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SATELLITE Markets & Research

Industry Trends, News Analysis, Market Intelligence and Opportunities

Satellite Broadcast Market Update

by Elisabeth Tweedie

In an article for this magazine exactly a year ago, I suggested that maybe it was time for us to start thinking of ourselves as the bandwidth industry, rather than the satellite industry. Now, I'm not vain enough to think that that remark was what prompted DirecTV to announce at the end of last year that it would not be ordering any more satellites, and that it would instead concentrate on building out fiber and OTT offerings for its customers. Nevertheless, it is a very interesting move on the part of one of the major satellite video players in the US. However, to put this in perspective, it should be remembered that the last two satellites launched for DirecTV will be in service until 2030 at least, so this will not be a sudden withdrawal from satellite delivered video. Findings from Leichtman Research Group indicate that during 2018, DirecTV lost 1.236 million subscribers. During the same time period, the relatively new IP offering known as DirectTV Now gained 436,000 subscribers, making a total of around 1.6 million subscribers. DirectTV is far from unique in losing subscribers: Dish TV also lost over 1 million subscribers last year, and its IP offering Sling TV gained 205,000 subscribers, bringing the total to 2.417 million subscribers.

DirectTV is far from unique in losing subscribers. But DirecTV Now, the company's IP offering, is gaining new subsribers.

Direct to Home (DTH) is not alone in losing subscribers; in the

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What's Inside

EDITORIAL

The Satellite Broadcast Market

April is one of my favorite months. It's been an unusually rainy winter here in Los Angeles and the fresh, sunny days of spring is a much needed change. April also means that the NAB in Las Vegas is here. I particularly like the NAB because it's the only major show that I don't have to get on an airplane to attend.

The NAB has changed quite a bit since I first attended it way back in 1996 and this year even more so. The show's importance to the satellite industry is slowly diminishing as broadcast customers use less satellite capacity and rely more on Over-the-Top (OTT) and IP services. It would be interesting to what impact the announcement at the end of last year by DirecTV, one of the largest buyers of satellite spacecraft, that they won't be ordering any more new satellites. Meanwhile, as fewer satellite companies exhibit at the NAB, we see a greater presence by the Amazons, Facebooks and Googles of the world into the content distribution space that used to be dominated by satellite services providers.

If you are attending the NAB, do drop by our booth at the South Hall Upper , booth # SU 5624. We look forward to seeing you there.

Virgil Labrador
Editor-in-Chief

Satellite Executive BRIEFING
Industry Trends, News Analysis, Market Intelligence and Opportunities

EDITORIAL

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Satellite Broadcast Market from page 1

Despite the continued transition to IP and unicast, overall satellite capacity is expected to grow from 1.3 TB in 2017 to 10TB in 2022.

US the major cable companies and phone companies also lost over 1 million TV subscribers the last year. Given that between them, they have over 56 million subscribers compared to DTH's 29 million, this is obviously a much smaller percentage. However, these terrestrial companies also provide Internet and phone service, and frequently they are the only provider of Internet service in any given area. This adds a degree of "stickiness" which, in spite of the major improvements in satellite broadband in recent years, satellite operators find hard to compete with.

As we all know, these statistics do not mean that people are watching less video. If anything, people are spending more time watching video, but are consuming it in different ways. According to IHS Markit the number of subscriptions to online video services worldwide increased to 613.3 million in 2018, up 131.2 million from 2017. Cable subscriptions fell 2% to 556 million. According to the study, most households subscribe to both cable and OTT and are therefore counted in both categories.

The OTT market, although growing rapidly, is still dominated by Netflix, Amazon Prime and Hulu. But there are no shortage of competitors, "wannabe" competitors, and market exiters. On the same day, that Apple announced Apple TV+; according to Bloomberg, YouTube cancelled plans to build a slate of high-end programming. Thereby shifting away from its premium subscription service. Given that Goldman Sachs estimates that Netflix's 2018 content spend could be as high as US$ 13 billion, it would take steely nerves and deep pockets to want to compete with that. Apple apparently has both.

However, although the announcement came with a great deal of fanfare, it did not come with a great deal of detail. What we do know, is that it will launch in over 100 countries this fall. Different TV channels will be offered including HBO, Showtime and Starz as well as Apple's own channel showing original content produced by Apple. Pricing was not announced, but customers will apparently be able to select which channels they want and pay for only those. Disney will also launch its own streaming service later this year. Unlike Apple, which is a newbie in the content production business, Disney has a vast catalog and will make it available in its entirety for its streaming service. It's currently in the process of pulling its content from Netflix. Obviously, Disney has a more precisely targeted audience than Netflix, but given the size and timelessness, of its content library, which appeals to children now as much as it did to those of 20 years ago, this is a streaming service that could well be a great success.

"...The OTT market, although growing rapidly, is still dominated by Netflix, Amazon Prime and Hulu. But there are no shortage of competitors, "wannabe" competitors, and market exiters..."

Netflix, meanwhile continues to go from strength to strength. At the end of Q3 last year, Netflix had 137.1 million users. 57% of which come from outside the US. 23 languages are supported. In the US Netflix has a 51% share of the paid streaming market, Amazon Prime is in second place with a 33% share. In the UK, the ratio is similar, 59% Netflix, 31% Amazon Prime. Interestingly in the UK last year, the number of subscribers to streaming services

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"...UHD has not been as fast to take off as many people have expected. However, as Thomas Wrede, VP New Technologies & Standards, SES Video, points out: its introduction is actually moving at a faster pace than that of HD..."

actually overtook number of people who use traditional satellite or cable television services, [15.4 Million to 15.1 Million].

So, what does this continued transition to IP and unicast mean for satellite? Is it the beginning of the end, as some are saying, or is there still a role for satellite in an IP world? During World Satellite Business Week last September in Paris, Euroconsult forecasted a slight increase in video capacity leased to 2021 but a decline in revenue, from ~US$ 7 Billion today to ~US$ 6 Billion in 2021. However, overall satellite capacity is expected to grow from 1.3 TB in 2017 to 10TB in 2022.

Concurrent with the move to unicast streaming services, is the move to higher quality video, from standard definition [SD], to high definition [HD] and now to ultra high definition [UHD], otherwise known as 4K, all of which require increasing amounts of bandwidth. UHD has not been as fast to take off as many people have expected. However, as Thomas Wrede, VP New Technologies & Standards, SES Video, points out: its introduction is actually moving at a faster pace than that of HD. Two years after its introduction there were 32 HD channels, whereas in the same time period there were 92 UHD channels.

Higher bandwidth requirements and more viewers can create bottlenecks for terrestrial services. These can occur in two areas. Locally, the amount of bandwidth available to each individual home in an area tends to decrease during high viewing and occupancy times. This can cause buffering issues in the evenings or on weekends when the majority of households will have one or more occupants on the computer and/or watching streaming video. The other bottleneck occurs during major events, often live sporting events when the playout servers simply cannot handle number of video streams requested. As we all know, neither of these cause any problems when satellite is used to multicast video.

Various approaches, targeted at different parts of the value chain, are being offered to keep satellites relevant and capitalize on its high bandwidth, multicast efficiencies. One approach from Broadpeak, known as nano-CDN uses adaptive bit rate streaming (ABR) over satellite, to transform the unicast OTT video stream to multicast at the headend, for delivery over the network. At the home it is transformed back into a unicast stream for viewing on WiFi connected devices. This is the approach adopted by Eutelsat

The Switch and Eutelsat partnership is providing The Switch's user community of over 800 of the world's leading content producers and distributors with the ability to transmit feeds on a minute-by-minute basis to and from large parts of the globe.

in its Cirrus service.

An alternative, but similar approach, is that adopted by Anevia and Quadrille who have partnered to deliver OTT over satellite. The solution enables content providers and operators to offer live-TV services in situations where it was previously unavailable due to limited bandwidth. The OTT Stream is delivered via satellite, and at the receiving end, the signal is re-transformed to enable Multi-screen viewing on any smart device. Initial applications are targeted at high-speed trains, in-flight entertainment and universities.

On the contribution side, Eutelsat and The Switch are partnering to provide what they call "An unparalleled satellite and fiber video contribution network." The partnership utilizes three Eutelsat satellites covering Europe, Africa and the Americas with The Switch's global video transport network. Keith Buckley, president and CEO of the switch, said: "We have seen a huge increase in the demand for worldwide uplinking, from our connected customers and venues. Partnering with Eutelsat, allows us to combine our shared resources to bring a seamless, flexible offering to market."

