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Markets & Research

MARKET Briefs

Executive Summaries of Market Trends and Opportunities in Key Market Segments and Regions Worldwide

Satellite in an OTT World

Satellite in an Increasingly OTT World

by Elisabeth Tweedie

"Over-the-top (OTT) streaming services overtake cable and satellite viewing in USA." "More Netflix viewers than Sky satellite TV viewers in the UK." As you read headlines like these, it would be easy to think that satellite, not only as a Direct-to-home (DTH) service, but also as a content delivery provider has lost its place in the value chain. Nothing could be further from the truth. There are many reasons why satellite will continue to be both necessary, relevant and indeed an essential partner for key players in the OTT industry, and this MarketBrief will examine the key ones.

But first a quick look at the numbers behind those headlines. From an adjunct to its DVD rental service in the US in 2007, Netflix, globally the most popular OTT video service, now boasts 182 million subscribers in 190 countries. Amazon Prime, the second most popular service, doesn't release streaming numbers, but is generally regarded to have around 100 million users in the US alone.

Unsurprisingly, traditional broadcasters have not taken this lying down, and many around the world have launched their own OTT streaming services. The most well-known and successful being Disney+, which at the beginning of August 2020, less than nine months after its launch, had 60.5 million subscribers. Whilst these, and a few others: Hulu, YouTube, Britbox, HBO Max for example, are household names, there are many more OTT services. According to SNL Kagan, globally there were close to 1,000 streaming services at the end of 2018, some

Image courtesy of MUVI

national, some international. Between them, according to Strategy Analytics these services had 809 million Subscription Video-on-Demand (SVOD) subscribers in 2019 and this is expected to grow to 1.43 billion by 2025. SVOD is the largest OTT segment, but there are also advertising supported services (AVOD), and now also download to own (DTO) and Pay per View (PPV). The latter is becoming particularly relevant for both live events, particularly sports and concerts, and recently, due to the fact that most theaters are closed, also for new movie releases.

Actual subscriber numbers only tell part of the story. In many regions of the world, subscribers use the service on multiple devices: television, laptop, tablet and phone. In the US the average household has three devices on which video is viewed, and in many households all three, or more, will be being used simultaneously, sometimes by one user but more often by different members of the household. By definition, OTT is a unicast service. So three devices equates to three separate video streams. Streams which all need to be delivered in different formats, bit rates and coding depending on the device.

Subscriber numbers are important, so too is the amount of time that those subscribers are spending watching online (OTT) video. According to the State of Online Video 2019 from Limelight Networks, globally online video viewing increased by 59% from 2016 to an average of 6.8 hours per week. This compares to a global average of 7.2 hours per week viewing broadcast, cable or satellite video. These average figures, hide some interesting variations. At 7.62 hours, Singaporeans for example, spend nearly two more hours a week watching online than they do watching linear video (5.73 hours), whereas the Italians
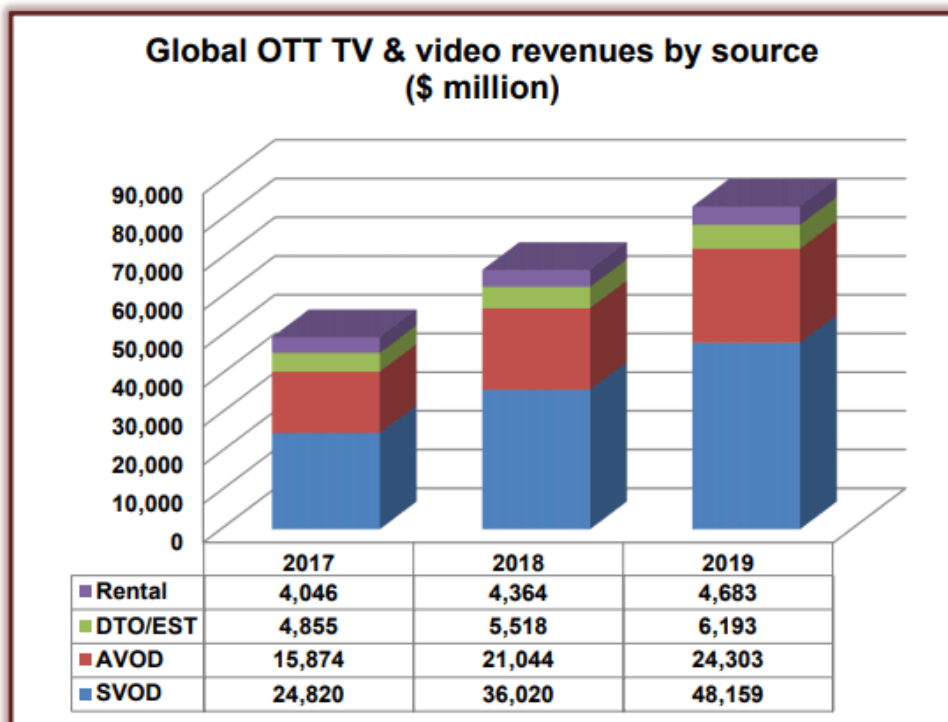
watch just over an hour and half more linear video (8.99 hours) than online video (7.35 hours). As would be expected, younger viewers (under 35 years of age) are watching more online video and are also less likely to watch any linear video, with 23% saying that they do not watch any, compared to only 14% of those over 60 years of age who state the same.

