT market, there are two ways in which Iridium is employed to create what is typically known as a "dual-mode" or "hybrid" connectivity solution:

Iridium partners, who develop their own dual-mode hardware platforms, will integrate Iridium transceiver modules into their finished products.

For Iridium partners who source their hardware platforms from third party



suppliers, they will consider externally interfacing with a finished Iridium modem product, such as the previously-mentioned Iridium Edge. Iridium maintains relationships with many of the top tier IoT device manufacturers worldwide.

In both cases, the result this dual-mode implementation provides is ubiquitous coverage that enables the efficient management of communication paths based on the criticality of the application and individual message types.

Globalstar: Globalstar has VARs that work with hybrid solutions combining our chip sets like STX 3 and STINGR with cellular services. It is important to understand that for a number of market sectors, they fall outside of cellular or move in and out of cellular coverage regularly. That is where satellite really is a key component in being able to reach and keep those devices connected. Globalstar will continue to work on solutions that make sense when combining technologies that meets the customer's need.

Orbcomm: We've already experienced a merging of terrestrial and satellite communications. Many of our current solutions are dual-mode, which provides terrestrial and LEO/GEO satellite services when not in terrestrial coverage, enabling the best of both worlds in cost-effective and reliable fleet management and industrial asset tracking applications. Plus, all of our network services are managed in one place through our versatile ORBCOMMconnect service delivery platform.

SM: ***Any other further information about your current and future satellite fleet to provide services for the IoT market?***

Astrocast: Astrocast's first Advanced Nanosatellite Network.

Inmarsat: Our current fleet is recognized as the most reliable and complete global offering for satellite IoT today, with the widest range of services available to address diverse market needs. We'll continue to drive efficiencies with our future fleet, and one of our key strategic pillars as a business unit, is to be the leading global satellite IoT enabler which will factor prominently in our services evolution.

Iridium: As mentioned earlier, Iridium is launching its next-generation satellite constellation, which is on target for completion in 2018. Iridium NEXT is a US$ 3 billion investment that includes infrastructure upgrades, eight launches, and 81 new satellites. A network replacement of this scale is unprecedented, making it the largest tech refresh in the space industry. Iridium has partnered with SpaceX for all eight launches, including the use of both new and refurbished Falcon 9 rockets. Of the 81 new satellites being built, 66 will serve as operational satellites in the new LEO constellation. Nine will serve as on-orbit spares, and the remaining six satellites will act as ground spares. As of late March, there have been five successful Iridium NEXT launches, delivering 50 of the new satellites to orbit. The sixth launch is a unique rideshare that will deliver five Iridium NEXT satellites and the NASA/German Research Center for Geosciences (GFZ) Gravity Recover and Climate Experiment Follow-On (GRACE-FO) twin spacecraft to space. It is scheduled for May 19, 2018 out of SpaceX's west coast launch facility, Vandenberg Air Force Base in California. Among other things, the new constellation will position Iridium IoT well to assess and respond to new opportunities as they emerge.

Globalstar: Globalstar's next generation satellites are fully deployed and are in full commercial use. A LEO constellation is best suited to these types of IoT devices as Globalstar provides low latency, small antenna size options and small hardware footprint with our STX 3 and STINGR options. Globalstar continues to release new revolutionary products like Sat-Fi 2, SmartOne Solar, a soon to be released two way messaging device and other innovative devices to meet the growing IoT needs.

Orbcomm: ORBCOMM's customers are looking for seamless access to network connectivity. They simply want to use the best network or combination of networks to meet their requirements for geographic coverage, regulatory authorizations, the fastest service, and the largest message payloads. ORBCOMM offers the most comprehensive offering of network services, including three satellite networks and seven terrestrial networks for global message delivery to meet all of our customers' needs. We will continue to take the lead in developing disruptive industrial IoT technology – from devices to applications to analytics– that connects businesses to their assets to deliver increased visibility and operational efficiency.

B. H. Schneiderman is the Principal of Telematics Business Consultants. He can be reached at : info@tbc-telematics.com

Can Cubesats Save IoT?

by Hub Urlings

A flood of research, publications and studies over the last couple of years forecasts up to 56 Billion IOT devices to be active worldwide in 2025. When we look in practise however, the numbers on a global scale are nowhere close to that at the moment. One could argue the IoT market is still in its initial (flat) phase, and will pick up in a hockey stick style. As in many promising markets, the million dollar question is, when will the growth curve pick up?

