

Satellite Executive BRIEFING

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Industry Trends, News Analysis, Market Intelligence and Opportunities

European Broadcast Update

by Elisabeth Tweedie

The video landscape is changing, it has been doing so for several years now, but in the last year, in some areas in particular, the pace has really picked up.

The change in viewing habits and the move to Over-the-Top (OTT), on-demand viewing, is one of these, and is now evolving rapidly. The transition started



several years ago, when Netflix, added online movie delivery to its existing DVD rental business. Now, Netflix is one of a handful of independent OTT video companies. It is also, like Ama-

zon Prime, a major content producer, and with a budget of over US\$6 billion last year; one that is spending more than many of the traditional studios.

Unsurprisingly, this investment in content by Netflix and others, coupled with the spread of smartphones, and increasing bandwidth speeds, both on mobile devices and at home, has produced a profound shift in viewing habits. The change started several years ago, but the momentum increased dramatically in the last 12 months.

Every year, Ericsson conducts research, with 20,000 16-69 year olds in thirteen countries around the world. The results from the 2017 survey, highlight some dramatic shifts. In 2010, the traditional "couch potato" accounted for 21% of respondents and the "average TV Joe", someone who primarily watches TV, but spends a small amount of viewing time on a mobile or other device, 19%. By 2020, Ericsson is predicting that "couch potatoes" will be reduced to 11% of all video view-

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You know the year is almost over and people start to plan for the next year when the IBC starts in Amsterdam this month. There have been many changes in the industry in just the last couple of years and as usual we look to the IBC to help us navigate through these changes.

Our cover story by our Associate Editor, Elisabeth Tweedie will give a brief guide to what to expect at the IBC and other satellite events this month which includes the World Satellite Week organized by Euroconsult in Paris and the VSAT Global in London, among others. So it's going to be a busy month. Catch us at all these shows and do pick up a copy of the magazine and our other products such as the Market Brief reports and others.

Those of you who are discerning readers may notice a change in the look of our magazine. We welcome your comments and suggestions. We are now embarking on a major redesign and restructuring of our products to make them more responsive to the needs of the new digital consumers. Watch out for this space and our website for the changes. It's all part of our continuing commitment to provide you with the most user-friendly information tools to help grow your business.

Virgil Labrador

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Industry Trends, News Analysis, Market Intelligence and Opportunities

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European Broadcast Market Update...from page 1

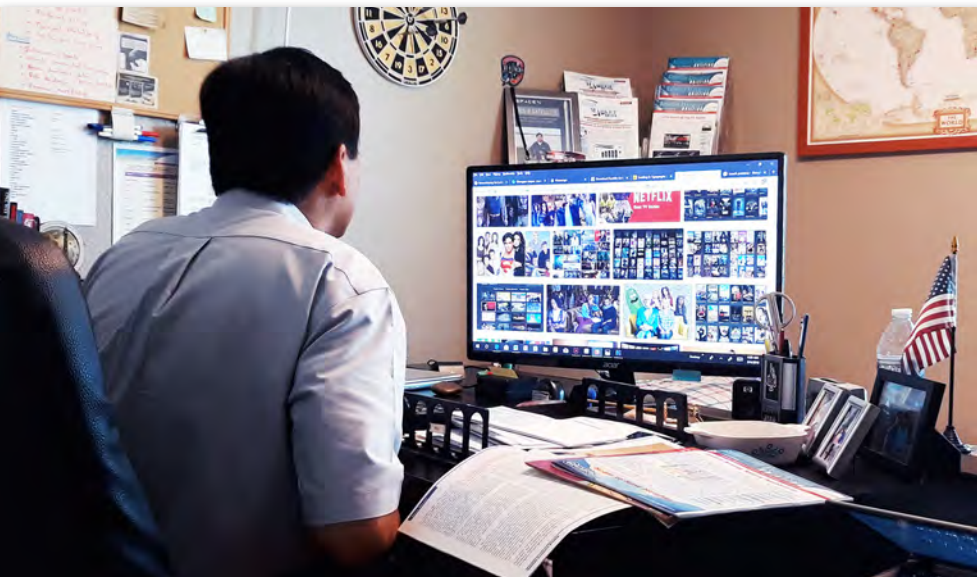
ers and “average Joes” to 12%. Whereas the “mobility centric,” people who mostly use a smartphone or tablet for all viewing, except broadcast, will jump from 5% to 28% in the same period. When asked about their attitudes to viewing, nearly 60% of all respondents said “I prefer on-demand over scheduled viewing.” In complete contrast, only around 25% commented: “My traditional TV service provider gives me all I need.” Loyalty, to a service,

ed viewing of linear TV, declined, the increase is due to OTT viewing.

More worrying for the traditional broadcaster, are the results of two studies done in the UK. One, by Ofcom, the regulator, showed that subscriptions to streaming services have now overtaken subscriptions to regular Pay TV services (including cable and satellite). A separate study was carried out by Childwise, in the UK. This was an in-depth study done with 2,000 5-16 year olds. It showed that most of their viewing, is done on personal

Eutelsat, in an interview with the French news site, Les Echos, stated: “Video is a mature, but resilient sector, the number of TV channels in the world continues to grow, thanks to emerging markets; parts of the world, where Eutelsat is strong.” He went on to say that the number of TV channels carried by Eutelsat continues to grow by around 5% p.a. He also pointed to the growth in bandwidth needed, as a result of the transition to HD and UHD. He continued, adding: “There is no great pressure from OTT” pointing out that for every additional hour spent watching OTT, linear TV declined by only ten minutes. This may well be true, but it belies the fact, that linear TV viewing is being supported by older audiences, and OTT by younger viewers. According to the Ericsson survey, 54% of viewing by 16-19 year olds is on-demand content, compared to 21% for 60-69 year olds.

However, in spite of this apparently rather complacent attitude, Eutelsat is promoting hybrid services on its website. SmartBEAM uses satellite to WiFi transmission, for TV viewing on portable devices in the home or hotels. In addition, newer set-top boxes combine internet and satellite to enable interactivity, including VoD. Sat.TV is a new electronic program guide (EPG) from Eutelsat that is designed to enhance program discoverability. Given that according to Ericsson, searching for something to watch is a major issue, Eutelsat may have a winner there. In 2017 the average daily time spent searching for something to watch was 27 minutes for linear TV and 24 minutes for VoD.



There is a growing preference for on-demand over scheduled viewing.

is rapidly disappearing with 41% saying that they are using different services to the ones they used five years ago. Confirming all these changes; IHS Markit released a new report: “Cross-Platform Viewing Time” at the beginning of August. This showed that across the leading five European markets (UK, France, Germany, Italy and Spain) VoD viewing increased by an average of two hours per month. This was across all platforms, but since time-shift-

devices, and binge watching a series is a growing habit. Children are “becoming unaccustomed to waiting for content – they want it instantly.” Also, 25% have mobile virtual reality equipment at home. This correlates with the prediction from Ericsson that by 2020, one in three consumers will be virtual reality users.

So, what does this mean, and more importantly for us. How is the satellite industry responding?

Rudolphe Belmer, CEO of



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According to the 2017 Ericsson survey, "mobility centric," people who mostly use a smartphone or tablet for all viewing, except broadcast, will jump from 5% to 28%.

SES is also promoting a hybrid approach. MXI, a wholly owned subsidiary of SES, is a major content distributor offering content aggregation, management, channel playout and online distribution. MXI 360 Unified Media Platform provides management and delivery of all linear and non-linear content to any broadcast, VoD or OTT platform. Cell C, a South African cellular operator, is making full use of these capabilities to deliver a combination of live and linear TV, movies, sports, betting, gaming, and other services, to a handset – in a wide variety of content packages that can be purchased via a pre-paid air-time account. Working with Vubiquity, a content provider, the service is delivered by SES and MXI.

Intelsat, meanwhile has launched IntelsatOne Prism, a multi-media networking platform and managed services, that enables media organizations to easily upgrade a legacy satellite

network to a satellite-terrestrial converged IP network for legacy and multi-screen video.

Arabsat, is also getting into IP, having announced earlier this year, that it will be setting up an uplink platform at TwoFour54. TwoFour54, is a

community of content creators and over 470 media companies located in Abu Dhabi. This agreement, will allow TwoFour54 tenants to distribute content directly from the free zone. Arabsat is also planning on introducing a High Dynamic Range (HDR) platform there. This will be the first in the Middle East. It is also testing the Hybrid broadcast-broadband TV (HbbTV) platform there. HbbTV is a European initiative for providing both broadcast and broadband/web content on a flat-panel screen in the living room. This platform is also supported by Eutelsat and SES, amongst others.

Another change, but one that is moving more slowly, is the transition from Standard Definition (SD) to High Definition (HD). This is an on-going one. And one that is really not moving that quickly. We hear so much about HD and Ultra-High Definition (UHD) (often referred to as 4K) in this industry, that it is easy to assume, that SD is now part of history. Not so, at all. A quick

trawl through the Astra website shows that its satellites are carrying 1,865 SD channels, and only 820 HD channels. Oh, and a mere 22 UHD channels of which six are SES/Astra demonstration and promotion channels. Overall, SES carries over 5,000 SD channels and over 2,600 HD channels and 38 UHD channels. Claudia Vaccarone, Head of Global Market Research, Eutelsat, speaking at MIPTV earlier this year, said that worldwide just 27% of the 11,700 channels broadcast are HD channels and 125 are UHD.

This is good news and bad news for the satellite industry. Good news, because it is likely that many of the channels that are still being broadcast in SD only, will at some point transition to transmitting in HD as well. Although, bearing in mind that HD has been around since 2003, and it's only reached 27% penetration, this could take many years yet. Bad news, because many of the channels that are carried in both SD and HD will ultimately transition to HD only. However, that change is likely to be many years in the future; particularly in the less developed regions of the world.

As for 4K, is it going to go the way of 3D, or will it continue to grow, albeit slowly? Behind the scenes, the leading technologists are working hard at developing and promoting standards for both UHD, high dynamic range (HDR) and 8K. High dynamic range adds tremendous color wider range of colors, higher contrast and brighter images to the picture. 4K describes the quantity of pixels, HDR describes the quality of the the pixels. 8K is the follow-on to 4K providing

COVER STORY


even greater granularity and clarity.

Given that 15 years after its launch, HD is only at 27%, I would say it's too soon to write UHD off, particularly in view of the number of 4K TV sets out there now. However, we are still waiting for more program makers to feel it's worth the extra expense of making and transmitting a 4K show. As was the way with HD, sports is leading way with 4K-UHD. Four years ago, UHD was being discussed and there were a few demonstrations – mainly at trade shows. This year, several broadcasters, including: Canal+, Sky Deutschland and Oi, delivered the (football – in case you missed it) World Cup, in 4K. The Israeli Public Broadcasting Corporation went even further

and transmitted the matches in HDR.

According to Thomas Wrede, VP New Technology & Standards Media Platforms, SES Video, this progress over the last four years has been due to team spirit: “as industry partners have worked together on various trials and demo channels, pushed to sort out the standards, the many

elements of the Ultra HD ecosystem have fallen into place, from camera to living-room.”

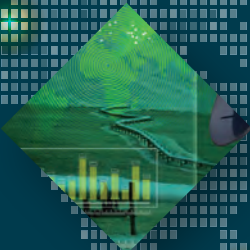
Team spirit, is what it will take to keep satellite at the forefront in the changing video landscape. In this our competition is not each other, but changing consumer habits and the ever-improving terrestrial infrastructure. 