Seamless and flexible. Those two words probably sum up, what is needed. Given the growing, but changing OTT market, satellite operators need to be flexible to accommodate the changing needs of their customers, and willing to continue innovating to provide a seamless service with terrestrial networks.

Elisabeth Tweedie has over 20 years experience at the cutting edge of new commmunications 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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FEATURE

IoT Applications, Markets and Opportunities

by Hub Urlings

After the launch of a whole new generation of small satellite Internet of Things (IoT) systems at the end of 2018, the market is looking forward to how these networks are going to fulfill their promise of global low-cost IoT connectivity services. The significant decrease of the overall global IoT connectivity costs and power requirements these new generation Sat-IoT networks bring are expected to lead to a market expansion that will at least equal the magnitude of this reduction at a factor 25. Expectations, however, are that the market for Sat-IoT may expand way beyond that leading to tens of millions of nodes around the world.

But how will the customers benefit from low-cost global connectivity? And how will this new generation of operators fit in the established Sat-IoT market?

Existing satellite IoT services from Inmarsat, Iridium, Globalstar, and Thuraya have dominated the market already for decades, targeting high-end market segments like logistics, the government, or the energy and the mining sector.

The IoT market is described as the market of million verticals. The vast majority of them (smart home, smart city, connected cars) will be met using terrestrial networks. What market verticals will be able to benefit most from the low-cost, low-power advantages the next gen small Sat IoT operators will offer? How can the new Sat-IoT operators find their niche, and will the high expectations of these new operators and their investors be met?

In this article we will zoom in on this promising new product market combinations in the satellite IoT market and outline the playing field these new operators will have to work in.

Sat-IoT market size: Yes, but is it is big enough?

To venture an estimate on the sat-iot market, we first have to look at the size of the overall IoT market. Where aggressive forecasts put the IoT market at US$ 800 billion by 2025, more conservative scenario puts the IoT market at UD$ 300 billion by 2025 according to the McKinsey Global Institute). Anyone with a better guess is welcome, but one thing is clear: the potential is huge.

Within the supplier ecosystem, it is generally expected that software and services suppliers will capture the greatest share of value over time as costs of hardware and overall systems decline, while connectivity will remain a requirement.

The total value of IoT connec-

tivity is estimated to reach 10% of this amount, i.e. between €30 billion and €80 billion. Terrestrial networks like GSM, Lora, Sigfox and wifi provide low-cost and low-power connectivity for most use cases in densely populated territories where they have coverage. This includes 95% of the global population but only 10% of the world's surface. Since Sat-IoT is addressing 'things' (equipment, assets, vehicles, etc.) in 90% of the globe in less densely populated areas, one could make a conservative estimate of the economic value of the Sat-IoT connectivity to be 5% of that figure. That leads to a total addressable market between €1.5 billion and €4 billion for Sat-IoT. This sounds big enough a market to be shared both by traditional and next gen Sat-IoT operators. Let's zoom in and try to see how.

Sat-IoT service types and their markets

First of all let's put Sat-IoT in perspective and try to understand what small Sat-IoT is offering for that low price. In sync with the 5G pyramid of service types, we can make a service model for satellite IoT connectivity services. The model consists of a continuum where on the left side we see (see table below).

Massive Machine Type Communications ⟷ Ultra-reliable and low Latency communications

Service continuum

Communication is commodity	*Communications is necessity*
High latency, store and forward messaging services as provided by the next gen Sat-IoT players. Simplex messaging service with a Limited message size (small data).	Low latency, real time services provided by traditional Sat-IoT players. Provided as duplex service in different low data rate bandwidths.
Massive Machine Type Communications (MMTC) will focus on providing connectivity to a large number of devices that transmit sporadically a low amount of traffic, that can stand long latencies	Ultra-reliable, Low-Latency Communications (URLLC), which will target wireless connections with stringent requirements on both latency and reliability;
MMTC is more machine-centric rather than human-centric communications, and will form the backbone of the upcoming automated society.	URLLC is for Mission Critical applications (e-health), and emergency communication supporting human interventions in the case of crisis.
Git with mid market segments: Scheduled Tracking: unpowered assets, vehicles, vessels, e.g. every day, hour, or 15 minute Wide area monitoring: non critical and scheduled monitoring for smart agriculture, public infra, meteo/climate, water, energy grids Connectivity costs must be low cost to allow justifiable business case.	Fit with high end market segments (Near to) Realtime Tracking of vehicle and vessels: maritime market, trucking, logistics, Monitoring critical business processes in Energy/mining/manufacturing Emergency communications for first responders, government, blue light sector Connectivity contributes significant value justifying high costs.

> "...The conservative estimate of the economic value of Sat-IoT connectivity... leads to a total addressable market between Euro 1.5 and 4 billion... big enough a market to be shared both by traditional and next gen Sat-IoT operators..."

Small Sat IoT and their market fit

Small Sat-IoT is very suitable for:

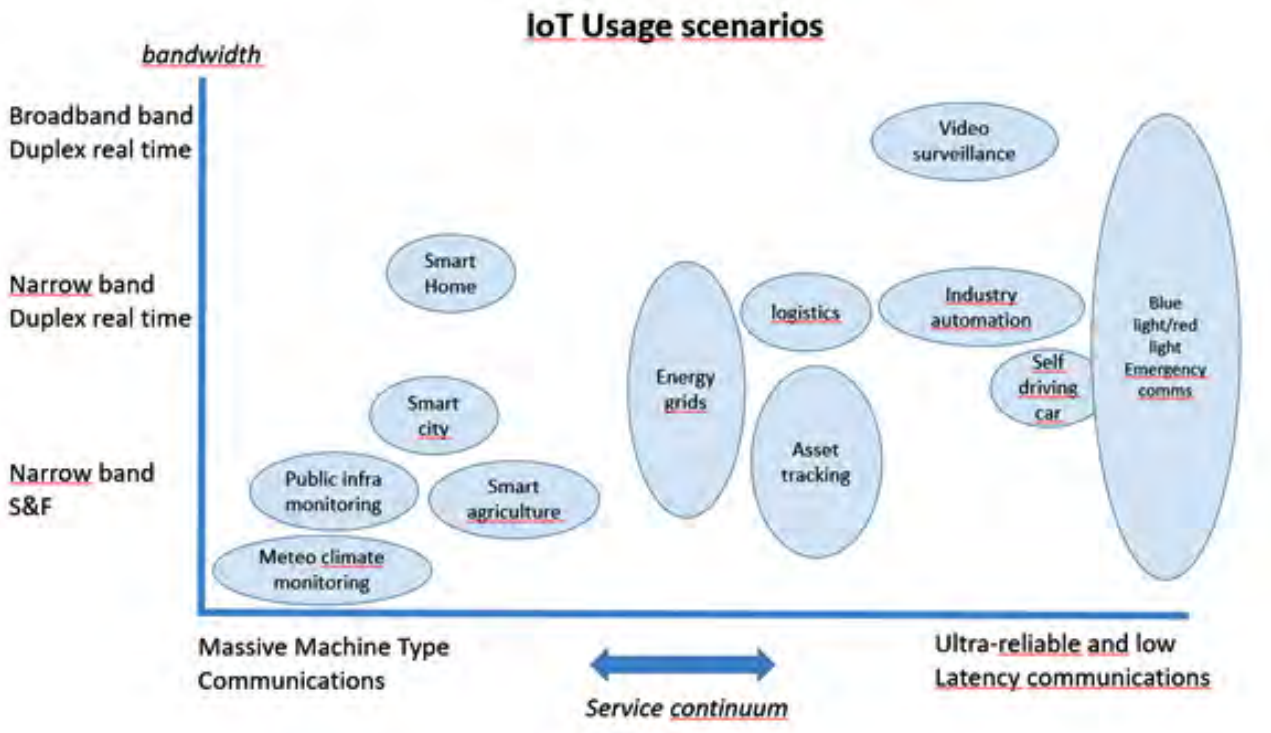
- Low-speed connected sensors with lenient latency requirements, and limited power budgets
- IoT solutions that are deployed globally and/or in areas with little or no coverage by terrestrial networks (rural/remote areas)

Small Sat_IoT is not meant for:

- IoT solutions that produce vast amounts of data, or with strict real-time requirements.
- IoT solutions that require bi-directional connectivity.