Covid-19 Impact

Those numbers of course, are pre-Covid-19. In March of this year, large parts of the world went into lockdown mode. For many, this meant working from home and using online courses and video platforms for education. For others, their jobs were such that they couldn't be done from home, so suddenly they were in a stressful situation with a lot of spare time on their hands. It is hardly surprising that many used this time to watch more video, primarily OTT video. Live sporting events, one of the key drivers of linear viewing, were canceled, further pushing viewers to OTT services. In the UK for example, a report from Enders Analysis, indicated that between March 16th and April 19th linear and catch-up TV saw an increase in viewing time of 23%, while "unmatched" TV usage increased by 75%. Unmatched TV usage, is time spent using the TV for things other than linear and catch-up TV viewing: primarily OTT and gaming. The increase in linear viewing is largely attributed to an increased thirst for news, and already viewing has fallen back to 2019 levels as news exhaustion and overload set in.

Unsurprisingly, this dramatic increase in numbers, put a lot of pressure on the broadband network. In many countries OTT providers, either voluntarily or at

Global OTT TV & video revenues by source ($ million)

	2017	2018	2019
■ Rental	4,046	4,364	4,683
■ DTO/EST	4,855	5,518	6,193
■ AVOD	15,874	21,044	24,303
■ SVOD	24,820	36,020	48,159

Global online TV episode and movie revenues reached US$ 83 billion in 2019, climbing from US$ 67 billion in 2018 and up by US $ 50 billion on 2017 according to the OTT TV and Video Databook published by Digital TV Research. The global pandemic in 2020 has seen even more growth in OTT viewership.

the request of government or network providers, downgraded the quality of the video stream to reduce bandwidth pressure, but this wasn't always enough. Simultaneously delivering so many individual streams, presents a challenge, not just to the last mile, but to the backbone itself, as Netflix found out when many subscribers lost access at the end of March. The outage only lasted for about an hour, but it impacted viewers in Northern Europe as well as across large parts of the US. Network overload is a real issue, particularly for live events which cause a dramatic surge in viewers; and a problem that is only likely to get worse as subscriber numbers increase, concurrent with the continuing migration to 4K, with the associated demands on bandwidth.

Other Sectors

Streamed video is not confined solely to the entertainment sector. There are many smaller, but significant niche markets, of which education, particularly in the wake of Covid-19 is the most well-known. Around the world, schools and universities have turned to online teaching as classrooms have been shut down. Educators have used a combination of methods: some online classes, using a videoconference app such as Zoom, or Panopto, (a platform specifically designed for universities and large organizations), for streaming of pre-recorded classes for students to do in their own time and online study groups. In many areas, broadband infrastructure is both available and adequate to meet this need; in others it is not, and that is when organizations turned to satellite. For example, in Alaska, OpimERA, an ISP in the town of Unalaska, immediately increased its leased capacity from SES in order to be able to provide

distance learning and telemedicine services in the town. Similarly, in the UAE, the Abu Dhabi Department of Education and Knowledge (ADEK) collaborated with Yahsat to provide free satellite broadband services for distance learning students residing in the Al Dhafra region. With ADEK's support, Yahsat, the leading satellite operator in the UAE, will offer its services free of charge to support students' distance learning needs until the end of the current academic year.