Critical drivers for IOT to reach these mega numbers are actually quite simple and come down to the availability of global, low cost connectivity with easy to use and low power IOT equipment.

In order to connect all those billions of devices connectivity around the globe a variety of telecom networks will be used. From near distance blue tooth, local WIFI networks connected to a wired IP line, and national LPWAN or 3G/4G/5G cellular networks to continental or global satellite networks.

Terrestrial local and national networks already provide IOT services in the urban and densely populated areas of the world taking care of the bulk of IOT connectivity worldwide. Terrestrial networks are only covering about 10% of the earth's surface however, leaving the rest of the world to satellite networks to provide the necessary connectivity to IOT applications.

Existing satellite systems, mainly from the mobile satellite sector like Inmarsat, Iridium, Globalstar or Thuraya already provide IOT connectivity to applications like fleet management, pipe line monitoring, geo-fencing for trucks or fishing vessels or asset management for containers or dangerous goods monitoring. Their numbers are increasing sharply in the last couple of years (2016: ca. 2,5 Million) but their inherent features prevent the subscriber growth that is foreseen in the many IOT forecasts.

Existing Sat-IoT services are just too costly, power hungry and complex to serve outside the niche markets like maritime, logistics or government. Costs are high not only because of their subscription and satellite connectivity costs, but in particular also because their high cost of ownership. They are quite difficult to install and integrate into applications, and require specialist engineers to operate them. No way the existing terrestrial and satcom IoT services will be able to support the numbers of IoT terminals that are in the forecasts.

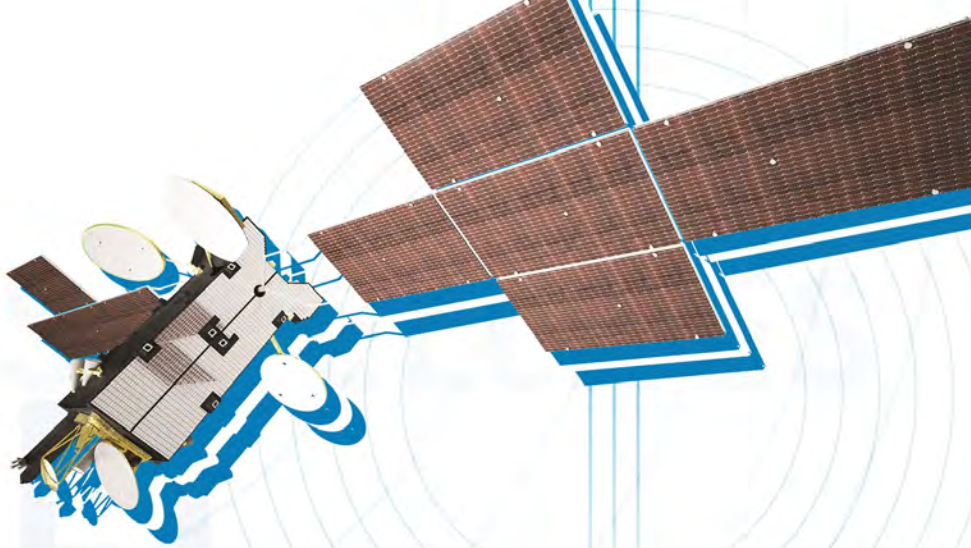
Can Space 2.0 come to the rescue?

New developments in the space industry however might come to the rescue. Like the satellite launching industry with companies like Space-X or Blue Origin is on the brink of a transformation from governmental to a commercial sector, satellite manufacturing is doing the same with the use of cube-sats.

A new generation of Satellite IOT operators is taking advantage of that and is using cube-sats to meet the IOT requirements in a better and more cost effective way.

These nextGen Sat-IoT operators face two challenges: how bring satellite network cost down , and how to develop a super efficient communications protocol supporting large volumes of low power communication nodes.

Satellite network costs are coming down, as the satellite manufacturing industry is now able to build cube-sats put together like a pc in a standardized housing based on 10x10cm cubes. We see an ever growing supply of new and more cost effective propulsion, navigation, power of radio modules to choose from. Although finding a proper launcher is an art as such, launching a Cube-sats is relatively easy to launch to a 600-800 km height. That altitude also makes that their life cycle is limited in terms of years. A fraction in