Sat-IoT Market segmentation

The IoT market is sometimes called the market with the million verticals. From a commercialization perspective that is not practical. In this article we will look at the market based on the different IoT service types like described above, then matching it with customer requirements in a number of use cases.



Small Sat-IoT markets

In this section we will not deal with the ULLC type of service as provided by traditional Sat-IoT operators, but we will zoom in on the MMTC type of Sat-IoT services as provided by the next gen small sat iot operators.

In the non-critical domain there is lots of opportunity for low cost, low power consumption solutions as provided by small sat iot operators:

The following markets show a good match with the service characteristics of the small sat Iot networks:

Tracking market

Unpowered assets

An example application here is the monitoring hazardous materials in train wagons or other unpowered transport units. As GSM networks do not provide continental coverage, currently these assets can only be monitored by traditional satellite connectivity, and that happens on a small scale already. Current cost levels and power consumption of the traditional Sat-IoT operators, however, are prohibitive to equip e.g. 400,000 additional train cars.

For that, the customer needs an easy to install, low-cost device, that covers every railroad in every European country with low power consumption and long battery life that is able to do a few transmissions per day to report the current position and cargo info. This makes it a good match, therefore, with Small Sat-IoT connectivity.

The Asset Tracking market is broader, however, with equipment tracking, tracking in the transportation & logistics segment, or the tracking of maritime assets (small boats, yachts, fishing boats).

Monitoring market

Smart-agriculture

Farm and agricultural processes and management have become increasingly automated over the last decades, benefitting from the convergence of IT, communications, and automation in other industries. Unique applications revolve around the planting, cultivation, and harvesting of plants and the raising of livestock. The more industrial horticulture, as we see it in the greenhouse sector already, is one of the leading IoT sectors, with a complete sensor/activator based climate control and management of growing conditions. Small sat IoT will take this knowledge and experience out to the fields around the world, promising more productivity, higher yields, less need for detergents, and efficient use of water and nutrients that will justify the use of low-cost sensor

networks.

Also global IoT connectivity will allow agri-tech companies to improve supply-chain efficiencies. Via IoT, it is now possible to track the origins of food. To import fish into the EU, you have to prove, as a supplier, that your produce does not come from a maritime reserve; the same applies for certain types of lumber. Imagine you could prove your cattle has only grazed in an area with premium grasses. You can then sell the beef as premium as well.

Public infrastructure

In the public infrastructure market, potential applications for small sat IoT include structure and environmental monitoring, asset tracking, and infrastructure maintenance process monitoring and optimization. Coming from the Netherlands, I immediately think of the use of Sat-IoT in the monitoring dams and dikes to prevent future flooding.

But the market is much broader; think of monitoring of a national road, waterway, railway, waste disposal infrastructure, including all buildings, bridges, structures, etc. Wide area monitoring can help in preventive maintenance or help in monitoring infrastructure that can become dangerous due to lack of maintenance.

Environmental monitoring

A lot of the environmental monitoring applications have a perfect fit with the MMTC sat-iot service type: non-critical, high-latency no problem, low-cost and low-power requirement.

This range of applications is very wide and ranges from weather/meteorological monitoring:

- volcanic activity
- monitoring climate change
- water height management
- wild fire monitoring
- drought monitoring

Already satellite images play an important role in this process using earth observation techniques. The addition sensor data from ground-based sensors, however, will enlarge the resolution of the pictures and will provide more detailed insight in the situation.

In terms of "return on investment' Sat-IoT solutions for environmental monitoring are difficult to assess. The upside of these applications lies more with what does not happen and were a lot of effect costs can be avoided (based on appropriate reactions to bushfires, floods, natural disasters).

Energy & Utilities

Where return on investment in Sat-IoT solutions is clearer is with the monitoring of all kinds of gas, oil, and wind energy grids, both in the upstream and in the downstream. Grid monitoring allows for a more efficient use of the grid against lower cost leading directly to a positive business case.

Another important utility is with water grids. Monitoring here can help with water conservation, predict asset performance, and predict maintenance of the water grid and fresh water reservoirs.

Conclusion

The Connected World Revolution is in full swing. We will be connected to a vast IoT network that will feed unimaginable amounts of data into ever more advanced artificial intelligence tools, enabling us to create new and highly disruptive products and services that generate

Farm and agricultural processes and management have become increasingly automated over the last decades. Unique applications revolve around the planting, cultivation, and harvesting of plants and the raising of livestock. (Lanner photo)

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IoT network operators, both for terrestrial as well as for satellite IoT networks, will have to carve out their specific niche complementing other networks available. This also applies to the new generation Sat-IoT operators that is using small sats to bring the connectivity cost and power consumption of their units (let's call them LPGAN or Low Power Global Area Networks) down to the level of terrestrial Low Power Wide Area Networks (LPWAN) like Lora or Sigfox. Their services are clear and potential markets are identified. Let's see if this new generation Sat-IoT player can turn their startups to profitable business. In the next article, we will go into the challenges these new satellite operators and their service providers face while doing that.

Hub Urlings was one of the pioneers of Satellite M2M as Product Manager Inmarsat-C at the famous KPN Station 12. The reliability and success of this "small data" satellite service, its global coverage and reliability made that the service was used for a myriad of applications.Now, 25 years later, he is again involved in the development of a new generation of Sat-IoT services working as Innovation Manager for the ESA program at Hiber. His company, M2sat, is a value added service provider for Sat-IoT services. He can be contacted at: urlings@m2sat.com

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OPINION

RITUALS

by Lou Zacharilla

In much of the world spring is a season with a nice big payload of rituals, customs and a whiff of hope. Easter, Passover and Ramadan, on the religious side, occur before summer's sun blares at us. Among my favorite rituals is "Hanami," the ancient Japanese tradition of viewing cherry blossoms (sakura). I go to Brooklyn's Botanical Gardens for this (not Japan.) But the sakura (cherry blossoms) are really nice in a part of New York not necessarily linked to delicacy.

Most important for me is the start of the baseball season. Baseball means that that cold winds are behind me, and it will not be long before the warm air returns to put some tail behind the long home run.

And of course there is the ritual of NAB in Las Vegas, where you probably are reading this. Vegas is not known for its sakura but rather for its ritual of bringing together from a key industry people served daily by space and satellite.

Like the multitude of shows in different verticals NAB proves that satellites do have a role -everywhere. Even at home plate and the pitcher's mound during baseball stadium. NASA tweeted an amazing series of images over baseball stadiums in April which made the hearts in baseball fans from Japan to Pennsylvania jump with envy at not being at all of these Opening Day games. https://twitter.com/NASA/status/1111290477926645761

But thanks to satellites we were able to watch the highlights on our devices, the MLB Channel and our broadcast news outlets no matter where we were.

There will be some additional, unexpected rituals this Spring. These include the Satellite Show in Washington, DC, which this year takes place in May. SSPI will be inducting new members into its Hall of Fame during the show. Our own "Babe Ruths" will be given their honor at the Hall of Fame Celebration, which takes place in the Newseum https://www.sspi.org/cpages/hall-of-fame-celebration on 7 May.

It will be preceded by another established rite of the season, the Chairman's Reception. The C-suite event is the power networking moment of Spring for the industry. If your CEO or Managing Director or startup's Founder has not received their invitation yet, let us know.

Rituals define every aspect of our lives. In our industry they bring out the best as we trudge from booth to booth, event to event, and see friends, feel the buzz and learn.

Rituals also bring out the best in us, especially in coarser times.

"Lock him up!"

One of the satellites transmitting from Washington, DC during the Nationals baseball game picked up the sounds of fans chanting, "Lock him up! Lock him up!" We cringed until we realized that the fans were not chanting this familar unfortunate, un-American cadence in response to a political item. Rather, it was their embrace for Anthony Rendon, a star player on the team who is in a contract negotiation with the team's management. Fans think their third baseman is worth the money he is asking for and want to "lock" Mr. Rendon into an agreement.

The amount would total US$ 23.4 million in annual salary. Spring is hope. Good luck with your deals at NAB.

See you there and hopefully at the SSPI Hall of Fame Ceremony in May!