For households that don't have a computer, but do have a television, ST Engineering iDirect have developed a solution that allows content to be pushed to a specially adapted set-top box (STB) for viewing on tablets or mobile phones, as well as on a traditional television. If required and available, the internet could be used as a return path.

However, in some parts of the world, a shortage of teachers, poor infrastructure or simply being remote necessitate distance learning via satellite. According to UNICEF over 121 million primary and secondary school age children, cannot attend school. A number of factors may contribute to this situation, but satellite can address one of the key ones: location. Children living in the outback of Australia, for example. Although distance learning has been available there for many years, going back to the Radio School of the Air; the launch of the NBN broadband satellites has made a huge difference in the quality of the lessons. Immediately prior to the NBN launch distance learning was available via the Interim Satellite Service, but bandwidth was severely limited. One family with three children to educate and a farm to run, was limited to 20GB a month. The family now has an allowance of 50GB per child, plus an additional general allowance for everything

else. Another example is Project iMlango deployed across Kenya to educate 180,000 marginalized children. This project is led by Avanti Communications and the UK Department for International Development (DFID). The broadband solution utilizes Hylas-2 to deliver the e-learning program to 245 rural and remote schools in Kenya. Preliminary results students who have access to the individualized learning platform for 60 minutes per week improve their "maths age" by on average, 18 months within their first year of access.

Mobile is of course another niche segment for satellite video. As well as the current maritime and aeronautical applications, with the development of a suitable antenna, the connected car market will open up. Streaming video for passengers and software updates are two potential applications.

Enterprise video is another growing market segment. In the fashion industry for example, a large retailer may have a video for every item of clothing on its website.

The Ecosystem

Prior to emergence of OTT services, content delivery was a relatively straight forward process of distributing programs to the headend. Satellite provided the means to do this reliably and cost-effectively and MVPDs (Multichannel Video Programming Distributors) usually leased transponders or bought satellite time, directly from the satellite operator or from an independent provider to do this.

OTT, coupled with the multiple viewing devices that are now in use around the world, turned this simple operation on its head, changing it into a far more complex procedure. Instead of one

ST Engineering iDirect's OTT via satellite solution can enable distance learning in remote areas.

format, every piece of content has to be formatted and encoded for thousands of different devices. Instead of one copy of a program residing at the headend to be shown at the same time for everyone, multiple copies in multiple formats are needed so as to satisfy the on-demand nature inherent to an OTT service. For an advertising supported OTT (AVOD) service, a SCTE metadata marker needs to be inserted to indicate the correct placement of advertisements. Depending on the service these could be national, local or even personal and a separate feed needs to be generated for each. For all the OTT services, vast amounts of usage data are collected so as to be able to personalize recommendations. In other words, the nature of the video business has changed drastically.

Satellite's Advantages

Historically, video has been the bread and butter of commercial satellite revenues and whilst broad-

How Does Satellite Satisfy the Demands of the OTT World?

Here are three use cases that highlight satellite technology's unique ability to meet the demands of the OTT world:

BUFFERING NO MORE

Satellite has the ability to reduce buffering by feeding the Content Delivery Network (CDN). As growing traffic presents a fundamental challenge to telcos and CDN streamers, bandwidth must be used efficiently, and traffic minimized to offer the best possible Quality of Experience to consumers.

Satellite may be used to significantly reduce distribution backbone traffic and ensure efficient use of bandwidth. By distributing content spatially relative to end-users, the CDN achieves high performance, thus reducing buffering. This is especially significant for live events such as sports where downtime can't be tolerated.