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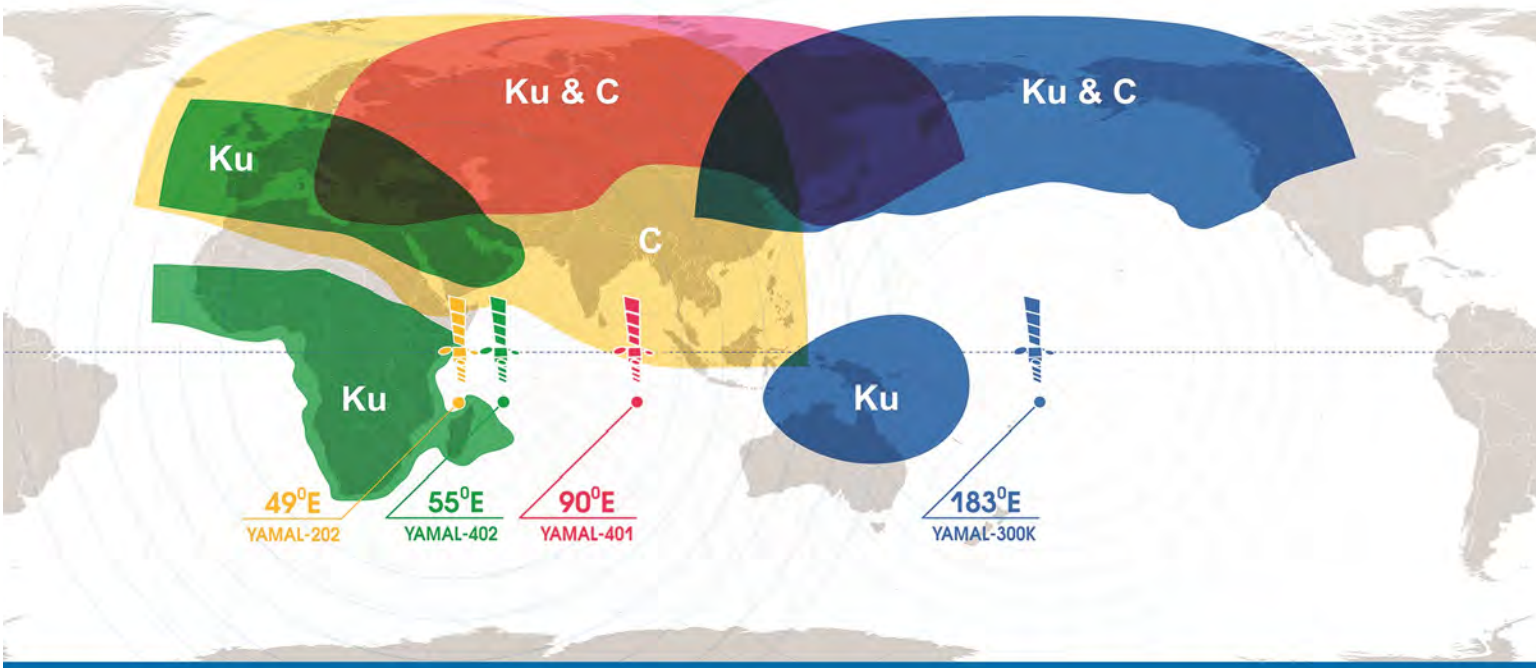

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the eye of a 20-25 year lifecycle of the large satellites of existing operators. Advantage with this is that cube-sat components can be replaced every couple of years, bringing the operator the opportunity to use the latest in equipment and CPU power in their modules.

With satellites costs down the new generation of satellite IOT network operators is facing the challenge on how to select the right radio spectrum and communication protocols to support large numbers of low power communication nodes. Here we see a wide variety of combinations here, that will have to proof themselves in practise after launch.

A whole new industry segment with new sat-iot operators like Myriota, Else AstroCast, Blink Astro, Fleet, Sky and Global Space, Kepler, Helios Space or Hiber from Magnitude Space is embarking on the possibilities low cost cube-sats promise for global IOT data services. Nearly all are building their first flight satellites with launches planned in 2018 bringing the IOT market on the brink of a new era.

While there might be failures here, and launch delays and disasters, in the end one or more of them will succeed deploying their satellite networks. Once that hurdle is taken cube-sat based IOT networks will proof they are best qualified to deliver on the three drivers for IOT growth: global coverage, low costs and low power requirements for the equipment.

So , the answer is yes cubesats can and will save the global IoT.