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

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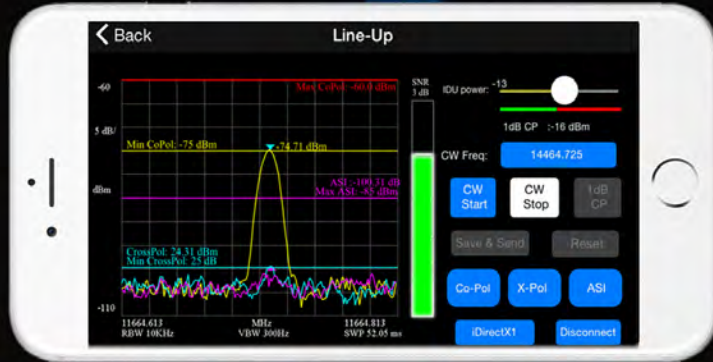


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How Can Cube-sats Find their Niche in the Satellite-IoT Market

by Hub Urlings

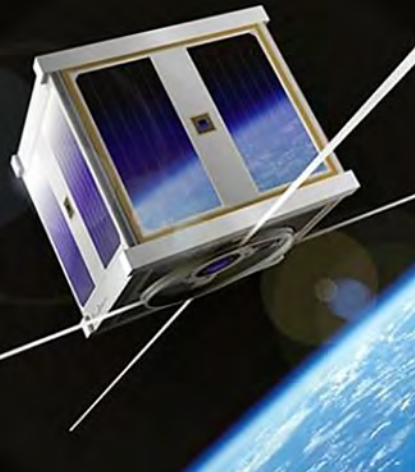


Photo Credit: Aalborg University

Finding the right niche

Breakthroughs in cubesats and small sat technology have led to a lot of speculation on the impact it will have on the space industry in general and on specific markets like IoT in particular. Is it really going to be so disruptive that the old space GEO systems will become replaced by new space constellations of LEO satellites? Or will it just expand the existing satellite markets opening up new markets? In this article we will have a closer look at these questions, especially as we are now at the verge of a new era as a number of new cubesat base IoT systems will be launched in 4Q2018.

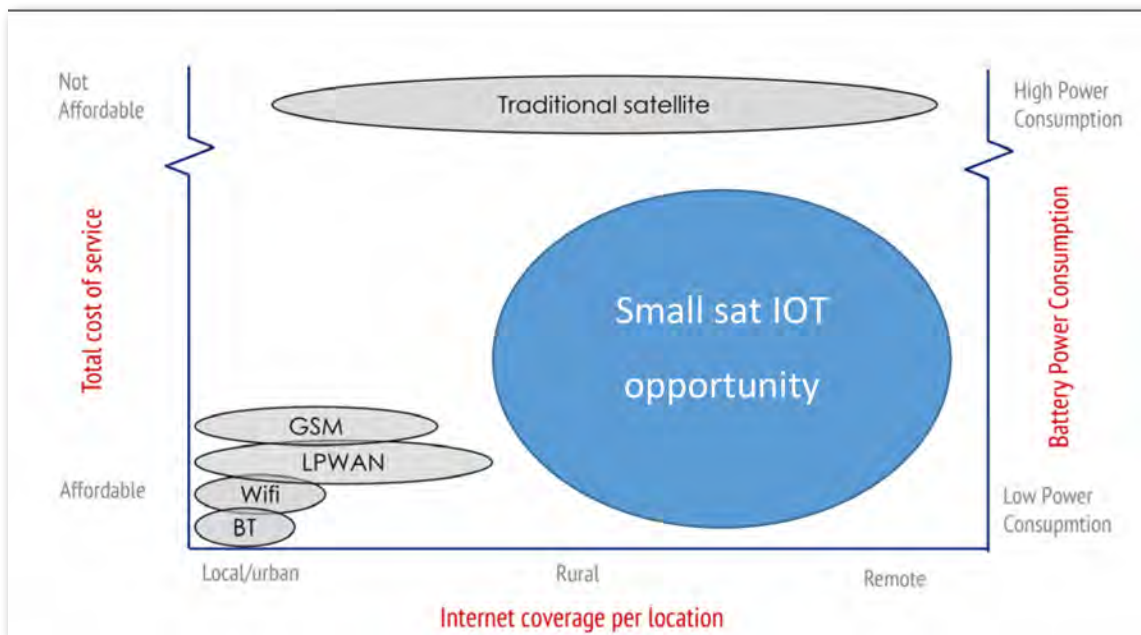
Is Satellite IoT Really Complementary to Terrestrial IoT networks?

Satellite networks always have been providing telecom services that are complementary to those provided by terrestrial networks. Judging how much market room there is for satellite in addition to terrestrial networks has always been a key element in the business planning for new satellite networks. Sometimes things can go wrong with this, as we know from Iridium that in its initial business

plan did not really see the rapid expansion of GSM in particular in densely populated areas around the world.

Comparable to the effect of the extension of terrestrial GSM networks on the satphone market is the use of satellite based IoT systems as an extension of the terrestrial IoT Networks. The development of terrestrial IoT networks like LORA and Sigfox (also called LPWAN low power wide area networks) and IoT in cellular networks like NB-IoT at the moment is accelerating. To judge to position of Satellite IoT in this market, let's have a look at those terrestrial IoT networks more closely.

LORA is a IoT technology platform with a large number of independent eco-system partners. It develops the coverage mainly according to the location where their customers need service. Although classified as a Low Power Wide Area Networks for the moment LORA proves to be ideal for covering skyscrapers or industrial plants and providing IoT services in rather small and local areas. Using LORA services becomes more difficult and expensive when the customer requirements include servicing communication nodes spread over a wide geographical area.



The main question here is if this is the same area that is required in terms of coverage when it comes to the distribution of IoT devices? When we look at the world's surface 90% is not covered by any terrestrial network. Smart home

Sigfox takes another approach as it sees itself as a network operator, covering large areas with their own base station infrastructure in order to provide services. In densely populated countries like the Netherlands where I come from that works great, for countries like France it is already a challenge, and imagine what it will take for a country like Brasil or Indonesia. The associated network investments will be an impossible barrier to take.

The third and most promising terrestrial IoT development is NB-IOT. At the moment this is rather a standard agreed upon in the cellular operator world with as main pitch: “we-can-just-do-a-simple-base-station-firmware-upgrade-and-deliver-low-power-wide-area-IoT”, and with a coverage in the high density populated areas. For the time being however it is no network to actually deliver the LPWAN connectivity and we will have to see how long it will take upgrading the cellular towers.

With 90% of the population covered by at least a 2G signal (voice and sms), and 70% by 3G (internet access) only 10 % of the world's population is not covered by terrestrial networks that can offer IoT connectivity. Is it fair to assume that the same distribution will apply to the proliferation of IoT terminals as well?

The majority of unconnected individuals are low income, living in rural regions of Asia and sub Saharan Africa, and make up the majority of the 4.8 billion not yet on the internet.

and smart city applications might work via terrestrial IoT networks but what about Environmental monitoring, Smart Agriculture, Energy grids, and assets the travel across the world? Is that the niche for satellite-IoT complementary to terrestrial, or are these new market segments that can be addressed but that will never be serviced by terrestrial services?

Is Old Space Satellite IoT Challenged by New Space Sat-IoT?

Satellite-IoT services are available in all frequency bands ranging from UHF, L-band, S-band, Ku and Ka band and are offered by both fixed and mobile satellite network operators. In this section we focus on the MSS providers like Inmarsat, Iridium, Thuraya or Globalstar that are providing the majority of the M2M and IoT connectivity services to the market and do this already for more than 10 years.

Inm-C was one of the first dedicated M2M services specifically build for the purpose. Starting in the land mobile market because of its high reliability, in a very short time it reached its final destination in the maritime market as the most cost effective solution to fulfill the Global Maritime Distress and Safety requirements for ocean going vessels.

The success of Inm-BGAN in the IoT market was unexpected for a “broadband system” but the fact that it is an IP-based system with data volume based billing made it (after a rather hefty investment in a



ESA's cubesats: *“The advent of fleets of small satellites in LEO providing global IoT services have the potential to change the paradigm for satellite IoT.”*

BGAN terminal) a very suitable connectivity service for IoT applications.

Iridium and Globalstar were designed as a traditional cellular service with the focus on voice but with a small data service along side as well. After it turned out the demand for voice (due to terrestrial network proliferation of GSM in particular in the densely populated areas where the International Business Traveller normally resides) was not as high as planned, attention turned to ‘alternative’ service for data, M2M and IoT. The so called data modems have the feel of the early PSTN modems however, and are rather complex to install, configure and maintain.

A common feature of “old space” satellite IoT services is that they are relatively expensive when compared to terrestrial services not only due to the high connectivity charges but also because of the high cost of ownership taking installation, configuration and maintenance into account.

For high end markets like Government or corporate segments like Energy or Mining that ask for high quality services and for markets with no alternatives like the maritime market this is might be ok, but fact is that there is hardly any growth in this market. Old satellite operators might also question the profitability of their Sat-Iot services, especially when looking at the huge network costs and the fact that the IoT service basically piggy back on the voice or broadband internet revenues of the network.

Here come the new space sat-iot operators: the

Low Power Global Area Networks!

In the fourth quarter of 2018 a number of new space satellite iot networks will launch their first satellites, and start offering their services. From that moment new space IoT operators will be challenging the dominance of existing old space sat-iot networks with their constellations of cube-sats for IoT connectivity. With fleets of dozens of relatively small satellites the new space challengers can reach cost price levels a magnitude lower than the current sat-iot networks, while at the same time offering global coverage. Important for customers is also the fact that these new sat-IoT constellations are able to work with easy to install, low power IoT devices that can stay in the field without maintenance for yours thus also lowering the operational cost significantly. For that reason they are called Low Power Global Area Networks.

When we look at IoT research three main requirements for the growth of the IoT market are identified: main requirements are a global service, with low cost of ownership and low power requirements for the field terminal.

It looks like these new space sat-iot providers might just be able to deliver on that. The advent of fleets of small satellites in LEO providing global IoT services have the potential to change the paradigm for satellite IoT, but no one knows exactly how, since no constellation is up yet.

This is going to change in the last quarter of

“...When we look at IoT research three main requirements for the growth of the IoT market are identified: main requirements are a global service, with low cost of ownership and low power requirements for the field terminal...”

2018 when a number of new players (Kepler, Hiber, AstroCast, Fleet) will launch their first cubesats into orbit. In a follow up article we will describe them more in detail.

Making Cubesat-based Sat-IoT a Success


The greater question as to who will succeed lies in how much demand their constellations will actually meet/generate.


If you make a comparison with the satellite proposal hype in the end of the 1990's (e.g the handheld voice systems like Iridium / Globalstar, but also a lot of the satellite broadband systems) the biggest issue was not the technology, but the fact that the market forecasts were dramatically wrong.

That's always the challenge for something big and new, and it doesn't matter whether you are building LEO's or GEO's . When you are trying to get into a new market, it's very difficult to come up with an accurate market forecast.

The new generation of smallsat LEO constellations face similar issues as some of their 1990's forebears, with as most significant hurdle how to establish credibility that demand will exist at the prices

necessary to make the business case work.

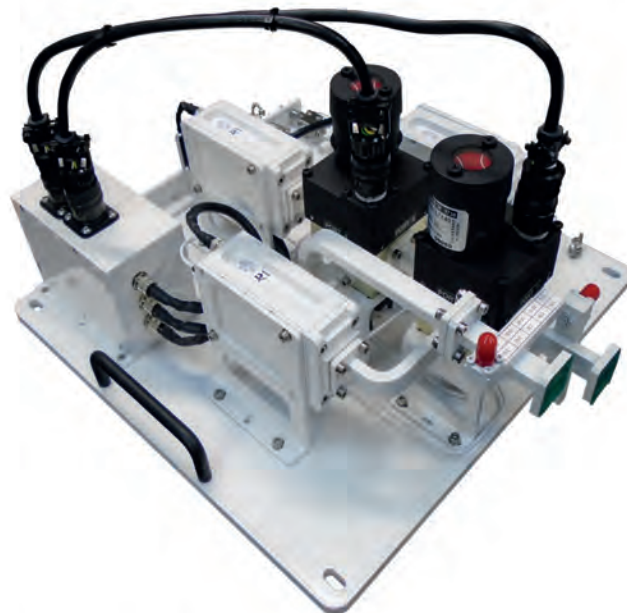
In a follow up article we will describe the various cubesat based IoT system more in detail and we will see their vision on the market. 



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

"Dreams about the future are always filled with gadgets"

Neil deGrasse Tyson



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OVERCOMING THE LIGHT OF DARKNESS

By Lou Zacharilla

Sarah Coffey, an editor at Dow Jones Newswires, recently complained, “I just wish I could turn on my light without having to ask my phone to do it!”

So it goes. Pavlov rules. The silent epidemic spreads as we surrender personal, psychological and communal power without a shot being fired in anger or before a subversive move has been made against us. We decided that someone or something else should turn our lights on and off, our marvelously connected devices complied, our industry helped enable it – and then we got mad!

I remind myself daily that those connected devices are also connected to satellites – and to free will. Mine. It has become a prayer of sorts. The other prayer is of gratitude for knowing what I know about the industry, and

for all the good and convenience offered by the devices I too complain that “enslave” me. SpaceX leader Elon Musk famously shared a similar conflict within himself. In his case, a nap and a day at the beach are prescribed.