Furthermore, as telcos work to expand their reach to more remote areas, satellite enables them to offer high quality video streaming to isolated communities that would not have previously had access due to its geographical reach.

UNLIMITED SCALING

Satellite can scale rapidly and cost effectively. The beauty of satellite is its ability to reach anywhere on the planet. A satellite's footprint covers a vast geographical area and therefore allows service providers to deliver multicast content to many more subscribers in ever more remote locations. For viewers in areas where there is no terrestrial access, this opens up a new world of entertainment and access to other important content such as governmental broadcasts and educational programming.

This ability to reach anywhere also translates into mobile access for those who have no terrestrial connectivity or where connectivity is patchy and unreliable, such as cars, trains and planes. Satellite's ability to reach a growing population of receivers in a cost-effective way makes it the perfect choice for OTT on the move.

PROVIDING CRITICAL EDUCATIONAL LINKS WITH OTT

Satellite can enable broadcast distribution with OTT format. With schools around the world closed due to the COVID-19 pandemic, educational content must be distributed to children at home. Many households, however, do not have access to an Internet connection but they do have a TV set. Using a specially adapted Set Top Box, OTT content can be pushed to these households using satellite. The content may be viewed either on a TV or on a mobile device such as a tablet.

The ability of satellite to reach to even the most remote places on the planet, means that no child needs to forego their education and can even enjoy interactive classes through bi-directional satellite links.

Consistent Innovation in OTT

ST Engineering iDirect is constantly innovating and developing strong technological partnerships that enable us to spearhead satellite's place in the OTT ecosystem. With our heritage in video and IP and our leading position in the broadcast market, we continue to forge the path to the future of OTT, enabling providers to deliver content anywhere and for a multitude of use cases.
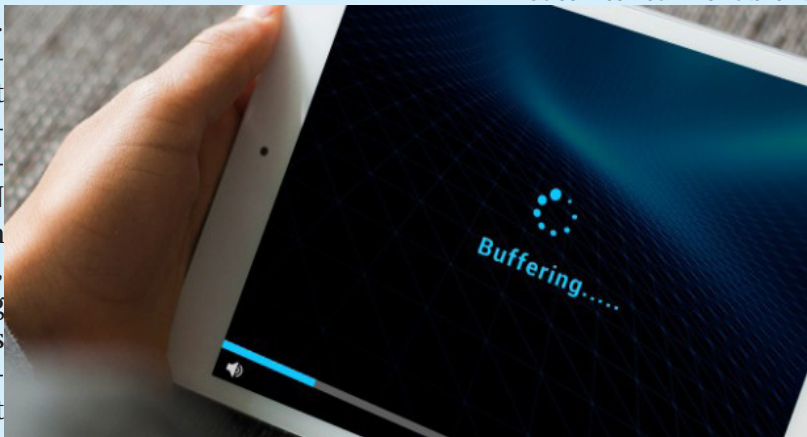
Hans Massart, Head of Media and Broadcast, ST Engineering iDirect

How has the recent merger of ST Engineering iDirect and Newtec strengthened your position in the broadcast markets?

The merger has brought together two companies with their own strengths. Newtec has always had a strong presence in the broadcast market and iDirect has a strong foothold in convergence and innovation. The merger allows us to leverage and combine into strengthening the focus, widening it beyond traditional broadcast with an importance across all the vertical markets that we serve.

By bringing the two companies together, we have widened both our portfolio and our reach. The combination means that we now have much more resources open to us and more representation across the world so that our customers benefit on a local level. We have a great team of people that can support our work in the broadcast sector and enable us to do more. Looking to the future and the use of VSAT platforms for broadcast purposes such as All-IP for contribution and distribution, or OTT video delivery in general, we now suddenly have a very large installed base of both iDirect legacy VSAT systems on top of the Newtec systems already out there. We are looking forward to building on our very strong market position and continuing the innovation that the broadcast sector recognizes us for.

Hans Massart

How is ST Engineering iDirect continuing to innovate in the broadcast market?