Hub Urlings was one of the pioneers of Satellite M2M as Product Manager Inmarsat-C at the famous KPN Station 12. The success of this "small data" satellite service, its global coverage and reliability made that the service was used for a myriad of applications: from sending messages, to truck fleet management, to pipeline monitoring and bringing back data from all types of sensors. At that time satellite was the only type of network that was able to offer global coverage for what we would now call IOT services. Now, 25 years later he is again involved in the development of a new generation of Sat-IOT services. He can be reached at: urlings@m2sat.com

The Horizontal and the Vertical: 'AIC' and Oilfield Connectivity 2018

by Martin Jarrold

Washington D.C. and Aberdeen, Scotland, on 10th May 2018 will be particular hotspots in the GVF immediately upcoming events calendar, with the two cities hosting programs with a horizontal and a vertical emphasis, respectively.

The GVF **Applied Innovation Conference (AIC)** – a predominantly horizontally focused event – will take place at Intelsat's Washington DC offices in Tysons Corner, Virginia. The program, the second of the **AIC** one-day events, is entitled ***'Next Generation Satcom Antennas... Now!'*** and will comprise multiple shark-tank sessions featuring key representatives from satellite communications service providers, antenna manufacturers and end users. The agenda will be a deep dive into the latest status on emerging and future timelines for the availability of game-changing flat panel, parabolic and other state-of-the-art antenna solutions. Cross examination of manufacturers by their potential customers and partners will reveal how, when, where – and at what cost – satcom services will be delivered supported by these innovative new systems.

Speakers from Ball Aerospace; Boeing; C-COM Satellite Systems; General Dynamics Mission Systems; Globecomm; iDirect; Inmarsat; Integrasys; IsoTropic Networks; Kymeta; LeoSat; Mission Microwave Technologies, LLC; Phasor; SatProf; SatixFy; SES; SpeedCast; ThinKom; and, Viasat, will address issues related to new and next generation terminal innovations, together with the evolution of new technologies in land, aeronautical, and maritime antennas.

You can find more information at the **AIC** website (https://www.gvfaic.org/program), or by contacting Angie Mar in GVF's Washington office (angie.mar@gvf.org).

GVF-EMP's **Oilfield Connectivity 2018: *'The Next Generation Digital Oilfield'*** conference – a focused vertically orientated program – takes place across the Atlantic, five hours ahead of the Washington agenda, in the City of Aberdeen. The program, the 11th in the series dedicated to communications connectivity as it serves Europe's oil & gas ecosystem development, brings to the market an ICT-oriented dialog at the crucial interface of demand for information and connectivity solutions by the energy vertical, and the supply of those solutions from the satellite communications industry.

The current oil market is still challenged by high stocks and sluggish prices, although increasing global demand and a clearer idea of how digital technologies can drive down costs, suggest a continued, steady, rise in oil prices, from the 2016 US$40/bbl low, to the current (end-April 2018) level of around US$68/bbl, and beyond. However these market and technological dynamics continue to fluctuate, they are always set against the backdrop of the dangerous, harsh, and remote environments where exploration and production (E&P) take place, and of the constant demands of the industry's commercial and operational centers for cost and efficiency improvement and application/service innovation.

Such innovations are still growing in significance for Europe's oil, not least because about one-third of the known

recoverable resources below the United Kingdom Continental Shelf (UKCS) remain to be exploited. This is no longer 'easy oil', but marginal oil, requiring an even more robust ICT environment and an equally more-robust ICT-oriented dialog.

The **Oilfield Connectivity 2018** (www.uk-emp.co.uk/current-events/oilfield-connectivity-2018/) program features four themed panel sessions: *[1] Communications Technology Solutions & Building the Digital Oilfield; [2] Communications Service Solutions & Building the Digital Oilfield; [3] Digital Oilfield Applications: Development & Roll-Out; and, [4] The Greater Connectivity Ecosystem in the Oil & Gas Environment*, and these will encompass such topics as:

- HTS – High Throughput GSO & NGSO/LEO Networks Emergence
- Antenna/Terminal Evolution in Oil & Gas
- Bandwidth, Throughput & Traffic Optimization Techniques
- Digital Transformation & the Internet of Things (IoT)/Machine-2-Machine
- Digital Oilfield Applications & the Cloud
- Big Oil/Marginal Oil, Big Data & Analytics
- Regulating Oilfield Connectivity
- The speaker line-up in Aberdeen includes:

Panel Session 1: *Communications Technology Solutions & Building the Digital Oilfield*

Andy Lucas, Senior Vice President (Satellite Operators), Comtech EF Data; **Drew Klein**, Vice President Sales, C-COM Satellite Systems; **Jo De Loor**, Market Director HTS & Enterprise, Newtec; and, **Richard Moir**, Senior Solutions Engineer, Riverbed Technology.