For every action there is reaction. So it is with the unprecedented success of communications and connectivity, which our industry has been instrumental in enabling in ways unthinkable before our era. Yet the lights are also getting brighter on a growing backlash against technology, globalism and good

old life-saving human intelligence and reason. Let’s call it The Light of Darkness. We may claim a neutrality of sorts, not unlike Facebook a few Congressional hearings ago, and assume that our belief in science, progress and the better angels will always prevail.

“...the lights are also getting brighter on a growing backlash against technology, globalism and good old life-saving human intelligence and reason...”

“We are just the plumbers,” a CEO said on a panel I hosted. Some of us are quick to add under our breath, “Don’t blame me.”

Perhaps it is all true. But the plumbers are going to launch 7,000 smallsats by 2022, according to Eurocon-

sult, and have made sure that when you want a pizza in Brooklyn at 12:30 AM, you are directed to Tonino's for their Sicilian slice. Not everyone assumes these are common virtues.

Because in the world people still wonder if satellites are spying on them. In the world, peoples' thumbs move as smoothly as a three-card monte dealer's across tiny screens. And those thumbs have produced a form of blindness. It has appeared, oddly, in politics, which is often a gateway into our own hearts. We get mad, we get tired and we sputter due to a lack of time and focus, but we are not sure why or at whom this anger or frustration should be directed. We walk away from relationships, and the hard work they require, and we invest (waste?) time around gadgets and devices; keyboards and games, hoping the distraction relieves a global anxiety we cannot identify; hoping somehow it will all get sorted out by someone or something. Some – many – have begun to blame “technology!” To find relief we buy New Age toys, sign up for hot stone treatments, meditation in high-heels in tepees with native peoples' guiding us romantically back to a time when the central nervous system was, evidently, only moving along at 15 miles per hour.

As they say at Tonino's, “Fah-get about it.” The old days were fine for a lot of us, but always look better when you are scared of the path ahead.

Satellite is Heroic Novel, Not just a Manual

It was with all of this in mind that we started to offset the fear and the insularity by poking holes



“...Satellites and the industry is key to making sure the lights go back on...”

at it <https://www.youtube.com/watch?v=J4ndk3SvL6Q>. We now regularly tell the story of an industry where fulfilling the demand for capacity not only keeps pace with an information grid that is increasingly essential to the management of ships, food supplies and our cities, but also helps us overcome disasters. The narrative has changed. The vision of a better world is more associated with our industry than ever before because we are telling a human story, not a technical one. We are a heroic novel, not a manual.

In our new Podcast series, “The Better Satellite World,” we have spent the past few weeks talking about how our industry is in line with the new Crisis Connectivity Charter, recently signed in May 2018, with the intention of making sure that the foreboding sense of helplessness many feel is not the reality when a disaster strikes.

What we hope to reveal through our new podcast, which includes an exclusive “Making Leaders” series, is that It is mainly OUR choice. Not the phone's. We all need to look at the “Bet-

ter Satellite World” to see where we play a role in pushing back against whatever tide is beating someone — anyone — down. At Notre Dame University they have a great campaign called, “What Would You Fight For?” It is an essential question and many of the entrepreneurs, astropreneurs and young Promise Award recipients at the Future Leaders Dinner we know guide us because their mandate is to fight for that better world.

It is our choice for sure. Our game to lose. “Every conversion is a soul saved,” they used to say. (And still do.)

Today, on the street, a young dude wearing a NASA baseball hat was walking alongside me outside the bakery on Third Avenue. I asked about that hat. He said he wanted to study astronomy and space related sciences. I told him what I tell you here (sort of). Five minutes later he took out his device, swiped his thumb to the www.sspi.org site and gave me a thumbs up.

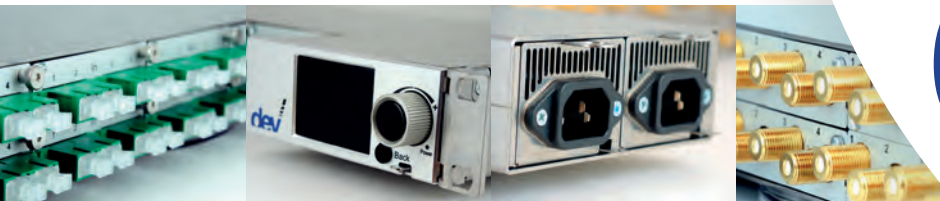
“This is cool. This is for real. This is for the good. I will check it out.” 📧

If you are interested in the new SSPI podcast, go to: www.sspi.org/cpages/podcast



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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From Antenna to Receiver

Transmission and distribution of satellite signals in large facilities

by Yannick Zeller & Tom Beutelspacher

Whether in a cable head-end, earth station or teleport, reliable signal transmission and distribution is the backbone of a facility's successful operation. From signal reception at the satellite dish, to processing and distribution within a facility, and final distribution, signal quality availability must be properly engineered and managed. Redundancies play a key role in order to guarantee maximum reliability and uptime.

Satellite Reception

Satellite Earth Station antennas, often referred to as satellite "dishes," are used for receiving satellite signals from television programming networks at cable head ends and other facilities. Their size may vary from 1 to as large as 30 meters in diameter, depending on the frequency, satellite position, and service requirements.

Source: The signals are transmitted from space to earth at different frequencies and polarizations between satellite and ground antennas. Television signals are usually sent in the Ku (10-18 GHz) or C-band (3-6 GHz) or a combi-

nation, depending on local and regional environments. A growing number of signals around the world are being broadcast at Ka-Band (20/30 GHz). The direction of the electric field of the received electromagnetic wave is called polarization. The Vertical and Horizontal polarization are perpendicular to each other. The separation is performed by an antenna feed, which feeds the signals to a Low Noise Block Converter (LNB).

The LNB (Low Noise Block Down Converter) frequency converts the weak signals received from satellites and amplifies them for delivery via cables to indoor

reception and decoding equipment typically racked with other electronic networking units.

The high-frequency input signals received (or downlinked) from the satellite in space are typically down converted by the LNB to the L-band (950-2150 MHz) or extended L-band (850-2450 MHz) frequency range and transmitted via cable, such as coaxial copper cables. Specially shaped antennas provide the ability to mount more than one LNB to receive several different satellite positions simultaneously.

Lightning protection devices directly installed on the antenna, or in the downstream signal path,



Antenna field earth station in Raisting, Germany (Wikimedia / pixabay.com)

can be used in order to protect equipment in the downlink chain from over-voltage damage.

Transfer to the Receiving Device (Inter-Facility Link / IFL)

The next step is the transmission of down converted signals from the LNB to the Integrated Receiver/Decoder (or IRD), which processes and decodes the signals to baseband. This link is sometimes called the Inter-Facility Link or IFL. The electrical transmission over coaxial cable from the LNB often leads to attenuation losses, especially at longer transmission paths. Amplifiers are commonly used at the beginning of the route to compensate for losses. Otherwise, the signal level and Signal-to-Noise Ratio (SNR) can be too low to ensure proper signal quality.

For antennas and systems with transmission paths of less than 100 meters from LNB to IRD, transmission over coaxial cable introduces minimal losses and is typically acceptable for cost reasons. For larger cabling distances, or for systems with multiple antennas, where bigger line losses over coax would result, RF-over-Fiber transmission delivers major advantages and should be used. In addition, if a particularly high signal quality is required, coaxial IFL links may not be a prudent option.

In general, fiber optic transmission advantages include:

- Dramatically higher bandwidth capacity
- Virtually lossless over much longer distances and extremely low noise
- Unlike copper coaxial cable, fiber is very resistant to



Optribution® RF over Fiber Outdoor Chassis DEV 7152 (Source: DEV Systemtechnik)



Rack Shelter with devices for electro-optical conversion (Source: DEV Systemtechnik)

Electro Magnetic Interference (EMI) effects, such as can be caused by power systems, heating, ventilation, TV and radio station signals, radar, etc.

- Reduced fire hazard and lightning hazard: no sparks if cut; does not conduct electricity.
- Security: fiber is much more difficult to tap than copper.

The conversion of an LNB output signal onto optical fiber usually takes place in dedicated devices that are housed outdoors in the rack shelters at an antenna site close to the antenna. Compact units are typically used, such as RF equipment supplier DEV Systemtechnik's DEV 7152 outdoor chassis (See Figure 2). Devices mounted directly on the mast of the satellite dish are also in use. These devices can provide redundancy features for the link to the IRD (Receiver) in addition to performing electrical-optical

conversion. They can also be used to set important parameters for onward transmission of the downlinked signal.

Redundant Transmission and Antennas

In order to ensure continuous signal availability, even in the case of failure of a part of the transmission chain, routes are designed redundantly. If a section of the route fails, a backup can take over the signal transmission of the failed part. Implementing one redundancy unit for each transmission part (a so-called 1+1 redundancy) would lead to an increase of costs. Since backup equipment is only required in the rare case of a primary path failure, a more effective solution is to implement an N+1 redundancy. With N+1 redundancy, "N" number of primary units can share the same (1) redundancy unit, thanks to intelligent switching devices on both sides of the transmission line.



Antenna Redundancy Switch DEV 1993 (Source: DEV Systemtechnik)

The concept of hedging against dropouts with redundancy is not only applied to transmission lines. Antenna fields can also be protected against failure. A motorized steerable backup antenna can be employed to restore failure of 1 to N number of fixed (non-steerable) antennas in a facility. The backup antenna, controlled from an Antenna Control Unit (ACU), can be pointed to different satellite positions in order to restore one of several fixed position antennas. This antenna failure backup restoral can be accomplished using a Redundancy Switch typically installed in an antenna rack shelter. It is also possible to install the switch behind the optical fiber transmission link.

If the redundancy switch detects a malfunction of the signal from one of the fixed antennas, the ACU points the motorized steerable backup (redundancy) antenna to the faulty antenna's satellite position. Once peaked on the correct satellite, the backup antenna can receive and restore the signal in place of the faulty

antenna. The signal outage is thus minimized.

For operators that do not have a management system that can perform the switching automatically, or do not wish to perform the integration, there is a special solution from DEV Systemtechnik: the DEV 1993 Antenna Redundancy Switch monitors and switches the signals of connected antennas, and it can completely take over the control of the ACU in the case of a dish failure. As a result, it creates a closed, automated system for achieving antenna redundancy without the need for an external management system.

Site Diversity

Failures are not only caused by technical defects. Severe weather events can affect entire antenna farms, due to attenuation of satellite signals caused by rain and atmospheric moisture, which more severely attenuates higher satellite frequencies (Ku-Band, Ka-Band). However, since outage-causing weather effects tend to be geographically localized, a

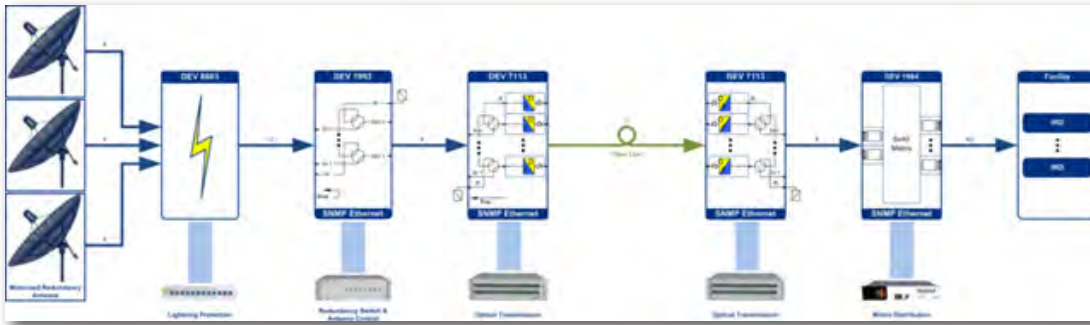
concept called Site Diversity can be implemented to maximize uptime and minimize weather effects. With this Site Diversity approach, a redundant downlink antenna facility is built in another location, typically at least 50 to 150 kilometers away. RF-over-Fiber (RFoF) is used to link the two sites.

The redundant facility would typically be smaller, possibly unmanned, and may only include the primary satellite dishes, outdoor equipment and shelter. At the "Diversity Site", the downlinked electrical signals are converted for fiber transmission, multiplexed and sent to the main headend receive equipment via fiber optic links.