For more information about SSPI go to: www.sspi.org and www.bettersatelliteworld.com. To listen to Lou's recent podcast with venture capitalist and RRE Venture's Will Porteous got to: https://www.sspi.org/cpages/podcast. Follow SSPI on Twitter at: @SSPI & @LouICF

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

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SATELLITE COMMUNICATIONS

CABSAT Wrap-Up: GVF Hub Summit Debrief

by Martin Jarrold

The Satellite Hub Summit @ CABSAT 2019, GVF's prominent MENA platform for addressing and analyzing evolutionary and revolutionary transitions in satellite technologies, services, applications, and markets, was a central feature at the Dubai International Convention & Exhibition Centre/Dubai World Trade Centre over 12th to 14th March. The Hub program started-off with the first of two important keynote addresses.

International Keynote Address

Xiuqi "Ellie" Wang, Head, Data Treatment Section, Space Publication & Registration Division, Space Services Department, Radiocommunication Bureau, International Telecommunication Union

Ms. Wang's keynote covered the details of the preparatory processes in the build-up to the World Radiocommunication Conference in November 2019 including February's CPM19-2 consolidated report that will serve as the basis for discussion at the WRC-19 through providing detailed background for each of the agenda items.

Following the ITU address and before the first of four main program sessions I, as Summit Chair, introduced the moderating team who brought a wealth of insight and informed perspective to their management of the program.

The Hub Summit Moderating Team

- Virgil Labrador, Satellite Markets & Research
- Riaz Lamak, GVF
- Stéphane Chenard, Euroconsult,
- Torsten Kriening, SpaceWatch Global

The format of the four main sessions allowed each speaker/panelist to have a maximum of 15 minutes to deliver a presentation and opening remarks relating to their selected topic within the overall session theme to which they were a contributor. At the conclusion of all presentations/opening remarks the speaker/panelists formed a panel with 45-50 minutes of moderator-led interactive discussion amongst the panel members and the Hub Summit audience.

As above with Ms. Wang's keynote, I have provided below brief descriptions of each speaker/panelist contributions. For access to the full slide presentations in PDF format please contact me at martin.jarrold@gvf.org.

Global Satellite Focus… "Big Ticket" Issues on the Industry Forward Agenda

- Alexander Mueller-Gastell, Chief Executive Officer, ND SATCOM

Disaster response satcoms in-

novations and strategies.

- Martin Coleman, Executive Director, Satcoms Innovation Group

  Space traffic management and space debris.

- Yasir Hassan, Director, Transmission Operations, ArabSat

  Operations excellence, communications systems monitoring, interference source geolocation.

- Torsten Kriening, Chief Commercial Officer, PTScientists GmbH

  Future moon exploration and the first lunar 4G/LTE network established with Vodafone, Nokia and Nokia Bell Labs.

- Nick Roullier, Vice President, Customer Enablement, SES Networks

  Sustainable space initiatives and best practice; optimizing network performance.

- Jack Buechler, Vice President, Business & Product Development, Talia; Chief Operating Officer, Quika

  The new VSAT market and the LEO disruptive factor.

Global Satellite Business is Big Business. New Space Making It Bigger

- Ramesh Ramaswamy, Senior Vice President & General Manager, International Division, Hughes

  Perspectives on the GEO, NGSO and terrestrial networking world for wide ranging user markets and addressing the digital divide.

- James Taylor, Director, Business & Market Development, Methera Global Communications

  Key drivers and challenges for New Space; the Methera MEO disruptive approach to broadband provisioning solutions.

- Javier Santos, International Business Development Engineer, INSTER

  Opportunities for an expanding satcoms ecosystem: ground terminals on-the-move, last mile satellite backhaul, IoT remote connectivity.

- Ronald van der Breggen, Chief Commercial Officer, LeoSat

  The challenges of increased data dependency, and highly-secure and resilient laser backbone spanning the entire planet in the most cost-efficient way possible – via space.

- Nick Dowsett, Director, IntelsatOne Managed Solutions, Intelsat

  Innovating for the Global Hybrid Network and investing in innovation with simplified access, on standards and interoperability, for flexibility and longevity, and hybrid networks.

National Keynote Address

- Khalid Al Awadi, Manager, Broadcasting & Space Services, Spectrum Management Affairs Department, United Arab Emirates Telecommunications Regulatory Authority

  Mr. Al Awadhi's keynote speech covered all facets of the TRA's policy position preparations for WRC-19 in November, with reference to all communications technologies, and the development, under the leadership of the U.A.E. Space Agency, of national satellite and space programs and collaborations with other national agencies.

Mobility: 'Maritime Morning' – "To the Wider Market and Service Horizon"

- Andrew Faiola, Head of Mobility, Newtec

  Customer demand in the mar-

Continued on page 22

PRODUCTS & SERVICES MARKETPLACE

A guide to key products and services to be showcased at NAB Show 2019, April 8-11, Las Vegas, Nevada.

Advantech Wireless Technologies
Booth # SU 9207
www.advantechwireless.com

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

AvL Technologies
Booth # OE 11015
www.avltech.com

Founded in 1994, AvL Technologies is celebrating 25 years in the satellite communications industry this year. AvL's first antenna – serial number 001 – is a 1.8m SNG antenna still in operation today, and it operates from its third uplink truck at PacSat.

This year at NAB, in Outdoor Exhibit OE11015, we will show a new and very adaptable antenna that can be mounted to a pick-up truck, SUV or box truck. The 1.2m antenna has a segmented reflector to enable it to fit into a smaller case, and it can be shipped or transported as mounted on a vehicle.Also in our booth will be AvL's newest ultra-lightweight and compact flyaway antennas. Two of these antennas, with 75cm and 98cm reflectors, are integrated, and can be used with manual operation or upgraded to motorized auto-acquisition operation. We also will show the new 2.2m ultra lightweight manual quad-band antenna.

2.2M Ultra-Lightweight Flyaway Antenna

C-COM Satellite Systems Inc.
Booth # OE 11029
www.c-comsat.com

Join **C-COM** at the NAB for a live demo of the Ka-98H/JUP mounted on a vehicle providing fast satellite acquisition with the iNetVu® 7710 Controller at a touch of a button. This New Generation .98m Auto-Acquire Driveaway Antenna has been "Approved for operation on Hughes JUPITER Systems" and is convertible from Ka to Ku band.

C-COM's iNetVu® FLY-981, a .98m Ku-band Flyaway antenna will also be on display. This highly portable, self-pointing, auto-acquire unit is configurable with the iNetVu® 7710 Controller to provide fast satellite acquisition within minutes, anytime anywhere. It can be assembled in 10 minutes by one person.

Both terminals are indispensable for applications requiring reliable and/or remote connectivity in a rugged environment for Internet services (High-speed access, Video & Voice over IP, file transfer, e-mail or web browsing and are ideally suited for industries such as Oil & Gas Exploration, Military Communications, Disaster Management, SNG, Emergency Communications Backup, Cellular Backhaul and many others.

Comtech EF Data Corp.
Booth # SU 3308
www.comtechefdata.com

Comtech EF Data Corp. is a leading suppli-

er of communications equipment with a focus on satellite bandwidth efficiency and link optimization. Our high-performance satellite communications ground equipment is deployed globally to support mission-critical and demanding applications for government, mobile backhaul, premium enterprise and mobility. Service providers, satellite operators, governments and commercial users wanting to optimize communications, increase throughput and delight customers leverage the performance and flexibility of the Comtech brand. The solutions are facilitating fixed and mobile networks in 160+ countries and across every ocean.

COMTECH Xicom Technologies
Booth # SU 3308
www.xicomtech.com

Comtech Xicom Technology provides a broad product line of KPAs, TWTAs, SSPAs and BUCs for worldwide satellite uplink covering C-, X-, Ku-, DBS-, Ka-, Q-band, Tri- and Multiband with power levels from 8 to 3,550 watts and available in rack-mount and antenna-mount ODU packages.

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

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

Newtec
Booth# SU 1416
www.newtec.eu

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

Get more information on satellite and OTT – learn more about feeding the CDNs and injecting into the Cloud.

This year, we will also be running a new feature at NAB – the SATCOM HUB, where satellite and media connect. We will create an environment in NAB's South Upper Hall that unites the industry and demonstrates why satellite is a critical part of the connectivity mix of the future. We will have free, daily presentations from industry players – a rich program of insights from the leading lights of the satellite broadcast sector. It's not to be missed!