Panel Session 2: *Communications Service Solutions & Building the Digital Oilfield*

Mark Bennett, Business Development Manager Energy Europe, Marlink; **Jeffrey R. Osborne**, Co-founder & Vice President Business Development, Kepler Communications; **Stephen Hampton**, CTO, CCIE & Network Architect, Hutchinson Networks; **Ronald van der Breggen**, Chief Commercial Officer, LeoSat; **Mike Manson**, Sales Manager Oil & Gas, Telenor.

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

Mark Lambert, Vice President Business Development, Kratos Communications Ltd, **Chris Smith**, Sales Director - Europe (Cyphre), RigNet; **Alvaro Sanchez**, General Manager, Integrasys; and, **Vicky Glynn**, Product Manager, brightsolid.

Panel Session 4: *The Greater Connectivity Ecosystem in the Oil & Gas Environment*

Vadim Doronin, Senior Consultant, Access Partnership; and, **Bernie McPhillips**, Sales Director, Pangea.

Registrations for the event are still open for attendees to join the following participating organizations (as at 25th April):

4MS Networks Solutions; ABS; Access Partnership; Antenna Solutions; Baker Hughes; BP Exploration; brightsolid; British Petroleum; C-COM Satellite Systems; CETel; Comtech EF Data; CPI Europe; DF Communications; General Dynamics; Hunter Communications; Hutchinson Networks; Inmarsat; Integrasys; Kepler Communications; Kratos; LeoSat; M&J Communications; M4SAT; MACOM Consulting; Marlink; Media Broadcast Satellite; National Physical Laboratory; ND Satcom; Newtec; NovelSat; Pangea; Paradigm; Ping Networks; prosource.it; RigNet; Riverbed Technologies; Scottish Enterprise; seaVsat; Sematron; SpeedCast; Stena Drilling; Tampnet; TechnipFMC; Telenor Satellite; Terrasat; Wood Group; Woodsons of Aberdeen; and, WorkSmart Group.

The next maritime and offshore event to be run by GVF, in this instance by its Maritime SatCom Forum (MSF) Working Group, will be the **GVF Maritime Connectivity Seminar: *'Today's Broadband Satellite Imperative @ Posidonia'***, embedded within the **Posidonia International Shipping Exhibition** (http://posidonia-events.com/) – one of the maritime industry's most important gatherings. Held in 2018 at the Metropolitan Expo Centre, Athens, over 4th to 8th June, the event regularly attracts more than 20,000 visitors from over 100 countries and almost 2,000 exhibitors. A conference program is a long-standing part of the Posidonia event, but the inclusion of a general satellite communication seminar is an innovation from the GVF MSF for 2018. More information about the Seminar will appear in my next column.

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

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

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The Sweet Spot of the Satellite Business

These are challenging times for the business of satellite. The research house NSR made that clear in an April 18 editorial promoting their new satellite capacity pricing study, "No Pain, No Gain: Activating Demand Elasticity." Analyst Lluc Palerm-Serra noted that satellite capacity pricing continues to fall at an accelerated pace, and so far, satellite operators are unable to generate sufficient additional demand to offset the price declines. There is every expectation that prices will fall further as gigabits of capacity come on line in the next few years. The question he asks is: when will lower prices have real impact on demand – called elasticity by economists – driving total revenues higher?

Even television, that historic mainstay of the business, is feeling the pain. In the US, DirecTV lost 188,000 satellite TV subscribers in the first quarter of 2018. That was more than offset by 312,000 DirecTV Now streaming service customers who signed up in the quarter, but OTT has yet to generate the kind of average revenue per user that satellite has managed all these years. In January, Sky revealed that the average amount billed to subscribers fell for the first time ever as lower-priced and less-profitable streaming services made up more of the company's viewership.

From the Highway to the Skyway

Yet there is a corner of the satellite business that finds itself in a sweet spot, despite the strains of managing this high rate of change. That corner is occupied by teleports, the commercial ground stations that connect the digital highway on the ground to the skyway in space. With most satellite still in the traditional bent-pipe mode of transmission and reception, teleports have long been the part of the circuit where the intelligence goes in. The dramatic changes sweeping the industry are giving that intelligence greater value every year.