Since the purchase of fiber optic telecommunications service may be required for the fiber connection, and this can incur a costly recurring fee, methods such as CWDM (Coarse Wavelength Division Multiplexing) and DWDM (Dense Wavelength Division Multiplexing) are typically used to bandwidth-efficiently combine and transport the signals from the antenna Diversity Site to the main site. With CWDM or DWDM, using different wavelengths, up to 16 or 80 different signals can be transmitted over a single optical fiber. At the RF-over-Fiber receive location a demultiplexer divides the multiplex back to individual channels and paths. The switching between the antenna sources can also be managed by a 1+1 redundancy switch.

Distribution Inside the Facility

To distribute, demultiplex,



Overview of a complete signal path (Source: DEV Systemtechnik)

transport, and switch RF-over-fiber signals within and between facilities, different approaches are viable, depending on the application and operator preferences. The classic version is a hard-wired distribution: the incoming RF signals are fed to the electrical-optical converters on a splitter. Integrated amplifiers are mostly used here, since splitting reduces signal power. For instance, the signal level drops by about 3-4 dB with a 1:2 splitter. A distribution of 1:128 corresponds to an attenuation of approximately 26 dB. This very significant loss due to splitting must be addressed in addition to any line losses.

DEV Systemtechnik is a key supplier of equipment for RF signal distribution, switching and amplification functions, offering unique solutions in a single chassis. These products are available in different sizes and with different degrees of integration. Combining both the signal conversion and signal distribution in the same device delivers significant space and power consumption savings compared to conventional solutions.

Matrix Switching: Operating Efficiency, Control & Redundancy

Another, much more flexible


option than “hard wiring” a facility is to use a Matrix Switch. This makes it possible to switch an input source to any number of outputs, or vice versa. With an RF Matrix Switch, it is no longer necessary to manually reconfigure the cabling or patch panels in order to change signal paths. Redundancies, optical-electrical conversion, and amplification can all be executed by a Matrix Switch. The device can be controlled remotely via a web browser or by an existing management system. The product portfolio of DEV Systemtechnik ranges from compact RF Matrix Switches with 8 inputs and outputs to a 64x64 matrix, which can be assembled in a cluster, and delivers up to 2048x2048 inputs and outputs.

RF signal routing requirements within a facility differ, depending on the application. For programming acquisition, incoming satellite and/or fiber RF signals are transmitted to IRDs (Integrated Receiver Decoders) to decode the video, and/or feed it to the cable or IPTV system multiplex. If an IRD fails or suffers faults, the Matrix Switch can be used to feed a backup IRD, or duplicate and route a problem signal to test equipment for testing and fault isolation.

On the out-bound transmission side, matrix switches can also be used to route signals from IRD sources for forward distribution, for example to modulators for

direct transmission onto an HFC (hybrid fiber/coax) cable network, or to IPTV encoding and multiplexing systems for downstream distribution to set tops.

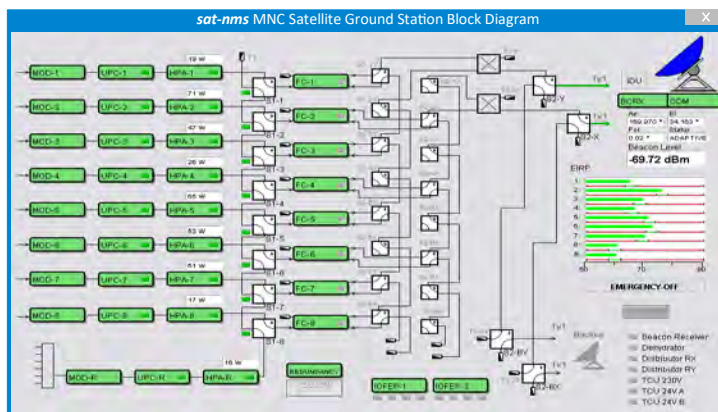
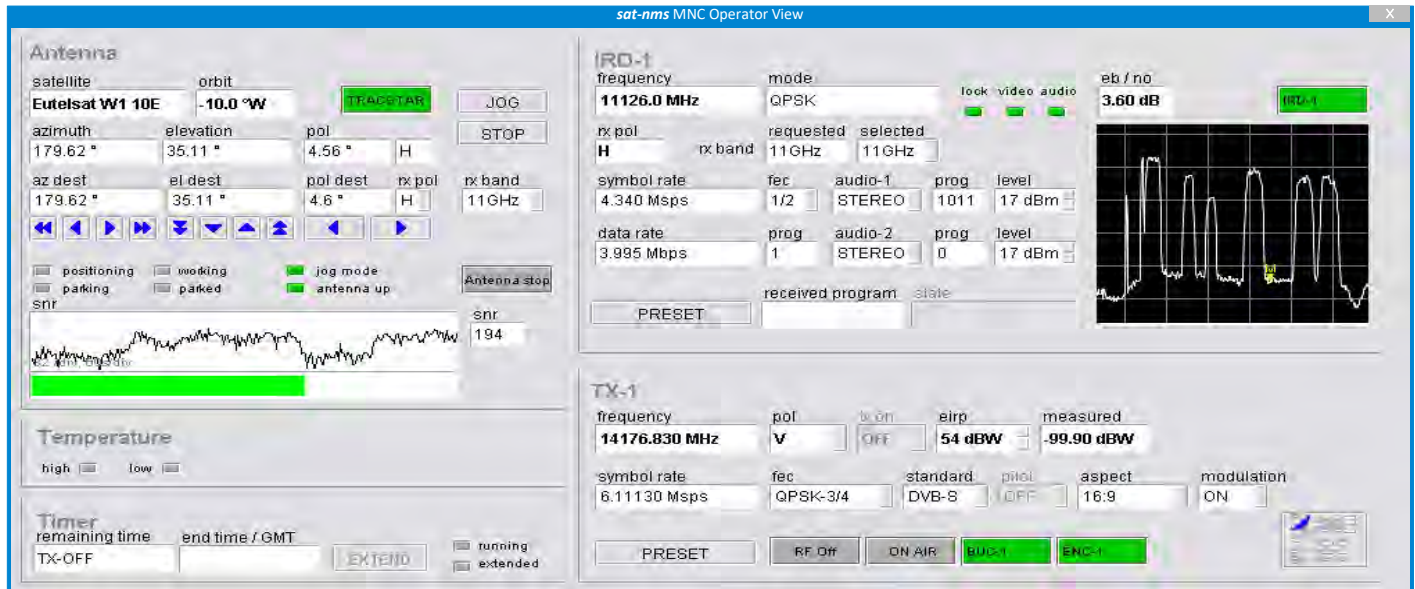
About DEV Systemtechnik

DEV Systemtechnik, part of the AXING Group, develops and manufactures a complete range of products and systems for the optical and electrical transmission of Radio Frequency (RF) signals via coaxial cable or fiber. For over 20 years DEV has designed, engineered, and manufactured RF transmission equipment for satellite, broadcast, and cable applications. All products are built to meet the highest standards of system availability, reliability and manageability. 

Yannick Zeller (yzeller@dev-systemtechnik.com) is Systems Engineer while Tom Beutelspacher (tbeutelspacher@dev-systemtechnik.com) is Business Development Manager of DEV Systemtechnik GmbH of Friedberg (Hessen), Germany.



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Can you give us an update on Gazprom Space Systems' position in the satellite market today?

Nowadays, as always, Gazprom Space Systems (GSS) is well positioned as a well-known reliable international satellite operator providing Yamal satellites capacity all over the world. Although, hard times and new market realities forced us to concentrate our efforts on improvement of operational efficiency and cost saving, and we looked for new approaches and leveraged our strength and capabilities. The volume of satellite capacity sales has grown, but we are forced to provide it at a slightly lower price than before.

This is the market today: on the one hand, the demand is growing, on the other hand, the overproduction of the satellite capacity and the expansion of operators owning fiber-optic infrastructure has put

strong pressure on prices. The client base of GSS was replenished with new companies, and some of our customers did not survive the difficult times and moved to the category of former clients. But, we are

not giving up and continue to find new solutions to satisfy our current customers and developing new projects aimed to extend our service portfolio and the customer base as well.

You have an upcoming satellite launch in the first quarter of 2019 with Yamal 601, can you give details on this satellite and what benefits it will provide the market and your potential clients?

Early next year we are going to replace Yamal-202 with the new HTS Yamal-601. The coverage area of new satellite is almost the same as its predecessor in C-band. All existing customers will

move to the new satellite and get some benefits such EIRP on the new satellite will be two decibels higher. It will allow customers to use more efficient coding modulation systems and use the bandwidth

more cost-effectively. Yamal-601 is also equipped with Ka-band payload providing 32 beams covering the most populated regions of Russia. GSS is focused on growth with Yamal-601, the company



Artist rendition of Yamal satellite 601.

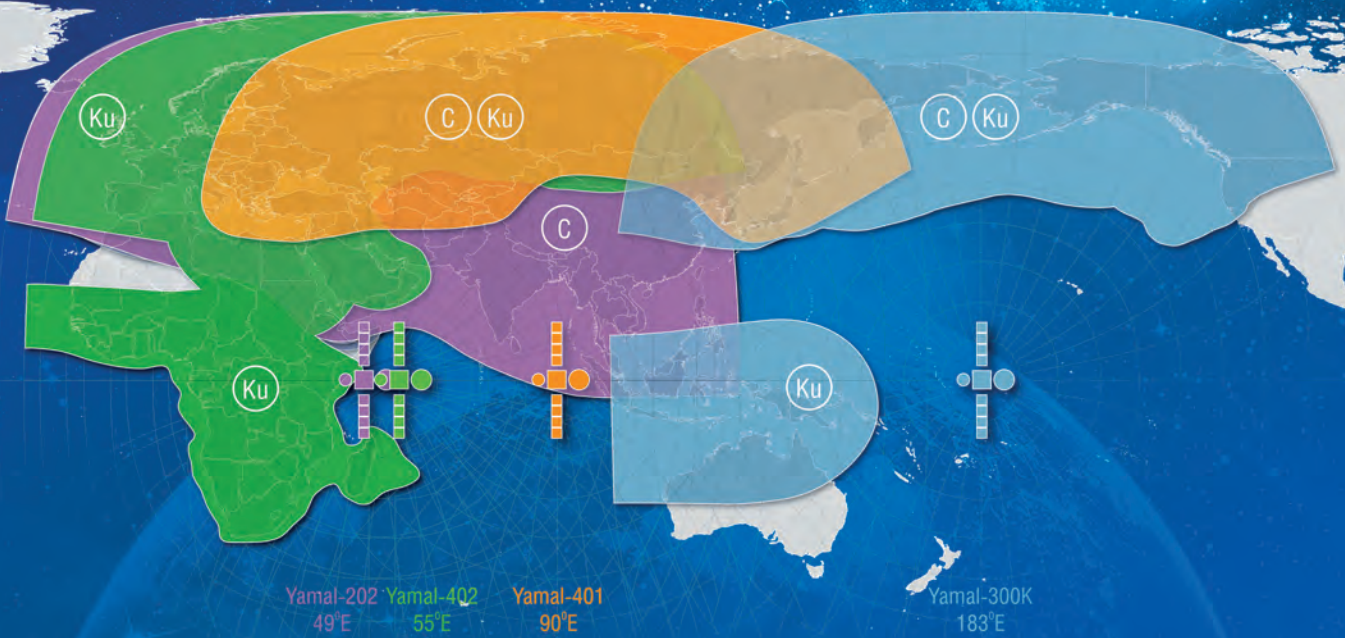
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intends to develop cost-effective wholesale services of broadband Internet access. The throughput of Yamal-601 is 30 Gbit/s. For the Russian market this is more than adequate now. During the first five years of satellite operation, we intend to increase the customer base to 200-300 thousand user terminals, both for individual and commercial use.


Therefore, Yamal-601 is the focus of our development strategy, combining traditional satellite capacity with operation in traditional bands in wide coverage areas and capacity organized on the principle of high-throughput satellites (HTS) with multi-beam coverage and frequency reuse.

How do you see the current market for satellite services? What trends do you see and how is your company adopting to the changes in the market?

On the international market GSS acts only as a satellite operator providing the main service of satellite capacity. We do not develop a ground infrastructure and sales offices outside Russia for end customer support, but we cooperate with providers who are strong and competent in different local markets outside Russia. This is our conscious posi-

tion that allows us to minimize business expenses and avoid competition with our customers. Within the conditions of market transition and at a time when operators are seeking for new forms of doing business, this approach may seem rather old-fashioned, but it still works.

How do you see your company in the next few years? What are your targets?