We keep on pioneering. There are many innovations we propose for the broadcast market, especially in terms of the move to IP. We are constantly asking ourselves how we can more efficiently and effectively transport OTT signals over satellite. We are contributing, as we have always done, to designing new standards with DVB. We are also participating in different forums on distribution of video over 5G networks and investigating how we move forward to build a successful 5G ecosystem and facilitate efficient video transportation over such networks.

It's not just the broadcast market, though. We are looking into how video is being used in so much of what we do on a daily basis. We are very aware that video is used across many different verticals such as enterprise, IFC, mobility, government, etc. It's not necessarily just the broadcast market that utilizes video – it's a plethora of markets, and we need to find the best way to deliver to these users as well.

As most of the world faces the impact of the COVID-19 pandemic and beyond, what do you see as the key trends for broadcast satellite delivery?

During the pandemic, especially in the first months, all sports were put on hold. This definitely had a negative impact because no Outside Broadcasts were taking place from sporting events. But, on the other hand, as journalists have also remained at home, they have had to adapt to delivering their stories from home studios. In some cases, flyaway broadcast kits were used and small SNGs could even be parked outside journalist's homes so that they could continue to work effectively.

The other key trend is OTT and we are heavily engaged in its delivery over satellite. This is especially important for OTT transmission across a very large footprint, yet with the capability to offer a very high Quality of Experience. Satellite can be hugely beneficial for delivery of this kind of solution. In the context of COVID-19, there has been exponential growth in the use of OTT services for video streaming. However, OTT is also finding its place in the delivery of educational content and lessons to pupils in remote areas where they have not been able to get to school. This is an example of the importance of OTT access in isolated communities that would otherwise be cut off completely.

What specific products and services are you offering that address these key trends?

If we first look at contribution, our Newtec Dialog VSAT platform is perfectly positioned for contribution for IP Newsgathering. The advantage here is that it is compatible with the new ways in which newsgathering crews do their job, focusing on the story without having many technical people around. The beauty of Dialog is that it automates the newsgathering process and therefore can be operated extremely simply with no requirement for additional technical personnel. It sets up a bi-directional IP pipe towards the studio. In some cases, these stories are breaking in the middle of nowhere, or where infrastructure has been destroyed and only satellite is available. In some cases, terrestrial

"…We keep on pioneering. There are many innovations we propose for the broadcast market, especially in terms of the move to IP. We are constantly asking ourselves how we can more efficiently and effectively transport OTT signals over satellite. …"

IP media cannot provide enough reliable bandwidth, and here satellite provided IP bandwidth can be blended in flexibly so all applications required can be run.

For distribution, we have our modulator range such as the MCX7000, which enables us to facilitate unidirectional OTT video over an entire footprint. In terms of traditional DTH, it offers the opportunity to transport multicast Adaptive Bit Rate (ABR) streams. Our modulators can also be utilized for distance learning and educational content can be made available to children over tablets or other smart devices. If there is no internet available, an intermediate connection can be made in the form of a set top box or gateway.

For interactive distance learning we have our VSAT platforms, Evolution, Dialog and Velocity that can be used and facilitate interactivity, enabling classes over this IP pipe and an overall more immersive classroom experience. It also offers pupils the opportunity to have an Internet connection if it's not possible using terrestrial means - so we open a door to the world.

What differentiates ST Engineering iDirect's products from the competition?

Over the past 30 years, we have built both a video and IP DNA which is unique in the industry. This allows us to handle video over IP over satellite. All of our data products are built with video transport in mind and we have developed some unique features to ensure that video is transported in an efficient way whilst guaranteeing Quality of Experience. IP video is a data application, but it is a data application that deserves special attention in terms of Quality of Service and Experience. It is that attention to detail and our constant innovation that sets us apart.

band and mobile are increasing their importance, video remains a key market, still accounting for well over 50% of revenue. Nevertheless, the growth in OTT, particularly given the numbers of younger viewers who do not watch any linear TV, is posing a threat to the long-term viability of this segment. In order to protect this revenue, satellite operators, service providers and technology vendors alike need to adapt to the new reality of a hybrid world, that still needs traditional linear video, but also needs OTT. Flexibility is the key.