OTT is the premier example. Teleports serving media & entertainment companies are already repositories of immense volumes of program content and advertising, ingested into their servers and scheduled for playout. That makes them an efficient and cost-effective place to perform the formatting, metadata insertion and transcoding needed to prepare files for OTT and deliver them to content distribution networks and cloud service providers. The same logic holds true for cellular backhaul, where teleports can provide hosted switching, E-911 compliance, least-cost routing and other services for carriers as well as just moving the bits. Their systems integration capabilities make them strong competitors in maritime and enterprise networks, and their data centers open opportunities in IoT and interconnection with cloud service providers.

Sector in Transition

Having these natural advantages does not shield teleport operators from change. WTA recently released its *Sizing the Teleport Market 2010* study, and it revealed a sector in transition. Using data from the study, decision-makers are already estimating global and regional market share for their ompanies, conducting due diligence for mergers and acquisitions, and identifying potentially underserved regions for investment.

Over the past seven years, 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 decline of 1%. In 2010, WTA reported a worldwide commercial total of 996, representing an average 3% 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 6% from US$9.813 billion in 2016 to $10.384 billion in 2018. Average revenue per teleport rose 9% from $13.9 million in 2016 to $15.2 million in 2018. For the sector as a whole, consolidation did its job of creating fewer, more productive assets.

Consolidation, however, is hardly the whole story. In a mature technology market, while midsize companies become larger and the largest seek further increases in scale, new players enter the market to exploit new demand creat-

ed 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.

While managing diverse transmission paths, teleport operators are hardly abandoning satellite. Spending on capacity rose 6.5% across all regions from 2016 to 2018, as teleport operators continued to make satellite a vital part of their network operations.

Going for Growth

As they navigate change, teleport executives are targeting specific growth opportunities that leverage the sweet spot they occupy. In an earlier study, *Teleport Opportunities 2018*, they told us their top growth targets were in mobility for commercial transport (maritime, trucking and rail), IoT, OTT video and the integration of third-party cloud services (e.g., AWS and MS Azure) into their offerings. Aeronautical services are on the list, but executives have the reasonable expectation that satellite operators will succeed in serving passengers airlines directly.

While using fiber and broadband as transmission paths, most of the opportunities they are targeting also have a satellite component. And if prices continue to erode, it may increase the competitiveness of satellite to the point NSR called attention to: when lower prices trigger growth in volume that drives total revenues higher. That would be a win for the entire industry, including the sweet spot where teleports operate.

Robert Bell is Executive Director of the World Teleport Association, (www.worldteleport.org), which conducts research into the teleport and satellite industry and offers a Teleport Certification program to service providers. This article is based on data from *Sizing the Teleport Market 2018* study published in March and the *Teleport Opportunities 2018* report published in January.

Geeks Without Frontiers Appoint Hartshorn as CEO

Washington, D.C. May 2, 2018 – Geeks Without Frontiers (GEEKS), an award-winning Non Governmental Organization (NGO) focused on addressing global connectivity challenges with a view to closing the Digital Divide and facilitating the implementation of the United Nations Sustainable Development Goals (SDGs), announce the appointment of **David Hartshorn** as Chief Executive Officer with effect from 1 July 2018. Hartshorn, who will be supported by Angie Mar in her new role as GEEKS' International Program Director, brings more than 25 years of experience tackling global communications issues including through helping to build and lead the Global VSAT Forum (GVF), an international association focused on all aspects of improving access to satellite-based connectivity.

David Hartshorn

GEEKS co-founder Michael Potter said: "GEEKS has achieved a lot in the last three years with the launch of its Model Law on DigOnce!, the success of its Community Connect initiative and GEEKS' appointment to a working group of the Federal Communications Commission's 'Broadband Deployment Advisory Committee' (a new body focused on accelerating the deployment of broadband Internet access in the USA). We have ambitious plans for the future, and David and Angie's skills and experience will enable us to accelerate our connectivity programs."

"Since GEEKS' inception, I have admired the Founders' vision and the strategic approach of the team and their advisors," Hartshorn said. "I'm honored to have the opportunity, at this moment in history, to pursue the organization's goal of positively impacting the lives of a billion people through the innovative use of technology, connectivity and sustainable social enterprise models. In addition to helping to expand and accelerate the rollout of GEEKS' current initiatives, I look forward to establishing a global community and platform to help close the digital divide by bringing communications-enabled health, education, security and other solutions to unserved and underserved global communities."

Eutelsat Appoints Tshipama To Head Broadband in Africa

Paris, France, May 1, 2018--Satellite operator **Eutelsat Communications** announced having finalized the staffing of its teams in charge of broadband activities with the appointment of **Jean-Claude Tshipama**, who will be heading Broadband in Africa to promote satellite broadband connectivity in Africa.