In the near future, we are going to concentrate on Ka-band system development through extension of Ka-band service area to the east by planning new satellite Yamal-501. Ka-band services is a new business for us, but in general, the satellite broadband is already familiar to us, as we provide similar services in Ku-band. On this market we can play two roles. In the first instance, we provide services to end users. In the second, we provide satellite capacity to VNOs. Using this approach, we are going to realize up to 80% utilization of the system capacity. Currently, there are dozens of such companies operating via GSS satellites. And then, they provide services to customers using our capacity and our technological platform. And they are willing to develop this business in Ka-band further. 

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Mission Microwave: Gaining Market Share in the Competitive Ground Segment

by **Virgil Labrador, Editor-in-Chief**



THE NEW SHAPE OF SOLID STATE

X, Ku, & Ka-Band BUCs & SSPAs
from 12 Watts to 400 Watts

A dynamic company based in Los Angeles, California, Mission Microwave Technologies is making waves in the industry with its revolutionary Solid State Power Amplifier (SSPA) Block Upconverters (BUCs) to support ground-based, airborne, and space-based applications. Founded in 2014, Mission Microwave in just four years is gaining market share in one of the most competitive segments of the satellite ground equipment market.

Mission Microwave Technologies was founded with the aim of building the the next generation of SSPAs and BUCs. They utilize advanced GaN transistors, unique power combining technology, and novel full-system designs to create the industry's most efficient, lightweight, and compact high-power SSPA's.

"Utilizing the latest in semiconductor technology, we have optimized the size, weight, and power (SWaP) for these critical applications while delivering the best possible reliability. We currently offers advanced GaN BUC products at X-Band, Ku-Band, and Ka-Band from 12W to 400W, and sets the 'new standard' for performance and reliability," said Francis Auricchio, President and Co-Founder

of Mission Microwave.

One of the keys to Mission Microwave's relative speed in developing new products and getting them to market is the experience of its management team. Auricchio, who co-founded the company, formerly served as Chief Executive Officer of amplifier provider Wavestream Corporation, where he grew the company to over US\$ 70 million in revenue, leading to an acquisition. He was previously a Sr. Scientist at Boeing Satellite Systems (formerly Hughes Space and Communications Company) where he focused on design, development and production of solid-state power amplifiers (SSPAs) and low noise amplifiers (LNAs). Auricchio was key in developing MMIC devices for the Spaceway™ satellite program and microwave power FETs for the SSPA product line. He also led an integrated product team developing high-power optical amplifiers for space. Other members of the company management team also have extensive experience in the industry.

Mission Microwave's Solid State Power Amplifier BUCs at X-Band, Ku-Band, and Ka-Band combine the industry's highest RF power, lowest prime power consumption, smallest volume, and lightest weight in a compact package. These amplifiers are

“..Utilizing the latest in semiconductor technology, we have optimized the size, weight, and power (SWaP) for these critical applications while delivering the best possible reliability...”


--Francis Auricchio, President

ideal for SNG, communications on-the-move, on-the-pause, and terrestrial airborne connectivity, or anywhere that size and performance really matter. Light enough to mount directly on an antenna boom yet powerful enough to deliver content through adverse conditions, these are equipped with an advanced control interface for quick setup and ease of use.

Steve Richeson, VP for Sales and Marketing said that the key factors in considering BUCs are size, weight, and power strength. “And it’s really those three things that set our products apart because obviously the design, the shape is attractive. And it’s remarkably small in terms of size and weight. But one of the things that customers look at it more they start to appreciate is also the power efficiency.”

These key qualities of its products has helped Mission Microwave gain market share in various segments of the ground equipment market such as the military, aviation and maritime markets in a

relatively short time. “Probably the satellite show this year marked our transition from a startup to being accepted as a part of the satellite industry. We passed some financial milestones. The company is solid financially and we have a good customer base that is continuing to expand,” added Richeson.

“We’re in the fun part of our evolution now. We are going to continue to grow We are very bullish on our current growth trajectory and our increasing market share. Even if the market is slack or down in the next two years, which isn’t, we think our growth will continue,” said Richeson. 



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Founded in 1976 by the 21 member-states of the Arab League, Arabsat has been serving the growing needs of the Arab world for over 40 years, operating from its headquarter-



ters in Riyadh-KSA and two Satellite control stations in Riyadh and Tunis. Now one of the world's top satellite operators and by far the leading satellite services provider in the Arab world, it carries over 500 TV channels, 200 radio stations, pay-tv networks and wide variety of HD channels reaching tens of millions of homes in more than 80 countries across the Middle East, Africa and Europe—including an audience of over 170 million viewers in the Middle East and North Africa (MENA) region alone tuned into Arabsat's video "hotspot" at 26°E.

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At IBC 2018, AvL Technologies' booth will have on display a 2.0m ultra-lightweight manually operated axi-symmetric antenna, its newest addition to the flyaway family.

The antenna features a 14-piece carbon fiber reflector and its RF components are located behind the hub, making the antenna highly configurable. The unit is easily assembled and available on-network in <25 minutes. The antenna packs into two checkable transit cases each weighing <100 lbs. This ultra-lightweight flyaway antenna is the most compact 2.0m on the market and offers performance specifications comparable to competing 2.4m lightweight antennas with small pack-up.



Additionally, featured will be our Family of Integrated Terminals (FIT) – two aperture sizes, the 0.75m & 0.98m will be manually operated whilst the 1.35m will be motorized. These fully integrated systems are ultra-light in weight, ultra-compact, with ultra-high performance. All units are upgradeable from manual-point configuration to a motorized, auto-acquisition platform.

Also in the booth will be our 0.70m LEO/MEO Rapid Retrace Terminal, a single antenna with a <7 second retrace enabling re-sync without disruption. The terminal packs into two cases each weighing <40 lbs., allowing ease of transport and deployment. The antenna can be deployed and operational in minutes. This rapid retrace satellite tracking terminal offers the power of O3b Network's high throughput, low latency connectivity.

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dam to discuss the latest in COTP and COTM antenna innovation. On display will be the iNetVu® Ka-75 Driveaway, iNetVu® FLY-981 Ku/Ka Flyaway system and Ku-band iNetVu® MP-100 ManPack. C-COM offers the world's premier commercial grade mobile VSAT solution for SNG, Oil & Gas Exploration, Disaster Recovery, Government / Military, Emergency Response, Cellular Backhaul, Mobile Banking & more.



COMTECH EF Data
booth # 1.F80

www.comtechefdata.com



Comtech EF Data Corp. is a leading supplier 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 # 1.F80

www.xicomtech.com

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



Comtech Xicom Technology offers state-of-the-art Gallium Nitride (GaN) solid-state amplifiers for the fast-growing In-Flight Connectivity market. We have DO-160 in-cabin certified and cabin exterior certified designs. The high efficiency technology and advanced packaging techniques used enable industry-leading power density products that meet the tough environments of airborne applications.

Xicom SSPAs and Block Upconverters (BUCs) for in-cabin ARINC-type and out-of-skin hermetic configurations support DO-160 requirements from category A1 to F2. Xicom

Gallium Nitride (GaN) SSPAs enable high-speed satellite connectivity for both airlines and travelers around the world.

Datapath
booth #1.F27

www.datapath.com

DataPath leverages over 25 years of experience across 40 countries to bring best practices to everything “From Terminals to Teleports and all the Tools In Between™.” We focus on remote, distributed or at-risk environments, where reliable communications are a must. This includes government, broadcast, emergency response, and industrial markets.



DEV Systemtechnik
booth #5.A15

www.dev-systemtechnik.com

DEV Systemtechnik is expanding its product line with a combining matrix switch to meet the growing demand serving satellite uplink equipment.



Unlike distributing fan-out matrix devices, combining matrix switches allow several or all input signals to be routed into one output channel. The DEV 1975 can automatically switch signals according to signal levels. This allows a flexible arrangement of redundant capacity switching to guarantee constant availability in the event of signal failure. The matrix can be controlled and individually configured via SNMP or the DEV Web Interface and is available from 4x4 to 16x16 arrays.



DEV 1975 will be featured for the first time at the IBC in Amsterdam from September 14 to 18. The DEV booth will be located in Hall 5, Stand A15. Appointments for detailed discussions and demonstrations can be reserved anytime online at dev-systemtechnik.com or by e-mail at info@dev-systemtechnik.com.

Gazprom Space Systems
booth # 1.A21

www.gazprom-spacesystems.ru

Gazprom Space Systems is pleased to propose you satellite capacity on Yamal-202 (49E), Yamal-300K (183E), Yamal-401(90E), Yamal-402 (55E).

Due to wide service areas covering most of the Eastern Hemisphere, high technical characteristics and favorable prices, GSS' capacity is used in more than 100 countries worldwide.

In early 2019, GSS' space infrastructure will be upgraded by new HTS satellite - Yamal-601. The key feature of Yamal-601 is multi-beam Ka-band service zone over Russia.



So it is high time to book new HTS capacity. Visit us at IBC 2018 in Amsterdam, September 14-18 at booth 1.A21 to get the best price!

Integrasys S.A.

To schedule a demo at IBC or VSAT Global contact info.sales@integrasys-sa.com

www.integrasys-space.com



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

Hispat/Hispamar
booth # 1.C37

www.hispasat.com



The HISPASAT Group is composed of companies with a foothold in Spain as well as in Latin America, where its Brazilian affiliate HISPAMAR, sells its services. The Group is a leading Spanish- and Portuguese-language content broadcaster and distributor, including over important direct-to-home television (DTH) and high-definition television (HDTV) digital platforms.

LP Technologies
@ the SatService booth #1.F47
www.lptechnologies.net



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

ND Satcom
booth # 5.A60
www.ndsatcom.com

With over three decades of experience, **ND SatCom** is the premier supplier of and integrator for innovative satellite communication equipment systems and solutions to support customers with critical operations anywhere in the world. Customers in more than 130 countries have chosen ND SatCom as a trusted and reliable source of high-quality and secure turnkey and custom system-engineered communication solutions. ND SatCom's flagship product, the SKYWAN platform, enables international users to communicate securely, effectively and quickly over satellite.



Newtec
booth # 1.A49
www.newtec.eu



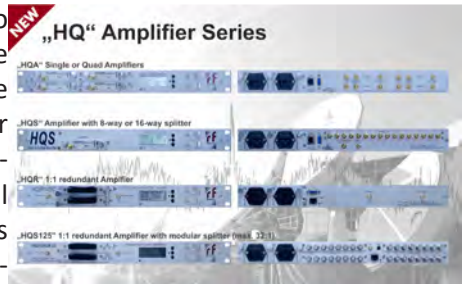
Newtec, a specialist in designing, developing and manufacturing equipment and technologies for satellite communications, will be showcasing at the NAB its most advanced VSAT modem to date – the first on the market to support wideband DVB-S2X, the Newtec MDM5000 Satellite Modem. The MDM5000 is capable of receiving forward carriers of up to 140 MHz, and processing over 200 Mbps of throughput. On the return channel, it supports SCPC, TDMA and Newtec's unique Mx-DMA™, up to 75 Mbps.

RF-Design
booth # 1.F45
www.rf-design-online.de



RF-Design specializes in developing, manufacturing and marketing high quality RF distribution and RF-over-Fiber solutions for the international Satellite, Broadcast and Broadband communications market. Our product portfolio includes a wide range of Switch Matrix systems, RF-over-Fiber solutions, Splitters/Combiners, Switches/Redundancy Switches, Line Amplifiers and RF/DVB Signal Quality Analyzers...perfectly suited for applications in Teleports, Satellite Earth-Stations as well as for Broadcast- and Broadband RF distribution

infrastructures. We also have strong capabilities to design and to manufacture custom-made solutions for your individual needs. All our products are developed, manufactured, tested and approved in our own facilities in Lorsch/Germany and characterized by high quality, reliability and superior RF performance.



At IBC 2018 we will demonstrate our new single, quad or 1:1 redundant amplifier systems "HQ Series" for insertion of up to 4 amplifier modules each with gain control of max. 40dB, our new 32:32 Switch Matrix system "FlexLink-K4" and our Quad RF-over-Fiber system "QLink". Join us at our booth (Hall 1, Stand #1.F45). We look forward to welcoming you and to talking about your individual RF equipment requirements.

SatService GmbH
booth #1.F47
<https://satservicegmbh.de>



SatService
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SatService GmbH, a system integrator, manufacturer and reseller

in the field of satellite communications, is pleased to present at IBC 2018 the second generation I/O Frontend Processor: the new sat-nms IO-FEP2.