Fortunately, satellite operators and vendors are not standing idly by and many, if not most, are looking for ways to participate in this burgeoning industry. Various approaches targeted at different parts of the ecosystem are being taken in order to keep satellites relevant and capitalize on its high bandwidth, multicast efficiencies. As a unicast service, the more successful OTT becomes, the more pressure there is on the broadband delivery pipe. As already stated, this situation will only get worse as numbers of users and devices increase, at the same time as constantly improving video quality demands increased bandwidth.

This can be a win-win situation. OTT really needs the multicast capabilities of satellite to distribute the vast amount of content that it generates. The satellite industry on the other hand, needs to evolve in order to protect a key business segment.

For the OTT service provider, satellite has a lot to offer:
- It can take pressure off the backbone by delivering prime content in multiple formats, to the edge of the network, whether that be a headend, cell tower, or STB.
- The return channel can be used for much needed analytical data.
- Coding can ensure that digital rights (DRM) are adhered to, and content is only delivered to the region for which its licensed, and only in the correct viewing window.
- It can elevate the quality of experience (QoE) for the viewer, by delivering to the edge, so reducing if not eliminating the likelihood of buffering occurring.
- Similarly, latency between a broadcast signal and the OTT signal is eliminated, greatly elevating the QoE for a sports viewer.
- It can extend the geographical reach of an OTT service into areas without a good terrestrial broadband link.
- It can grow with the service, scaling up rapidly and cost-effectively as numbers of users and devices increase.
- Satellite operators and service providers, have many years' experience of packaging and delivering video programing, something that many new OTT providers lack.

The Way Forwards – A Win-Win Situation

Teleport operators and service providers have been at the front end of this revolution and have had to respond accordingly. Many have totally changed their business model, and evolved from selling bandwidth to selling a managed network service, as clients didn't want to take on the complexities of an OTT network. This necessitated retraining RF engineers to become IT professionals and/or recruiting additional staff with the necessary skills. Some have entered into partnerships with telcos and data centers.

OTT services are distribut-ing an increasing number of live events. Sometimes in tandem with a broadcast network, and sometimes independently. This is an area that teleport operators have vast experience with. From capturing and uplinking the event, to packaging and distributing it, with end-user authorization and authentication on a PPV basis. This is a key service that can be offered to OTT providers.

Several of the technology providers are also at the forefront of this revolution, developing new products and software that will help pivot the satellite industry into the heart of the OTT business.

One approach from Broadpeak, known as nanoCDN™, uses adaptive bit rate (ABR) streaming formats (such as HLS and DASH formats for delivering video over the web) 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, at the same quality as a DTH broadcast. This means that OTT and satellite can be merged to offer a consistent experience, whilst at the same time offering additional services on the STB, such as content personalization and targeted advertising, that otherwise are only available on mobile devices. nanoCDN™ employs various optimizations such as HTTP chunked transfer encoding and CMAF chunking to reduce latency after encoding to a negligible amount. From the OTT service provider's point of view, utilizing nanoCDN™ significantly improves the user quality of experience (QoE), minimizes bandwidth and significantly reduces latency. In 2019 nanoCDN™ was the recipient of the Teleport Technology of the Year award and NAB Product of the Year award.

MCX7000 Multi-Carrier Satellite Gateway

ST Engineering iDirect's MCX7000 is a new dense DVB-S2X multi-carrier satellite gateway, resulting in OPEX and CAPEX savings. Its field of use covers all Broadcast applications, from DTH and primary distribution to towers and head-ends to contribution and exchange networks. Its 133 Mbaud capability extends its use to HTS spot-beam transponders.

Building upon the MDM6100 Broadcast Satellite Modem software suite, the enhanced hardware platform of the MCX7000 extends the modem capabilities beyond single carrier support. This is in full compliance with all satellite DVB standards up to DVB-S2X. In a multi-modulator configuration, four 133 Mbaud carriers can be generated. In a multi-demod configuration, three 133 Mbaud carriers can be demodulated. As a modem, two carrier demodulation can be combined with the modulation of a 133 Mbaud carrier. Each and every transport stream embedded into the received carriers can be outputted on to one of the six (optional) ASI or dual Ethernet ports. The same data interfaces can be used as input ports for the modulator. Transmodulation of a received stream is also an option.