Tshipama started his career in the telecommunications industry in the 2000s. He was the Commercial Director of Celtel in DR Congo, Director of sales and distribution at Digicel Group and later Director of sales and distribution for Africa at Microsoft Corporation. More recently, he served as CEO of Canal+ in DR Congo. He sits as a non-executive Director on the Board of Equity Bank in Kenya. He has an executive MBA and a Master's degree in economics,

In his new role as CEO of Broadband in Africa, Jean-Claude Tshipama's core mission will be to ensure that Eutelsat's broadband business is successfully deployed across Africa, drawing on the in-orbit resources of the Al Yah 3 satellite which will operate the service after entering operational service during next summer. The operation of the Al Yah 3 satellite will be followed next year by the launch of the KONNECT satellite.

Tshipama's appointment adds the final touch to the composition of the teams in charge of Eutelsat's fixed broadband activities, led by two senior executives with extensive experience in the telecommunications and Pay TV industries: Béatrice Beau as Executive VP for global broadband services, and Catherine Carde, who heads up broadband activities on the European continent. Jean-Claude Tshipama and Catherine Carde both report to Béatrice Beau.

Jean-Claude Tshipama

The broadband business will be one of the main focuses of Eutelsat's growth strategy in the coming years. This was evidenced recently by the order of the KONNECT VHTS satellite, a next-generation very high throughput satellite, whose footprint will cover Europe as from 2021.

Michel Azibert, Eutelsat Chief Commercial and Development Officer, said: "We are delighted to welcome Jean-Claude Tshipama to Eutelsat. His expert knowledge of the African market serving various industries, particularly telecommunications, will be a valuable asset to us in achieving our strong ambitions on this continent. We are now in perfect shape and looking forward to expanding our business in the fast-growing fixed broadband sector."

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24i Media Acquires Mautilus

Amsterdam, May 9, 2018 - 24i Media, the leading internet TV app technology provider for the world's top media companies, today announces the acquisition of Mautilus, the Czech TV app agency specializing in HbbTV and applications for multiple devices. The acquisition strengthens 24i's technology framework with new products and features, and increases its production capacity with Mautilus' highly-skilled engineers. The acquisition of Mautilus is the next step in 24i's ambition to deliver the most innovative, modular, flexible and scalable video streaming application technology.

"Mautilus shares our vision and recognizes the importance of delivering flawless and immersive experiences for our clients and their end-users. Its solutions strongly complement the broader 24i portfolio, and allows us to continue building a global internet TV app powerhouse with the best talent in the industry," said Martijn van Horssen, CEO and Co-Founder of 24i. "We are excited to be adding a tremendously talented team to contribute to our competitive edge. Sharing our values, our culture and our ongoing commitment to bringing state-of-the-art solutions to the new TV industry will allow 24i to bring even more powerful solutions to market. As one company, we will provide customers with truly innovative solutions enabled by cutting-edge technologies." he added.

Martijn van Horssen, CEO and Co-Founder of 24i and Rehor Vykoupil, CEO of Mautilus.

24i continues to grow and expand its position in today's evolving video landscape according to the company.. While 2017 was a year of record growth, this trend is continuing into 2018. In fact, Mautilus is 24i's second acquisition in 2018; the company acquired multiscreen video platform provider Vigour in March.

"Innovation, agility and the ability to scale are crucial ingredients to surf the impressive waves caused by the TV industry's fundamental changes. We've been able to accelerate our growth by picking partners that strengthen our strategic positioning. We always strive to attract great media professionals, whether individually or by teaming up with highly valued peers like Mautilus. Based on our successful integration with the former Siemens CVC front-end team in 2016, we are convinced of the value creation and cross-pollination of our teams in Brno," added 24i's Co-Founder and Chief Strategy Officer Hans Disch.

Mautilus develops TV apps for multiple platforms, including smart TVs, mobile, HbbTV, as well as for games consoles, set-top-boxes, and much more. Its customers include HBO, T-Mobile, iFlix and Showmax.

"Joining forces with 24i will allow us to better serve our customers by offering an innovative approach to streaming video technology," said Rehor Vykoupil, CEO of Mautilus. "The combination will allow us to provide the best solutions to our customers, and will be a great home for our technology and team. With our unique blend of multi-platform experience, specific HbbTV expertise and knowledge of addressable TV, we can strengthen and accelerate 24i?s ambition of becoming the most recognized technology provider for developing cutting-edge video applications across all devices. Petr Mazanec, Ivan Bradac and myself, as founders of Mautilus, are really proud to marry our team into the 24i family," he added.