The sat-nms IO-FEP2 is the easiest way to integrate any "low level" interface commonly used in satellite ground stations like equipment alarm contacts, waveguide- or coaxial-switches and other status signals into your Monitoring & Control System.



It provides opto-coupled in- and outputs and potential free relay output contacts. It manages HPA inhibit, redundancy switching and monitoring of current and voltage for up to 6 LNA's/LNB's.

In spite of extended functionality, the sat-nms IO-FEP2 needs 40% less space than the previous sat-nms IO-FEP-E but it 100% pin compatible.

Terrasat Communications
booth #1.F61
www.terrasatinc.com



Terrasat Communications designs and manufactures innovative RF solutions for Satellite Communications systems. Our ground-breaking IBUC, the Intelligent Block Upconverter, brings advanced features and performance to C-band, X-band, Ku-band, DBS-band and Ka-band satellite earth terminals and VSAT's.

New to IBC 2018, we now have 300W and 400W Ku-



band IBUCG models featuring minimal backoff to PLinear usable power. We have made recent developments that bring significant 2-3 dB improvements to GaN technology amplifier linear output power. Through conservative engineering, Terrasat products have gained a reputation for enduring over the long term in extreme operating conditions.

UHP Networks
booth # 1.A91
www.uhp.net



UHP Networks is engaged in the development, manufacturing and marketing of satellite networking equipment. Its core products include UHP universal satellite routers and advanced Network Management System. UHP is the industry's first fully software-defined, DVB-S2X enabled VSAT router, which can be used in a network of any size and any topology either as a remote or a building block of a VSAT hub. UHP-powered solutions are efficient and reliable, with industry-best total cost of ownership. These solutions have been deployed in over 300 networks by Tier 1 telecom service providers, broadcasters and government agencies.

Work Microwave
booth# 1.C51
www.work-microwave.com



WORK Microwave's Satcom Technologies division is a leading provider of high-performance, advanced satellite communications equipment. This equipment is designed for use by telecommunications companies, broadcasters, integrators, and government organizations operating satellite earth stations, satellite newsgathering vehicles, flyaways, and other mobile or portable applications.

As one of the only satellite technologies providers offering an end-to-end solution for wideband applications, including an advanced modem, modulator, and demodulator, WORK Microwave enables operators to adapt to future requirements, including the next-generation DVB-S2X standard, with ease and affordability. At CommunicAsia, WORK Microwave will demonstrate its all-IP platform, which provides operators with increased flexibility, scalability, and a future-proof solution. WORK Microwave supports a wide range of use cases, such as outbound carrier for the HTS/UHTS/UHDS VSAT system, IP trunking, cable/fiber restoration, and HD image downloading in earth observation.

Walton Enterprises
booth 1.A62
www.de-ice.com



Walton De-Ice, the world's leading designer and manufacturer of satellite earth station antenna (ESA) weather protection solutions, will unveil 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.

"Our new ADC-4000 features now give users control of the actual temperature on their dish," adds Walton.





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5.C55

Opportunities Emerging from “New Space”

by **Omkar Nikam**

Across all regions, a plethora of “New Space” companies are bringing about innovative and affordable solutions to access space

Overview

The increased privatization of space activities has brought about a new generation of space companies. The most successful of these private companies have come about as a result of consistent cooperation with, and support from government agencies. The New Space industry to now has attracted several billion USD worth of investment, with this amount expected to rise in the coming years with more support from government entities and the private sector. The plethora of technological changes that have occurred on earth over the past decades—miniaturization of components, cheaper processing power, etc.—will increasingly make their way into space, enabling new applications and new business models to emerge.

The global space industry today is worth 250 billion USD. The US, Russia, and a few European countries are the biggest stake-

holders of this billion-dollar industry. Historically, investments into space have been highly scrutinized due to the inherent risk involved in such a cutting-edge industry. With advancement in a variety of technologies, the New Space industry and its associated companies promise to bring down the cost of access to space, allowing for lower-risk, faster-moving business models that will allow for iterative improvements and ultimately, a more prosperous space economy for all.

Regional New Space Landscape

United States

The American New Space model is the most successful example of strong cooperation between the government and private sector. Over the past two decades, the US government has provided strong support to startup space companies, with the most notable being SpaceX, in the form of several NASA launches awarded to the company. Even after numerous SpaceX failures, the American government helped the company to spread its wings for New Space opportunities.

This kind of cooperation between public and private sector will continue to help the development of New Space companies. Silicon Valley has been a primary source for triggering the New Space activities. Well-known venture capital firms like Sequoia, Khosla Ventures, and RRE Ventures have invested in many successful American New Space companies such as Planet, Orbital Insight, and Spire. These companies have raised the bar in research and development of affordable space solutions while also helping to develop the American New Space ecosystem.

Europe

With a strong legacy of space excellence, Europe has the potential to become a center for New Space companies, however it has thus far lacked the US’s coordination between private enterprise and government, partially due to difficulties in coming to consensus between various EU countries and pan-European organizations such as the European Space Agency (ESA). With that being said, individual European countries such as Luxembourg have already started rolling out

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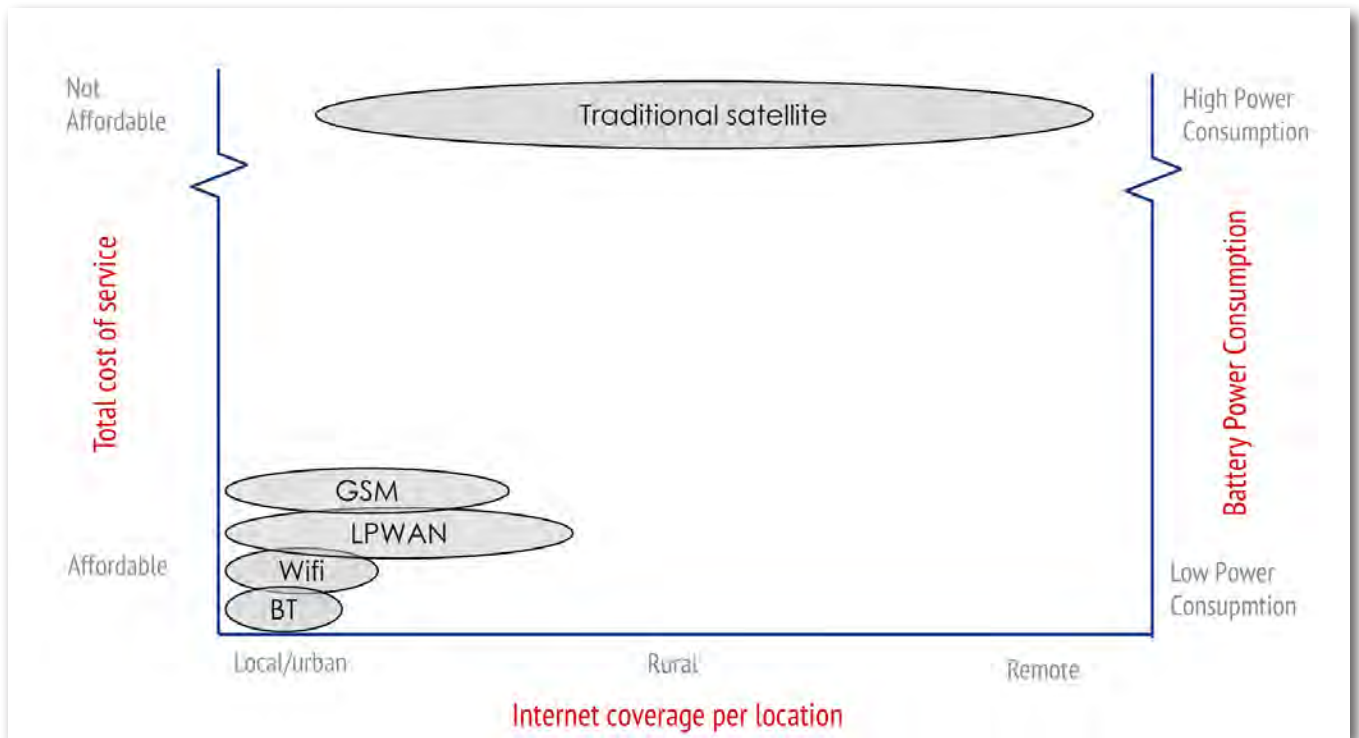
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strategies not only to attract private European companies, but also well-known American New Space companies like Planet and Spire. Though European companies like iCEYE and GomSpace are partially backed by American investors, the Luxembourg government is making consistent efforts to create a sustainable New Space nexus in Europe. Apart from individual government initiatives, venture capital firms like Seraphim Capital and OHB Venture Capital are also prominent investors in European New Space segment.

Along with the individual European States, the ESA has also started taking the necessary steps by extending support to young entrepreneurs through various business competitions to help establish business in the space segment. The ESA's Technology Transfer Program Office has created Business Incubation Centers (BIC) in different parts of Europe. These BIC's inspire and en-

courage entrepreneurs to develop business ideas based on space science and technology. As the ESA's Sentinel satellite data is freely available online, it has attracted various investors and entrepreneurs from non-space segment to participate and create innovative earth observation startups with the help of BICs. But looking at the qualitative growth rate of the startups incubated at BIC, the results are less positive, with one of the reasons being an insufficient amount of funds. The BIC generally allocates 50,000 Euros as a seed funding for a startup, which is considerably low for a space startup at the initial stage. Therefore, the ESA must create a framework where the incubated startups are able to kickstart themselves at the very initial stage through more funding.

Russia has likewise joined the New Space race, with an investment of 3 billion rubles (approx. US\$50M) in Skolkovo Project

for development through 2020. The Skolkovo Foundation based in Moscow is creating a strong platform for young entrepreneurs to participate and kickstart their projects in New Space. In spite of huge efforts by Skolkovo, the Russian New Space sector has experienced a mixture of both failures and success, as companies like Dauria Aerospace failed in its first project of remote sensing nanosatellites, while companies like KosmoKurs and 3D Bioprinting Solutions are on the way to making a good mark on the industry in their respective niches.

Asia, the Middle East, and Africa

In Asia, China has ignited the flame of innovation with its heavy investment in the launch and satellite sector, and also its partial liberalization of the space industry starting in 2014. They also achieved global fame by successfully testing the world's first quantum communication satel-



European Space Agency Business Incubation Center Hessen & Baden-Württemberg with its Darmstadt site located in the direct vicinity of European Space Operation's Center. (ESA photo)

to access to space.

Having a look at Middle Eastern and African countries, it can be said that the international collaboration can help nations develop their own space programs. For example, Saudi Arabia has joined the space race with its first joint Moon Mission with China, while Morocco and South Africa have also achieved success in satellite operations by collaborating with ESA and NASA.

Scope for International Cooperation, and Looking to the Future

In the past few years, geopolitical events have created challenges for many industries, and space is no exception. The wave of nationalism triggered by the series of events after 2016 US elections as well as Brexit has clobbered the gateway of opportunities for many entrepreneurs around the world.

While many American companies maintain international collaboration, and while the UK is still the part of ESA in spite of

lite. While India being second in the region after China, they still have a long way to make a mark in the space industry. Asia is at an emergent stage in New Space race, though is home to many exciting startups, such as Rocket Labs of New Zealand (and also US), an emerging New Space company to provide launch systems for small satellites. With the advancement of affordable low-cost launch service, many satellite communication startups will now have a platform to launch their future small satellites. This technological disruption will lead to reduced cost of launch which may in-turn shuffle the supply and demand curve as it pertains

Brexit, recent geopolitical events may ultimately lead to bifurcation of the space industry into two or more distinct camps. This is to some extent not new, with, for example, the US having historically kept China from participating in the International Space Station (ISS), but this process could speed up, particularly given the increase in protectionist policies from the US and others. The current status of ISS is mainly government centric along with a small portion of private companies like SpaceX and Orbital ATK providing commercial launch and resupply module services for ISS. The commercial operations of ISS are now slowly making a transition into the private sector, so there is possibility of ISS being a potential site of opportunity for private companies in the near future, though again this may fall along nationalist lines.

Ultimately, the best way for the New Space economy to develop is through open collaboration, not only between countries, but between private companies and governments, between research institutions and for-profit organizations. The opportunities in the commercialization of space are endless, and only through increased collaboration can we make the most of this most greenfield of markets. 