Its remote in-band management and software upgradeability makes it the receiver equipment of choice for remote unattended towers and headends. Subsequent releases of this future-proof DVB-S2X platform guarantee, by simple software upgrade, even increased functionality and higher density.

The MCX7000 Multi-Carrier Satellite Gateway is one of the best performers to offer unmatched bandwidth efficiency optimization options, thereby lowering overall Total Cost of Ownership (TCO). The fully automated operation of Newtec´s field-proven Equalink® 3 predistortion technology is now available for any satellite transmission application providing up to 15% bandwidth gain in DVB-S2(X) 8PSK mode in single carrier per transponder constellations. Clean Channel Technology®, in combination with DVB-S2X, improves satellite efficiency by up to 15%, thereby enabling much smaller carrier spacing.

Maximum symbol rates up to 133 Mbaud and modulations up to 256APSK (DVB-S2X standard) combined with Variable Coding and Modulation (VCM) allow for maximum throughput in large contribution links. Built upon the flexible and latest generation programmable technology, the MCX7000 Multi-Carrier Satellite Gateway is a future-proof building block that lets any satellite network evolve to the next level of capabilities. A scalable, pay-as-you-grow, licensing and software upgrade mechanism that facilitates the launch of new services, or last-minute network design changes, without rebuilding the entire network infrastructure. Migration from ASI to GbE and IF to L-band is facilitated by simple in-field installation of license keys. Powerful MPE encapsulators enable transmission of M-ABR streams over satellite.

Migration of standard distribution links towards the new DVB-S2X standard can be as simple as inserting an MCX7000 Multi-Carrier Satellite Gateway in the headends while keeping the installed base of Integrated Receiver/Decoder (IRDs). Efficient transmission of Ultra High Definition (UHD) TV bouquets over two or three transponders for Direct-To-Home (DTH) only requires the Channel Bonding license.

Eutelsat has been utilizing nanoCDN™ in its Cirrus service for several years, and last year invested 10 million Euros in the company. Cirrus is a service designed to deliver content both OTT (from a cloud) and via a DTH service, permitting the user to view content anytime, anywhere and on any device. As well as delivering the content, Cirrus provides user analytics and digital rights management (DRM). Eutelsat is working with several other industry partners including AWS, Irdeto, Dolby, Nagra Kudelski and Babeleye as well as Broadpeak. Customers include Orao Telecom (Congo) who are using Cirrus to provide an OTT service to the Congalese diaspora, and Mondo Globo/MCNC who are using the service to provide Arab language programming to hotel guests in Europe. Edwardian Hotels in London are one of hotel groups utilizing this 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.

SES has taken a somewhat different approach and last year introduced a new product simply branded as "Satellite and OTT in Sync." It works by removing the source signal traveling to the satellite and distributes it via IP in tandem with satellite. By applying low-latency encoding and tuning to the IP stream at the source, the system can deliver content to OTT platforms in sync with the satellite signal. This removes seconds of delay between a traditional linear broadcast and regular OTT delivery of live programming. Obviously, the key target market for this is live sports so as to eliminate the annoying delay between a linear and OTT signal at that crucial moment. Apart from their own team losing, there are few things more frustrating to a sports viewer than watching a match on a streamed service and hearing the roar from the pub down the road, as satellite viewers witness a crucial goal seconds before they do! SES won the bronze prize for this product, in the category "Advancing the TV User Experience" at the Videonet 2020 Connected TV awards.

SES also offers an alternative approach to OTT delivery, for areas lacking high speed internet connectivity, known as VoD Everywhere. This service pushes a regularly updated content selection based on a users' profile, to a STB. It's then made available to all WiFi connected devices in the home, with all the normal play and pause features.

As already mentioned, AVOD local or even personal advertisements need to be inserted into the video stream. In order to offer this service SES has partnered with Nowtilus, a provider of targeted dynamic in-stream ad-insertion solutions.