Walton Enterprises
Booth # OE 20052
www.de-ice.com

Walton De-Ice, the world's leading designer and manufacturer of satellite earth station antenna (ESA) weather protection solutions, will showcase its all-new Walton ADC-4000 Antenna De-Icing Control System for the first time in Europe at the IBC. The Walton ADC-4000 makes the operation of Walton hot-air de-icing systems more accurate and efficient than ever, offering potential savings in management and labor overhead for satellite broadcast and head end facilities.

The ADC-4000 Antenna De-Icing Control System adds a new method to actively control the heat within an antenna de-icing enclosure thus allowing for improved control of the antenna surface temperature.

Walton De-Ice's new Portable Radome is designed to protect satellite terminals for applications such as transportable, coms on-the-pause (COTP), first responder, vehicular and similar VSAT and smaller earth station sites. Walton's solution design is also resistance to high winds. It would also support permanent installations and SNGs, and LEO/MEO gateway terminals.

such applications as virtual networking, vessel enterprise, big data, BYOD) met with HTS in the mix.

- Ramsey Khanfour, Vice President, Corporate Development, Middle East & Africa, SES

  MSS to VSAT: VSAT market dominated by Ku-band across all segments, but Ka-band catching up and will reach >30% share by 2027; key maritime mobility drivers.

- Hassan Aouisse, Director, Systems Engineering, iDirect

  Maritime trends, the connected ship, emerging maritime IoT applications, future trends and complexities influence ground segment considerations.

- David Burr, Vice President, Business Development, Satellite Operators & Mobility, Comtech EF Data

  Uncertain times with maritime customer increasing performance expectations, tighter budgets, greater complexity of satellite networks.

- Gagan Agrawal, Senior Consultant, Northern Sky Research

  Major industry changes; forecasting capacity drivers in the new wave of growth; architecture adaptation; revenue shares from data; decoding critical market changes; core offerings, competitive threats and evolving business models.

- Steve Richeson, Vice President, Sales & Marketing, Mission Microwave Technologies LLC

  The new shape of solid state BUCs/SSPAs and advantages for maritime: lighter BUCs, better RF performance, higher throughout, leveraging advantage of HTS and GEO/MEO/LEO architectures.

Mobility: 'Aero Afternoon' – "It's Not Just About the IFEC!"

The 'Aero Afternoon' audience listening to the speaker/panelists:

- Hassan Aouisse, Director, Systems Engineering, iDirect

  Aero growth across all market segments; tomorrow's technology: software-defined architecture, terminal integration to reduce SWaP, multi-receive/satellite/technology solution, multi-provider/multi-waveform/multi-technology, 5G standard connectivity architecture.

- Guido Baraglia, Director of Business Development & Sales, Kratos Communications

- Sebastien Couvet, EMEA Sales Manager, Integrasys

  Link budgeting with SatMotion Pocket; automatic lineup and auto-commissioning of VSAT remotes to minimize interference with other terminals and adjacent satellites.

Workshop – Satcoms Insights & Capacity Building

Workshop Chair:

- Martin Jarrold, Chief, International Program Development, GVF

Workshop Leaders:

- Yasir Hassan, Director, Transmission Operations, ArabSat

  Capacity building challenges regarding VHTS satellite monitoring, Geo-location increasingly challenging with payload complexity (onboard processing), number of spot beams; Earth station registration and Big Data of measurements and analysis required.

- Riaz Lamak, South Asia Liaison for Training, Benchmark-

ing, Validation & Product Quality, GVF

Capacity building resources provided through GVF online, mentored, and classroom-based training, with examples of Pacific Endeavor/Satcom Endeavor and ITU Satellite Symposium @ WRS-18.

Workshop Contributors:

- H. E. Dr. Riyadh Najm, Former President of the General Commission for Audiovisual Media & Current Chairman of the Advisory Committee for the Arab Radio & TV Academy, Kingdom of Saudi Arabia

  No slides.

- Martin Coleman, Executive Director, SatComs Innovation Group (SIG)

  Innovation enablers; game changers: space traffic management, network complexity, operational efficiency improvement; RFI management, improved integration of tools and processes, automation and AI.

- Guido Baraglia, Director of Business Development & Sales, Kratos Communications

Next on the GVF events calendar is the Newtec Satcom Hub at the NAB Show in Las Vegas, U.S.A. David Meltzer, GVF Secretary General will be speaking on: Upcoming Spectrum Battles at WRC-19; Satellites – A Ubiquitous Solution for Communications Needs; and, Sustainable Space Operations, at 16:00 hours on April 10, 2019.

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

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Connected Cars: Too Important to be Left to Cellular Service

The "connected car" is poised to make your time behind the wheel safer and more productive.

The world buys more than 78 million cars every year. People shop cars for horsepower and acceleration, leg room and cargo space, and how many miles they can go on a tank of fuel or on a single charge. And every year, more and more buyers want to know just how smart their car is.

The "connected car" is poised to make your time behind the wheel safer and more productive. Connected cars can stream music from your favorite web service, help you navigate, provide internet access, and offer road-side assistance in an emergency. But that's just the start.

A Computer on Wheels

Why does your car need to be connected? Behind the dashboard and under the hood, today's cars contain over 100 million lines of computer codes that process up to 25 gigabytes of data an hour. A high-end model has more computing power than a supercomputer from the year 2000.

There are already millions of connected cars on the road and some of them connect over the same cellular network your phone does. In 2016, for the first time, cellular connections for cars grew at a faster rate than new phone connections.

Those cellular connections are okay for the fun stuff – the music, the maps, and internet access. But when it comes to keeping you safe, there's a problem. Cellular network doesn't go everywhere. You may get great service in a city or along a highway – but get out into the countryside, even in one of the world's richest nations, and it's another story. Drive in a developing nation, and the problem is even greater.

That's why serious designers of the connected car are mixing

cellular connectivity with satellite.

The Next Generation of Connected Car

The Kymeta Corporation is delivering the next generation of the connected car. The company has developed a service called KĀLO, making it possible to gain access to satellite connectivity to deliver seamless, global internet access. It works just like a cellular plan for your car but, because it can use satellite networks, it works even where there are no cell towers.

To connect to those satellites, Kymeta has developed the world's first flat satellite terminal, called KyWay™, using revolutionary metamaterials. KyWay can be built right into the roof of a vehicle. Kymeta manufactures the terminals using liquid-crystal-filled glass panels on the same production lines as LCD TVs. Small, lightweight, and with no moving parts, they are still powerful enough to communicate with satellites thousands of miles overhead. The KĀLO service is being extended to support cellular-satellite connectivity.

Providing Safety and Security

So, what's going on in your car that needs all the data a satellite can provide?

Your car runs on software, and that software needs to be updated regularly. Right now, that means taking your car to the repair shop. That costs manufacturers billions, and the inconvenience means that a lot of software never gets updated. With satellites, the update can be transmitted to millions of cars at the same time easily, ensuring that everyone on the road has the required safety enhancements.

Satellite updates aren't just convenient; they're also secure. We've all heard the scary stories about cars of the future being hacked. Satellite is secure because it touches just one place – your car – instead of traveling across the internet or phone network. That's why the government turns to satellite to protect its most secure communications.

Security matters more every year because cars are starting to drive themselves. Self-driving cars are a miraculous blend of computers and sensors. And one more vital component. Smart cars run on digital maps – incredibly detailed, always up-to-date maps of highways, streets, alleys, corners, sidewalks, stoplights and all the rest.

In a world of constant change, maps get out of date fast. Buildings rise and are torn down. Roads are closed and opened. Stop signs are replaced with stoplights. Only satellite can send cars the massive amounts of map data that will keep people safe when computers take the wheel.

The connected car got its start in 1996, when General Motors introduced its OnStar roadside assistance program. By 2015, OnStar had handled more than one billion requests from drivers. That's why car shoppers are now looking not just for horsepower or leg room but for "intelligence" or "smarts" as well. Kymeta is working today with satellite operators and automobile companies to make sure your next car will keep your passengers more entertained, get you where you want to go faster, and keep you safer than ever before.

Car shoppers are now looking not just for horsepower or leg room but for "intelligence" or "smarts" as well.