Omkar Nikam is currently working as a Market Research Intern with Orbital Gateway Consulting (OGC) while completing his post-graduate studies at the International Space University in Strasbourg, France. At OGC, he is focused on New Space. Apart from his academic and professional engagements in space activities, he also participates in voluntary science outreach programs. He can be reached at: omkar.nikam@community.isunet.edu



Tedial Names Antonio Robles as Operations Director

Malaga, Spain, August 30, 2018 — Tedial, the independent MAM technology solutions specialist,



has named **Antonio Robles** as Operations Director, effective immediately. He will lead the company's project design and implementation teams as well as the support team. He brings with him almost 20 years of experience in the audiovisual industry. Prior to joining Tedial, Robles held CIO positions in important Media Companies and TV channels including Antresmedia, La Sexta and Tres60 Group.

"Antonio's background and deep understanding of customer needs make him uniquely positioned to assess customer requirements in a constantly evolving environment where new technologies such as AI may change the business paradigms," said Esther Mesas, Tedial CMO/CSO. "He is the perfect candidate to continue to guarantee the highest level of quality, reliability, service and commitment to our customers, which will enable them to stay ahead of the curve in a transforming industry".

Tedial is a provider of Media and Content Management solutions designed to maximize business efficiency and profitabil-

ity. Its award-winning Media IT platform, Tedial Evolution, provides international broadcasters and global media companies with the next-generation in MAM and business driven media workflow. It enables an end-to-end business media platform marrying media preparation and logistics into a complete supply chain.

Globecast Names Gerry McAree as VP Sales, East Region in the US

Los Angeles, Calif., August 28, 2018 — Globecast has named **Gerry McAree** as VP of Sales, East Region, effective August 27. In his new role, McAree will lead the sales efforts on the east coast to promote



an innovative, fresh approach to client relationships and further drive Globecast's revenue and growth priorities in the US.

McAree brings 18 years of sales experience to his new role, having worked directly with senior decision-makers at major broadcasters and content owners, including for satellite operators PanAmSat and Intelsat. Most recently in the media industry, he served as Director, North America Media Sales for Intelsat, based in Washington DC. Gerry joins Globecast directly from his position as VP of Sales for Arena, a software-as-a-service company based in Maryland.

Tim Jackson, SVP of sales and

marketing at Globecast Americas, said Gerry's leadership skills and ability to drive creative solutions in competitive markets will be a huge asset to the already strong sales force we have in the Americas for Globecast. "He has the background necessary to help our customers understand the changing nature of this dynamic market, especially as we see a shift toward IP, virtualization and cloud services. We're delighted to welcome Gerry to our growing team," he added.

McAree commented said he is honored to be working with such a dynamic company. "I'm looking forward to building upon the success in the US and working closely with our customers so they can maximize the monetization of their content," he said.

McAree holds a Master of Business Administration (MBA) from Georgetown University in Washington, DC. He is based in Maryland and reports to Jackson.

David Meltzer Appointed Secretary General of Global VSAT Forum

Washington, D.C., August 27, 2018 — The **Global VSAT Forum** (GVF) announced the appointment of **David Meltzer** to




serve as its Secretary General effective 27 August 2018. Meltzer brings

over twenty five years of experi-

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- RF power monitoring & threshold alarming
- Front panel monitoring ports
- Switchable LNB-supply
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- 6RU/19" scalable from 8:8...64:65 to 256:256
- Also available with optical inputs
- Switchable LNB supply
- Variable gain control, slope equalization...



ence in the satellite industry, including serving as a board member for both a regional satellite operator and for a mobile satellite operator. Previously, he served for 16 years in various business and legal roles at Intelsat, culminating in serving as Intelsat's General Counsel and Executive Vice President for Regulatory Affairs. Most recently, Meltzer served as the General Counsel and Chief International Officer of the American Red Cross where he led its legal, international disaster relief and development activities.

Dr. Arunas Sleky, GVF's Chairman of the Board, said Meltzer brings a unique mix of industry and non-profit management experience on the international stage. "...we are confident that he will add significant value to GVF as a leading voice of the rapidly growing satellite industry—a vital part of the telecom and Internet fabric that connects the world," he said.

GVF is a global non-profit association of the satellite industry. Founded in 1997, it brings together organizations engaged in the development and delivery of broadband satellite technologies and services for consumers, commercial and government organizations worldwide.

David Treadway Named Chairman of the Board at iKO Media Group

Pfaffikon, Switzerland, July 30, 2018 – iKO Media Group, a global end-to-end service provider for broadcasters and content owners, named **David Treadway** as Chairman of the Board effective immediately.

Treadway is an experienced Director in international business- es in the broadcast & media, communications and technology sectors with strategic skills and extensive experience in managing growth. Treadway brings with him over 30 years experience in the media industry spent in senior management, investments, business development and sales in major broadcast and distribution companies such as Telewest (now Virgin Media), WRN Broadcast, RR Media and MX1.



"I am delighted to be part of such an innovative and creative team. iKO Media Group is rapidly growing and heading towards becoming a global leader in distribution services as well as a host of other boutique services," said Treadway. "I am looking forward to utilizing my experience in the industry to help project iKO forward and enable the company to meet future milestones for growth."

AsiaSat Promotes Ina Lui to Senior Vice President, Commercial, Business Development and Strategy

Hong Kong, August 1, 2018 – Asia Satellite Telecommunications Company Limited (AsiaSat – SEHK: 1135) announced that it is integrating the company's commercial, marketing and business

development teams under the leadership of **Ina Lui**, who has been promoted to the new role of Senior Vice President, Commercial, Business Development and Strategy, effective 30 July 2018, following the decision of Barrie Woolston to resign as Chief Commercial Officer.

Ina Lui in her newly expanded role will assume additional responsibilities in commercial and marketing.

On restructuring the company's commercial operations, Dr. Roger Tong, Chief Executive Officer



of AsiaSat, said, "I am pleased to announce this new transformation for the company. By elevating and uniting our commercial, marketing and business development teams under one leadership, we are better positioned to harness the strength and synergies of a combined team to synchronise our transformation with our customers and accelerate growth at AsiaSat."

Ina possesses over 25 years of experience in the satellite, telecommunications and technology sectors, covering areas in commercial, marketing, product and business development. She has worked in Singapore, South China and Hong Kong, and has held senior management positions at ABS, Intelsat, PanAmSat and Hong Kong Telecom. Prior to joining AsiaSat, Ina was at ABS as Managing Director, Sales Asia Pacific. 



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Communications & Power Industries Expands Antenna Business with Acquisition Of Orbital Systems And Quorum Communications

PALO ALTO, Calif., Aug. 21, 2018 — Communications & Power Industries (CPI) has acquired the related companies Orbital Systems, Ltd. and Quorum Communications, Inc. from their co-founders. The acquired companies design and manufacture associated ground-based full-motion antenna products that play a key role in communications applications; Orbital Systems provides antenna systems primarily for communications with earth observation satellites in low earth orbit (LEO) and telemetry, tracking and control (TT&C) applications, while Quorum Communications, its sister company, provides satellite microwave receivers, downconverters and other communications products.

“Orbital Systems’ and Quorum Communications’ antenna products are thoughtfully designed for very high reliability and ease of operation, even in the harsh environments to which earth observation antennas are subject. Additionally, the companies have demonstrated a winning combination of extensive systems-level expertise, well-chosen antenna pedestal technology, reasonably priced solutions, and a forward-facing architecture designed to address opportunities for satellite communications programs with medium earth orbit and low earth orbit satellite customers,” said Tony Russell, president of CPI Antenna Systems Division. “Their approach, products and technology are an excellent complement to CPI’s existing antenna product offerings.”

CPI intends to retain the leadership, personnel and facilities of the newly acquired companies. The three co-founders and principals, Carl Schoeneberger, Allan Bundens and Richard Fogle, will join CPI. CPI intends to continue to utilize Orbital Systems’ and Quorum Communications’ shared manufacturing facilities in Irving, Texas.

“When evaluating potential buyers, we knew that we wanted a partner that is respected in the industry, that shared our dedication to providing reli-



Communications & Power Industries

able and affordable, yet state-of-the-art, antenna products to commercial, academic and government customers, and that will be able to grow the business and sustain it over the long term,” said Carl Schoeneberger, president of Orbital Systems. “We found that partner in CPI, and we look forward to Orbital Systems and Quorum Communications being part of the CPI team.”

Terms of the acquisition were not disclosed.

Coupled with CPI’s recent purchase of the large-diameter satellite communications antenna family from Viasat Inc., the acquisition of Orbital Systems and Quorum Communications enables CPI to offer commercial and government customers a comprehensive range of limited-motion and full-motion antenna products. The acquired companies will be integrated into CPI’s Antenna Systems Division, bringing proven, reliable, innovative and synergistic technology and products to an already broad portfolio of advanced antenna products for communications, telemetry and radar applications, according to the company.

Speedcast International Signs Agreement to Acquire Globecomm

Sydney, Australia, Aug. 28, 2018 — Remote communication and IT solutions provider Speedcast International Limited (ASX: SDA) announced that it has entered into a definitive agreement to acquire Globecomm Systems Inc. from affiliates of HPS Investment Partners, LLC and Tennenbaum Capital Partners, LLC for an estimated net purchase consideration of US\$135 million¹, on a cash & debt free basis.

The acquisition, which is expected to close in Q4 2018, strengthens Speedcast’s global position in Government, Maritime and Enterprise and it strongly complements last year’s acquisition of Ulti-

Sat. This will double Speedcast's revenue in Government, and add more scale, visibility and capabilities in this strategic growth market.

Speedcast estimates it will generate over US\$15 million in annual cost synergies within 18 months after the acquisition.

The acquisition will be funded by a fully underwritten US\$175 million add-on to Speedcast's existing 7-year senior secured credit facility (due 2025) from the US institutional term loan market. This will also be used to repay a portion of Speedcast's Revolving Credit Facility and enhance Speedcast's liquidity and cash reserves

"The acquisition of Globecomm is fully in line with our strategy to consolidate our market and thus build competitive advantages based on scale and capabilities. Globecomm is particularly complementary to UltiSat as it strengthens Speedcast's position serving Government customers at a time when government spending globally is expected to rise," Beylier said.

Encompass to Acquire Babcock's Media Services

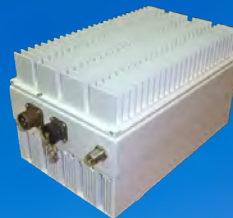
Atlanta, GA, August 29, 2018—Encompass Digital Media, a global technology services company delivering end-to-end video playout and distribution solutions to broadcast and digital media companies, announced today it has signed a definitive agreement to acquire Babcock International Group's (Babcock's) Media Services business. This deal expands Encompass' scale in EMEA and extends the company's combined channel playout, transmission and digital products portfolio while adding international radio distribution to its suite of services.

"Acquiring Babcock's Media Services business increases our presence in the EMEA region, expands our video services offering, specifically in the live streaming sports arena, and bolsters our collective relationships with some of the most important media companies and public service broadcasters around the world," explains Chris Walters, Encompass CEO. "We are thrilled to be adding a large number of highly regarded industry professionals to

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the Encompass team.”

The amount of technical complexity required to generate and deliver content to viewers continues to grow exponentially, and the acquisition of Babcock’s Media Services business represents a continued push to offer end-to-end, highly reliable and scalable services to media companies. With combined resources, Encompass will offer enhanced solutions to capture, process and deliver video content from any source, in any format, to any destination in the most efficient manner possible.

“I am delighted that Babcock’s Media Services business is becoming a part of one of the leading



global providers of managed video services. The combination of Encompass’ significant international presence and prestigious customer base, together with Babcock’s growing capabilities in the rapidly expanding live streaming market and our market-leading position serving many of the world’s leading international radio broadcasters, will further cement Encompass’ global reputation as THE provider of choice,” states Nick Thompson, Managing Director of Babcock’s Media Services business.

Encompass has existing facilities in the UK, US, Singapore, Argentina, Latvia and India; this acquisition will grow its operations in the UK and Singapore and add operations in Oman and Ascension Island. 

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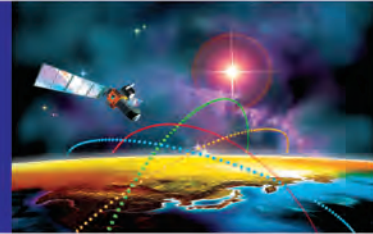
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Asia Pacific Online Video Revenues to Grow To US\$48-B by 2023, with More than 60% from China

HONG KONG, August 21, 2018 — Online video revenue, comprising net ad spend and subscription fees, will grow at an 18% CAGR across Asia Pacific between 2018 and 2023, climbing from US\$21 bil. in 2018 to US\$48 bil. by 2023, according to Asia Pacific Online Video & Broadband Distribution, a new report published by Media Partners Asia (MPA).