ST Engineering iDirect Solutions

ST Engineering iDirect, named earlier this year as "One of the top ten hottest satellite companies" is another company that is very actively looking to the OTT future, developing products and applications to propel its satellite customers into the OTT business.

On the contribution side, Newtec Dialog® from ST Engineering iDirect is ideally suited for news gathering. These days, it is rare that a full crew will be sent to a breaking news site, so the whole process needs to be automated. Dialog® sets up a bi-directional IP pipe to the studio quickly and efficiently, without the need for technical assistance.

On the distribution side, the company teamed with DVB at IBC last year, to demonstrate DVB-I, an ongoing initiative to develop technical standards for delivering television services over IP. DVB-I can be a standalone delivery or could combine broadcast and IP to create a single hybrid offering. "Historically, satellite has been overlooked as an enabler of OTT services, but its synonymity with broadcast and its capability to deliver high-quality, reliable transmissions anywhere, makes it ideal to enable universal OTT television services," said Thomas Van den Driessche, then CEO of Newtec, now President and CCO ST Engineering iDirect, "We have a long

history of being involved in developing DVB standards and we are pleased to be able to support this latest initiative which will significantly increase service availability, especially for users who don't have access to broadcast television." The demonstration utilized the MCX7000 modem to provide the content for the DVB-T2 and OTT transmissions. The hybrid reception at the customer's site is a combination of DVB-T2 (or S2) and OTT.

Delivery of OTT content in a timely manner, is important as already explained. Equally important is being able to provide analytics and digital rights management. OTT services tend to be highly personalized and the first screen that a viewer sees and the recommendations given are related to their individual profile. So, knowing precisely how a subscriber is using the service is very important: this information will be used for targeted advertising, monitoring, and providing a suitable QoE. Digital Rights Management (DRM) is important to ensure that content is only shown in locations for which the operator is holding a license and in the appropriate release window. Dialog® hubs provide the necessary return path for these CDN analytics and the operation of DRM in the Cloud. The forward pipe will efficiently transport live content to feed the edge CDN servers, whilst the return channel can be used for feedback analytics and DRM, if there are no alternative terrestrial return channels.

Dialog® was also used in the ARK Mediacom, Inc. demonstration of the first end-to-end delivery of IP streaming video content. Intelsat provided the satellite IP transmission via their gateway and uplink services employing Dialog to establish a bi-directional IP pipe with the reception site. These ARK

5G and ATSC 3.0 trials demonstrated the ability to simulcast content across a nationwide IP multicast network, enabling virtually unlimited OTT video and IP delivery straight to customers.

Working with Broadpeak, ST Engineering iDirect utilized its M6100 Modulator to help power Astro Malaysia Holdings OTT service. The pay-TV operator offers public venue and business owners the facility to offer an Astro OTT service that takes its signal from satellite and then distributes live and on-demand programming over Wi-Fi to on-site customers. Venue users can therefore watch TV on their mobile devices via an app, or on Android TV-based television sets in the building. Broadpeak's nanoCDN™ technology is being used to deliver 20 live MPEG-DASH channels.

As can be seen from the examples above, partnerships are the name of the game. ST Engineering iDirect, is working with a variety of service and technology providers to facilitate and enhance OTT delivery services. These include ARK, Mediacom/Intelsat on the service side and Broadpeak, Quadrille and EKT for technology, as well as Tier-1 broadcasters. As Hans Massart, Head of Media & Broadcast, ST Engineering iDirect said: "We are constantly innovating and developing strong technological partnerships that enable us to spearhead satellite's place in the OTT ecosystem. We are continuing to forge the path to the future of OTT, enabling providers to deliver content anywhere and for a multitude of use cases."

Conclusion

OTT is an evolving and complex business. The satellite industry has a lot to offer to facilitate its continuing success. The ability and capacity to take content to the edge is obviously paramount; but more than that, combined, the players can provider years of experience capturing, processing, packaging and delivering content. Something the OTT players badly need. A win-win situation.

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