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

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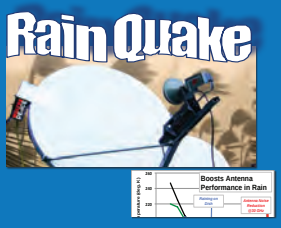

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Eutelsat Appoints Julie Burguburu as Corporate Secretary

Paris, France, March 14, 2019 — Eutelsat Communications (NYSE Euronext Paris: ETL) announced today the appointment of Julie Burguburu as Company Secretary of the Group and a member of the Executive Committee, effective March 15.

Burguburu will oversee Eutelsat's legal, compliance, regulatory and governance issues by heading the company's teams in charge of these functions. She will succeed Edouard Silverio, who has decided to pursue new professional projects beyond Eutelsat.

As a senior counsel member ("maître de requêtes") to the French Conseil d'Etat, Julie Burguburu was, up until now, a State rapporteur to the Administrative Litigation Division. She has held several top management positions in the French State administration. From 2014 to 2016, she was deputy chief-of-staff to Claude Bartolone, president of France's National Assembly, then from 2016 to 2017, to Bernard Cazeneuve, in his role of interior minister and then prime minister.

Julie previously spent four years in Shanghai, China, where she was vice-president of Veolia China, with the responsibility of transforming the company. In particular, she steered the reorganization of the Chinese and Japanese structures as well as the merger of Veolia's water and waste management entities in China. Prior to that, she had served seven years at the French Conseil d'Etat from 2003 to 2010.

A French national, Burguburu is a graduate of the Ecole Nationale d'Administration and Sciences Po Paris. A member of the Young Leaders of the France-China Foundation and an auditor with the IHEDN, she also holds a Diploma of Advanced Studies (French DEA) in general private law (from Paris I Panthéon-Assas University) and a Master of Arts in international relations and international economics from the School of Advanced International Studies, Johns Hopkins University, Washington D.C.

DataPath Appoints Henrik Asbjørn Head of Sales for Europe

Duluth, GA, March 10, 2019 — DataPath announced the appointment of Henrik Asbjørn of Copenhagen, Denmark, to the position of Senior Director, Head of Sales – Europe.

Asbjørn will have overall responsibility for sales and customer development for the company's satellite and wireless communications products and systems and secure communications software.

In making the announcement, DataPath's Chief Sales & Marketing Officer, Carsten Drachmann, said, "We are thrilled to have Henrik joining the DataPath team as he brings a wealth of knowledge and experience in leading global sales in the telco industry and wireless communications sectors. His experience and success in selling innovative solutions and identifying strong partnerships speaks for itself and will translate seamlessly to DataPath's advanced SATCOM and wireless tactical solutions."

Asbjørn comes to DataPath after serving as the Chief Sales Officer – EMEA for the Bullit Group, a manufacturer and marketer of licensed communications devices in the UK. Prior to that assignment, he held the position of Vice President – for Motorola Solutions in Europe, the Middle East and Africa. At Motorola, Asbjørn headed up all organizations and channels within the Land Mobile Radio, Tetra/Astro/Dimetra Systems, Consumer Radios and SCADA businesses.

Asbjørn is a graduate of The Copenhagen School of Economics and Business Management, where he received a Bachelor's degree in International Marketing and Business Management followed by a Master of Science degree. In addition, Asbjørn has participated in numerous executive development programs around the world.

LinQuest names Timothy Dills as President and CEO

Chantilly, VA, March 10, 2019 — Space systems technology solutions company LinQuest Corporation appointed Timothy Dills as its new Chief Executive Officer and President.

Dills' appoint-

lows LinQuest's acquisition by Madison Dearborn Partners and CoVant Management and will provide new executive leadership focused on continuing the company's superior performance as well as capitalizing on its future growth opportunities. As enhancing and protecting national security space capabilities continues to be a U.S. priority, Dills will lead a broadened corporate development strategy to pursue opportunities that bring new market access and capabilities to the company, expand its customer base, attract and retain top talent, and increase engagement with all stakeholders.

Dills was previously President of Scitor Corporation. Having joined the company in 1989 and becoming its President in 2008, he helped Scitor grow to be a $600M business. Following Scitor's sale to SAIC, Dills remained with the company for more than a year to support a successful transition. While at Scitor, he also led the successful acquisition and integration of Kinsey Technical Services, Inc. (KTSi), as well as Intelligence Community related assets acquired from General Dynamics.

LinQuest, a Los Angeles-based space systems technology company with offices throughout the U.S., provides innovative and cost-effective services and solutions to U.S. national security agencies and the intelligence communities that are focused on the convergence of C4ISR, information, and cyber systems. These services and solutions span the interpretation, engineering, testing, operations, and sustainment of critical space, air, and ground system capabilities and programs.

Irina Petrov Appointed as VP Marketing and Member Services of GVF

London, U.K., March 5, 2019 — The Global VSAT Forum (GVF) has announced the appointment of **Irina Petrov** to serve as its Vice President for Marketing and Membership with effect on March 5, 2019.

Petrov brings over twenty years of experience in the satellite industry serving the last eleven years with Onlime Group that provides premium business communications to customers across the globe, with the last five years as its VP for marketing. Ms. Petrov has also worked for several satellite operators in marketing and project management positions. Additionally possessing significant experience planning and organizing conference events and writing articles for satellite industry media, Ms. Petrov will bring an extensive set of skills, knowledge, and a network of relationships that will enable GVF to significantly increase the services offered to its membership and grow it to an even stronger satellite community.

Leola Moss and Steve Young Join ICEYE

Espoo, Finland, March 5, 2019 — ICEYE has announced the appointment of **Leola Moss**, a seasoned satellite imaging and aerospace professional, as vice president, product delivery and operations, and of **Steve Young**, a seasoned space and aerospace professional, as vice president, business development and sales.

Leola Moss

Prior to joining ICEYE, Leola worked as the director of pipeline operations for Planet Labs and spent three years as a senior program manager for Google. Her extensive background includes positions at Skybox Imaging, GeoEye, Space Imaging, and the United States Air Force.

With Leola's guidance, ICEYE aims to ensure ideal reliability and timeliness for the company's SAR satellite data products, and to exceed customer expectations with the rapidly increasing quantity of commercially accessible imaging capacity.

Steve Young

Prior to joining ICEYE, Steve worked at BAE Systems, most recently as campaign director, typhoon and chief of staff. In 2015, he helped co-found the New Space company Earth-i, a high-resolution satellite imaging provider, after a previous role as the head of business development and sales for Surrey Satellite Technology Limited (SSTL).

Singapore Technologies to Acquire Newtec for US$ 281 Million

Singapore, March 27, 2019 — Singapore Technologies Engineering Ltd. announced that its subsidiary, Singapore Technologies Engineering (Europe) Ltd, has entered into a conditional share purchase agreement to acquire a 100% ownership in Newtec Group NV, an established Belgium-based company in the satellite communications industry.

The consideration of US$ 281.24 million €250 million or approximately S$ 383 million) on a cash-free and debt-free basis for the proposed acquisition, subject to closing adjustments, is payable in cash.

ST Engineering has been growing its satcom business through its U.S.-based iDirect and Singapore-based satcom product and solution business. The Group's satcom business is an industry leader in the Aeronautical and Maritime segments and has led the industry's transition to high-throughput satellite (HTS) managed services. It is also the technology provider for leading global satellite operators such as Inmarsat, Intelsat and SES.

Satcom is a fast-growing industry with an expected CAGR of 8% over the next 10 years. The surge of Low Earth Orbit (LEO) constellations will increase bandwidth capacity and reduce operating cost, thereby creating new demand. New use cases, especially to support Smart City applications such as IoT and connected cars, will drive demand for satcom services.

Newtec is a key technology provider in the satellite broadcast segment with unique ultra-high throughput capabilities and a strong presence in the European satcom market. It has a proven range of cost-effective consumer satellite terminals, and industry-leading bandwidth efficiency technology. Recently, Newtec was among the first companies to successfully test over-the-air communication via LEO satellites. LEO satellites are expected to take off with the launch of more than 5,000 satellites in the coming years. The company is also well placed to leverage the advent of IP-based satellite broadcast which is critical for real-time content distribution.