China will account for the lion's share of industry value, with more than 60% of Asia Pacific online video revenue and more than 75% of direct-to-consumer SVOD subs by 2023. After China, the largest markets by revenue in 2023 will be Japan, Australia, India, Korea and Taiwan.

Commenting on the findings of the report, MPA executive director Vivek Couto said online video monetization is starting to scale, supported by rising investment in premium entertainment and sports as well as the growth of broadband and digital payments. "Strong digital ecosystems are emerging, especially in China while telcos are also becoming important aggregators of video services in markets such as Australia, India and Southeast Asia. Advertising is a major revenue stream for online video across the region, while subscription is also

key, especially in Australia, China and Japan, and growing from a low base in India, Southeast Asia, Korea and Taiwan. Different payment models are emerging across China, India and Southeast Asia incorporating more flexible options, including TVOD and shorter time commitments, freemium tiers, bundles and loyalty programs tied to a broader mix of digital services,"

"We are in the early innings of an industry evolution which will require high levels of investment and strong balance sheets. For standalone players, there is no clear path to significant free cash generation in any market over the medium term, while integrated digital giants and large-scale TV players are subsidizing losses for their online video services, although operational breakeven is likely in the near-to-medium term for local platforms in Australia, China, India and Japan," he continued.

There remain significant barriers to growth, led by high levels

of online piracy, notes the report. Ex-China, many local players are also struggling to scale in fragmented marketplaces. The top three SVOD players in a market typically have ~50% or more of online video subscription revenues, according to MPA analysis, leaving scope for future consolidation.

Online Video Subscription

The growth of online video subscription has been impressive in China, with fees rising from less than US\$850 mil. in 2015 to a projected ~US\$5 bil. in 2018. The growth of online video subscription fees has also been strong and increasingly scalable in Australia and Japan, while meaningful opportunities are opening up in India, driven by the growth of payment infrastructure as well as investment in sports rights, local movies and series. By 2023, India will be Asia Pacific's fourth-largest online video subscription opportunity after China, Australia and Japan. Online video subscription fees in Southeast Asia (including



Advances in broadband connections will boost online video revenues predicted to grow to US\$48 Billion by 2023.

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Hong Kong) are relatively low, at a projected US\$267 mil. in 2018. This could grow to US\$724 mil. by 2023, driven by greater momentum in Hong Kong, Indonesia and the Philippines.

Online Video Advertising

Net online video ad spend in Asia Pacific will grow from US\$13 bil. in 2018 to US\$30 bil. by 2023. Ex-China, this opportunity equates to more than US\$11 bil. by 2023, versus US\$5 bil. in 2018. YouTube and to some extent Facebook will remain dominant, with 73% of online video ad spend ex-China by 2023, versus 78% in 2018. The biggest online video ad markets after China by 2023 will be Japan, Australia, India and Korea. Local players will gain share with India leading the way, although Southeast Asia will lag behind.

Content Costs

Content costs are a critical component of online video growth, especially original productions, local and Hollywood movies and entertainment, and sports rights. Online video content costs across Asia Pacific grew by 27% in 2017 to reach US\$13 bil., with China contributing 85%. Asia Pacific online video content costs will grow from US\$16.6 bil. in 2018 to US\$31.5 bil. by 2023, a 14% CAGR, according to MPA. Ex-China, OTT video content costs will grow from US\$2.7 bil. to US\$5.9 bil. over 2018-23, a 16.5% CAGR, with Australia, India and Japan driving momentum, followed by Korea.

Broadband

Advances in broadband will



Content costs are a critical component of online video growth, according to MPA.

provide a significant boost to online video consumption, reach and monetization. Mobile broadband will continue to grow, including the first flowering of 5G in North Asia and Australia post-2020, alongside a slow but steady transition to next-generation fixed broadband. Mobile broadband penetration in Asia Pacific ex-China will reach 80% per capita by 2023 versus 57% in 2018, with some of the biggest growth coming from India, Indonesia and Thailand. With China included, average mobile broadband penetration in Asia Pacific will grow from 74% to 94% per capita over the 2018-23 period. Average fixed broadband penetration in Asia Pacific will grow steadily from 50% to 54% of households over 2018-23, with the focus increasingly on upgrading networks using fiber and next-generation cable technologies.

Eastern European OTT revenues to triple

Middlesex, UK, August 21,

2018 — OTT TV episode and movie revenues for 22 Eastern European countries will reach US\$ 3.51 billion in 2023; more than triple the US\$1.01 billion recorded in 2017.

Russia will account for 40% of the region's OTT revenues by 2023, with Poland generating a further 23%. From the US\$ 2,495 million additional revenues between 2017 and 2023, Russia will provide US\$ 994 million, with Poland bringing in a further US\$ 537 million.

Simon Murray, Principal Analyst at Digital TV Research, said: "We believe that Russia will achieve this growth with little help from international players. Foreign ownership restrictions on OTT platforms limit companies such as Netflix and Amazon Prime Video. Luckily for Russia there are plenty of home-grown platforms."

SVOD became the region's largest OTT revenue source in 2017. SVOD revenues will reach US\$ 2.25 billion by 2023 (64% of total OTT revenues) – up from US \$ 515 million in 2017 (51% of total OTT revenues).

Russia will overtake Poland to become the SVOD revenue leader in 2018. Russia's SVOD revenues will reach \$766 million by 2023 – or 34% of the regional total. Poland will provide another \$598 million (27%). Their joint share will fall from 68% in 2017; revealing strong take-up in other countries. The Eastern Europe OTT TV and Video Forecasts report estimates 22.1 million SVOD subscribers by 2023; triple the 7.1 million recorded in 2017. 📺

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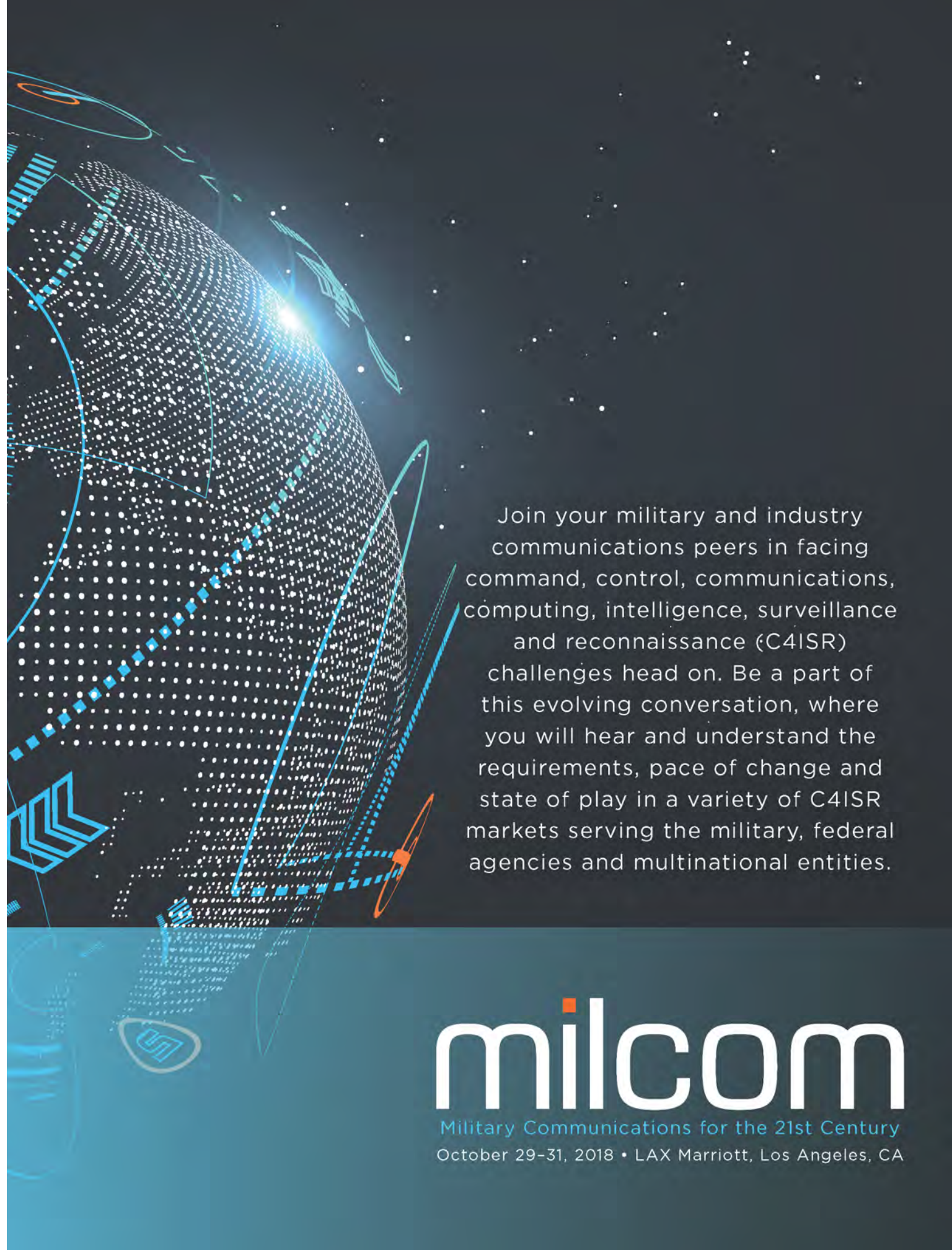
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Asia Satellite Telecommunications Holdings Li	1135.HK	5.50	4.62	7.51
Eutelsat Communications S.A.	ETL.PA	20.42	15.28	25.37
APT Satellite Holdings Limited	1045.HK	3.13	2.85	4.18
Inmarsat Plc	ISAT.L	546.80	334.30	747.40
SES S.A.	SES.F	16.95	10.64	19.60
Satellite Manufacturers				
The Boeing Company	BA	342.79	234.29	374.48
MacDonald, Dettwiler and Associates Ltd.	MDA.TO	66.60	61.80	80.28
Lockheed Martin Corporation	LMT	320.41	291.52	363.00
OHB SE	OHB.DE	35.7	27.50	49.75
Honeywell International Inc.	HON	159.06	136.17	165.13
Equipment Manufacturers				
C-Com Satellite Systems Inc.	CMI.V	1.03	0.98	1.30
Comtech Telecommunications Corp.	CMTL	35.85	17.11	36.80
Harris Corporation	HRS	162.51	121.38	170.54
ViaSat Inc.	VSAT	62.82	59.16	80.26
Gilat Satellite Networks Ltd.	GILT	8.96	5.50	9.30
Service Providers				
DISH Network Corporation	DISH	35.35	28.80	58.67
Globalstar Inc.	GSAT	0.51	0.40	2.04
Orbcomm Inc.	ORBC	10.79	8.50	11.95
Sirius XM Holdings Inc.	SIRI	7.10	5.17	7.70
Sky plc	SKY.L	1545.50	893.42	1576.00

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 Sept. 4)
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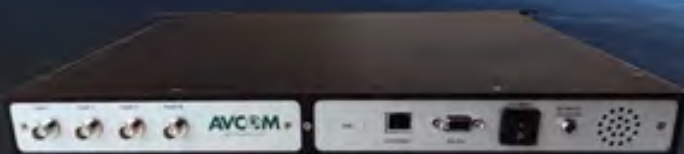
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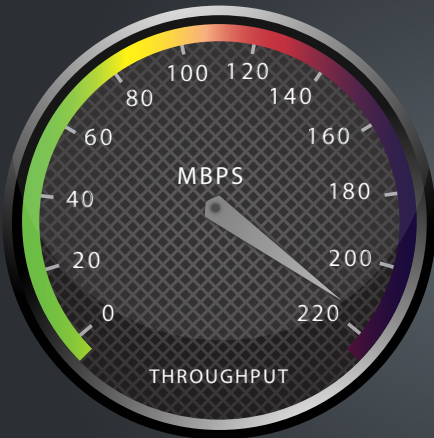
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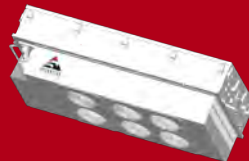
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