Having experienced rapid growth in 2018, as well as announcing the launch of the Tennis Channel app for Sinclair Broadcasting Group last month, 24i will continue to expand its market position in the coming months according to the company.

Satellite Backhaul Going Mainstream?

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

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

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

After years of hype generation, 5G implementations are finally becoming real. Beyond extravagant network requirements, the true focus for Satcom must be in finding a way to fuse with ground networks via consolidating SDN/NFV technologies and integrating MNO operation platforms.

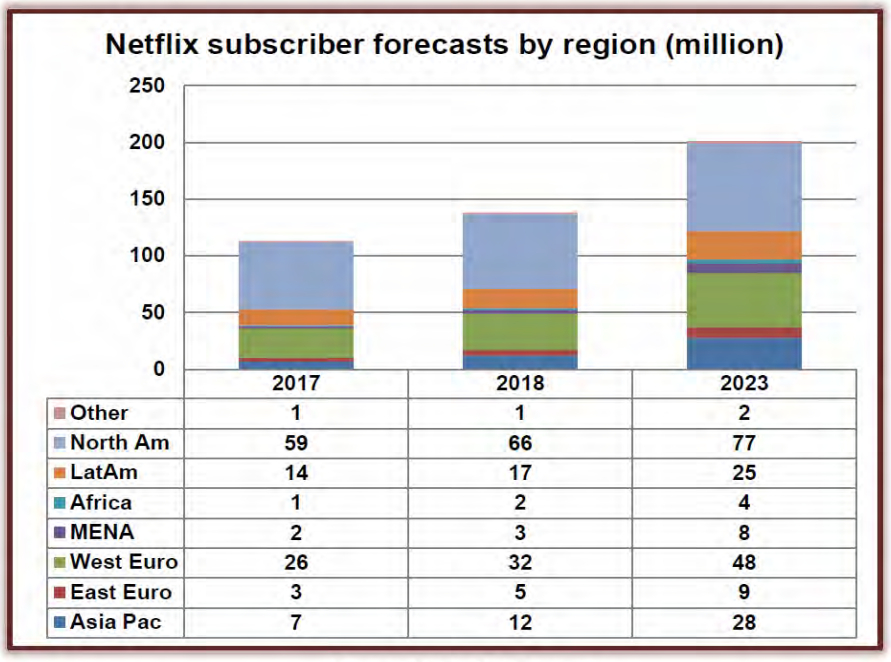
Video continues to be the "cash cow" for the satellite industry, but OTT is putting that to task. Satellite is reacting by offering VoD over satellite with some promising initial experiences. While penetrating those video ecosystems will be hard, transition to heavier formats, 5G or the ongoing Media-Telecom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

Wireless Backhaul via Satellite, 12th Edition is an industry leading analysis and forecast of 3 key market segments: Mobile Wireless Backhaul, Trunking and the newly added IP Content Distribution. The study assesses the installed base of sites in seven different regional markets, investigates trends impacting market growth, forecasts capacity and equipment revenues, and predicts satellite capacity requirements for provisioning each market vertical. Beyond classic C-, Ku- and Ka-band FSS capacity, NSR also leads the industry in forecasting use of High Throughput Satellites (HTS) segmented by band (C-, Ku- & Ka-bands) for GEO-HTS systems and assesses the impact of Non-GEO HTS constellations in the Backhaul markets.

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

Vital Statistics

201 million Netflix Subscibers by 2023



	2017	2018	2023
Other	1	1	2
North Am	59	66	77
LatAm	14	17	25
Africa	1	2	4
MENA	2	3	8
West Euro	26	32	48
East Euro	3	5	9
Asia Pac	7	12	28

Source: Digital TV Research.

Digital TV Research forecasts that Netflix will have 201 million streaming subscribers by 2023, up by 82% from 111 million at end-2017. About 28 million subscribers will be added in 2018 – making it the largest growth year ever. Lower growth is expected after 2018, according to the Netflix Forecasts report.

North America and Western Europe will together supply 62% of Netflix's total subscriber base by 2023 – still dominant, but down from 76% in 2017. Asia Pacific will boast fast growth by taking 14% of the 2023 total. This represents 28 million subs; quadruple the 2017 figure.

Simon Murray, Principal Analyst at Digital TV Research, said: "These forecasts are a lot higher than the last edition of this report. Similar to many other analysts, we underestimated the fast take-up in international markets."

Advertisers' Index