The proposed acquisition of Newtec will add

Creating a preferred partner for global satcom ecosystem - Left: Ravinder Singh, President, Electronics, ST Engineering - Right: Roald Borré, Chairman of Newtec Board of Directors

intellectual property, products and market access. ST Engineering will continue to invest in Newtec in Belgium to position it to be the Group's European centre for the satcom business. The complementary and synergistic effect of this proposed acquisition will enable ST Engineering to meet demand across the full spectrum of the satcom market.

ST Engineering said that with enhanced satcom capabilities, it can better participate and lead the advancement of the satcom industry to enable Smart Cities globally. Capitalizing on an enlarged IP and product portfolio, the Group will be able to:

- Accelerate the deployment of satcom-enabled 5G telco network, bringing high bandwidth connectivity to remote regions. This will help bridge the digital divide and enable the development of new applications such as tele-medicine and tele-education.
- Address the growing needs for IoT and M2M connectivity, where millions of devices and telematic sensor points are expected to be connected for surveillance, data gathering and big data analytics.
- Provide end-to-end solutions for the mobility segment, enabling seamless internet connectivity and remote monitoring for the aeronautical, maritime and connected car segments.

"This proposed acquisition expands our satcom business in a meaningful way in an attractive industry that is high-tech and high-growth, driving con-

nectivity advances in a world where 5G and satcom converge," said Vincent Chong, President & CEO, ST Engineering. "It aligns with our strategy to invest in businesses that help accelerate our growth trajectory, especially in Smart City, to deliver long-term shareholder value."

JV Company Triton Bidco Acquires Inmarsat for US$3.4 Billion

London, UK, March 25, 2019 — The boards of Inmarsat and Triton Bidco announced that they have reached agreement for a US$3.4 billion in cash takeover by Triton Bidco of Inmarsat.

Triton Bidco is a newly formed joint venture company owned in equal shares by fund managers Apax Warburg Pincus, Canada Pension Plan Investment Board, and Ontario Teachers' Pension Plan Board.

Under the terms of the acquisition, Inmarsat shareholders are to receive US$7.21 per Inmarsat share, comprised of a cash consideration of US$7.09 per share, and a final divided of US$0.12 to be paid on May 30.

The acquisition is worth approximately $3.4 billion, which is equivalent to £2.6 billion based on announced exchange rates.

Inmarsat is a leader in global, mobile satellite communications. It owns and operates 13 in-orbit satellites designed for customer mobility, and holds a multi-layered, global spectrum portfolio, covering L-band, Ka-band and S-band, enabling unparalleled breadth and diversity in the solutions it provides. It has a long-established global distribution network includes not only the world's leading channel partners but also its own strong direct retail capabilities, enabling end to end customer service assurance.

The investor group said it would keep Inmarsat's headquarters in the UK and maintain the company's spending on research and development. Inmarsat employs 800 people at its base at Old Street roundabout in London, out of a 2,000-strong global workforce.

Nine months ago, Inmarsat rejected an offer from its US rival EchoStar. The takeover also reignites concerns over takeovers of leading UK technology businesses following Melrose's controversial £8bn acquisition of the engineering company GKN and the £24bn takeover of smartphone chipmaker ARM Holdings by Japan's SoftBank.

Triton Bidco said it believes that the satellite sector is attractive, with unique characteristics, including long lead times and the need for deep technical expertise, while operators in the sector require strategic management and a long investment horizon. Triton Bidco said integrated satellite operators with scale like Inmarsat are well positioned as network provision becomes more complex.

The Inmarsat directors were advised by J.P. Morgan Cazenove, PJT Partners and Credit Suisse as to the financial terms of the acquisition.

Vertice 360 Acquires M-Three Satcom

Madrid, Spain, March 12, 2019 – Vertice 360, the Spanish media company owned by Squirrel Capital, is set to acquire M-Three Satcom, the Italian based teleport operator founded in 2004 and acquired by Giglio Group in 2015.

M-Three Satcom will be main part of a wider agreement including the purchase by Vertice of other media assets of Giglio Group as the internationally distributed Nautical Channel and the Italian DTT Lcn 68.

Vertice 360 S.A. produces audiovisual screening services. The company offers film, TV, and new interactive platforms, as well as provides technical services and equipment for audiovisual production, advertising, transmission channels, direct generation of live entertainment, development of applications, and solution for communication.

Reports say the new company asset and partnership will allow a further expansion in the international arena with plans of new POPs and satellite/OB facilities outside of the legacy Italian infrastructure, which will remain the key asset of the company. Plans for 2019 - 2021 include further diversification in the teleport based services with new video and data platforms and additional investments in the Broadcast division.

Advanced Television reported that Michele Magnifichi, co-founder of M-Three Satcom in 2004 and manager of the company, will continue to head the expanded company as M3 CEO and will report to Vertice board for the Group's related activities.

29% of Indonesian Consumers Use Pirated TV Boxes, Survey Finds

Jakarta, Indoneisa, March 21, 2019 — A recent study of the online content viewing behavior of Indonesian consumers has revealed that 29% of consumers use a TV box which can be used to stream pirated television and video content. These TV boxes, also known as Illicit Streaming Devices (ISDs), allow users to access hundreds of pirated television channels and video-on-demand content. Such illicit streaming devices often come pre-loaded with pirated applications which are either free or charge low subscription fees, which then provide 'plug-and-play' access to pirated content.

The survey found that IndoXXI Lite, LiveStream TV and LK 21 Reborn are among the most popular pirate applications amongst Indonesian consumers. More alarmingly, 55% of respondents admitted to using free streaming services, with the IndoXXI Lite app (29%), in particular, representing a larger userbase than all local legitimate online video platforms combined (19%).

The survey, commissioned by the Asia Video Industry Association's (AVIA) Coalition Against Piracy (CAP), and conducted by YouGov, also highlights the detrimental effects of streaming piracy on legitimate subscription video services. Of the 29% of consumers who purchased an illicit streaming device for free streaming, two in three (66%) stated that they cancelled all or some of their subscription to legal pay TV services.

Specifically, 33% asserted that they cancelled their subscriptions to an Indonesian-based online video service as a direct consequence of owning an ISD. International subscription services, which include pan-Asia online offerings, were also impacted – more than one in three (31%) Indonesian users abandoned subscriptions in favor of ISD purchases.

The surge in popularity of ISDs is not unique to Indonesia. Similar YouGov consumer research has been undertaken in other South East Asian countries where high levels of ISD usage was also found: 15% of Singapore consumers, 20% of Hong Kong consumers, 25% of Malaysian consumers, 28% of Filipino consumers and 34% consumers of Taiwanese consumers use a TV box which can be used to stream pirated television and video content.

"The illicit streaming device (ISD) ecosystem is impacting all businesses involved in the production and distribution of legitimate content", said Louis Boswell, CEO of AVIA. "ISD piracy is also organized crime, pure and simple, with crime syndicates making substantial illicit revenues from the provision of illegally re-transmitted TV channels and the sale of such ISDs. Consumers who buy ISDs are not only funding crime groups, but also wasting their money when the channels stop working. ISDs do not come with a 'service guarantee', no matter what the seller may claim."

Roy Soetanto, chief marketing officer of CATCHPLAY Indonesia, said putting a stop to piracy will need the cooperation of the whole industry. "It has been a pleasure for CATCHPLAY to have the opportunity to work with AVIA and be a part of this important initiative to support the anti-piracy movement," he said.

The damage that content theft does to the creative industries is without dispute. However, the damage done to consumers themselves, because of the nexus between content piracy and malware, is only beginning to be recognized. In late 2018, the European Union Intellectual Property Office released a report on malware found on suspected piracy websites and concluded that such websites "commonly distribute various kinds of malware luring users into downloading and launching such files". The research, which worked closely with the European Cybercrime Centre at Europol, concluded that "the threat landscape for malware distributed via copyright-infringing websites is more sophisticated than it might appear at first glance."

Cancelling legitimate subscription services and paying less for access to pirated content is fraught with risks, as Neil Gane, the general manager of AVIA's Coalition Against Piracy (CAP), comments, "Piracy websites and ISDs typically have a click-happy user base, and are being used more and more as clickbait to distribute malware. Unfortunately the appetite for free or cheap subscription pirated content blinkers users from the very real risks of malware infection."

MARKET TRENDS

Capacity Supply from VHTS, NGSO Satellite Systems to Grow from 1.3 Tbps in 2017 to 10 Tbps by 2022

Paris, France, March 20, 2019 — Wholesale capacity revenues from telecom applications will surpass video applications by 2021, whose growth is largely supported by the influx of low-cost capacity from new Very High Throughput Satellite (VHTS) systems and Non-Geostationary Orbit (NGSO) broadband in the coming years. As a result, total capacity supply is projected to grow eight-fold from 1.3 Tbps in 2017 to nearly 10 Tbps by 2022.

Based on the latest market projections found in Euroconsult's latest report, Satellite Communications and Broadcasting Markets Survey, in its 25th edition, the report said the FSS industry continues to move towards telecom/data markets, as wholesale revenues derived from video markets continue to erode.

The report concluded that innovations in technology, services and in the ecosystem will make satellite connectivity relevant in the context of the communication sector of the 2020s, that will see the spread of terrestrial 5G and the rollout of a wider range of communication services, either between humans or driven by IoT exchanges.

In the short term, the impact on legacy services and the related pressure on the economic performance of operators could be unfortunately described as a necessary pain, and is certainly no different from the cyles observed in other industries navigating a breakthrough innovation period, the report said.

But the growth acceleration in HTS capacity demand, the authors said, confirm their view of the market shift from regular to HTS and the increasing demand for telecom applications. HTS capacity leased increased to around 594 Gbps in 2017, a new record high, and a clear acceleration (+36% y-o-y) in take-up across all telecom verticals.

The net growth in capacity usage in 2017 did not result in revenue growth as the FSS industry is still absorbing the impacts of the recent capacity price resets. Leased regular capacity decreased for the first time in more than a decade to around 6,920 Transponder Equivalents (TPEs) in 2017. Growing requirements for video distribution, milsatcom and aero In-Flight Connectivity (IFC)

are expected to mute regular capacity erosion until 2020.

The report outlined the key trends, drivers & forecasts for FSS satellite communications as follows:

- Transponder pricing trends
- Demand trends & 10-year forecasts by application, region & frequency band
- Supply trends & 10-year forecasts by region & frequency band
- Operators' market shares by application & region
- Assessment of high throughput services (including Ka & Ku-band)
- Upgraded supply databases & expanded HTS demand forecast with capacity leased versus used

NSR Report Forecasts US$4.5 Billion in Cumulative Revenues from In-Orbit Satellite Services by 2028

Cambridge, Mass., March 19, 2019 – NSR's In-Orbit Servicing Markets, 2nd Edition (IoSM2) report, released today, forecasts US$4.5 billion in cumulative revenues from In-Orbit Satellite Services by 2028. While growth is anticipated across all applications in all orbits, GEO satellite life extension will yield the largest share of revenues. As more LEO constellations start to launch, Non-GEO players represent an emerging target market, with de-orbiting services expected to dominate this segment. However, despite the abundance of opportunities for In- Orbit services, systems will be most constrained by the need for government and legal administration support.

NSR forecasts US$4.5 billion market for in-orbit satellite services. Photo shows Lockheed Martin's concept for NASA's Commercial Resupply Services 2 program.

"In-Orbit servicing is a gateway to new opportunities and revenue streams in space," notes NSR Senior Analyst and report co-author, Shagun Sachdeva. "Options like life extension, robotics, and salvage not only offer immediate cost benefits, but open environmentally positive possibilities, such as debris removal in the near term to recycling components from defunct, de-orbited satellites in the long term." Over the next decade, In Orbit servicing is expected to be dominated by GEO services – making up 78% of the total revenues according to NSR's IoSM2.

The lack of strict regulations remains one of the biggest constraints for the In-Orbit Servicing market. Investors are cautious about these services, considering the novelty of the technology and the accompanying lack of policy.

NSR Analyst and report co-author, Leena Pivovarova adds, "Long-term growth will depend on government support, as well as, legal and regulatory requirements coming together to facilitate market expansion." The small satellite business model is capable of challenging the status quo by bringing in new ideas to derive more performance from existing assets. While early years will face challenges common to any new technology, such as sensitive stakeholders and the need for new regulations to be deployed around liability and communication, once the first in-orbit demonstration is successfully completed, it will raise the confidence level amongst weary shareholders.

With a wide array of options and an even wider assortment of potential benefits, In Orbit Servicing is well positioned for growth over the next decade. NSR's In-Orbit Servicing Markets, 2nd Edition report discusses the potential for the entire industry, with focus on opportunities in both GEO and non-GEO orbits.

The Satellite Markets 20 Index™

Company Name	Symbol	Price April 1, 2019	52-wk Range	
Satellite Operators				
Asia Satellite Telecommunications Holdings Li	1135.HK	6.57	4.62	7.20
Eutelsat Communications S.A.	ETL.PA	15.68	15.27	23.11
APT Satellite Holdings Limited	1045.HK	3.59	2.47	3.80
Inmarsat Plc	ISAT.L	547.00	334.30	646.00
SES S.A.	SES.F	13.75	10.81	20.81
Satellite Manufacturers				
The Boeing Company	BA	391.54	292.47	446.01
Maxar Technologies	MAXR	4.43	3.83	55.28
Lockheed Martin Corporation	LMT	304.29	241.18	361.99
OHB SE	OHB.DE	36.55	27.55	38.25
Honeywell International Inc.	HON	161.47	123.48	162.52
Equipment Manufacturers				
C-Com Satellite Systems Inc.	CMI.V	1.51	0.98	1.55
Comtech Telecommunications Corp.	CMTL	23.60	20.95	36.94
Harris Corporation	HRS	163.30	123.24	175.50
ViaSat Inc.	VSAT	78.09	55.93	78.65
Gilat Satellite Networks Ltd.	GILT	8.27	7.54	10.74
Service Providers				
DISH Network Corporation	DISH	33.14	23.22	39.72
Globalstar Inc.	GSAT	0.42	0.29	0.88
Orbcomm Inc.	ORBC	6.65	6.50	11.25
Sirius XM Holdings Inc.	SIRI	5.79	5.48	7.70
Speedcast International	SDA.AX	3.85	2.73	6.83

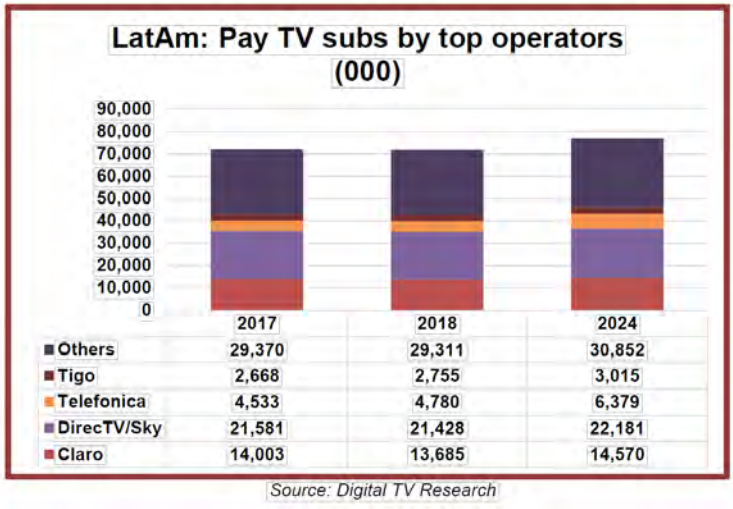
The Satellite Markets 20 Index™ is a composite of 20 publicly-traded satellite companies worldwide with five companies representing each major market segment of the industry: satellite operators; satellite manufacturers; equipment manufacturers; and service providers. The base data for the Satellite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

INDEX	Index Value April 1 2019
Satellite Markets 20 Index™	3,325.07
S & P 500	2,867.19

ADVERTISERS' INDEX

VITAL STATS

LatAm will return to pay TV subs growth in 2020



Source: Digital TV Research

*After years of declining subscription, **Digital TV Research** has predicted that pay TV penetration in Latin America will start climbing again in 2020. Simon Murray, Principal Analyst at Digital TV Research, said: "DirecTV/Sky had 21.43 million subscribers by end-2018 – or just under 30% of the region's total. The company has increased its base due mainly to the popularity of its prepaid offer. Slow growth will push its count to 22.18 million subs by 2024."*

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- **Optional teleport services**

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